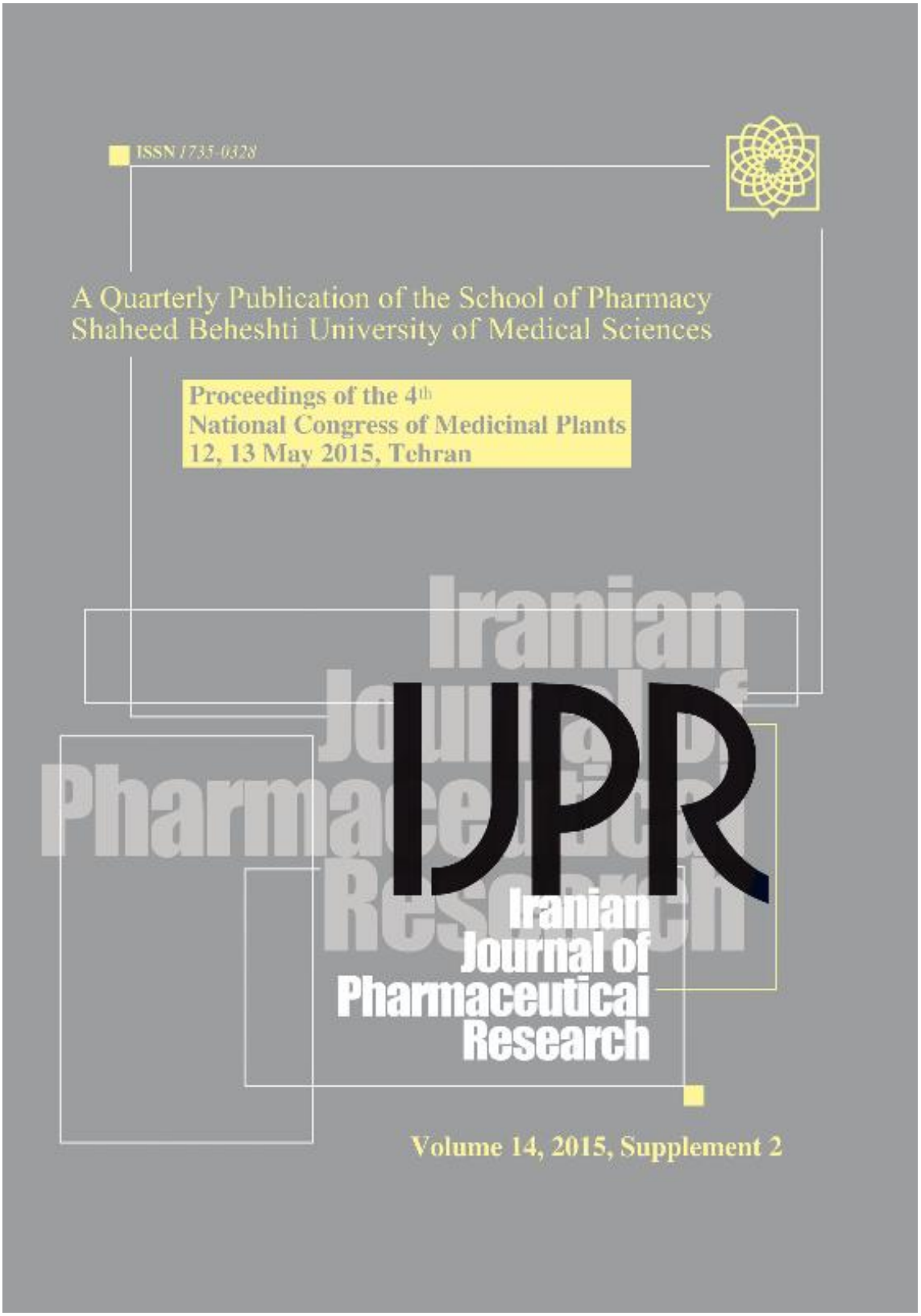
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POSTER PRESENTATIONS

50

EXTRACTION OF LAVENDER (*LAVANDULA OFFICINALIS*) ESSENCE WITH CLOSED AIR CYCLE METHOD

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Lavender (*Lavandula officinalis*) was known as a medicinal plant in Iran from many years ago. In Iran conventional methods such as steam distillation are used to extract the lavender's essential oil. Using water or steam as a mass and heat transfer media in conventional methods the work temperature of 100 degrees centigrade is inevitable. In this research for the first time in essence production industry the closed air cycle procedure was introduced to extract the essential oil of Lavender. Using this method essence production process could be lower temperatures. Lavender was treated with two methods; the closed air cycle method and steam distillation using a laboratory scale Clevenger. The two components were analysed with a GC/MS system and the Kovats Retention Index were calculated. Results showed differences between the components of the two essence specimen. It was also verified that essence production is possible in lower temperatures using this new method.

55

THE EFFECT OF REDUCED RATE OF PENDIMETHALIN AND TRIFLURALIN ON EARLY SEASON WEEDS CONTROL IN FENNEL (*FOENICULUM VULGARE* MILL.)

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Fennel (*Foeniculum vulgare* Mill.) is one of the important medicinal plants. However, it's characterizes such as Owning low LAI index and long seasonal plant, make fennel plant a poor competitor against weed especially in early season, therefore, protection from weed is essential for successful cropping. Since conventional hand and mechanical weed controls are not economically effective, the use of other weed controls methods, such as chemical control, is necessary. Field experiment was carried out in 2013 to evaluate of pendimethalin and trifluralin as a soil applied herbicides for weeds control in fennel. In this experiment the efficacy of different rates of pendimethalin and trifluralin (recommended dose (R), 75% R, 50% R, and 0% R) for selective control of grass and broadleaf weed species, were evaluated. Chenopodium album and Amaranthus retroflexus were the dominant broad leaf weed and Echinochloa crus-galli and Setaria viridis were dominant grass in all plots. Results showed that weed biomass significantly affected by herbicides rate and increasing herbicides dose generally improved both grass and broad leaf controls. However, Grass weeds were more susceptible to given rate of the herbicides compared with broad leaf weeds. For example the rate of 75% R of herbicide reduced broadleaf weed biomass by 76% , while application of the same rate of herbicide controlled 94% of grass weed. Also Pendimethalin provided better weeds control than trifluralin. For example the rate of 75% R of pendimethalin redused broad leaf weed biomass by 88%, while application of recommend dose of trifluralin controlled 76% of broadleaf weed biomass. Overall, the recommended dose of pendimethalin provided excellent control (>96%) of total grass weed and (>94%) of total broad leaf weed. Results from this research suggested that, pendimethalin more suitable than trifluralin. Also in area which grass weed are dominant weed in fennel fields, the rate of 50% R of pendimethalin could be sufficient to effective control of grass.

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65

STUDY ON THE BEST TIME OF WEED CONTROL IN THYME (*THYMUS VULGARIS* L.)

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To determine the best time of weed control in Thyme, an experiment was carried out in a randomized complete blocks design with 18 treatments and 3 replications in 2008-2009 at the experimental field of Shahed University Research Institute. Two series of the treatments including weed-free and weed-infested were applied in the regular time distances of 15, 30, 45, 60, 75, 90, 105 and 120 days right after the beginning of thyme growth at spring. Two check treatments including full and no control of weed during the whole season were also included. The logistic and Weibull models were fitted to determine the critical period of weed control. The results showed that periods of weed- free and weed- infested significantly affected the dry weight and number of weeds in all treatments. Considering 5% and 10% of the expectable yield loss in the models, critical periods of weed control were between 41-90 days and 54-76 days for fresh weight, 12-94 days and 29-78 days for dry weights, and 20-105 days and 30-86 days for essence yield after the beginning of growth at spring.

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67

OPTIMIZATION OF PROLIFERATION OF *ROSA CANINA* AS A MEDICINAL PLANT

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In vitro propagation of rose has played a very important role in rapid multiplication of species with desirable traits and production of healthy and disease-free plants. *Rosa canina* is one of the commercially important species of scented roses which is widely used for producing rose oil and other medicals, foods, cosmetics and perfumery products. Micropropagation using nodal segments of *Rosa canina* under different combinations of BAP, GA_3 and NAA on (MS and VS), medium was investigated. The results showed that the highest shoot proliferation was obtained on VS medium containing 8 µM BAP without any GA_3 and NAA. Furthermore the highest root regeneration obtained in half strength VS medium. The present investigation recommended a practiciable *in vitro* plant protocol for *R.canina* as an important step for successful implementation of biotechnological techniques for rose improvement in Iran.

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70

COMPARING THE MORPHOLOGY CHARACTERISTICS AND ESSENTIAL OIL YIELD OF THE FIVE ACCESSIONS OF *SATUREJA MUTICA* IN IRAN

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In this experiment, five accessions of *Satureja mutica* of Khorasan and Gilan or mazandaran provinces, Iran, were collected and cultivated in the form of a randomized complete block design with three replications. At flowering stage, the following traits were measured canopy diameter, plant height fresh and dry yield, and essential oil yield. At the flowering stage, plants were harvested and dried under shadow, and the essential oil was produced by hydrodistillation using a clevenger in 2 hours. Analysis of variance indicated the, five accessions varied in their shoot dry yield. Accession *S.mutica* 1 had the highest plant height (71.09 cm). Accession *S. mutica* 44 the highest canopy diameter (93.79 cm^2) Accession *S.mutica* 2 the height fresh and dry yield (918.1 g/h), (1873.3 g/h). The essential oil yield was the highest in *S. mutica* 2 (62.78 g/h).

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90

EFFECT OF IRON OXIDE NANOPARTICLES ON HYOSCYAMINE AND SCOPOLAMINE PRODUCTION RATE IN HAIRY ROOT CULTURES OF *HYOSCYAMUS RETICULATUS* L.

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Hyoscyamine and scopolamine are tropane alkaloids produced by plants belonging to Solanaceae family such as *Hyoscyamus reticulatus*L. These alkaloids were traditionally used in medicine because of their anticholinergic activity. Hairy roots culture of *Hyoscyamus reticulatus* L. produce tropane alkaloids. In an attempt to increase productivity, the effect of iron oxide nanoparticlesas abiotic elicitoron hyoscyamine and scopolamine production with different concentrations and elicitation times, in *Hyoscyamus reticulatus* L. hairy roots culture was evaluated. Tropane alkaloids content in the cultures was increased by the stimulation of iron oxide nanoparticles in compared with control. These results suggest that iron oxid nanoparticles can be used as a novel effective elicitor for the production of plant secondary metabolites.

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93

ANTIBACTERIAL ACTIVITIES OF THE ESSENTIAL OILS IN *SALVIA OFFICINALIS* L. PLANT TREATED WITH DIFFERENT RHIZOBACTERIA

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Salvia officinalis L. plant is one the most popular medicinal and aromatic plant species belongs to Lamaiceae family[1]. A greenhouse experiment was carried out to determine the antimicrobial activty of *S. officinalis* L. plants inoculated with four rhizobacteria strains namely *Pseudomonas fluorescens* (*Pf* Ap1, *Pf* Ap18) and *P. putida* (*Pp* Ap9, *Pp* Ap14). rhizobacteria suspensions were diluted in sterile distilled water to achieve the final concentration of 10^8 CFU ml^{-1}. The suspensions were subsequently applied to the soil, cuttings and leaves.Totally, 60 ml of the final suspension was applied for each treatment The control cuttings received the same amount of distilled water. The experiment was arranged based on completely randomized design and replicated at three times. Plants were harvested after four months at the full flowering stage. Essential oils (EOs) were obtained by hydrodistillation method using a Clevenger-type apparatus for 3 h. *In vitro* antibacterial efficacy of the reference EOs were tested against three Gram-positive bacteria including *Staphylococcus aureus* PTCC 1431, *Staphylococcus epidermidis* PTCC 1114, *Enterococcus faecalis* PTCC 1394, and three Gram-negative ones namely *P. aeroginosa* PTCC 1310, *Escherichia coli* PTCC 1396 and *Kelebsiella pneumonia* PTCC 1290. The test was based on disc diffusion method using Muller-Hinton Agar (MHA) according to the National Committee for Clinical Laboratory Standard [2]. The highest activity was observed for the EOs extracted from plants inoculated with *Pp* Ap14 against *S. aureus* with maximum inhibition zone (IZ, 29.5 mm), a minimum inhibitory concentration (MIC) value of 0.5 µg ml^{-1} as well as a minimum bactericidal concentration (MBC) value of 2 µg ml^{-1}. Therefore, *S. aureus* could be considered as the most susceptible bacterium tested. In contrast, *K. pneumonica* with the lowest mean diameter of IZ, and with MIC and MBC values mostly higher than those of the other test organisms was found as the most resistant pathogenic bacterium. However, the growth of *K. pneumonica* was prevented to some extent using EOs of *Pp* Ap14 source in comparison to other sources, as judged by a slightly higher IZ value than other treatments.

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94

ANTIOXIDANT ACTIVITY OF THE METHANOL EXTRACTS FROM *SALVIA OFFICINALIS* L. PLANT INOCULATED WITH VARIOUS RHIZOBACTERIA

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The common sage (*Salvia officinalis* L.) is one the most popular medicinal and aromatic plant species belonging Lamaiceae, native to the Mediterranean region, although it has been naturalized in many places throughout the world mainly because of to its high medicinal value. A greenhouse experiment was carried out to determine the antioxidant activty of *S. officinalis* L. plants inoculated with four rhizobacteria strains namely *Pseudomonas fluorescens* (*Pf* Ap1, *Pf* Ap18) and *P. putida* (*Pp* Ap9, *Pp* Ap14). rhizobacteria suspensions were diluted in sterile distilled water to achieve the final concentration of 10^8 CFU ml^{-1}. The suspensions were subsequently applied to the soil, cuttings and leaves.Totally, 60 ml of the final suspension was applied for each treatment The control cuttings received the same amount of distilled water. The experiment was arranged based on completely randomized design and replicated at three times. Plants were harvested after four months at the full flowering stage. The air-dried and finely powdered shoot tissues were Soxhlet-extracted using the method of Sokmen *et al*.,[1]. The antioxidant activity of the plant extracts was studied using free radical 2, 2′-diphenyl-1- picrylhydrazyl ($DPPH^o$)and *ß*-carotene/linoleic acid assays basedon Burits and Bucar method [2]. Here, lower value of IC_{50} indicate higher antioxidant activity, therefore, PGPR inoculation significantly ($p < 0.05$) enhanced the antioxidant activity compared to the uninoculated control. According to the results, the extract from plants inoculated with the *Pf* AP18 strain was the most active one with an IC_{50} value of 15.7 µg mL^{-1} as compared to that of control plants (26.7 µg ml^{-1}) and BHT as positive probe (20.4 µg ml^{-1}). For the ß-carotene/linoleic acid bleaching methods, however, the improved antioxidant activity was only observed in plants inoculated with *Pf* Ap1, *Pf* Ap18 and *Pp* Ap14. In conclusion, the beneficial rhizobacteria are promising biological components with the capacity to enhance phytocemicals efficiency of *S. officinalis* plants.

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95

CHANGES IN GROWTH INDICES AND ESSENTIAL OILS CONTENT OF *SALVIA OFFICINALIS* L. PLANT INOCULATED WITH DIFFERENT RHIZOSOBACTERIA

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Salvia officinalis L. is one the most popular medicinal and aromatic plant species belonging Lamaiceae family, native to the Mediterranean region, although it has been naturalized in many places throughout the world mainly because of to its high medicinal value[1]. A greenhouse experiment was carried out to determine the antioxidant activty of *S. officinalis* L. plants inoculated with four rhizobacteria strains namely *Pseudomonas fluorescens* (*Pf* Ap1, *Pf* Ap18) and *P. putida* (*Pp* Ap9, *Pp* Ap14). rhizobacteria suspensions were diluted in sterile distilled water to achieve the final concentration of 10^8 CFU ml^{-1}. The suspensions were subsequently applied to the soil, cuttings and leaves.Totally, 60 ml of the final suspension was applied for each treatment The control cuttings received the same amount of distilled water. The experiment was arranged based on completely randomized design and replicated at three times. Plants were harvested after four months at the full flowering stage. The essential oils (EOs) were isolated from aerial flowering parts of the plants by hydro-distillation method. The dry matter yield of root and shoot of plants was significantly ($p < 0.05$) increased with different rhizobacteria inoculation as compared to the uninoculated control plants. However, the effects of inoculation varied depending on the rhizobacteria strains involved. The root dry weight of plants inoculated with each of *P. fluorescens* (*Pf* Ap1, *Pf* Ap18) or *P. putida* (*Pp* Ap9, *Pp* 14) strains was increased by 42.6%, 36.8%, 40.8% and 83.5% over the control, respectively. Also, employed rhizobacteria significantly increased the shoot dry matter yield as 33.2%, 10.2%, 30% and 53.9% over the control, by the treatment of *Pf* Ap1, *Pf* Ap18, *Pp* Ap9 and *Pp* Ap14, respectively. The maximum yield of whole plant dry matter (8.95 g) was obtained in *Pp* Ap14-treated plants as compared to the other treatments. Exposure to all employed rhizobacteria strains, increased the EOs yield as compared to uninoculated control plants. Except for the *Pp* Ap9 treatment, all inoculated plants had significantly higher EOs content compared to uninoculated controls. Plants inoculated with Pp Ap14 showed the highest EOs yield (2.95 $g.plant^{-1}$), which was 2.5-fold higher than those of control plants.

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115

INFLUENCE OF SALT STRESS TOGETHER WITH BACTERIA PGPR TREATMENT ON THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF ESSENCE OF THE ROSMARINUS OFFICINALIS PLANT

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To investigate the effects of salt stress together with inoculation of bacteria pgpr on the value and percentage of essence compounds in the shoot of plant Rosmarinus Officinalis, an examination has been made in the greenhouse of the College of Natural Resources of Kashan University. First, bacteria pgpr Were cultured in the soil lab. of Tehran university and after preparation have been inoculated to Rosmarinus Officinalis cultured in pots and then this test has been don In a completely randomized block design at six treatments and five replications.In this examination, The effects of drought stress have been investigated in five treatments including the salt values 0, 2.5, 5, 7.5, 10 and 12.5 gram/Liter. The results of this examination, shows that by increasing the salty, the value of the generated essence in the plant increases up to salty level 10 gram/liter and at the become constant at the treatment with salty level of 12.5 of generated essence value and no changes are seen. Also, the values of the compounds produced by essence which have been identified and split by GC/MS, show that by increasing the salty, the percentage of the all compounds increases. The highest salty of the whole essence has been seen at salty level 12.5. Also, in this salty level, the highest percentage value of Phellandrene, considered as one of the fundamental compound of Rosmarinus Officinalis essence, has been seen. Generally, we can state that by increasing the value of salty at 12.5 level together with inoculation of bacteria pgpr, we have the increasing of amount and compounds constituting the essence of the shoot organs of Rosmarinus Officinalis plants.

137

ANTIFUNGAL ACTIVITY OF SOME MEDICINAL PLANT ESSENTIAL OILS AGAINST *BOTRYTIS CINEREA* AND *ALTERNARIA SOLANI*

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In recent years, natural plant products as environmentally safe option have received attention for controlling phytopathogenic diseases. Investigation of plants containing natural antimicrobial metabolites for plant protection has been identified as a desirable method of disease control [1]. Grey mould caused by *Botrytis cinerea* is an economically important disease worldwide [2] and *Alternaria solani* causes early blight disease of Solanaceae family occurs annually to some degree in most production areas. In this study, essential oils of 11 plant species belonging to four families collected from the west of Iran were screened for antifungal activity against *B. cinerea*. and *A. solani*. Essential oils were obtained as described by Tripathi *et al*. [3]. Bioassay of the oils was conducted by agar dilution method on agar plate cultures with five replications at concentration of 1000 ppm. Results indicated that six (*Carum copticum, Foeniculum vulgare, Mentha pulegium, Thymus kotschyanus*, *Oliveria decumbens* and *Cinnamomum zeylanicum*) and four (*C. copticum, T. kotschyanus*, *O. decumbens* and *C. zeylanicum*) out of 11 tested plant species completely inhibited mycelia growth of *B. cinerea* and *A. solani*, respectively. The results of this experiment and high number of plants with antifungal activity showed that the flora in the west of Iran could be regarded as a rich source of plants with antifungal activity.

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140
EXPRESSION PROFILE OF *THCAS* AND *CBDAS* KEY GENES INVOLVED IN CANNABINOID BIOSYNTHESIS

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Cannabis has a history of love and hate by legitimate side of human culture which has resulted in neglect and late rediscovery of all of its wide range of potentials in industry and medicine. Despite of negative image of the plant for its recreational use it has lately been rediscovered for its properties against cancers, Multiple Sclerosis, inflammation and pain and for industry, which resulted in whole genome sequencing of this valuable multipurpose plant [1]. Cannabinoids biosynthesis is affected at transcriptional and post- transcriptional levels. In this study, the expression profile of key genes *THCAS* and *CBDAS* involved in Cannabinoids biosynthesis were studied. RNA was extracted from leaf, male and female flowers, seeds and seedlings of two fiber and ornamental accession. Relative expression of genes was performed using Real-Time PCR. The relative expression of *THCAS* and *CBDAS* showed different pattern in both ornamental and fiber cannabis. Relative expression of *CBDAS* in ornamental accession was higher in all tissues compared to *THCAS*. Relative expression of *CBDAS* was higher in all tissues of fiber accession as same as ornamental cannabis. The relative expression of *THCAS* and *CBDAS* in hemp accession was also higher than ornamental cannabis in all tissues included leaf, seed, seedling, female and male flowers. None of these genes was expressed in hemp and ornamental cannabis seeds.

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152
EVALUATION EFFECT OF DIFFERENT FERTILIZETR ON OIL YIELD AND CHEMICAL COMPONENTS OF VIOLET LANDRACE OF BASIL

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Ocimum basilicum (basil) is an annual, herbaceous, white to purple flowering plant, 20–60 cm tall, that originated in Iran and India [1, 2]. In order to investigate the effect of different fertilizers, chemical and organic including: control, organic fertilizer (2o ton/ha), mixture of organic and chemical fertilizer included 20 ton/ha organic manure integrated chemical manure, mixture of organic and chemical fertilizer according 10 ton/ha organic manure integrated chemical manure, chemical manure (N, P, K) and vermicompost on yield and essential oils content of *O. basilicum* L. An experiment was carried out in split plot based on complete randomized block design in three replications in oman samani research field of Saman of chaharmahal v bakhtiari. The essential oils of the aerial parts of the plants were obtained by hydro-distillation and were analyzed by using gas chromatography–mass spectrometry (GC–MS) [3]. The results indicated that the treatments different fertilizers on dry matter yield ($p \leq 0.05$) and essential oils ($p \leq 0.01$) were significant effect. The important chemical components of violet landrace basil were 1,8-cineole, methyl chavicol and geranial. In finally, the application of integrated manures mixture of organic (cow manure) and chemical fertilizer (2o ton/ha) can cause to improvement dry matter yield and essential oil content in violet landrace of Basils (*Ocimum basilicum* L.).

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153
THE STUDY OF CHARACTERIZATION OF GROWTH OF VIOLET LANDRACE OF BASIL UNDER DIFFERENT FERTILIZER

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Basil (*Ocimum basilicum* L.), belongs to the family Lamiaceae, is cultivated in Mediterranean countries and in various regions with temperate and hot climates. Fresh basil is widely used in the Mediterranean kitchen such as tomato products, vegetables, salads, pizza, meat, soups and marine foods [1, 2]. Effect of different fertilizers, including chemical, biological and organic (cow manure) on characterization of growth of *O. basilicum* L. (violet landrace) in a field in Saman, southwestern Iran at 2013 was investigated. A factorial experiment based on completely randomized design with three replications was conducted. Results of variance analysis showed that different fertilizers had significant effects on leaf area, fresh and dry flower weight and seed yield of basil. The highest leaf area of basil were observed by the application 20 ton/ha organic fertilizer. The highest fresh and dry yields was obtained by the application chemical fertilizer (N, P, K). Also, the highest seed yield of basil was observed by the application 20 ton/ha organic fertilizer.

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155

PHYSIOLOGICAL RESPONSES OF AJWAIN (*TRACHYSPERMUM AMMI*L.) TO EXOGENOUS ARGININE UNDER OSMOTIC STRESS

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It has been reported that arginine can alleviate the harmful effects of various stresses such as drought in crops [1]. The arginine effect as a precursor of nitric oxide or polyamines was studied in reducing the oxidative damages of osmotic stress to ajwain (*Trachyspermum ammi*)under growth cabinet conditions at the faculty of agriculture, ShaidBahonar University of Kerman, Iran. Experimental treatments included arginine at three levels (0, 10 and 20 µmol) and osmotic stress (induced by polyethylene glycol6000) at the levels of 0, 13.5% and 17% (W/V).Theexperiment was a completely randomized design in a factorial arrangement with three replications. Results showed that osmotic stress caused a significant reduction in relative water content and protein content and an increase in H_2O_2 content, Malondealdehyde, other aldehydes, Lipoxygenase activity and antioxidant enzymes activity (catalase, guaiacol peroxidase and ascorbate peroxidase). The application of arginine through the root medium increased the osmotic stresstolerance of ajwain seedlings. Arginine very profoundly induced the activities of catalase, guaiacol peroxidase and ascorbate peroxidase in seedlings, which led to reduction in H_2O_2 content, lipid peroxidation (Malondealdehyde and other aldehydes) and Lipoxygenase activity,and increased in relative water content and protein content. So it seems that the application of arginine greatly improves the dehydration tolerance through the elevated activities of antioxidant systems or may be the expression of genes encoding some reactive oxygen species-scavenging enzymes under osmotic stress, which would maintain the redox homeostasis and the integrity of cellular components [2].

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156

ESTABLISHMENT OF CELL SUSPENSION CULTURES OF SAFFRON (*CROCUS SATIVUS* L.)

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The cell suspension cultures system as an attractive method is now using for production of secondary metabolites with application in pharmaceutical, cosmetic and additive industry. Although saffron (*Crocus sativus* L.) is one of the world famous medicinal and Iran is the biggest saffron producer in the world plants, unfortunately there is no report on saffron metabolites through cell suspension cultures. The main purpose of this study was callus induction and consequently establishment of cell suspension cultures from saffron corms. To optimize these processes some effective parameters such as different hormonal combinations, sucrose levels and samplings time were tested. The best time for corm harvesting as was found to be in May. The results of callus induction revealed that the best hormonal combination is 4 mg/l 2,4-D and 1 mg/l Kin on solid B_5 medium while friable callus was induced on B_5 supplemented with 1 mg/l of 2,4-D and 2.0 mg/l Kin. The cell suspension culture was established in B_5 liquid medium containing 0.5 mg/l 2,4-D and 0.3 mg/l Zeatin with 60 mg/l sucrose and 54µmol/l total nitrogen which had the highest fresh weight and the best cell growth.

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161

EFFECT OF BIOLOGIC AND CHEMICAL FERTILIZERS ON GROWTH PARAMETERS AND ESSENTIAL OIL CONTENT OF BASIL (*OCIMUM BASILICUM* L.)

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Sweet basil (*Ocimum basilicum* L.) is one of the most important medicinal plants that its essential oil used in different medicinal industries. In this research, effects of different types of fertilizers were evaluated on on growth parameters and essential oil content of basil. The research was conducted under field condition in complete randomized block design with three replications. Treatments were included 100% chemical fertilizer, 50% fertilizer, nitroxin, combinations of nitroxin and 100% chemical fertilizer, combinations of nitroxin and 50% chemical fertilizer and control (no fertilizer). The results showed that the effect of fertilizer on inter-node, plant height, fresh weight, dry weight, leaf number, stem number, leaf area, essential oil content and essential oil yield was significant ($p< 0.01$). This study showed the highest dry weight yield per plant (21.88 g) and the highest essential oil yield (106.8 $L.ha^{-1}$) on the obtained in nitroxin. Also there was no significant difference between the nitroxin with combinations of nitroxin and 100% and 50% chemical fertilizer. The lowest dry matter yield (5.393 g) and the lowest essential oil yield (13.55 $L.ha^{-1}$) were obtain with control (no fertilizer). Therefore, it could be concluded that biological fertilizers may be considered as a suitable replacement for a lot of chemical fertilizers consumption in sustainable agricultural systems.

178

STUDY OF ORGANIC SUBSTRATS AND PHOSPHOROUS AND ZINC FERTILIZATERS ON SOME AGRONOMIC CHARACTERS, SEEDS AND YIELD OF PUMLKIN (*CUCURBITA PEPO* L.)

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Understanding the interactions and relationships between fertilizer and minerals help to have optimum fertilization practice with the lowest costs. In a split-split plot field experiment, we studied the effect of some organic substrates (control (soil), spent mushroom substrate (SMS), cow manure and vermicomposts), different levels of phosphorus (at 0, 75, 100 and 125 kg h^{-1}) and zinc foliar applications (0 and 1000 mgl^{-1}) to investigate the best fertilization treatment for some characters of medicinal pumpkin (*Cucurbita pepo* L.) such as: leaf, stem length, fruit weight, dry matter percentage, seed number, phosphorus and protein content of seeds and TSS. For lonely application of organic substrates, phosphorus concentration and zinc foliar application; vermicomposts, 125 P ($kg.ha^{-1}$) and 1000 Zn (mg l^{-1}) treatments resulted the highest improvment in pumpkin seeds and qualities. The results are consistent with other investigators studies [1,3].For combining application of organic substrate×P levels, organic substrate×Zn levels, P levels× Zn levels and organic substrate×P levels×Zn levels, reslts showed the maximum of seed number with high quality (protein) were found in cow manure × 125P, vermicomposts × 1000 Zn, 125P × 1000Zn and vermicomposts ×100P ×1000 Zn, respectively.Because of variety of micro and macro elements in organic substrates and elements availability or solubility in the presence of different phosphorus and zinc levels, combine application of organic substrates, phosphorus and zinc with different concentraition, intricately affected quality and quantity of properties in pumpkin plants [2,4]. Therefore, we suggest that further studies are needed to achieve the best fertilizer for plants.

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180

A COMPREHENSIVE OF ENVIRONMENTAL MANAGEMENT OF HEAVY METALS BY *LAVANDULA ANGUSTIFOLIA* L.

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WHO reported that about 10% of the global total of deaths were attributable to environmental exposure and management of selected chemicals[1,2]. To move forward on chemicals management, a project has been done in Pharmaceutical faculty in Tehran-Iran which has 20 laboratories in chemical and toxicological laboratories whose area of work are divided into two types of educational and research. The research has focused on comprehensive environmental management of the poisonings and exposure to toxic and hazardous chemicals especially heavy metals. Applies to chemicals management, Phytoremediation as a friendly and low cost environmentally method was selected as a suitable remediation strategy. Due to vast medicinal benefits and the easy conditions for growing lavender plant we chose it for cleaning –up the soil. Lavandula angustifolia grown and not grown in it by different pHs after every 10 days. Lead and Cadmium in old and young leaves, roots and soil samples were studied by Flame Atomic Absorption every ten days during two months. Results revealed that young leaves have more potential to absorb lead and cadmium during first days of growing ($p<0.004$) Translocation factor in all conditions were higher than one which indicates that metal concentrations in shoots were higher than roots and the plant is suitable for phytoremediation. The heavy metals uptake rate by this plant is significantly affected by the age of plant cultivated as for lead uptake ($p<0.003$). Current survey, which reveals high health consequences of unsound chemicals could be managed in educational institutes.

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184

THE EFFECT OF VARIOUS PLANTING DENSITIES ON YIELD AND CHEMICAL CHARACTERISTICS OF *STEVIA REBAUDIANA* B. IN PRE-WINTER CUTTING

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Synthetic sugars along with the natural originated sugars are applied in food industries and this application is increasing. To avoid harmful health effects of synthetic sugars and also due to human attention to supply sugar from natural sources, the level of the sugar plants cultivation, especially *Stevia rebaudiana*, B. have been increased. Since the products of this plant are valuable, this article has studied the effects of the various planting density (30×60, 45×60 and 60×60 cm) on yield and quality of Stevia in pre-winter cuting (last cutting in season) under short & cool days conditions in Çukurova region located in Mediterranean climate of Turkey. The density of 30×60 cm had the highest production.Thus, the density of 30×60 cm produced 34.5 gr fresh weight per plant, 1917.22 kg/ha total fresh weight, 183.33 kg/ha total leaf dry weight and 428.33 kg/ha total dry weight. The results of chemical analysis done by HPLC showed that there was no significant differences between planting densities considering the various types of sugars such as sucrose, glucose, fructose and sorbitol. Also, Stevioside content in leaves in 60×60 cm was higher than the other densities. Comparing of the pre-winter cutting with previous cuttings and the available data in literature, a significant loss of yield and quality in pre-winter cutting of Stevia was seen. But due to high worth of Stevia glycosides and low cost of management during autumn months, while obtaining seeds from pre-winter cutting, also it can increase the final yield [1,2].

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207

EFFECTS OF PRIMING TEMPERATURE AND OSMOTIC PTENTIAL ON SEEDLING EMERGENCE AND GROWTH OF SAVORY (*SATUREJA KHUZESTANICA* JAMZAD) UNDER DROUGHT STRESS

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Satureja khuzestanica is one of the nine endemic savory species of Iran [1, 2]. Drought stress is one of the most unfavorable factors for seedling establishment and growth in main parts of Iran. Emergence of the most plants is affected by drought and decreased. One way to improve seeds and seedlings to cope with stressful conditions is seed priming. Priming as a technique can improve emergence rate and uniformity, increase seedling competiveness and also increase range of stress tolerance under stressful conditions. This research conducted in order to study the effects of priming temperature and osmotic potential for improving seed and seedling performance of *Satureja khuzestanica* Jamzad under drought stress condition. A green house research was carried out as a factorial experiment in base of randomized completely block design with three factors and four replications. The factors were including drought stress (50% and 25% of field capacity) with control (75% of FC), priming osmotic potential (0, -4, -8 bar prepared by PEG 6000) [6] and priming temperature (15 and 25 ºC). The percent and rate of emergence, and leaf area decreased with increasing in drought stress. Root length increased by increasing drought meanwhile root dry matter decreased. So root morphology of savory affected by drought progress and tend to forms more thin and lengthy root. Interaction of drought stress and osmotic potential of priming was significant on percent and rate of emergence. The interaction of priming temperature and priming osmotic potential was significant on the percent and rate of emergence. Hydro-priming at 15 ºC had the most positive effect on the percent and rate of emergence, root length and leaf area. Overall, seed quality was better when priming temperature was lower (15 ºC). Hydro-priming mitigated drought stress till 50% FC and it was not useful at 25% FC.

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208

EFFECT OF DRYING METHODS ON PHYSICOCHEMICAL PROPERTIES OF SERISH ROOT (*EREMURUS SPECTABILIS*) FRUCTAN

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The fructans, inulin and oligofructose, are relatively unique functional food components because of their chemical nature and the combination of their physiological and nutritional effects that affect gastrointestinal functions. In the present study, Serish root fructans produced by freeze drying, spray drying, vacuum drying and oven drying at 80 and 105ºC were evaluated for their physicochemical properties. The oven-dried (80 and 105ºC) and freeze-dried fructans seem to be more hygroscopic than the spray and vacuum oven-dried fructans. The oven-dried (105ºC) sample showed the least water solubility among all samples. Yields, purities, and the degree of polymerization for dried Serish fructan samples were 85-87%, 79–80, and 13–14%, respectively. The hunter color values suggested that the spray drying followed by freeze drying methods had the least negative effect on appearance among the drying treatments. In addition to establishing the difference of these drying methods, zeta potential and conductivity analysis, scanning electron microscopy, X-ray diffraction, Fourier-transform infrared spectroscopy and differential scanning calorimetry have shown to be useful tools to investigate, approximate and predict characteristics of dried fructans [1, 2].

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211
PERFORMANCE OF BROILERS FED DIETS SUPPLEMENTED WITH *FERULAGO ANGULATA* (SCHLECHT.) BOISS POWDER AS A GROWTH PROMOTER

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Ferulago angulata (FA) is an important medicinal plant in west parts of Iran. The aerial parts of this plant contains variety of components with different therapeutical effects such as antioxidant [1] and antibacterial activities [2], but to date there is little information on its possible benefit to young chicks. The study described here was conducted to examine the effect of powder of aerial parts of FA on growth performance and intestinal microflora content of broiler chicks. A total of 126 one-d-old straight-run broiler chicks (Ross 308) were assigned randomly into three dietary groups each with three replicate of 14 chicks. The dietary groups included: basal diet without any supplement (control), and basal diets supplemented with 0.1 or 0.02% FA powder. The experiment lasted for 42 d. In the overall period, chicks fed diets supplemented with FA gained more weight than those fed the control diet and the highest weight gain was found in those fed diet with 0.1% FA. Feed conversion ratio was improved by FA supplementation. No difference in gastrointestinal pH levels, and in *Lactobacillus* and *Escherichia coli* numbers in the ileal and cecal contents between the treatment and control groups were found. The results suggest that the growth performance and carcass characteristics of broiler can be improved by dietary supplementation of FA. However, these changes are not paralleled with changes in the microbial population of the gut.

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217

PERFORMANCE, CARCASS TRAITS AND BLOOD PARAMETERS OF BROILER CHICKENS AS AFFECTED BY DRINKING WATER SUPPLEMENTATION OF LICORICE (*GLYCYRRHIZA GLABRA* L.) ROOT EXTRACT

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Licorice, the root of the leguminous *Glycyrrhiza glabra* plant, has been consumed for over 4,000 years and is among the botanicals most frequently employed in foods and traditional medicines in both Eastern and Western countries [1, 2]. Although licorice has such a long history of consumption, the effects of licorice extract (LE) on broiler chickens have not been well documented. Therefore, the present study was carried out to evaluate the effect of LE administration through drinking water on the performance and some blood biochemical constituents of broiler chickens. A total of 400 one-day-old broiler chickens (Cobb 500) were randomly divided into 20 separate floor pens each comprising 20 chickens and 4 pens (replicates) per treatment in a completely randomized design. The experimental treatments consisted of a control (no inputs), and 3 levels of LE (0.1, 0.2, and 0.3 g/L of drinking water). No significant differences were observed in body weight, feed intake, and feed conversion ratio among the broilers given the control or the LE levels. Birds receiving 0.3 g/L of LE had lower abdominal fat weight compared with those in control group. Blood glucose, total cholesterol, and low-density lipoprotein cholesterol concentrations decreased in broilers receiving LE as compared with the control. In conclusion, LE supplementation through drinking water improved carcass traits and blood biochemical constituents of broiler chickens.

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220

PHYTOCHEMICAL INVESTIGATION OF *SMYRNIUM CORDIFOLIUM* BOISS. IN KOHGILUYEH & BOYER-AHMAD PROVINCE

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According to *Smyrnium cordifolium* Boiss. plant spreaded dispersion in Kohgiluyeh & Boyer-Ahmad province [1] , this research did the study quantitative and qualitative indicators of this plant essence in this province. For this purpose , after the plant collecting , plant parts seperating and then drying in laboratory temperature [2] , in the way of hydrodistillation and then their chemical compononets seperated and identified with devices GC-FID and GC/MS [3]. Based on the quantitative results of this study , a total of 11 chemical components were identified in volatile oil extracted from this plant and the average of essential oil production according to V/W percentage in three times pepeatition was about 0.17%. In the case of quality indicators , five chemical compounds Curzerene , Menthofuran , Furanodiene , Caryophylene oxide and -Elemene introduced as indicator components and a major portion of Sesquiterpenes. The main contribution of Sesquiterpenes compared to other terpene compounds. Considering the desirable characteristics of essential oil of *Smyrnium cordifolium*, is recommended further studies on broader levels.

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222

PHYTOCHEMICAL INVESTIGATION OF *ECHINOPHORA CINEREA* BOISS. FROM GAAV-DAANEH HABITAT IN KOHGILUYEH & BOYER-AHMAD PROVINCE

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Echinophora cinerea Boiss. is an aromatic and native plant that belongs to Apiaceae family[1]. In addition to obtaining the therapeutic effect of a number of diseases in traditional medicine, oil extraction from the plant, due to the specific characteristics, potential business's position in the industry [2]. According to *Echinophora cinerea* plant spreaded dispersion in Kohgiluyeh & Boyer-Ahmad province , this research did the study quantitative and qualitative indicators of this plant essence in this province. For this purpose , after the plant collecting , plant parts seperating and then drying in laboratory temperature [2], in the way of hydrodistillation and then their chemical compononets seperated and identified with devices GC-FID and GC/MS [3]. Based on the quantitative results of this study , a total of 10 chemical components were identified in volatile oil extracted from this plant and the average of essential oil production according to V/W percentage in three times pepeatition was about 0.19%. In the case of quality indicators , four chemical compounds Carvacrol , Farnesol, Oleic acid and linalool introduced as indicator components and a major portion of Monoterpenes. The main contribution of Monoterpenes compared to other terpene compounds. Considering the desirable characteristics of essential oil of *Echinophora cinerea*, is recommended further studies on broader levels.

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229
TEXTURAL AND SENSORY CHARACTERISTICS OF ULTRAFILTRATED WHITE CHEESE PRODUCED BY *WITHANIA COAGULANS;* A VALUABLE MEDICINAL PLANT

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Numerous attempts have been made to replace calf rennet with other milk clotting proteases because of limited supply and high prices. There was no systematic study on quality attributes of cheese produced by *W. coagulans'* milk clotting protease. The purpose of this study was to evaluate of the textural and sensory properties of ultrafiltrated white cheese produce by *W. coagulan*s protease in comparison with fungal rennet during storage period. The fruits of *W.coagulans* were extracted by NaCl 0.85%, and used as coagulant. Textural characterices and sensory evaluation of the samples that produced with *W. coagulans* and fungal rennet were determined with texture analyzer and hedonic scale.The result showed that the type of coagulant had significant effect (p <0.05) on textural properties and sensory evaluation of cheese samples during storage. In sensory evaluation, except for the third day of storage period, the scores of all properties cheese produced by fungal rennet were higher than *W. coagulans.* It seems that *W. coagulans* proteases have a good potential to be used in cheesemaking as a milk clotting agent especially for producing cheeses with short maturity.

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237

ANTIMICROBIAL ACTIVITY OF ESSENTIAL OIL AND EXTRACTS OF DASTAMBOO FROM IRAN

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Dastamboo or Dudaim melon (Cucumismelo var. dudaim) is a weedy annual form of the agriculturally important musk melon (Cucumismelo) [1]. Fruits are more or less edible, but plants are most often grown as ornamentals or for the fragrance of the fruits. Plants require much moisture, grow rapidly, and are often highly productive. All varieties of muskmelon, including the commercial cultivars of cantaloupes [C. m. L. var. reticulatusNaud.], readily hybridize with one another, making the presence of dudaim melon in commercial cantaloupe fields highly undesirable. It has been known as Dastamboo in Iran. *In vitro* antimicrobial activity of essential oil and methanolic, chloroforme, ethyl acetate and hexane extract of Dastamboo were investigated against six gram positive and negative microorganism by disc diffusion method and the minimum inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) determination. The studied samples were active against gram positive and gram negative bacteria. The maximum antimicrobial activities of sample were shown by the essential oils, and in general, the oils showed moderate activity against all tested microorganisms.

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239
CHEMICAL COMPOSITION OF ESSENTIAL OIL OF DASTAMBOO FROM IRAN

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Dastamboo or Dudaim melon (*Cucumismelo var. dudaim*) is a weedy annual form of the agriculturally important musk melon (Cucumismelo) [1]. Fruits are more or less edible, but plants are most often grown as ornamentals or for the fragrance of the fruits. Plants require much moisture, grow rapidly, and are often highly productive. All varieties of muskmelon, including the commercial cultivars of cantaloupes [*C. m.* L. var. *reticulatus*Naud.], readily hybridize with one another, making the presence of dudaim melon in commercial cantaloupe fields highly undesirable. It has been known as Dastamboo in Iran.The composition of the essential oils hydrodistilled from the fruits of *Cucumismelo var. dudaim*collected from Neyshabur, Iran, in June 2014, was analyzed both by gas chromatography (GC-FID) and gas chromatography-mass spectrometry (GC-MS). Identification of the components was based on GC retention indices computer matching with Wiley GC-MS library, and by comparison of the fragmentation patterns of the mass spectra with those reported in the literature [2]. Essential oil yield of dried plants obtained by hydrodistillation was 0.21 (w/w%). Thirty one components were identified, representing 96.9% of the total oil composition. The major components in flowers oil were α -pinene (6.8%), 1,8-cineole (22.4%), β-pinene (5.5%), p-cymene (5.9%), δ-carene (7.0%), β-phellandrene (5.0%) and neoiso-3-thujanol (4.4%). Amongst them monoterpenes and oxygenated monoterpenes were predominant.

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242

PHYSIOLOGICAL RESPONSES OF MALLOW *(MALVA SYLVESTRIS)* UNDER DROUGHT STRESS AND MINERAL ZEOLITE APPLICATION

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Malva sylvestris L. (Mallow) is a biennial–perennial herbaceous plant that originated in southern Europe and Asia [1]. Mallow, with beautiful blossoms ranging in color from pale mauve to intense violet, has been prized since Roman times for its natural medicinal properties and its ability to soothe rough and dry skin. Due to its high mucilage content, the flower extract forms a soothing, protective gel. This plant possesses anti-inflammatory properties, calming and caring for delicate, sensitive skin [2, 3]. The effect of drought stress and application of mineral zeolite was evaluated on morphological and physiological traits of mallow on complete random blocks design with three replications in greenhouse conditions in Maragheh (2011). Factors including, drought stress (control (100 percent FC), mild drought stress (75 percent FC) and intense drought stress (50 percent FC)) and zeolite (0, 2, 4, 6, 8 gr/kg soil). Significant differences were observed between the treatments. The results show that the highest shoot fresh weight (164 gr), root (87.66 gr), shoot length (79 cm), stomata conductance (875.00 milli mol/m^2/second) electrolytic leakage (87.72 milli mol.cm^{-1}), a and b chlorophyll (25.72 and 9.06 mg g^{-1}) were observed in 8 gram zeolite and 100 percent moisture field capacity. Also the highest amount of soluble sugar (155.20 mg.g^{-1} DW) and prolin content (1.41 µM.g^{-1} FW) was belong to zeolite control level, 50 percent moisture field capacity. The application of different levels of zeolite in each three moisture conditions improved agricultural traits. Totally, the results of this research shows that the application of zeolite in combination with soil prevent from water waste and facilitate water availability to plant

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245

THE STUDY OF GERMINATION STAGE IN *ALYSSUM SPP.* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Alyssum spp*, this experiment was conducted in the University of Nahavand, using a completely randomized design with three replications. Treatments included 5 levels of salinity (control, 20 mM, 40 mM, 60 mM, and 80 mM). The results showed that salinity levels hadn't any significant effect on germination percentage, seedling dry and fresh weight and radical and plumule length. The increase of salinity didn't reduce the germination percentage up to 80 mM. With considering these results, it can be concluded that *Alyssum spp* can germinate in 80 mM without any significant reduction so *Alyssum spp* can be known as a tolerant plant to salinity in germination stage.

247

GENETIC DIVERSITY OF DIFFERENT ECOTYPES OF HORSE MINT (*MENTHA LONGIFOLIA*) IN SOUTHWEST OF IRAN USING MORPHOLOGICAL TRAITS

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Horse Mint (*Mentha longifolia* syn. *Mentha sylvestris*) is a valuable medicinal and aromatic plant belong to Lamiaceae family. In order to evaluate diversity of horse mint in southwest of Iran, 35 ecotypes from six provinces of Lorestan, Fars, Khuzestan, Esfahan, Kohklouye va Boyerahmad and Charmahal va Bakhtiari were examined. To investigate the morphological traits at flowering stage, 10 plants selected in each habitat and 17 qualitative and quantitative morphological traits including plant height, number of branches, branch shoot length, number of flowering shoots, number of branches without flower, the number of inflorescences per plant, inflorescence length, main shoot diameter, number of nodes, leaf length and width, number of leaves per plant, essential oil content, inflorescences color, the state of flowering shoots, status of plant growth flowering date and oil content for each ecotype were investigated. The results showed that there was great diversity among ecotypes. Cluster analysis divided ecotypes into four groups. Also Factor analysis showed that five major components which 74.23 percent of the total of variance data to justify. Number of branches, branch shoot length, number of flowering shoots and inflorescences were the first component. Plant height had a significantly positive correlation with inflorescence length, main shoot diameter, number of nodes, leaf length and width, number of leaves per plant. The results of this study showed that the two ecotypes of 6 and 13 (Lorestan and Fars) due to good characteristics and the large amount of oil are a good potential for domestication of this species.

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249

INVESTIGATION OF FLOWER EXTRACT AND PURIFIED FLOWER EXTRACT OF *TANACETUM PARTHENIUM* AS A GROWTH INHIBITORY IN EUKARYOTIC AND PROKARYOTIC CELLS

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Tanacetum parthenium L. the parthenolide which is the main *sesquiterpene lactone* and is responsible of several medicinal properties recognized to treat disease such as migraine [1, 2]. This research aims to compare the direct extract from feverfew flowers and purified extract on inhibiting the growth rate of cancer cell line. Feverfew flowers were collected from Hamadan province, Iran. Parthenolide extracted by methanol/acid formic (1000:1 v/v) and its presence was confirmed through HPLC analysis comparing with standard curve. Flower extract was purified by thin layer chromatography (TLC) with n-Hexane/Benzane/Acetonitrile (30:21:15 v/v) as mobile phase. MTT assay used to investigate anticancer effect of both flower extract and purified flower extract on MDA-MB-231 breast cancer cell line. Area of parthenolide peak identified by HPLC was calculated 7% in flower. The half maximal inhibitory concentration (IC_{50}) for flower extract and purified flower extract calculated 600 µg/ml and 2µM, respectively. Indeed, the antibacterial effect of flower extract on *Bacillus subtilis* was studied and Minimum inhibitory concentration (MIC) found 2.5 µM. Further studies have to *elucidate* the mechanism of action of parthenolide on cancer cell line.

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252
CHEMICAL DIVERSITY AMONG SOME POPULATIONS OF *ZIZIPHORA CLINOPODIOIDES* LAM.

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In this study, genetic diversity among five populations of *Ziziphora clinopodioides* lam. collected from three provinces (Isfahan, Kohghiluyeh va Boyer Ahmad, Alborz) of Iran using chemical composition of essential oil was evaluated as an important step for possible use in the breeding programs of this medicinal plant [1]. Chemical composition of essential oils were determined by means of gas chromatography (GC) and GC–mass spectrometry (GC–MS) analyses. Finally, twenty-four compounds were identified in the essential oil of all samples representing about 92.1–98.4% of the chemical composition. Geraniol (in Talmohamad and Sisakht samples), thymol (Iin Charan sample), carvacrol (in Khozankola sample) were generally found as the principals component of essential oils. Factor analysis was also used for defining of the determinant factors and the characters constituted in each factor. In Principal component analysis (PCA), 10 main and independent factors with over Eigen values than 1.5 explained 83.16% of the total variation related to main effective characters. Based on the constructed dendrogram, five populations of *Z. clinopodioides* were clearly divided into 2 main clusters. Members of the first group contained thymol, carvacrol and *p*-cymene as the main constituents of essential oils, whereas plants of the second group had the high amounts of geraniol and geranyl acetate.

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254
EFFECT OF ALTITUDE ON MORPHOLOGICAL FACTORS AND ESSENTIAL OIL CONTENT OF *MENTHA PULEGIUM*

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Mentha pulegium (pennyroyal) is one of the endemic medicinal plants species of lamiaceae family; which is native to humid northern mountainous regions of Iran [1]. Pennyroyal is a traditional culinary herb, folk remedy, and abortifacient. The essential oil of pennyroyal is used in aromatherapy [2]. One of the important factors in changing of ecosystems conditions is the altitude from sea level, so that increasing or decreasing of the altitude level can change the temperature, relative humidity, wind speed, available water to plant's roots and the sunlight rates. Hence, regarding the altitudinal level changes, ecophysiological reactions of plants will also change [3]. The aim of this study was investigation the effect of altitude on morphological factors and essential oil content of wild growing pennyroyal in three different altitudes (5, 420 and 980 metres above sea level) in Alborz Mountain. Plants were harvested from their natural habitats in flowering stage and some morphological factors such as plant height, leaf size, number of branches per plant and shoot fresh and dry weight were measured. Shade dried aerial parts of *M. pulegium* were subjected to hydro-distillation for 3 hours using a Clevenger-type apparatus to produce oil according to the method recommended by the European pharmacopoeia [4]. One way ANOVA method was employed to analyse the data set in SPSS v.17 software. Duncan method was also used to grouping of variables. The results showed that altitude had a significant effect on plant height, number of branches per plant, leaf size and essential oil content of pennyroyal. Shoot fresh weight showed non-significant variation under various altitudes. The average value for leaf size and shoot dry weight, were maximum in 980 metres above sea level altitude, while some of the parameters, such as essential oil content and plant height decreased in quantity with an increase of altitude. The highest number of branches per plants was measured in 420 metres above sea level altitude.

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255
EFFECT OF ORGANIC AND CHEMICAL FERTILIZERS ON THE ESSENTIAL OIL CONTENT AND CONSTITUENTS OF *LEMON BALM*

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Use organic fertilizers is a very important method of providing plant with their nutritional requirements without having the best undesirable impact on the environment [1]. Considering the importance of medicinal plants growth and biological application of fertilizers with sustainable agricultural production in order to eliminate or reduce chemical input to achieve desirable and sustainable quality, an experimental research was conducted based on a factorial on basis of randomized complete block design with 18 treatments and tree replicates in 2013. Factors including: Vermicompost at tree levels (0, 15 and 30 % V/Pot), two levels of biophosphate (treated and untreated) and tree levels of chemical fertilizers (0, 250 and 500 mg/pot). The Results showed that the essential oil content of Lemon balm (*Melissa officinalis*) and its constituents were significantly affected by treatments. The most significant essential oil content (0.5433%) was obtained by applying 30% V/Pot vermicompost. Fifteen compounds were identified in the essential oils of *M. officinalis*. Main constituents of the essential oil are citronellal, ß-caryophyllene, Neral, geranial and geranyl acetate. The maximum citronellal content in essential oil (49.434% and 47.786) were obtained with C0 (no chemical fertilizers), and V2 (30% V/Pot vermicompost) respectively. The highest geranial contents (19.818% and 18.902%) was obtained with C2, 500 mg chemical fertilizer, and V2, applying 30% V/Pot vermicompost, respectively and the highest geranyl acetate content (1.962%) was obtained with V2 (30% V/Pot vermicompost). ß-caryophyllene and neral content in essential oil were not affected by treatments. the results of current experiment show that vermicompost and biophosphate have stimulatory effects on the quantity and quality of the Essential oil in lemon balm and thus have considerable potential for providing nutritional elements in essential oil production of lemon balm, especially for the sustainable production systems.

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257

SEASONAL VARIATION IN VOLATILE OIL, POLYPHENOL CONTENT AND ANTIOXIDANT ACTIVITY IN EXTRACT OF *LAURUS NOBILIS* GROWN IN IRAN

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The leaves of *Laurus nobilis* were collected in the middle of four seasons (spring, summer, autumn, and winter) to determine the best harvesting time for obtaining the highest oil yield, 1,8-cineole and polyphenol content and antioxidant activity. After drying the plant materials in shade, their essential oils (EOs) were obtained by hydro-distillation method. Analysis of variance showed harvesting time had significant effect on the oil yields of *L. nobilis*. Seventy one components were identified in the oils of *L. nobilis* with 1,8-cineole (5.7%–42.6%),□□-terpinyl acetate (3.2%–13.1), sabinene (2.3%-12.0%), □-elemene (0.2%-17.7%) and (E)-caryophyllene (0.2%-16.9%) as the main constituents in different seasons. The predominant phenolic constituents in *L. nobilis* were cinnamic acid, carvacrol, quercetin and coumarin, respectively. Gallic acid, catechin, caffeic acid, chloregenic acid, p-Comaric acid and rutin were not detected in any seasons. The best antioxidant activity was in spring (268.6µg/ml) and the lowest one was in winter (702.1µg/ml).

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260

RESPONSE OF MEDICINAL LINSEED (*LINUM USTATISSIMUM* L.) TO SULFUR AND BIOFERTILIZERS APPLICATION

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To study the effect of Fertilizer sulfur, Solution phosphor bacteria and Thiobacillus (sulfur-oxidizing bacteria) application on yield and yield components of medicinal linseed (*Linum ustatissimum* L), this experiment was conducted based on factorial in a randomized complete block design with three replications. In this study, Sulfur as the main variable in three levels (0, 1000, and 2000 Kg.hec), Phosphate-solubilizing bacteria as sub factor in three levels (0, 100, and 200 gr.hec) and sulfur-oxidizing bacteria (*Thiobacillus thiooxidans*) as sub-sub factor in three levels (0, 2, and 4%) were selected. The results showed that Sulfur application has significant positive impact on grain yield and yield components, and usage of 1000 Kg/hec sulfur showed best yield. In addition, twofold and triplet interaction effects showed significantly on yield and all measured traits as, highest yield (2097 kg/hec) was achieved by usage of 1000 Kg/hec sulfur with 100 gr/hec phosphate solubilizing bacteria and 2% Thiobacillus, and lowest seed yield (928. kg.hec) was observed by application of 2000 Kg/hec sulfur with 100 gr.hec phosphate solubilizing bacteria and 2% Thiobacillus. Results in this research showed positive effects sulfur and biofertilizers on yield and yield components linseed. However, application of sulfur showed more positive effect on yield linseed in comparison to Phosphate-solubilizing bacteria and Thiobacillus.

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264

THE ESSENTIAL OIL COMPOSITION AND ANTIOXIDANT ACTIVITY AFFECTED BY APPLICATION OF THE CHEMICAL, VERMICOMPOST AND NANO-BIO FERTILIZERS IN PEPPERMINT

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Plants extract constituents and their secondary metabolisms are provided use to efficacies on human and animal health that can be used to cure maladies [1]. Peppermint has a high menthol content and its fresh or dried leaves extract and essential oil constituents are widely used as pleasant fragrances, flavorings for foods and beverages, tea, confectioneries, cooling anesthetic effect, cosmetics and hygienic products, antioxidant, bactericide, fungicide and insecticide properties, pharmaceuticals and oral health care products [2]. This study was designed to evaluate the effect of different levels of chemical, vermicompost and nano-bio fertilizers on *Mentha piperita* L. essential oil composition and antioxidant activity at two harvests. Treatments were: C-control, V1- vermicompost (30% wt%), V2- vermicompost (15% wt%), N1- nano-bio fertilizer (150 g/l), N2- nano-bio fertilizer (15 g/l), Ch1- $N_{20}P_{20}K_{20}$ fertilizer (10 g/l), Ch2- $N_{20}P_{20}K_{20}$ fertilizer (5 g/l), V1Ch2- vermicompost (30% wt%) + $N_{20}P_{20}K_{20}$ fertilizer (5 g/l), V1N1- vermicompost (30% wt%) + nano-bio fertilizer (150 g/l), V2N2- vermicompost (15% wt%) + nano-bio fertilizer (15 g/l) and N1Ch2- nano-bio fertilizer (150 g/l) + $N_{20}P_{20}K_{20}$ fertilizer (5 g/l). By GC-MS analysis Menthol was the dominant compound (40.73-52.05%) followed by Menthone (10.53%-22.54%) for all essential oil samples. The composition of essential oil was significantly affected by fertilizer treatments in both the harvests on Menthol and Menthone percentage. Mixture of aforementioned fertilizers compared to the use of them separately showed the most reduce of the stable free radical DPPH in both harvests. Since the use of mixture vermicompost and nano-bio fertilizers led to enhancement in examined traits, we recommend the replacement of chemical fertilizers with vermicompost and nano-bio fertilizers due to their safety and benefits.

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270

ANTIOXIDANT PROPERTY AND PHENOLIC COMPOSITION OF ARTICHOKE EXTRACTS CHANGED BY UV-A RADIATION DURING GROWTH

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Artichoke (*Cynara scolymus*) is reputed to have a high medicinal value due to its antioxidative potential. Previous studies have shown that Ultraviolet (UV) radiation stimulates producing some secondary metabolites in the plants. In the present study, the effects of increasing UV-A (360 nm) radiation on Artichoke were analyzed. The concentration of some phenolic compounds and the antioxidant capacities of Artichoke extracts were evaluated. In a greenhouse experiment, two variety, from USA and Italy, and one cultivated type from Isfahan were exposed to a range of UV-A in16 hours light of photoperiod, per two hours one time for 0, 15, 30 and 60 minute. Antioxidant capacity were measured using the DPPH assay. High Performance Liquid Chromatography (HPLC) was used for phytochemical analysis. In the present work, five phenolic acid including coffeic acid, comaric acid, chlorogenic acid, coffeoyl-quinic acid and di coffeoyl-quinic acid; one polyphenol compond, cinarin and three flavonoids including apigenin, loteolin and loteolin glucoside were analyzed. Based on the results, antioxidant capacity increased significantly in all genotypes by enhanced UV-A exposure. The highest and lowest amounts of antioxidant capacity were recorded for Green (USA) variety and Isfahan landrace, respectively. Based on the HPLC data, the concentration of medicinally important constituents including coffeic acid, chlorogenic acid, cinarin, apigenin and loteolin decreased by enhanced UV-A radiation. Probably other phenplic and flavonoid derivatives might be increased when the enhancement of total antioxidant capacity observed under UV radiation.

271

EXOGENOUS SUCROSE ENRICHMENT IN THE FIELD CONDITION BY ACTIVE COAL FOR ENHANCEMENT OF *STEVIA REBUDIANA* GROWTH AND PHYTOCHEMICAL ATTRIBUTES

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Sucrose represents the major transport form of photosynthetically assimilated carbohydrates and plays versatile roles in plants. The aim of this study was to determine some of the morphological and phytochemical response of stevia (*Stevia rebudiana*) to exogenous sucrose in the field condition. Methanol, boric acid and acetic acid were applied as the solvent and carriers of this sugar. This experiment arranged in randomized complete block design with four replications. Results showed that phytochemical traits such as reducing sugars, phenol and flavonoids increased under sucrose solved in methanol. Morphological traits also possessed the highest values under the same treatment. These traits consisted of stem height, wet and dry matter of aerial organs and leaf area index. Exogenous sucrose may have application possibility as one of the carbon sources to increase photosynthesis and finally results in better growth and secondary metabolites production.

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274

ENHANCEMENT OF PHYTOCHEMICAL AND MORPHOLOGICAL ATTRIBUTES OF SWEET BASIL (*OCIMUM BASILICUM*) AFFECTED BY SALICYLIC ACID

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The aim of this study was to determine the response of sweet basil (*Ocimum basilicum*) phytochemical and morphological characteristics in response to application of salicylic acid. Sweet basil planted in plots and salicylic acid was sprayed on the shoots at concentrations of 0, 0.5, 1.0 and 1.5 mM with 6 replications in a completely randomized block design. Morphological attributes such as shoot height, shoot dry matter, flower dry matter, flower weight and shoot wet weight were measured. On the other hand, phytochemical characteristics such as ion leakage, chlorophyll a, chlorophyll b, total chlorophyll, carotenoid, and antioxidant activity were also investigated under induced stress by different concentrations of salicylic acid. Results showed that some morphological traits such as shoot dry matter, flower dry matter, flower weight, shoot wet weight, possessed the highest values under treatment of 1.5 mM salicylic acid. Also, some phytochemical characteristics consisting of chlorophyll a, chlorophyll b, total chlorophyll in plants treated with 1.5 mM salicylic acid reached the highest values. Since salicylic acid is one of the growth regulators produced under stress conditions, it seems that spraying it on plants can control physiological actions and inhibit chlorophyll degradation and increases photosynthesis. Increment of chlorophyll content improves the photosynthesis and better growth and finally improves the production of the secondary metabolites.

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276

THE STUDY OF GERMINATION STAGE IN *CYNARA CARDUNCULUS* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage *in Cynara cardunculus*, this experiment was conducted in the University of Nahavand, using a completely randomized design with three replications. Treatments included 5 levels of salinity (control, 20 mM, 40 mM, 60 mM and 80 mM). The results showed that salinity levels had significant effect ($P \leq 0.01$) on germination percentage, dry and fresh weight and radical and plumule length. This study indicated that germination percentage didn't reduce up to 40 mM salinity level, but more increase in salinity caused less germination percentage. Although plumule length reduced significantly with increasing salinity, radical length didn't reduce up to 40 mM salinity level. The resistance of root than shoot under salinity stress has been reported in other studies [1].

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277

THE STUDY OF GERMINATION STAGE IN *NIGELLA SATIVA* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Nigella sativa*, this experiment was conducted in the University of Nahavand, using a completely randomized design with three replications. Treatments included 5 levels of salinity (control, 20 mM, 40 mM, 60 mM and 80 mM). The results showed that salinity levels had very significant effect ($P \leq 0.01$) on germination percentage and radical and plumule length. The increase of salinity reduced the germination percentage and radical and plumule length significantly. The results showed that increase of salinity from control level to 20 mM reduced the germination percentage 44%. Since the classification of saline soils begins from 40 mM, so *Nigella sativa* can be known as a sensitive plant to salinity in germination stage.

285

IN VITRO INDUCTION OF TETRAPLOIDS IN NURUOZAK (*SALVIA LERIIFOLIA* BENTH.)

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Nuruozak, (*Salvia leriifolia* Benth.) is a perennial herbaceous plant belonged to Lamiaceae family and is endemic to Khorasan and Semnan provinces of Iran. In this research, in order to induce polyploidy in nuruozak, *In vitro* regenerated explants were exposed to different colchicine concentrations (0.0, 0.05, 0.1, 0.2, and 0.5%) at various exposure times (24, 48 and 72 h). Subsequently, all *in vitro* proliferated explants were transferred to hormone free medium. Due to the colchicines toxicity, the majority of treated seedling died after the first subculture. The effects of different colchicines concentration on explants survival were significant at $p < 0.01$. Among the treatments, the highest seedling survival rates (84.44%) were observed in 0.05% concentration. On the contrary, 0.5% colchicines showed the highest rate of seedling lethality. With increasing ploidy level, stomatal length and width in leaf dorsal side surface significantly increased and the density of stomata of leaves significantly decreased. In tetraploid plants, some of the characteristics such as leaf width, leaf area was significantly higher than diploid plants. Whereas, some of other characteristics such as leaf length were significantly decreased in compare with diploid plants. Biochemical analysis showed significance difference between tetraploid and diploid plants.

286

EFFECT OF INCREASING POLYPLOIDY LEVELS ON THE AMOUNT OF SECONDARY METABOLITES IN HENBANE LATTICE (*HYOSCYAMUS RETICULATUS* l.), ZARRIN-GIAH (*DRACOCEPHALUM KOTSCHYI* BOISS) AND NURUOZAK (*SALVIA lERIIFOLIA* BENTH.)

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Medicinal Plants have highly valuable sources of medical materials. *In vitro* polyploidy induction using chemical mutation agents is widely used in medicinal plant breeding programs in order to increase the production of secondary metabolites. In this research an overview of successful induced polyploidy in three medicinal plants of lattice henbane (*Hyoscyamus reticulatus* L) belong to solanaceae, Zarrin-Giah (*Dracocephalum kotschyi* Boiss) and Nuruozak (*Salvia leriifolia* Benth.) belong to Lamiaceae family were investigated. In order to induction of polyploidy, explants prepared from in vitro gowning seedlings were exposed to different concentrations of colchicine and definite time point. Morphological, physiological, microscopic, flowcytometric analysis and chromos count were used for ploidy evaluation and screening of induced tetraploids. According to the results, it was found that the best colchicine treatment for *in vitro* induction of lattice henbane, was observed in 0.1% colchicine treatment for 48h and the highest explants survival rate (94.67%) were observed in the 0.05% treatment. Tetraploids of Zarrin-Giah were obtained at a frequency of over 8% by using 0.05% colchicine and 0.5% colchicine treatment. 0.05 % concentration of colchicine for 48 hours is the best treatment for induction of autotetraploidy (23.3%) in Nuruozak. In tetraploids plants, some of the characteristics such as leaf width, leaf area, leaf number, leaf thickness, petiole diameter, chlorophyll content, etc compared with diploid plants significantly were increased. Whereas, some of other characteristics such as leaf length, petiole length and etc significantly were decreased in tetraploid plants. In *Hyoscyamus reticulatus*, the total content of scopolamine was increased from 0.23 in diploids to 8.66 % (DW) in stable tetraploids. The induction of tetraploidy in *Salvia Leriifolia*, ploidy level interestingly changed the percentage and composition of the secondary metabolites. In *D. kotschyi*, cytological analyses showed the increase of chromosome numbers from 2n=2x=20 to 2n=4x=40. The total content of flavonoids was increased from 1583.28 in diploids to 1890.07 **(**μg/g DW**)** in stable tetraploid plants.

297

RESPONSE OF ANISE HYSSOP (*AGASTACHE FOENICULUM*) TO FOLIAR APPLICATION OF UREA AND SOME AMINO ACIDS

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Anise hyssop (*Agastache foeniculum*) is a perennial, herbaceous and medicinal plant belonging to the Lamiaceae family. As a medicinal herb it has soothing, expectorant and cough suppressant properties. A tea made from the leaves and flowers is sedating and relieves pain from coughing with chest colds. To study the effects of foliar application of different nitrogen sources on *A. foeniculum* a pot experiment was conducted in completely randomized design with four replications. The treatments were foliar application of urea (0.5, 1 and 2 g/l), aspartic acid (100, 200 and 300 mg/l), glutamic acid (100, 200 and 300 mg/l) and control (no nitrogen application). The results showed that foliar application of nitrogen had significant effects on fresh and dry herb yield, leaf chlorophyll and N content, essential oil content and yield. The highest and the lowest amounts of fresh and dry herb yield, leaf chlorophyll and N content and essential oil yield were obtained in 2g/l of urea and control treatment, respectively. The highest (2.75 ml/100 g dry weight) and the lowest (2.37 ml/100 g dry weight) amount of essential oil content were observed in 200 mg/l of aspartic acid and 2 g/l of urea, respectively. These results suggest that amino acids can be used as good nitrogen sources in order to increase essential oil content and yield in medicinal plants.

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300
EFFECT OF PACLOBUTRAZOL ON PHYTOCHEMICAL CONTENT OF BERMUDAGRASS (*CYNODON DACTYLON* (L.) Pers.)

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Cynodon dactylon (L.) Pers. is a member of the Poaceae family and has been long used as a medicinal herb in Iranian traditional medicine [1]. Bermudagrass has been reported to possess a variety of medicinal properties such as antiinflammatory, diuretic, astringent, demulcent, aperients, antiemetic, antidiabetic, antiseptic and blood purifying agent. Different part of this plant such as leaves, stolons, rhizomes and culms is a rich source of metabolites such as proteins, carbohydrates, mineral constituents, β-sitosterol, flavonoids, alkaloids, glycosides and triterpenoides [2]. Plant growth regulators can change physiological and biochemical characteristics in turfgrasses. Paclobutrazol is used as a plant growth retardant for high maintenance in turfgrass management to suppress shoot growth and improving aesthetic [3]. This pot greenhouse study was conducted to determine if applications of paclobutrazol would result in gainful phytochemical changes in Bermudagrass. Paclobutrazol was applied twice at four weeks intervals at 0, 1, 2, 3 and 4 g a.i. /100 m^2 over 8 weeks period. At the end of experiment, severe bermudagrass phytotoxicity occurred from paclobutrazol at 3 and 4 g a.i. /100 m^2. Leaves total non-structural carbohydrates (TNC), chlorophyll, flavonoids and soluble protein content increased with increasing paclobutrazol application rate, although no significant difference was found between 3 and 4 g a.i. /100 m^2 treatments in TNC, flavonoids and protein content. Total shoot growth was reduced 40%, 58%, 85%, and 91% from 1, 2, 3 and 4 g a.i. /100 m^2, respectively. With due attention to phytotoxicity and excessive suppression in shoot growth at high application rates of paclobutrazol, as well as, Minor enhancement in leaves flavonoids content from 0 to 2 g a.i. /100 m^2, we suggest that paclobutrazol application is not efficient in improving phytochemical concentration of bermudagrass. Maybe other plant growth regulator such as Trinexapac-ethyl and flurprimidol would be more effective in this purpose.

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301

EFFECT OF TRINEXAPAC-ETHYL ON PHYTOCHEMICAL CONTENT OF BERMUDAGRASS (*CYNODON DACTYLON* (L.) Pers.)

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Cynodon dactylon (L.) Pers. (Family: Poaceae), is a perennial grass distributed all over Iran. It has been extensively used in traditional medicines to treat varied ailments such as, hysteria, cough, headache, diarrhea, cramps, edema, dysentery, hemorrhage, hypertension and stones urogenital disorders [1]. Bermudagrass is a rich source of metabolites such as proteins, carbohydrates, mineral constituents, β-sitosterol, flavonoids, alkaloids, glycosides and triterpenoides [2]. Trinexapac-ethyl (TE) is a popular plant growth regulator in the turfgrass industry that inhibits gibberellic acid (GA) biosynthesis and effectively reduces leaf elongation [3]. The objective of this pot greenhouse experiment was to investigate if applications of foliar TE would result in beneficial phytochemical changes in Bermuda grass. TE treatments (0, 0.25, 0.5, 0.75 and 1 g a.i. /100 m^2) were applied biweekly over 8 weeks period. Data on leaves total non-structural carbohydrates (TNC), chlorophyll, flavonoids, soluble protein and shoot growth were determined at the end of experiment. The results indicate that leaf TNC, chlorophyll, flavonoids and protein content increased with increasing TE application rate; however, no remarkable difference existed in levels of leaf flavonoids between $TE_{0.75}$ and TE_1 treatments. Trinexapac-ethyl consistently reduced shoot growth. Greater suppression occurred in TE_1, where clipping production was approximately 50% less than $TE_{0.75}$ treatment. Considering the sharp decline in shoot growth at high TE rate application, We concluded that moderate TE application is more efficient in improving phytochemical concentration of bermudagrass.

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306

THE DROUGHT STRESS EFFECTS REDUCTION AND IMPROVING SEEDLING GROWTH AND ESSENTIAL OILS CONTENT BY SEED PRIMING IN GREEN BASIL (*Ocimum basilicum*)

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The seed priming techniques use to improve the seedling growth characteristics and essential oils content specially in stress conditions. Therefore a greenhouse experiment on Green basil (*Ocimum basilicum*) by seed priming under drought stress conditions was conducted. The experiment was factorial based on completely randomized design with 4 replications. The effect of seed priming solutions included KNO_3, $CaCl_2$, KCl , NaCl (as Halo priming treatments) at a concentration of 200 mEq per liter and distilled water (as Hydro priming treatment) and drought levels (included 20, 40, 60 and 80% of field capacity) on seedling growth and essential oil content under controlled conditions (greenhouse) were evaluated. Traits such as plant height, root length, number of leaves per plant and leaf area index (LAI) were measured in full flowering. The means comparison results show that the effects of different levels of seed priming treatments in greenhouse conditions and drought on the traits were significant. The seeds priming treatment with KNO3 had the greatest positive impact on improving seedling growth and essential oil content of Green basil. The emergence of KNO_3 treatment with an average of 36.25% and the lowest emergence percentage was for the control of average 16.69 percent. The treatment of 80% field capacity caused the highest percentage of emergence and emergence percentage reduced by increase of drought stress. The most essential obtained by KNO_3 seed priming treatment with an average 18.0 percent. The KNO3 treatment was able to increase the essential oil percentage up to 38.89 percent compared with control.

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314

EVALUATION OF YIELD AND ESSENTIAL OIL OF DILL (*ANETHUM GRAVEOLENS* L.) TO MUSTARD (*BRASSICA JUNCEA* L.) IN DIFFERENT INTERCROPPING PATTERNS

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Conventional agriculture leads to reduce in plant diversity and quality of agricultural products, so intercropping as a component of sustainable agriculture can increase diversity, yield per unit area and be more efficient in use of resources, reduce pest problems and leads to yield stability [1]. According to the emphasis on quality and yield stability in sustainable agriculture, medicinal plant could be suitable for intercropping and it seems that in this situation, they can have optimum growth and yield [2]. The purpose of this study was to identify the best model for dill and mustard intercropping to increase yield and essential oil content in two dill varieties Dukat and Super dukat. In this research different patterns of dill and mustard intercropping were evaluated using a randomized complete block design with three replications at the University of Tabriz at 2014. The experimental treatments were increasing rates of two dill varieties (25, 50 and 75%) with optimum density of mustard and sole cropping of dill and mustard. The results showed that although intercropping increased dill vegetative growth period, but in some patterns lead to increase in essential oil percent and yield. Super ducat variety has more essential oil percent than Dukat. The highest and lowest percentage of essential oil produced from 25% Super dukat dill with mustard (3.97) and sole crropping of Dukat (1.62), respectively. Intercropping of Super dukat dill had the most essential oil yield (15.08 g/plant), while 25% Dukat with mustard producted the lowest essential oil yield (0.472 g/plant). In generally it can be concluded that we can use intercropping of dill and mustard for increasing in essential oil production of dill.

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322

EFFECT OF FOLIAR APPLICATION OF ZINC-NANOPARTICLES ON GROWTH PARAMETERS AND ESSENTIAL OIL CONTENT OF SWEET BASIL (*OCIMUM BASILICUM* L.)

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Sweet basil (*Ocimum basilicum* L.) is one of the most important medicinal plants belonging to the mint family (Lamiaceae). Plant nutrition is one of the important factors that affect the quality and quantity of medicinal plants. To study the foliar application effects of zinc nanoparticles in four concentrations (0, 1, 2 and 3 g l^{-1}) on sweet basil, a pot experiment was conducted in a randomized complete block design with four replications. The results showed that foliar application of zinc nanoparticles has significant effects on growth parameters (plant height, number and area of leaves, dry herb yield), essential oil content and yield and leaf Zn content. The highest and the lowest amounts of growth parameters were observed in 3 g l^{-1} of zinc nanoparticles and no Zn application treatments, respectively. As the zinc concentration increased essential oil content and yield increased. The highest (1.24%) and the lowest (0.94%) essential oil content were obtained in 3 g l^{-1} of zinc nanoparticles and no Zn application treatments, respectively. Accordingly, the highest (0.202 ml/pot) and the lowest (0.147 ml/pot) essential oil yield were observed in 3 g l^{-1} of zinc nanoparticles and no Zn application treatments, respectively. On the other hand leaf Zn content increased with increasing concentration of zinc nanoparticles. Overall, the findings of this study showed that foliar application of zinc as nanoparticles can be used to increase the biomass and essential oil production in sweet basil.

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323

CHANGES IN SOME BIOCHEMICAL CHARACTERISTICS OF SWEET BASIL (*OCIMUM BASILICUM* L.) IN RESPONSE TO FOLIAR APPLICATION OF ZINC

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Basil or sweet basil (*Ocimum basilicum* L.) is an annual herbaceous plant belonging to the Lamiaceae family. Basil aromatic leaves and essential oils are widely used as antioxidants, flavouring agents in foods, confectionary products, beverages as well as perfumery. In order to evaluate the effects of foliar application of zinc nanoparticles and zinc sulfate in four concentrations (0, 1, 2 and 3 g l^{-1}) on some biochemical characteristics of sweet basil, a pot experiment was conducted as factorial based on randomized complete block design with four replications. The results showed that foliar application of zinc has significant effects on total protein and phenol content, total soluble sugars accumulation, total antioxidant capacity and leaf Zn content. The highest and the lowest amounts of biochemical parameters were observed in 3 g l^{-1} of zinc application and no Zn application treatments, respectively. As the zinc concentration increased total protein and phenol content, soluble sugars accumulation, total antioxidant capacity and leaf Zn content increased. On the other hand the findings of this study showed that foliar application of zinc as nanoparticles were more effective than zinc sulfate.

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326
ANAEROBIC FERMENTATION OF *MATRICARIA CHAMOMILLA* FLOWER EXTRACTION BY-PRODUCT USING GAS PRODUCTION TECHNIQUE

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This study was conducted to investigate the fermentation of *Matricaria Chamomilla* flower extraction byproduct by mixed rumen anaerobic microorganisms. In the glass vials used to measure gas production 30 ml of buffered rumen fluid (2:1 ratio of rumen fluid: buffer) poured in glass and cultured at 38.6 temperature. The only substrate used for fermentation were alfalfa and *Matricaria Chamomilla* flower extraction byproduct considered as treatment 1 and 2, respectively. Volume and pressure of produced gas were measured with syringes and digital pressure meter at different times and exponential model were used to determine the gas production parameters [1]. The byproduct was obtained from Barij Essence pharmaceutical company. There was a significant difference ($P<0.05$) in potential gas production (a+b) parameter between treatment 1 and 2 which were 71.53 and 44.61 ml/300 mg DM, respectively. Also, a significant reduction ($P<0.05$) was shown in cumulative gas production of the byproduct in 24, 48, 72 and 96 h after incubation. The rate of gas production (c) and partitioning factor were not affected by the treatments. *M. Chamomilla* flower extraction byproduct showed lower Dry matter digestibility in comparison with alfalfa ($P<0.05$). These data suggest that byproduct of chamomile flower extracting has an acceptable but lower potential to be fermented by the mixture of anaerobic microorganisms in comparison with alfalfa and it could be used as a substrate for methane production in the anaerobic reactors.

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339

EFFECT OF BAP CONCENTRATION ON DIRECT SHOOT REGENERATION OF *ORIGANUM VULGARE* SSP. GRACILE FROM DIFFERENT EXPLANTS

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Oregano (*Origanum vulgar* ssp. gracile) one of the very important medicinal plant, belongs to lamiaceae family. Thymol and carvacrol are the main components of essential oil of oregano. The current research was conducted to determine optimized *in vitro* culture condition of important oregano medicinal plants for subsequent studies about effective factors on biosynthesis of secondary metabolites and applying these methods in improving medicinal plants. Effects of different concentrations of BAP on shoot regeneration of various explants type (hypocotyls, cotyledon, leaf, nodal and shoot tip) under *in vitro* conditions. Experiments were done based on completely randomized design with three replications per treatment. The results of the ANOVA revealed that there were significant differences between treatments ($P < 0.01$). The highest mean shooting regeneration rate (35 shoots per explants) was observed in nodal and shoot tips explants and the lowest mean shoot regeneration rate (2 shoots per explants) were observed in cotyledon in of BAP. Although our results showed that shoot tip determined the best explant.

342

INVESTIGATION OF ESTABLISHMENT AND EVALUATION OF GROWTH AND YIELD OF MEDICINAL PLANTS UNDER DRY FARMING CONDITIONS OF MARKAZI PROVINCE.

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Wide range of dry lands in Iran and different ecological condition of medicinal plants make be uses of medicinal plant for commercial production. Growth habit and ecological adaptability of medicinal plants in medicinal of herbal collection will be studied. In order to studying of the establishment possibility, growth habit, yield and quality of medicinal plants in dry conditions 30 species of selected herbal medicinal plants including "*Thymus vulgaris*, *Melissa officinalis*, *Sanguisorba minor*, *Hyssopus officinalis*, *Physalis alkekengi*, *Teucrium polium*, *Ziziphora tenuior*, *Cichorium intybus*, *Ziziphora clinopodioides*, *Tribulus terrestris* ,*Stachys lavandulifolia*, *Ferula assa-foetida*, *Linum album*, *Carum copticum*, *Bunium persicum*, *Falcaria vulgaris*, *Salvia multicaulis*, *Dracocephalum kotschyi*, *Thymus kotschyanus*, *Valeriana officinalis*, *Cuminum cyminum*, *Dorema ammoniacum*, *Ferula gummosa*, *Matricaria chamomilla*, *Lavandula angustifolia*, *Rosmarinus officinalis*, *Thymus pubescens*, *Allium ascalonicum*, *Rosa damascena* and *Thymus fallax"* were cultivated in the plot on the basis of Randomized completed block design (RCBD) with tree replication during the five years (1391 to 1395). In the growth season seed germination, trilling, elongation of stem, stem diameter, Plant high, 50% flowering, 50% clustering, 50% fruiting, establishment power, 1000 seed weight, seed yield, biomass dry weight and root length, diameter and dry weight were measured. The results indicated that some medicinal plants such as "*Dracocephalum kotschyi*, *Cichorium intybus*, *Matricaria chamomilla*, *Physalis alkekengi*, *Sanguisorba minor*, *Thymus vulgaris*, *Lavandula angustifolia*, *Hyssopus officinalis*, *Melissa officinalis*, *Thymus kotschyanus*, *Thymus pubescens*, *Rosmarinus officinalis*, *Falcaria vulgaris*, *Ziziphora clinopodioides*" hade the more yield, biomass and establishment power compared to other species.

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345
INTRODUCTION OF COLOR-PRODUCING PLANTS IN MARKAZI PROVINCE

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Science of color is very important in the dye industry, painting, graphics, electrical engineering, printing and etc. Regarding the role of color- producing plants, the projection of collection of these plants was performed during 5 years in Iran, Markazi province. The province has an area of 2940000 hectares at position 48˚, 58˚ to 51˚, 05˚ east longitude and 33˚, 23˚ to 35˚, 34 ˚ north latitude is located is very important. The province is divided in to 20 parts that every year 4 part selected and the entire plants including flowers, fruits and roots were collected for the different seasons. This process is different for different plants so that their harvest was started until ecological factors including: height, slope, latitude and longitude were recorded and kept in Agricultural and Natural Resources Research Center of Markazi province as well as plant sample. During this project 203 specimens of this plant in 40 families, 50 genera and 73 species collected. Residues used for this purpose include aluminum sulfate, copper sulfate, chromium potassium sulfate and ferrous sulfate, and the color obtained with Al, Ca, Cu and Fe were tested, the results show Asteraceae family with 7 genera, Lamiaceae with 5 genera, Papilionaceae and Solanaceae with 4 genus, Brassicaceae, Rosaceae 3 genera and Amaranthaceae, Euphorbiaceae, Poaceae, Moraceae, Salicaceae, Apiaceae and Zygophyllaceae with 2 genera most of the rest of the family with a 1 genus lowest variability among color of these plants manufacturer.

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350

EFFECT OF PROPOLIS EXTRACT CREAMS ON HEALTHY SKIN

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The use of health products - cosmetics with natural origin , especially because of the lack of adverse effects on bee products and chemical use , and applications with a large variety of food , health, beauty , healthcare has been welcomed by many consumers worldwide . The aim of this review ; assess the impact skin cream containing propolis were volunteers . This study was conducted in 1390 , the city rush and collect propolis extraction using the solvent propylene glycol (10%) and add it to the cream base , cream containing 4 % by weight glycol extract of propolis was made. these worms were packed in containers of 25 g and 31 volunteers were given . Use the cream for 21 days , once a day before bed . Effects of propolis cream by questionnaire design , data were recorded and evaluated by Excel software . 61 percent male and 39 percent female. The most frequent between the ages of 20 to 35 years. Among consumers propolis cream for sensitive skin , only one (3%) was observed . Most of propolis cream , softening property to its highest satisfaction rate of 80 % and propolis cream by consumers, the response is good.Adequate funding for bee products processing and packaging in addition to the entrepreneurial economy , helps maintain the health of the community.

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353

EFFECT OF GROWTH REGULATORS ON MICROPROPAGATION OF BITTER MELON IN DEHDASHT ACCESSION

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Bitter melon (*Citrulus colosynthis* L.) is an anticancer medicinal plant and is one of the most important medicinal plants. Micropropagation of Iranian accessions of this plant is very functional for next researchs. In this research, the best medium for callogenesis, direct and indirect regeneration and rooting in Dehdasht accession of Bitter melon was been reported. This research was designed for studying the effects of different explants (leaf and stem) and different concentrations of plant growth regulators including 2,4-D in three levels (1, 2 and 6 mgL^{-1}), NAA in four levels (0.1, 0.5, 1 and 1.5 $mg.L^{-1}$), kinetin in three levels (1,2 and 4 $mg.L^{-1}$) and BAP in three levels (0.01, 0.5 and 1 mgL^{-1}) on MS, ½ MS and ¼MS mediums *in vitro* condition. Experiment was conducted in factorial based Randomized Complete Block Design with three replications. Results showed that callogenesis was done on shoot explants in MS medium containing 1 $mg.L^{-1}$ NAA and 1 mg. L^{-1}BAP and also in combination of 2 mg. L^{-1} 2,4-D and 1 mg. L^{-1} Kin. For stem explants, plantlets were obtained from callus in ½ MS medium containing 2 and 3 $mg.L^{-1}$ BAP. The best hormonal combination for direct regeneration on stem explants was ¼ MS containing 1.5 $mg.L^{-1}$ BAP and 1 $mg.L^{-1}$ NAA. The best medium for rooting in direct and indirect regeneration was MS medium containing 0.5 $mg.L^{-1}$ NAA and 0.5 $mg.L^{-1}$BAP.

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354

ASSESSMENT THE DIRECT REGENERATION IN GERMANY AND SHIRAZES CHAMOMILES

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Germany (*Matricaria chamomilla* L.) and Shirazes (*Matricaria recutita* L.) chamomiles are the most important medicinal plants are used in the pharmaceutical, health, food and cosmetics industries. In vitro propagation of plants have higher potential to produce qualified natural products, restoring and preserving of endangered plants, induction of somaclonal variation, industrial reproduction, valuable secondary metabolites and increased active ingredients. In this study the effect of plant hormones (NAA, BAP, 2ip, Zeatin and Kinetin) were studied on direct regeneration from leaf, cotyledons and stems (with or without node) explants of Germany and Shirazes chamomiles in a factorial Completely Randomized Design with four replications. The results showed that the best explants in both chamomiles for direct regeneration were stem (whit node) and cotyledon with 78.75 and 75 regeneration percents, respectively. The best genotype and hormonal combination were Shirazes chamomile and MS medium supplemented with 1.5 $mg.L^{-1}$ 2-ip and 0.1 $mg.L^{-1}$ NAA. Rooting was influenced by auxin (0.5 $mg.L^{-1}$ IBA) or spontaneously was done. Based on the results of this research, chamomile showed relevant response to direct regeneration.

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366
QUALITATIVE EVALUATION OF SOME SAFFRON (*CROCUS SATIVUS* L.) ACCESSIONS FROM KHORASAN.

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Crocus sativus L. (family Iridaceae) is an important crop cultivated for its red stigmatic lobes that constitute the high valued saffron of commercial use. It is a perennial stemless herb that is widely planted in Iran and other countries such as India and Greece. The main saffron production areas in Iran are located in Khorasan, Fars and Kerman provinces. Saffron is characterized by its specific compounds such as crocin, crocetin, and safranal. The bitter taste, color and hay-like fragrance are caused by picrocrocin, crocin and safranal, respectively. A variety of analytical methods such as HPLC and UV-Vis spectrometry have been developed for analytical separation and qualitative studies of crocins. The aim of the present research was to compare Khorasan saffron accessions regarding their quality. The samples from 64 saffron accessions were obtained by collecting the flowers from the field of saffron collection at research station of horticulture department, university of Tehran. The samples were analyzed using a UV–vis spectrophotometer. The absorbances at 257, 330 and 440 nm of the 1% aqueous saffron solutions were evaluated using a 1 cm pathway quartz cell. The results have been obtained by direct reading of the absorbance, at three wavelengths, as reported in standard procedure of ISO3632-1. Maximum values for safranal and picrocrocin were obtained from accessions of Gonabad and Mahvelat.The accessions of Torbat-heidarieh had high values for crocin. Totally, the results displayed a high qualitative variation among different saffron accessions from Khorasan which may be considered in selection programs. Also, these analytical methods could be used to evaluate saffron quality and characterize the saffron produced in a particular area of Iran (Khorasan).

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369
COMPARATIVE ASSESSMENT OF SEVEN IRANIAN *ARTEMISIA* SPECIES IN VIEW OF GLANDULAR TRICHOMES, USING SEM TECHNIQUE

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Artemisinin, a sesquiterpene lactone, is an effective anti-malarial drug, active against cancer, hepatitis and schistosomiasis [6]. It is produced in specialized 10-celled glandular trichomes on the leaves, stems and inflorescences of *Artemisia annua* plants [4]. Ten-celled biseriate glandular trichomes are common in *Artemisia* species [1, 2, 3, 5, 7, 8]. The leaves of seven *Artemisia* species were assessed in view of the density and area of glandular trichomes, using scanning electron microscopy (SEM). A positive and significant correlation coefficient ($r = 0.84^{**}$) was observed between artemisinin content and the density of trichomes. Since glandular secretory trichomes are the sites of the synthesis of artemisinin, it should be expected that more trichomes would result in more artemisinin produced. The leaves of *A. khorassanica* and *A. absinthium* showed no glandular trichomes and hence no artemisinin produced. These results confirmed that artemisinin are localized entirely in the subcuticular space of glandular trichomes of *Artemisia* species.

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371
EVALUATION OF THE OCCURENCE AND DEVELOPMENT OF TRANSGENIC HAIRY ROOTS OF *ATROPA BELLADONNA* PLANT IN VITRO

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Atropa belladonna is a plant of the solanaceae family, and it is a very important medicinal plant that has a significant amount of important medicinal alkaloids such as atropine and scopolamine in its roots. Production of these alkaloids that are basic components of some of important drugs through tissue culture and hairy root cultures need special attention. In this study, leaf explants of Atropa belladonna were inoculated with three strains of *Agrobacterium rhizogenes* included A4, A13, and 15834 and the occurence and growth rate of hairy roots were assessed in four type of medium culture Included liquid ½ MS, solid ½ MS, liquid ½ B5, solid ½ B5. The results showed that the occurrence percent of hairy roots in A4 strain was higher than the two other strains and also the best medium for root growth was liquid ½ B5 medium So that after two weeks, the hairy roots were obtained in each flask that their amount was higher in Compared of A13 and 15834 strains.The occurence and growth rate of hairy roots was influenced by *Agrobacterium* strains and also culture had a greater effect on the growth of roots.

374

EFFECT OF DIFFERENT CONCENTRATIONS OF FE-NANO ON YIELD AND GROWTH CHARACTERISTICS OF TWO MARIGOLD VARIETIES (*CALENDULA OFFICINALIS* L.)

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To evaluate the effect of spray application of Fe-Nano on quality and quantity characteristics of *Calendula officinalis* L., a experiment was conducted in complete randomized block design with 4 replications in 2013. The experiment treatments was including of two Marigold varieties (low and more leaves) and concentration of Fe-Nano (2, 4 and 6 $_{0.00)}$ plus a control treatment (no spraying). The results showed that was significant difference between Marigold varieties and Fe-Nano concentrations on plant height, flower yield, number of flowers and harvest index. The mean comparison showed that concentration 4 $_{0.00}$ of Fe-Nano has plant height, number of flowers and flower yield than the other treatments. Maximum and minimum flower yield (101.15 and 39.04 $g.m^{-2}$ respectively) were observed in variety with low leaves and concentration of 4 $_{0.00}$ of Fe-Nano. Also, most of the traits were observed significant differences between spraying and controls treatments. spray concentrations of 4 $_{0.00}$ of Fe-Nano significantly increased in biomass yield, seed weight, harvest index and flower diameter. it seems that with respect to the Marigold varieties yield, variety with low leaves and spray application Fe-Nano (4 $_{0.00}$) increase quantity and qualitative.

389

EFFECTS OF DIFFERENT CONCENTRATION OF SALICYLIC ACID AND DIFFERENT MEDIA ON SHOOT GROWTH CHARACTERISTICS OF LEMON BALM (*MELISSA OFFICINALIS* L.)

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Lemon balm is perennial and herbal plant [3], anticonvulsant and sedative, tonic heart and stomach [1]. Stimulus are living molecules, that are stimulates physiological and morphological responses in plant are involved [2]. In this experiment, different concentrations of salicylic acid (0, 0.1, 0.3, 0.5, 1 mili molar (m.M)) and MS and B_5 medium concentrations (5٠% and 100%) was used in lemon balm to study the shoot growth characteristics. Seeds sterilized by 96% ethanol for three minutes and sodium hypochlorite (50%) for seven minutes. The explants were cultured on MS medium and after optimal growth, were subcultured in different media. Salicylic acid treatments were applied after 40 days. Fourteen days after the treatments, shoot number, highest shoot length, number of node, fresh and dry weight of shoots were studied. The factorial analysis of variance based on completely randomized design was used for data analysis. The results showed significant difference between media with regard to shoot growth characteristics. Effect of salicylic acid on fresh and dry weight of shoots was significant. Between media and salicylic acid concentrations based on all of growth characteristics was observed significant interaction. MS medium at all concentrations of salicylic acid had the highest number of shoots. The maximum number of nodes on the longest shoot and the longest shoots were observed on MS and 1/2MS in 0, 0.1 and 0.5 mM salicylic acid concentrations. The total fresh weight of shoots in MS medium at different concentrations of salicylic acid was significantly more than other treatments. The highest total dry weight of shoots was obtained on MS medium. So we can say that the response of lemon balm to MS medium was better than B_5 medium.

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398
EVALUTION OF SOME BIOCHEMIKAL PROPERTIES OF TWO POMEGRANATE CULTIVARS IN THREE DIFFERENT REGION

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Pomegranate (*Punica granatum* L.) is belonged to Punicaceae family and it is considered as one of the oldest edible fruits which have been extensively used in traditional medicine in many civilizations [1]. Recent scientific findings corroborate traditional usage of the pomegranate as a medical remedy and indicate that pomegranate tissues of the fruit, flowers, bark, and leaves contain bioactive phytochemicals that are antimicrobial, reduce blood pressure, and act against serious diseases such as diabetes and cancer [2]. Iran has the first rank for pomegranate production in the world concerning: extent of commercial culture area, quality and the amount of production [3]. Also, there is a climatic diversity in Iran which influences pomegranate quality and dietary value. However, very few studies have been conducted to evaluate the effects of different climates on the qualitative specifications of this fruit [4]. In this research, some biochemical characteristics of two common commercial pomegranate cultivars (Malas and Yousefkhani) in three different climatic conditions (Ali-Abad, Sari and Saveh) have been evaluated. Results of this experiment indicated that climatic condition had a significant effect on the amount of vitamin C ($P<0.001$). The maximum and minimum amounts of vitamin C were found in Sari (2.117 mg/100ml) and Saveh (1.788 mg/100ml), respectively. However, the amount of Vitamin C was not significantly different in the mentioned cultivars. Maximum amount of EC (4.31 mmohs/cm) and TSS (17.23 ^{o}B) was found in Malas cultivar and in Ali-Abad region; whereas, this cultivar and this region had the minimum pH (3.47) compared to others. The maximum pH (3.91) in this cultivar was observed in Saveh region. A significant difference was found between Ali-Abad and Sari regions concerning the pH of Malas cultivar. The minimum amount of EC (3.68 mmohs/cm) and TSS (15.7 ^{o}B) was found in Yousefkhani cultivar and in the regions of Ali-Abad and Sari, respectively. Significant differences were present in the amount of EC between Yousefkhani cultivar in Ali-Abad and Yousefkhani cultivar in Sari ($P=0.002$). In general, the present study showed that both the cultivar and region had some influences on the biochemical attributes of pomegranate fruits.

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402

EFFECT OF SPRAYING OF IRON NANO OXIDE AND MAGNETIC WATER ON BIOMASS AND ESSENTIAL OIL YIELDS OF ANISE (*PIMPINELLA ANISUM* L.)

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To study the effect of spraying of iron nano oxide and magnetic water on yield and essential oil of anise (*Pimpinella anisum* L.), factorial experiment was conducted in complete randomized design with 4 replications of an greenhouse. The first factors were different concentrations of iron nano oxide including (0, 0.5, 1.5 and 2 per thousand) and the second factor was spraying of magnetic water including (250, 500, 750 and 1000 cc) during three periods of plant growth, plus a control treatment (water). Mean comparison showed that spray application 1.5 per thousand of iron nano oxide and application 750 cc of magnetic water harvest produced highest biomass and grain yield (1954 and 1021 $kg.ha^{-1}$ respectively). The highest of essential oil yield (39 $kg.ha^{1}$) was obtained from 2 per thousand of iron nano oxide and 750 cc of magnetic water. the lowest essential oil yield (11 $kg.ha^{-1}$) belonged to control treatments.

407

EVALUATION OF VEGETATIVE AND CORM YIELD OF SAFFRON (*CROCUS SATIVUS*) IN TALESH REGION OF GUILAN PROVENANCE

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Saffron (*crocus sativus* L.) is the one of most important economical crop in Iran and Attempts have been made to extend its cultivation in most parts of Iran. By notice the information, Talesh city of Guilan provenance has desirable features of climate and Saffron was cultivated in Guilan for corm production especially. Therefore, the present study was evaluated the physiological characteristics and yield of saffron corms in some elevation class of Talesh city. So, saffron was cultivated in six regions of the plains to the mountains. In the second year, yield of saffron corm were tested in a randomized complete block design with three replications and 10 observations at each replicate. The results showed that, there is significant difference among areas of culture of the number, diameter and dry weight of corm. Areas with 1250 and 1400 m altitude were produced maximum number of corm per plant with 7.64 and 6.16 number, respectively. Lowest corm numbers with 3.13 no recorded 1150 m altitude. In the plain region with 25 m altitude was produced maximum weight of corm with an average of four gram. High corm diameter (15.77 mm) and superlative corm dry weight (0.94 g) was recorded in plain region. The lowest corm diameter (8.79 mm) and weight (0.89 g) were observed in 1150 m altitude. Finally, according to experiments conducted, Saffron corm can be produced in Talesh of Guilan. With regards to the capacity of Talesh region to production of Saffron as valuable crop, it efforts to ensure optimal conditions for cultivation and production of Saffron corms in this region.

410

INVESTIGATION OF POLLEN VIABILITY AND POLLEN STORAGE LIFE CONDITIONS OF MEDICINAL PLANT *LEONURUS CARDIACA* L.

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Leonurus cardiaca (Lamiaceae) is an important medicinal plants growing in many regions of Iran. It has been used to cure cardiovascular problems, stress, anxiety, and nervous irritability. Review in the literature revealed that there is no report on the reproductive biology of the species. Therefore, this experiment was designed to investigate viability, storage temperature and storage duration of pollen in *Leonurus cardiaca*. Two colorimetric methods 2,3,5-triphenyl tetrazolium chloride (TTC) and acetocarmine and two developmental stages, before and after anthesis were examined to determine the pollen viability. Four store temperatures, 4, 24 ± 1, -20 and -80°C were applied to determine the optimum store temperature and storage duration. Pollens germination was tested in a culture medium containing 15% sucrose, 100 ppm boric acid (H_3BO_3) and 1% agar at 5 days intervals for the first two and every month for the two latest temperatures. Results showed that the highest value of pollen viability was observed by acetocarmine method. Viability of pollens before anthesis was 91.35% and reduced to 85.57% two hours after anthesis. Pollen germination was stopped after 20, 50, 60 and 60 days storing at 24 ± 1, 4, -20 and -80°C, respectively.

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412

STUDY ON THE PHENOLOGY OF GROWTH AND FLOWERING IN MEDICINAL PLANT *EREMOSTACHYS LACINIATA* (L.) BUNGE

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The World Health Organization (WHO) has listed 20000 medicinal plant species globally of them more than 2250 species grow in Iran. These valuable plants are under huge threat not only from changing environmental condition but also from human activities such as urbanization, industrialization and over exploitation of medicinal plants. In Iran high percentage of medicinal plants obtained from their natural habitat, considering these, conservation of the medicinal plants is crucial. Phenological studies are very important in the regulation of plants exploitation programs, and conservation of genetic resources. Phonological studies of medicinal plant species is an important step which can help for understanding life pattern of the individual species. *Eremostachys laciniata* (L.) Bunge (named chelledaghi in Turkish and: Sonbole Biabani Pare barg in Farsi) is a medicinal plant belonging to Lamiaceae Familly. The roots are used to cure the rheumatoid pains in the folk medicine of East Azerbaijan. This is a perennial herb that vegetative shoots grow from the buds on its underground rootstock every year. Roots are thick and the leaves and flowers are hairy. Phonological observation of *Eremostachys laciniata* carried out in Heris region in East Azerbaijan where the species occupies a large area and grew at altitude 1960-2080 m asl. In the studied area *Eremostachys laciniata* began to produce leaves in mid April. Flowering started at late May (days 25-30) and continued to full flowering stage at early June (days 1-6). Seed production started in 8-13 June and continued until 22-27 June. Seed dispersal started in 6-12 July and finished in 20-25 July.

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414
THE EFFECTS OF MUMIC ACID AND ORGANIC MANURE ON GERMINATION AND GROWTH OF SAGE IN GREENHOUSE

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Salvia is one of the most important medicinal plant worldwide which its leaves are also used as ingredient in food industry [1,2]. A greenhouse experiment was carried out at the College of Agriculture and Natural Resources of Darab, Shiraz University in 2014 to evaluate the effect of organic fertilizers and humic acid on germination characteristics and vegetative growth of sage (*Salvia officinalis* L.). The experimental design was completely randomized with three replications. Treatments consisted of some organic amendments and nitrogen fertilizer (municipal waste compost, vermicompost, sheep manure, N fertilizer and control) and humic acid (0, 50 and 100 mg l^{-1}). Results showed that compared to control (47 %), municipal waste compost (87 %), sheep manure (92%) and N fertilizer (82.5 %) increased germination percentage of the plant significantly. However, vermicompost had no effect on germination percentage. Humic acid also had a significant effect on germination percentage so that 50 mg l^{-1} caused a greater germination percentage (74 %). Additionally, both fertilizers and humic acid had a significant impact on plant biomass. N fertilizer and municipal waste compost produced a greater plant biomass compared to the other treatments. Humic acid at the rate of 100 mg l^{-1} also produced a greater plant biomass. Our results showed that both humic acid and organic amendments would increase sage's growth and germination but further studies should be done in field.

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416

ISOLATION OF ENDOPHYTIC BACTERIA AND FUNGI FROM LEMON VERBENA AND ASSESSMENT OF THEIR EFFECTS ON GROWTH AND ANTIOXIDANT PROPERTIES

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Endophytes are microorganisms that whole or part of their life cycle colonize inside the healthy tissues of the host plant, without causing no apparent symptoms of disease. They have many benefit for host plants, for example promoting their growth by mobilizing nutrients, producing plant growth regulators, protecting them from pathogens and etc. The choice of the plants to study of their endophytes is important. Therefore, medicinal plants which are known to be used as an alternative source of medicine, are a valuable source [1]. Lemon verbena, *Lippia citriodora* Kunth. from family Verbenaceae, is a shrub indigenous to South America. It is cultivated mainly due to the lemon-like aroma emitted from its leaves. Lemon verbena has a long history of folk medicinal uses in treating asthma, spasms, cold, fever, flatulence, colic, diarrhea, indigestion, insomnia and anxiety [2]. The aim of present study was to evaluate the effects of endophytes isolated from *L. citriodora* on the growth parameters and antioxidant property. In total, 24 fungul and 24 bacterial endophytes were isolated from different tissues of *L. citriodora*. Among them, bacterial (B10) and fungul (F14) isolates that were identified as *Sphingomonas paucimobilis* and *Aspergillus sp*., respectively, were selected to inoculate the plants. They were isolated from root and crown tissues, respectively. It was found that both of them significantly increased the plant growth parameters including plant height, leaf number, fresh weight and dry weight of shoot, root and leaf, compared with noninoculated control. However plant height and root weight in the *S. paucimobilis* inoculated plants was more than *Aspergillus sp.* inoculated plants. Beside, the endophytes investigated in this work, increased antioxidant property of leaf extract, but have no effect on content of phenolics compounds and flavonoids. The results of this study clearly indicate the possibility of using bacterial and fungal endophytes for enhancing plant growth and antioxidant property of the aromatic shrub, *L. citriodora*.

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418

ANTIOXIDANT CAPACITY VARIATION IN THE COLLECTION OF JUJUBE (*ZIZIPHUS JUJUBA*) FROM IRAN

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Fruits from the jujube plant (*Ziziphus jujuba*) possess health-promoting effects and medicinal properties [1]. Jujube has a long history of usage as a remedy in Iranian traditional medicine and is recommended for the treatment of some diseases [2]. The present investigated the variations in antioxidant capacity, total phenol and total flavonoid content of fruit extracts among 29 jujube ecotypes originating from Iran. The fruit tissue extract of mentioned ecotypes were obtained from methanol (85%). DPPH assay was performed for determination of antioxidant capacity of each extract. The total phenol and total flavonoids were measured by Folin-Ciocalteu and Chang method, respectively. Ardestan, Ghazi, Maroon, Shahreza and Podeh1 ecotypes showed most radical scavenge ability (DPPH), respectively, while, Hamedan, Dasht Biaz and Larim ecotypes were exhibited the least antioxidant capacity. Maximum total phenol belonged to Hamidabad, Kolaleh, Glian, Kuhpayeh2 and Natanz ecotypes, respectively, whereas the minimum phenol contents were recorded in Kamchenar, Kuhpayeh and Ghazi ecotypes. Additionally, no correlation between antioxidant capacities and total phenolic contents of extracts was found. Highest total flavonoid contents were obtained from Biazih, Hemoaralak, Kuhpayeh2, Glian and Ghazi ecotypes respectively whilst, the lowest flavonoid contents were observed in Hamidabad, Dahane Larim and Kuhpayeh. The knowledge of these diversities, found in this study, will allow a better plant exploitation related to pharmaceutical uses and also a better conduction of breeding programs for *Ziziphus jujuba* ecotypes.

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427

SPRAY EFFECTS OF METHANOL AND ETHANOL ON QUANTITY AND QUALITY YIELD OF ESSENCE AND GROWTH OF DILL

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Since cultivation of medicinal plants is expanded to protect the valuable resources of them in the natural environment, attempts to improve the qualitative and quantitative yield seem necessary. This experiment was conducted to evaluate the effects of foliar application of methanol and ethanol on essence and growth of Dill (*Anethum graveolens* L.*)* in the greenhouse of Medicinal Pant Institute during 2012-2013. The experiment was carried out in randomized complete block design with 9 treatments and 3 replications. The experimental treatments consisted of control (without spray), ethanol and methanol solutions with concentration of 10, 20, 30, 40 and 50% (v/w). The results showed that the foliar application of hydro-alcohols treatments had a significant effect on all morphological characteristics. The highest plant height, number of leaf, stem fresh weight, stem dry matter, leaf fresh weight, leaf dry matter, inflorescences dry weight,1000 seed weight, shoot fresh weight and shoot dry matter was observed at 30% methanol. The highest lateral shoot number and stem diameter was recorded at 20% methanol. Root fresh weight and dry matter was the highest at 40% methanol and the highest essence yield was recorded at 40% methanol. The results indicated that in all parameters was higher in the plant sprayed with ethanol and methanol compared to control. Application of 30% methanol had the greatest qualitative and quantitative yield compared to other treatments. In conclusion, foliar application of methanol and ethanol could increase amount of essence and growth of Dill.

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436
CHEMICAL VARIATIONS AMONG THE ESSENTIAL OILS OF *DRACOCEPHALUM MOLDAVICA* (LAMIACEAE) LANDRACES FROM IRAN

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Dracocephalum moldavica L. (Moldavian Balm) has been used as a stomach and liver disorders remedy in folk medicine [1]. Different bioactive constituents have been suggested to contribute to the painkiller activity, sedative and tranquilizer properties of this plant [2]. The present study was undertaken to assess genetic diversity in iranian landraces (cultivated populations) of Moldavian balm based on essential oil characteristics. Seeds of seven populations were provided from different regions of North West of Iran, Included: West Azerbaijan provinces (*Naghadeh*, *Keshtiban*, *Topragh Ghalee*, and *Baghchajogh*) and East Azerbaijan provinces (*Hokm Abad*, *Jahangir* and *Shiraz valley*). The seeds were cultivated in the field conditions in Hamedan, Iran. The aerial part of landraces harvested during the full flowering phase. Essential oils were extracted using Clevenger. The constituents of essential oils were analayzed by gas chromatography-mass spectrometry (GC–MS). The results indicated that the total oil content in populations varies from 0.02 to 0.12% (w/w). Among tested *D. moldavica* landraces, *Hokm Abad* population showed the highest essential oil content (0.12%). Totally, 41 compounds were identified in essential oils of seven populations. The dominant constituent for all populations was Geranyl acetate (19.8%-45.5%) with an exception of *Naghadeh* (Geranial: 23.82%). The second major constituent in five populations: *Keshtiban*, *Topragh Ghalee*, *Hokm Abad*, *Jahangir* and *Shiraz Valley* was Geranial (20.22%-25.60%) but for *Naghadeh* and *Baghchajogh* was Geranyl acetate (19.7%) and Neryl acetate (19.1%) respectively. Neral (15.8%-18.5%) was the third considerable constituent for six landraces. The populations from West Azerbaijan contained a higher amount of two constituents (Geranial: 25.0% and Neral:18.5%) compared with those of the East Azerbaijan. Whereas, the higher content of Geranyl acetate (45.5%) was obtained from populations of the East Azerbaijan province. The present study demonstrated a broad diversity among essential oils of Moldavian Balm landraces from North West of Iran. This knowledge could be useful in conservation, germplasm management and breeding programs of *D. moldavica*.

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448
EFFECT OF TEMPERATURE AND PACKAGING MATERIAL ON ESSENTIAL OIL CONTENT AND COMPOSITION OF *CARUM COPTICUM* FRUITS DURING NINE MONTHS STORAGE

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Post-harvest storage of medicinal plants has been poorly researched in Iran. In order to examine the effect of storage period (0, 3, 6 and 9 months), storage temperature (20±3°C and 30±3°C) and packaging materials (paper bag, polyethylene bag, aluminum foil under Vacuum condition, Polyethylene-polyamide packages under Vacuum condition, Polyethylene-polyamide packages with a gas combined of [98%N_2 + 2%O_2] and [90%N_2 +10%O_2]) on essential oil content and compositions of *Carum copticum* fruits, a laboratory experiment was conducted in Agricultural Faculty of Ferdowsi University of Mashhad, during 2013 and 2014. The essential oil of the samples was extracted by Clevenger apparatus. Gas chromatography (GC) and gas chromatography mass spectrometry (GC-MS) were employed to determine the chemical composition of the essential oil obtained from dry fruits of *Carum copticum* during nine month storage. Thymol (56.29%), γ-terpinene (19.65%), p-cymene (18.86%) B-pinene (1.03%) and carvacrol (0.75%) were found to be the major constituents of the oil before storage time. The results of this study reveal that constituents of the oil were affected significantly by the treatment interactions during storage time. According to the results, essential oil percentage was increased during the first six months and then decreased significantly to the end storage time in both storage temperatures.

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449

COMPARISION OF ESSENTIAL OIL PRODUCTION OF SAHENDI SAVORY (*SATUREJA SAHENDICA*) AND ITS EFFECTIVE COMPOUNDS UNDER AGRICULTURAL CONDITIONS AND RANGE LANDS OF QAZVIN PROVINCE

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The sahendi savory (*Satureja sahendica* Bornm.) is a native medicinal species of Iran which is subjected to extinction. Organic farming of this species in low input systems has an important role to protect this valuable genetic reserve. In order to evaluate the essential oil content and compounds of the savory in range land and in the field, a study was conducted which investigate the plant growth responses to different nutrition systems and competition of redroot pigweed (*Amaranthus retroflexus* L.) density,s whit different planting patterns. Experiment was carried out in a randomized complete block design with three replications and factorial arrangement of treatments at the Ismael Abad Research Station, Qazvin Agriculture and Natural Resources Research Center on 2010 to 2012. Results showed that planting pattern effect on the amount and composition of the essential oils were not significant. In oil production two tones vermicompost fertilizer + 40 liters of vermi tea in first harvesting and, in second harvesting four tones vermicompost compared to the control range land were dominant .Savory oil rate under the influence of weed factor were better than the control range land at all weed density,s of redroot pigweed. In all fertilizer levels, amount of thymol in comparison to range land control was superior and the highest amount obtained by four tones of vermicompost. In effect of weeds levels, weed free had produced greatest amount of thymol compared to range land control.

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451
GERMINATION BEHAVIOR AND ESSENTIAL OILS OF FENNEL (*FOENICULUM VULGARE*) AFFECTED BY STORAGE CONDITION AND PACKAGING MATERIALS

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The aim of medicinal plant storage is to preserve qualitative and quantitative properties of products. Optimal seed storage can be achieved by modifying the environment around the seeds. In order to investigate the effects of storage conditions (packaging materials and temperature) and storage time on quality of Fennel (*Foeniculum vulgare*) stored fruits, a split factorial arrangement in a randomized complete block designed with three replications was conducted. Temperature (at two levels : 20±3°C and 30±3°C) as main plots and packaging materials (at six levels : paper, polyethylene, aluminum foil under Vacuum condition, Polyethylene- polyamide packages under Vacuum condition, Polyethylene-polyamide packages with a gas composition of [98%N_2 + 2%O_2] and [90%N_2 +10%O_2]) and storage periods (at four levels: 0, 3, 6 and 9 months) as sub plots, were considered. Quality of stored seeds was tested by measuring seed germination percentage (SGP), germination rate (GR), mean germination time (MGT), germination Index (GI) and essential oil percentage. The results of this study reveal that seed quality was affected significantly by the treatment interactions in storage time. According to the results, essential oil percentage was increased significantly with the increase of storage period in both storage temperatures. Finally, results show that in aluminum foil under vacuum condition in 30±3°C storage temperature with minimal weight loss, germination and essential oil percentage increased 25.9% and 36.59%, respectively compared to the beginning of storage time; and in 20±3°C storage temperature, paper bags had the greatest increase in germination(35.91%) and essential oil percentage (31.01%) too. So these packages had better performance in this condition.

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452

VEGETATIVE YIELD AND ESSENTIAL OIL PRODUCTION OF SAVORY (*SATUREJA SAHENDICA* BORNM.) AFFECTED BY ORGANIC FERTILIZER AND REDROOT PIGWEED (*AMARANTHUS RETROFLEXUX* L.) COMPETITION

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Regarding to the important role of weed management, soil fertility and organic farming of the medicinal plants, in this research effect of different levels of redroot pigweed (Amaranthus retroflexux L.) density on growth and yield of sahendi savory (Satureja sahendica Bornm) in several fertility regimes including vermicompost with complete and decreased amount of conventional fertilizers have been studied. Experiment was carried out using randomized complete block design with factorial arrangement of treatments with three replicates in Esmaeil Abad Station of Agriculture and Natural Resoursec Research Center of the Qazvin Province on 2010-2012. Fertility factors includes chemical fertilizer as: chemical fertilizer as NPK plus micro nutrients spraying in first and second year (CF), vermicompost (4 t/ha) in first year (V4), vermicompost (2 t/ha)in first year plus liquid vermitea(40 L/ha) in second year (V2T). Redroot pigweed density levels includes: 0, 6, 12, and 18 plants per square meter(W0, W6, W12 and W18). Results showed that in first year main effect of fertilizer on shoot weight, and main effect of weed interference on essential oil ($p<0.05$) and shoot weight ($p<0.01$) were significant. Weed dry weight significantly ($p<0.01$) influenced by weed density in both years of the experiment. The highest percentage of savory essential oil was obtained in 2 t/ha vermicompost+vermi tea in no weed treatment. 16 compounds have been identified in essential oil of savory which thymol, p-cymene and γ-trepinene were the most important ones. According to the results of the essential oil analysis, treatment of 4 t/ha vermicompost in weed free condition increased thymol production and existence of weeds decreased thymol and increased p-cymene.

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454

EFFECT OF 28-HOMOBRASSINOLID PLANT GROWTH REGULATOR IN DROUGHT STRESS CONDITION ON SOME CHARACTERISTICS OF MOLDAVIAN BALM (*DRACOCEPHALUM MOLDAVICA* L.)

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Water deficit is one of the most important factors affecting the growth of plants [1]. Brassinosteroids are a new class of plant hormones with unique biological effects on plant growth and development. Brassinosteroids also can increase plant tolerance for water stress [2]. In a greenhouse study, the impact of three levels of irrigation at field capacity (FC), mild stress (FC2/3) and severe stress (FC1/3) and four concentrations of plant growth regulators of Article 28-Homobrassinolid including zero, 10^{-10} M, 10^{-8} M and 10^{-6} M were investigated on some traits of moldavian balm. The results showed that reducing irrigation had a significant effect on the reduction of growth parameters, including root length, root dry weight, branch number, plant height, shoot yield and total yield. Concentration of 10^{-6} M 28- omobrassinolid significantly increased root dry weight, branch number, plant height, and total yield of moldavian. Oil percentage showed a significant increase at 1% level of probability by reducing irrigation as it increased from 0.38% in full irrigation upto 0.57% in severe stress and use of 10^{-8} M hormone. Generally, our results showed that the use of 28-Homobrassinolid could increase dry matter yield through stimulating growth parameters and it was considered as a good strategy to deal with water stress conditions**.**

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456

EFFECT OF DIFFERENT CONCENTRATIONS OF SILICON ON OXIDATIVE DAMAGES INDUCED BY DROUGHT STRESS IN FENNEL (*FOENICOLUM VULGARE* MILL.)

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Drought stress is one of the main stresses that inhibit the growth of plants due to mainly disturbance of the balance between production of ROS and antioxidant defense mechanism and causing oxidative stress [1]. In this study, the effect of different concentrations of silicon on alleviation of oxidative stress [2], induced by drought was investigated. Results of the measurements of lipid peroxidation and photosynthetic pigments content showed that low concentration of silicon could protect plants against oxidative stress because under silicon treatment, lipid peroxidation decreased and pigment loss was ameliorated. In this study, the relationship between this defense mechanisms and activity of antioxidant enzymes was investigated. Results showed that drought stress increased the activity of ascorbate peroxidase and catalase. Concentration of 5 and 7.5 mM of silicon increased the activity of APX and CAT in plant under drought stress. In conclusion, in fennel plants, foliar with concentration of 5 and 7.5 mM of silicon could protect the plants under drought stress, probably through the contracts with ROS and or induction of anti-oxidative enzymes.

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458

STUDY OF ORGANIC AND CHEMICAL FERTILIZERS EFFECTS ON QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF SUMMER SAVORY (*SATUREJA HORTENSIS* L.)

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This study was conducted to determine the affects of chemical and organic fertilizers on the quantitative and qualitative traits of *Satureja hortensis* during 2013-2014 as a factorial complete randomized block design (RCBD) with three replications. The examination treatments were included organic fertilizers (5,10,15 t ha $^{-1}$ of vermicompost, three levels 5, 10, 15 t ha $^{-1}$ of compost, 25, 45, 65 t of bestial fertilizer per hectare and 65 kg per hectare of urea and potash). Based on the conclusions result of analyzing variance, the plant height was significantly affected by the fertilizer treatments. Among fertilizer treatments, using 45 t ha $^{-1}$ of bestial fertilizer had the most affect on increasing the plant height of *Satureja hortensis* ; using levels of compost and vermicompost fertilizer had also a significant affect on increasing this factor. The percentage and quantity of the essential oil of *Satureja hortensis* was significantly affected by using fertilizer treatments. The most increasment of essential oil percentage was reached by using 15 t ha $^{-1}$ of vermicompost fertilizer (in quantity of %1/12). Our results supported that the use of organic fertilizers can be helpful for yield and qualitative improvement of *Satureja hortensis* [1, 2].

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459
COLD ADAPTOGENIC PROPERTIES OF AJWAIN ESSENTIAL OIL IN CHICKENS

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Cold stress by increasing plasma levels of Reactive Oxygen Species (ROS) and activating some enzymatic markers in plasma such as AST and right ventricular hypertrophy induce pulmonary hypertension syndrome (PHS) and increases mortality in chicken flocks (1). Cold stress also induces hypoxia and increases blood corticostrone levels that in turn increases erythrocytes multiplication and hematocrit (2). Blood viscosity increases subsequently that contribute to PHS. But it should be noted that all of the birds exposed to cold stress did not develop PHS (2). Our aim of the present study was to investigate whether dietary ajwain essential oil (EO) supplementation could have cold adaptogenic effects in Iranian cold sensitive native chicks. A total of 196 day-old male chicks were randomly divided into cold and normal temperature groups. Birds in each temperature group were allocated to four dietary treatment with four replicate. The dietary treatment consist of basal diet as control,150 and 450 ppm ajwain EO that were added to the basal diet. Cold stress was conducted from 13d till 29d in birds of the cold ambient groups. Blood samples were taken from 4 bird/treatment at 29 d. Malondialdehyde concentrations were determined according to Bostoglu et al (1994). Serum activity of AST were determined by Zist-chimy commercial kits (1). Blood for hematocrit measurements was drawn into heparinized microcapillary tubes and centrifuged in a Hettich microliter centrifuge (Tuttlingen, Germany) for 7 min. he results show that cols stress and dietary treatments have no significant effect on RV/TV in chicks, perhaps because the intensity of cold stress was not enough to induce sever pathological effects in birds. Ajwain EO supplementation at 450 ppm in cold ambient reduced plasma MDA concentration compared to control ($P<0.05$). Cold stress have increasing effect on blood MDA concentrations (0.296 µg/g versus 0.436 µg/g) and plasma enzymatic activity of AST (59.1 versus 56 in normal temperature and cold ambient respectively). Hematocrit was higher in ajwain-150 and control but nor in Ajwain-450 group at cold ambient rearing in comparison with corresponding dietary groups at normal temperature ambient. The number of mortality at cold ambient in growth phase (13- 29 d) showed that the lowest percentage pertained to Ajwain EO group (4.1%) compared to control (29%) and ajwain-150 (20.8%). In conclusion we could suggest that suplementation of 450 ppm ajwain EO has attenuated early signs of PHS.

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465
STUDY ON DIFFERENT LEVELS OF *ALOE VERA* EXTRACT ON GROWTH PERFORMANCE AND SURVIVAL RATE OF SIBERIAN STURGEON (*ACIPENSER BAERII*)

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Today, along with the development of sturgeon farming in the country, the need for attention to growth and survival of this species with the use of medicinal plants is very important. *Aloe vera* belonging to family liliaceae is one of the most important medicinal plants in this case [1]. Siberian sturgeon has been the focus of much attention to date because it is a particularly interesting species in terms of rearing value. The quality, quantity and availability of food on farms can be useful in shaping the growth and survival of sturgeon in the various stages of life. The aim of the present study was to evaluate the effects of *Aloe vera* extract on growth performance and survival rate of Siberian sturgeon (*Acipenser baerii*). In this study, the fish were 10.95±0.03 gram in weight and 15.55±0.06 cm in total length. In order to study the effects of this extract, 360 Siberian sturgeon selected in 3 treatments and one control group (3 replications for each treatment) were used. During research the temperature, dissolved oxygen and pH were measured. The Siberian sturgeon (*Acipenser baerii*) with powder of *Aloe vera* extract (0.5, 1and 1.5 percent in food) were reared during two months in fiberglass tanks. At the end of two months, Weight gain, Specific growth rate, Feed conversion ratio, Condition factor, Survival rate and efficiency ratio Protein were calculated. The results showed very good growth of fish in treatments containing *Aloe vera* extract in comparison with the control group ($P<0.05$). This study showed that the application of *Aloe vera* extract can increase the production of Siberian sturgeon in fish farms.

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468

THE EFFECTS OF NANO PARTICLES ON GERMINATION AND SEEDLING CHARACTERISTICS OF *PLANTAGO OVATA* FORSK.

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Plantago ovata is an important medicinal plant. The mucilage present in the seed coats and seeds of this plant is used as a laxative. This study was carried out to evaluate different concentrations of two nano particles ($MnFe_2o_4$ and $MgCr_2o_4$) on germination and seedling growth of it. The experimental design was based on a completely Randomized Block Design (CRBD) with three replication. Different concentrations of nano particles (0, 10, 100 and 300 ppm) were applied. Different seedling-related traits including germination (%), shootlet length, leaflet number, fresh weight and dry weight were studied. The analysis of variance showed that two nanoparticle have significant effect on dry weight of seedlings. Different concentrations showed significant difference on shootlet lenght and fresh weight. Nanoparticla concentration showed no significant difference for evaluated traits. The concentration of 10 (ppm) of both nano particles showed the best effect on shootlet length, leaflet number and fresh weight. The highest value of dry weight were obtained at 300 (ppm) of nano particles. The effective dose of nano particles should be considered for progress in germination and seedling growth of medicinal plants.

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470

CHEMICAL COMPOSITION OF THREE MEDICINAL PLANTS OF LAMIACEAE AND THEIR EFFECTS ON *SITOPHILUS ORYZAE* L. (COLEOPTERA: CURCULIONIDAE)

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Chemical composition of the essential oil from *Mentha piperita* L., *Rosmarinus officinalis* L. and *Hyssopus officinalis* L. and theirs fumigant and repellent activity were investigated against *Sitophilus oryzae* (L.). Dry ground foliage was subjected to hydrodistillation using a modified Clevenger-type apparatus and the chemical composition of the volatile oil was studied by GC-MS [1, 2]. Forty components (98.33% of the total composition) of *M. piperita*, thirty three components (91.50% of the total composition) of *R. officinalis* and fifty two components (94.60% of the total composition) of *H. officinalis* were identified. Menthol (43.95%), menthone (8.28%) and 1,8-cineole (7.07%) were found to be the major components of the *M. piperita* oil; α-pinene (23.52%), verbenone (11.87%) and 1,8-cineole 8.56%) were found to be the major components of the *R. officinalis* oil and cis-pinocamphone (23.39%), trans–pinocamphone (17.78%) and β-pinene (9.64%) were found to be the major components of *H. officinalis* oil. The mortality of 7-14 days old adults of *S. oryzae* increased with concentration from 71 to 428 µl/ L air and with exposure time from 24 to 72 h. In fumigant bioassay *H. officinalis* with 78.16 µl/ L air showed the highest toxicity against *S. oryzae* adults, followed by *R. officinalis* and *M. piperita* with 115.63 and 299.51 µl/ L air, respectively. Also, the *S. oryzae* was repelled by *M. piperita*, *R. officinalis* and *H. officinalis* with 95.0%, 91.0% and 86.5%, respectively; however, they showed no significant difference between them. These results showed the *H. officinalis* essential oil was more potent for use in organic food protection.

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489

A STUDY OF THE BIOLOGY OF *STIPHROMETASIA MONIALIS* (LEPIDOPTERA: CRAMBIDAE) ON THE MEDICINAL PLANT, *CAPPARIS SPINOSA* (CAPPARIDACEAE) IN NATURAL CONDITIONS OF ABARKOUH REGION, YAZD PROVINCE, IRAN

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The medicinal plant, *Capparis spinosa* (Capparidaceae) distributed in the hot and dry areas of Iran. This research was conducted to collect and identify the insects damaging the reproductive organs of the plant. Moreover, biology of the dominant species and estimation of damaging rate of its first generation on this plant were investigated in natural conditions of Abarkouh region, Yazd province, Iran. Reproductive organs of Caper were sampled randomly during the years 2008 and 2010 and the collected larvae were reared on the fruits of their host plant under room temperature until adults appeared. Results showed that two moth species namely, *Stiphrometasia monialis* and *Thyridophora furia* were responsible for damaging to reproductive organs of the Caper and the former species was dominant. The first instar larvae of dominant species fed on the filament of stamen and the later instars on the seeds and tissues of the fruits of Caper and then pupated in a white cocoon. In the first generation the duration of larval stages to adult life-span lasted in about 45 days. The wasp *Bracon* (*Ophthalmobracon*) *ophthalmicus* (Hym.: Braconidae) were identified as gregarious larval-pupal parasitoid of S. monialis.

491
MODELLING THE EFFECT OF SALINITY STRESS ON SEED GERMINATION OF *SALVIA HYPOLEUCA*

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Quantitative information about salinity stress effects on seed germination in *salvia hypoleuca* is meager. The main aim of this study was to evaluate a seed germination model for *salvia hypoleuca* . This experiment was conducted in Institute of Medicinal Plants (IMP) in Iran. NaCl were used in order to cause the salinity stress in 5 different concentrations, (0, 50, 150, 200 and 250 mM). Several non-linear equations were used to describe the relation between seed germination and salinity stress. Results showed that the response of *Salvia hypoleuca* seed germination to salinity stress is best described by a Polynomial and sigmoidal functions. Six physiological germination Indices, (Coefficient of velocity of germination (CV), Mean Germination Time (MGT), Germination Percentage (GP), Vigour Index (VI) and Shoot: Root Ratios), were measured and stimulated in order to describe the germination behavior of *Salvia hypoleuca*. By increasing the salinity stress these Indices were reduced simultaneously. Sigmoidal, Hill, 3 parameters was the best equation which describe CV, MGT, GP and VI with R^2Adj of 98/93, 98/67, 99/96 and 98/8 respectively and Polynomial, Cubic has the best fitting for Shoot: Root ratios with 99/96 R^2Adj. Information gained from this research, improve our knowledge about germination behavior of *Salvia hypoleuca* under salinity stress.

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494

EFFECT OF SUPER ABSORBENT POLYMER, MANURE AND POTASSIUM ON CHLOROPHYLL CONTENT, CHLOROPHYLL FLUORESCENCE, AND THE DIAMETER OF THE OF PUMPKIN (*CUCURBITA PEPO*) ON DROUGHT STERESS.

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Water shortages and drought major factor reducing the growth of plants in arid and semiarid climates, and the impact of drought on crop yield depends on the availability of water in the soil **.**Effect of super absorbent polymer, manure and potassium on the property the physiological and paper skin pumpkin seed yield under drought stress experiment split plot randomized complete block design with three replications. Treatments consisted of three irrigation regimes, to 5, 8 and 11 days of treatment, no use of manure as a source of potassium and super absorbent polymer (control) at a rate of 40 t ha farmyard manure, potassium (k2so4) to the extent 100 kg per hectare to 300 kg per hectare and super absorbent polymer as a minor, was considered. Super absorbent polymer greatest impact on the shortcut fruit diameter, chlorophyll a, b and total chlorophyll found. The minimum relative humidity of leaves, number of branches of the irrigation 11 days, respectively.

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507
EVALUATION OF WITHAFERIN A CONTENT IN DIFFERENT ACCESSIONS AND IN *IN VITRO* CULTURES OF *WITHANIA COAGULANS* (STOCKS) DUNAL

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In recent years, *Withania coagulans* (Fam. Solanaceae) has gained much attention owing to the presence of a large number of steroidal lactones known as withanolides. Out of the several withanolides isolated from *W.coagulans*, The Withaferine A is pharmacologically important that have been demonstrated to possess significant and specific therapeutic action in cancer, Parkinson and Alzheimer's disease. The present study was, therefore, undertaken to make an assessment of Withaferin A content in root of different accessions of *W.coagulans* and in *in vitro* cultures. The seeds of five wild accssesion (USB001-5) were sown in greenhous. The cell suspension cultures were initialized from leaf explants derived callus on Murashige and Skoog (MS) medium supplemented with 30 gL^{-1} sucrose (w/v), 2.0 mg/l 2, 4-D and 0.5 mg/l kinetin (Kin). Adventitious roots were induced directly from leaf segments on half strength MS medium (0.8% agar) with 2 mgl^{-1} indole-3-butyricacid (IBA) and 30 gl^{-1} sucrose. The Withaferin A content was evaluated by TLC and HPLC method using standard Withaferin-A compound. The results showed the presence of Withaferin A in all accessions (21.01-44.54 µg/g D.W), Also, there was significant differences among Accession ($p<0.05$). USB005 was found to have the highest Withaferin A content (44.54µg/g D.W) and was selected for *in vitro* study. The results of *in vitro* study showed that Withaferin A accumulation was higher in Adventitious roots (21.40±1.67 in 4 weeks and 66.73±0.86 in 8 weeks old cultures) compared to cell suspension culture (6.62±2.01). Nearly, adventitious root possessed 10 and 1.5-fold higher Withaferin A content when compared with the cell suspension and *in vivo* roots, respectively. Thus, our study demonstrates the *in vitro* root cultures potential for large scale production of Withaferin A.

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513
EFFECT OF IRRIGATION LEVELS AND BIOTIC ELISITOR OF CHITOSAN ON PHYSIOLOGICAL TRAITS, AND THE ESSENTIAL OIL QUANTITATIVE YIELD OF *THYMUS DEANENSIS* CELAK IN SHAHREKORD CLIMATE

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Thymus daenensis is a medicinal plant endemic to semi-arid regions of Iran. Drought is the most common adverse environment, which limits crop production in different parts of the world special in Iran that is considered as dry and semi dry country [1]. Chitosan is frequently used in cell cultures of medicinal plants as well as plant organs for inducing the accumulation of bioactive secondary metabolites [2]. The pot experiment using a randomized complete block design with three replications at field in Shahrekord, Iran in 2014. Treatments comprised 0.0 (Ch_0) as a control, 0.2 (Ch_1) , 0.4 (Ch_3) and Acetic acid under of 0, 25 and 50% soil water depletion on morpho-physiological traits, essential oil of *T. daenensis* in 2014. The essential oils obtained by hydro-distillation. Results indicated that irrigation levels had a significant effect on many morphological and physiological trairs, including dry matter, plant height and leaf area index (LAI). Water stress reduced growth, dry matter, chlorophyll and carotenoid content, while increased proline, Ch=0.4% increased plant height growth, dry matter, LAI and essential oil. According to the results of this study, drought stress reduces the essential oil yields and dry matter and Ch=0.4% increased the essential oil yields in *Thymus daenensis.*

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514

EFFECT OF BIOTIC ELISITOR OF CHITOSAN ON BIOLOGICAL ACTIVITY OF ESSENTIAL OIL OF *THYMUS DEANENSIS* CELAK IN SHAHREKORD CLIMATE

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Chitosan is a deacetylated derivative of chitin, It is used to increase the biosynthesis of secondary metabolites in various plant cells [1]. Chitosan can trigger a set of defense responses, including gene activation the oxidative burst and the production of secondary metabolites [2]. A field experiment using a Spilt plot randomized complete block design with three replications was conducted to evaluate the effect of 0.0 (CH_0) as a control, 200 (CH_1) and 400 (CH_2) µL in Shahrekord, Iran in 2014. The antioxidant activity of essential oils was evaluated by DPPH assays. The effect of foliar application of Chitosan on antioxidant activities of *T. deanensis* in field condition were investigated. Results indicated that antioxidant activities when plants spryed with 400 (CH_2) µL. Our results indicate that 400 (CH_2) µL would be able to promise sources of with potential antioxidant activity.

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515

EFFECT OF BIOTIC ELISITOR OF CHITOSAN AND DIFFRENT FERTILIZERS (CHEMICAL, ORGANIC AND BIOLOGICAL) ON PHYSIOLOGICAL TRAITS, AND THE ESSENTIAL OIL QUANTITATIVE YIELD OF *THYMUS DEANENSIS* CELAK IN SHAHREKORD CLIMATE

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Thymus daenensis subsp. *daenensis* Celak, a perennial dwarf shrub native plant to semi-arid zones of Iran, is considered as an aromatic and medicinal plant. The aerial parts of *T. daenensis* are commonly used as spices, condiments and flavoring agents [1,2]. In order to study the effects of biotic elicitor of chitosan and different fertilizers on physiological traits, and the essential oil quantitative yield of *Thymus deanensis* Celak an field experiment was conducted in Shahrekord, Iran in 2014. Experimental design was split plot on RCBD with three replications. Main plot was different Fertilization levels at five levels includes: F1:control, F2:100% chemical Fertilizer F3: animal manure, F4 organic Fertilizer (Vermi compost) F5: animal manure+organic Fertilizer+chemical Fertilizer and sub plot (Ch_0) as a control, 0.2 (Ch_1) , 0.4 (Ch_3) and Acetic acid. The result showed that different Fertilization had significant effect on yield, biological yield, harvest index, phenol perecent, flavenoid percent, plant phosphorus and nitrogen content. By increasing of chitosan increased phenol perecent, flavenoid percent and leaf area index and Ch=0.4% increased phenol perecent, flavenoid percent and the essential oil yields in *Thymus daenensis.*

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517

EFFECTS OF ORGANIC FERTILIZERS ON PHYTOCHEMICAL PROPERTIES OF CALENDULA

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Calendula officinalis L. is one of the most important medicinal plants that cultivated for production of pharmaceuticals and active ingredients in the petals. The active ingredients of the plant are flavonoids, glycosides, carotenoids and essential oils. Active substances of Marigold are used as an anti-inflammatory, an antitumor agent, and a remedy for healing wounds and also used as blood purifier. For production of high quality and more plant yield the use of fertilizers is necessary in calendula. In medicinal plants healthy and free of residual pesticides and fertilizers is very important [1]. The increasing use of chemical fertilizers has caused irreparable damage to environment, health and economy. But use of organic fertilizers in medicinal plants emphasized specially by WHO [2]. In this regard, the present study was to evaluate the effect of organic fertilizers on calendula, in a randomized complete block design with 10 treatments and 3 replications in Zanjan University was studied. Treatments include manure, poultry manure and vermicompost, each on 3 levels (5, 10 and 15 tons per hectare) and control (no fertilization). Evaluated traits were flavonoids, carotenoids and essential oils content. Results showed that effects of fertilizers on carotenoid content, essential oils ($p \leq 0.01$) and flavonoids ($p \leq 0.05$) were significantly different. In general it can be concluded that the use of organic fertilizers had favorable effects on yield and active ingredients content or secondary metabolites of calendula. Between organic fertilizers used, vermicompost, poultry manure and cattle manure had the best results, respectively. The maximum carotenoid content and essential oils obtained from vermicompost treatment and the maximum amount of flavonoid obtained from poultry manure treatment.

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518

THE STUDY OF INHIBITION EFFECTS OF HERBAL PLANTS ON *ASPERGILLUS FLAVUS* AND *ASPERGILLUS PARASITICUS* FUNGI

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Herbal essences are the groups of effective components in plants that their inhibitory effects have been known against extensive range of microorganisms. Side effects of toxins and their indiscriminate supply caused to using from natural alternatives instead of pesticides and chemicals have been considered. The aim of this study was to investigate the antifungal effects of *Thymus daenensis* L., *Mentha piperita* and *Foeniculum vulgare* on *Aspergillus flavus* and *Aspergillus parasiticus* fungi. For this instance, herbal essences have been prepared using the steam distillation by Clevenger apparatus and the 8, 16, 32, 64. 128, 250, 500 and 1000 microgram per milliliter concentrations were achieved. Then, the minimum inhibitory concentration, MIC, and the minimum lethal concentration, MBC, of these essences were applied in triplicate to determine the antifungal effects using the disk diffusion method. Results showed the essence of *Thymus daenensis* L. had the highest inhibitory effects on fungi and the essence of *Foeniculum vulgare* had the lowest. We can concluded that the essences of *Thymus daenensis* and *Mentha piperita* have acceptable antimicrobial effects on fungi [1,2].

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525

EFFETE OF UREA FERTILIZER ON *SILYBUM MARIANUM VIGOR* SEEDS

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Silybum marianum. is a adapted to arid and semi-arid regions. This plant can be propagated by seed. Produces poor seed in dry regions. In order to examine the nitrogen effect on *S. marinum* seed vigor, an experiment was performed in a Block - randomized complete design with three levels of urea (50, 100 and 150 kg/h) in three replications. The results showed that germination rate and percentage were affected by nitrogen levels. The highest germination rate, shoot and root length obtained at 50kg urea per hectare, but the highest germination percentage obtained at 100kg urea per hectare. Generally germination characteristics of *Silybum marianum* increased with increasing of urea to a certain level, but increases of them had no significant effect on seed vigor and It merely increases costs.

527

THE EFFECT OF SALT STRESS ON MORPHOLOGICAL TRAITS IN IRANIAN AND FOREIGN YARROW(*ACHILLEA MILLEFOLIUM*L.)POPULATIONS

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Nowadays soil and water salinity is one of the obstacles to use of the resources in the optimum production of agricultural products [1]. Yarrow is a perennial plant with a height of 30 to 90 cm and most grows in the plains, along roads and mountainous areas. Flowers, plant configuration and yarrow leave have medicinal properties[2]. The present study was conducted to investigate the effect of salinity on morphological characteristics. This study is a factorial experiment in a randomized complete block design(RCBD) By four levels of salinity treatments including control (tap water), 5, 10 and 15 ds/m in ten populations of *Achillea millefolium* species including AmUK (England), AmUS (United states), AmLit-R (Lithuania), AmSlo (Slovenia), AmSp (Spain), AmJap (Japan), AmAus13 (Austria), AmCan(Canada), AmIr1 (Kandovan, Iran) and AmIr2 (Lorestan, Iran). The experiment was conducted in the growing season 92-93 in Isfahan University of Technology. Some morphological traits were measured. The results showed that salinity significantly affected the measured traits. With increasing levels of salinity, plant height, leaf length, leaf width, leaf area, flower diameter, number of florets per inflorescence, number of branches, flowers width, the flowers length, dry matter yield, number of days to flowering, days to 50% flowering, days to 100% flowering, days to maturity period of flowering and seed decreased significantly. The Yarrow populations of AmUS, Spain, Slovenia and Japan in the salinity level of 15 ds/m did not reached to 100% flowering, while Canada, Lorestan and Iran populations was more susceptible to slat stress and their 100% flowering was not occurred in 10 ds/m.

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532

THE EFFECT OF PLANTING DATE ON YIELD AND YIELD COMPONENTS OF ROSELLE (*HIBISCUS SABDARIFFA L*)

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Roselle (*Hibiscus sabdariffa* L.) is a medicine plant that. Its leaves, seeds, capsules and stems of Roselle or hibiscus tea are used in traditional medicine. Planting time is an important role in determining yield and yield components. In order to study the effect of sowing date on yield and yield components of hibiscus tea field experiment was conducted in Agricultural Research Shiraz- Bajgah. The experimental design was a randomized complete block with 3 replications. Treatment was planting at 4 levels (1, 10, 20 and 30 May). The result showed that the effect of planting date had a significant effect on yield and components yield. The highest dry biomass dry weight plant, weight petals, weight and number of seed, weight and number of capsules, was obtained on May 30. According to the results the best date planting Roselle is on May 30 in Badjgah.

541

EFFECT OF VARIOUS EXPLANTS ON SHOOT REGENERATION OF CHAVIR (*FERULAGO ANGULATA* SUBSP *CARDUCHORUM*), AN IMPORTANT MEDICINAL HERB

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Ferulago angulata (Known in Iran as Chavir) belongs to the Apiaceae family is an endangered medicinally herb. Also, *Ferulago angulata* is recorded as a vulnerable species in the Red Data Book of Iran[1]. The essential oil of seeds and aerial parts of this plant contains variety of components with different therapeutically effects. *Ferulago* species are used in folk medicine for their sedative, tonic, digestive, anti-parasitic antibacterial and antifungal effects [2,3]. Therefore genetic preservation and expansion of its acreage has a high importance for using development of rapid and new propagation methods. Calli were induced from root, hypocotyl and cotyledon explants of chavir seedlings and embryo explants on MS medium supplemented with 2,4-D in combination with BA. Formation of shoots induced from calli by culturing on MS medium containing 0, 0.1 0.5, 1, 2 mg l^{-1} BA in combination with 0, 0.1, 0.5 mg l^{-1} NAA. Calli derived from hypocotyl segments showed higher frequency of plantlet regeneration and number of plantlets than the calli derived from another Explants . Therefore, MS medium supplemented with 0.1 mg l^{-1} BA and 0.5 mg l^{-1} NAA produced the highest number of shoot regeneration in hypocotyl-derived callus. The described method can be successfully employed for the large-scale multiplication and conservation of germplasm this plant.

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544

ASSESSMENT OF GIBBERELLIC ACID AND MOIST-STRATIFICATION EFFECTS ON GERMINATION OF HENBANE (*HYOSCYAMUS NIGER* L.)

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In order to investigate the effects of Gibberellic acid and moist-stratification on germination of henbane **(*Hyoscyamus niger* L.), a** factorial experimental based on randomized completely design with three replications was conducted at Faculty of Agriculture, Tarbiat Modares University in 2014. The moist-stratification including 4, 15, 30, 45 and 60 days and different concentrations of Gibberellic acid including 750, 1500 and 2250ppm were experimental factors. The results showed that moist-stratification and Gibberellic acid had significant effect on germination percentage and rate at probability levels of 5%. According to results, the most amount of germination percentage (23%) was recorded in 60 days of moist-stratification and 2250ppm of gibberellic acid treatment.

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550

EFFECT OF UV B/C ON MORPHO-PHYTOCHEMICAL TRAITS OF GROWING PLANTS OF *DRACOCEPHALUM MOLDAVICA* L.

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Recently, ozone layer depletion turning to increase penetration of UV radiation and this is one of most important reasons why many studies have been done about ultraviolet effects. Plants have some defends mechanism such as photochemical changes and morphological adaptation confronting reactions against these damages. Therefore, knowledge about these mechanisms will play important rule in higher plants management when exposed in UV stress. Dragonhead (*Dracocephalum moldavica* L.) is an annual, herbaceous plant belonging to the Lamiaceae family. Plant originated from southern Siberia and Himalayas maintain. Aerial part of plant is supposed to contain potentially active substances which have tranquillizing and appetizing effects. Recent pharmacological studies have confirmed some medicinal properties of essential oil including antioxidant, antiseptic, antibacterial and carminative properties. [1]. The areal parts of plant are used in traditional medicine in West Azerbaijan (Iran) for general tonic, stomachic, digestive, antiemetic, sedative and diaphoretic cases [2]. In the present study uniform six leafy stage seedlings were subjected to UV treatments. The seedlings were irradiated during 15 days with two days interval, for 15 and 5 min per day for UV-B and UV-C respectively. The results showed that the application of UV reduced shoot dry weight, plant height, inter-node distance, leaf area index and chlorophyll content, while increased stem diameter, total node number, number of lateral branches, leaf thickness, total flavonoid, total phenolic, and total antioxidant capacity. According to the results, the highest phenolic content was found in UV-C treated plants (657.86 $\mu g.g^{-1}$ DW) and the lowest occurred in control (300 $\mu g.g^{-1}$ DW). The highest flavonoid content were observed with UV-C treated plants (325 $\mu g.g^{-1}$ DW) and the lowest with control plants (204.5 $\mu g.g^{-1}$ DW). Also UV-B (53.1 % DPPHac) and UV-C (62.8%) treated plants had shown higher antioxidant activity than control(44.7%). It is believed that phytochemical changes consisting of flavonoid and phenolic contents and number varieties are defensive reactions of plant against physiological stresses such as UV-C and UV-B.

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561
IPBS: RETROTRANSPOSON BASED MOLECULAR MARKER FOR ASSESSING GENETIC DIVERSITY IN MEDICINAL PLANT *CARTHAMUS TINCTORIUS* L.

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Safflower (*Carthamus tinctorious* L.) is an important oilseed crop that has long been cultivated for different purposes, such as oil, fabric dyes, food coloring, medicinal and industrial needs [1]. Evaluation on the genetic diversity of safflower accessions originating from different gengraphical regions will help to provide valuable information on the conservation and utilization of safflower germplasm [2]. Retrotransposons as a class of repetitive and mobile sequences are ubiquitous and abundant components of virtually all known eukaryotic genomes. In this study the genetic diversity and relationships among 23 safflower accessions were evaluated using 10 primers originated from primer binding site (PBS) in LTR retrotransposons and named *iPBS*. A total of 116 bands were amplified, and 73 bands (about 62.3%) were polymorphic. Five to eleven polymorphic bands could be amplified by each primer, with an average of 7.3 polymorphic bands per primer. All the 23 genotypes could be distinguished by iPBS markers and were divided into 3 groups based on genetic similarity by using Un-weighted neibour joining method. The genetic diversity of examined safflower genotypes by *iPBS* technique was high and indicated that *iPBS* is an effective and promising marker system for fingerprinting in safflower and give useful information on its genetic relationships.

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572

EFFECT OF TEMPERATURE AND SALINITY STRESS ON SEED GERMINATION AND SEEDLING GROWTH OF (*CALENDULA OFFICINALIS L.*)

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In order to evaluate the Effect of Temperature and salinity strees on germination characteristics and seedling growth of *Calendula officinalis L.*, an experiment was arranged in a factorial experiment based on completely randomized design with three replications in laboratory of agriculture college of the Mohaghegh university of Ardebil. In this research, two factors were evaluated: first, five temperature (10°c, 15 °c, 20°c, 25°c and 30°c) and second, different saline solutions consisted of 0 (control), 40 mmol, 80 mmol, 120 mmol and 160 mmol concentrations of Nacl . In the end of experiment, were measured fresh weight and dry weight of shoot and radicel, radicel and shoot length, seedling length, seedling total weight and germination percentage. In this research in many characteristics, 20°c has been the best temperature for growing in salinity levels and in 30°c no seed germinated. It also proved about the salinity that both of these characteristics at control treatment and salinity level of 40 mmol stay of the same level and the plant resisted against salinity of 40 mmol and in some characteristics even to 80 mmol but observed some decrease of characteristics in 120 mmol and 160 mmol. The goal of this survey is to measure the resistance of *Calendula officinalis L.* against salinity and to find out the best temperature for growth in salinity stress conditions.

573
EFFECTS OF DIFFERENT RATES OF NITROGEN AND POTASSIUM ON YIELD AND YIELD COMPONENTS OF CUMIN (BUNIUM PERSICUM L.)

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An experiment was conducted to Investigating effect of different rates of nitrogen and potash on yield and yield components of cumin (Bunium persicum L.). The experiment was on base of randomized complete block design with three replications in 1387 for 5 years in Torogh agriculture and natural resources research station.Treatments were 4 nitrogen levels as(0,40,80and120 kgN/ha), and three potassium levels as(0, 40 and 80 kg k2o/ha).Results showed nitrogen application decreased grain yield and yield components, but increased straw yield. The main effect of potassium on grain yield, straw yield and number of umbels per plant, was significant. Interaction of nitrogen and potassium on grain yield, straw yield, number of umbels per plant , was significant. Interaction effects of nitrogen , potassium and application on the grain and straw yield was significant.Under conditions of this experiment Cumin grow with minimum application of nitrogen at desirable level, while respond prope application of potassium [1,2].

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583

EXAMINATION OF THE EFFECTS OF ALLELOPATHY OF *ROSMARINUS OFFICINALIS* L. ON SEEDS GERMINATION AND SEEDLINGS GROWTH *Raphanus sativus* AND *Lactuca scariola* L.

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Plants maybe affected directly or indirectly by allelochemicals which released from plants or microorganisms. In order to study the allelopathic effects of aerial parts rosemary of flowering stage on seed germination, root and shoot length and allelopathic index of *Raphanus sativus* and *Lactuca scariola* L, an experiment in a completely randomized design with three replications and seven treatments (EOs of 300, 600, 900, 1200, 1500, 1800 μlL^{-1} and distilled water as a control) was performed. The results of this study indicated that rosemary essential oil significantly ($p \leq 5\%$) decreased germination and growth parameters of studied plants. However, at concentration of 1500 μlL^{-1} of radish and concentration of 1800 μlL^{-1} in Lettuce, maximum inhibition effec were observed .Rosemary EO had a stimulatory effect of low concentrations and Cause increased root and shoot length were compared with the control of Lettuce. The results showed that by increasing the EO concentration, the allopathic effects significantly increased [1,2].

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586

EVALOUTATION OF GENETIC VARIATION, DROUGHT RESISTANCE AND AGRONOMIC BEHAVIOR OF PLANTAGO SEPECIES

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World Health Organization (WHO) statistics shows that more than 70% of the world population relies on herbal medicines such as *Plantago* for primary health care [1, 5]. This study was carried out in two locations and two years, 2013 and 2014, to determine the genetic variation, agronomic behaviour and drought response of 6 species of *Plantago* including: *P. major* (8 ecotypes), *P. lanceolata* (5 ecotypes), *P. ovata* (5 ecotypes), *P. Psyllum* (5 ecotypes), *P. Coronopus* (2 ecotypes) and *P. lagopus* (2 ecotypes). Drought stress was imposed by two different irrigation interval (7 and 20 days) in the Research Farm of the College of Agriculture and also in Koshkak Research Station of Shiraz University. Results showed significant differences for seed yield and yield component, and biomass among *Plantago* species in both locations under two drought conditions. *Plantago major* significantly showed the highest seed yield and biomass under normal drought condition. The seed yield and biomass of *P. lanceolata* was significantly lower than *P. major* and but significantly higher than other species under normal drought condition. Under drought stress condition, biomass production of *P. Major* and *P. Lanceolata* was significantly less than other species. Grain weight of *P. ovata* and *P. psyllum* was significantly higher than other species under two drought conditions in both locations. Data showed that *P. major* and *P. lanceolata* are adapted to normal drought conditions and are very sensitive to water-deficit conditions. Data of grain yield revealed that *P. ovata* and *P. psyllum* are more tolerant when dealing with drought stress. Drought increased mucilage content of drought sensitive species. The effect of location on mucilage content was significant and it was differed upon the type of species. The hierarchical clustering results showed that *Plantago* species were divided into 4 major groups. *P.* major and *P.* Lanceolata assigned to the first group while the second group constructed by *P. psyllum* and *P. ovat*a. *P. lagopus* and *P. Coronopus* separately assigned to the third and fourth groups. Thus, it can be concluded that field and acclimatization research is useful for not only unravelling but also assessing genetic diversity in *Plantago* species [2, 3 , 4].

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594

INVESTIGATION OF GENETIC DIVERSITY IN SOME POPULATIONS OF FLAX (*LINUM ALBUM* KY. EX BIOSS.) USING MORPHOLOGICAL TRAITS

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Flax (*Linum album* Ky ex. Boiss.) is an endemic species of Linaceae family in Iran, distributed in northwest, west and center of the country. This plant contains some important Lignans such as podophyllotoxin and 6-methoxypodophyllotoxin with antiviral and antitumor effects. Understanding genetic diversity within a species is the first step for breeding and domestications in order to introduce a desired population or genotype. To investigate genetic diversity of *L. album*, 11 populations from Hamedan province selected and studied morphologically. In spring of 1393 total of 55 specimens (five per each populations) were collected and 26 morphological traits where measured with five replications. The measured traits were as follow: plant height and diameter; main stem length, internodes length of main stem and lateral stems, number of lateral stems, length (L), width (W) and the ratio of length to width (L/W) of basal, and stem leaves; W, L and L/W of bract (floral leaf); flower diameter; W, L and L/W of sepals and petals, length of flower tube, length of inflorescence, and number of flowers per inflorescence. Geographical information of studied habitats was recorded by GPS instrument. Data analysis was performed by mean comparison tests (F test) using SPSS software. The results showed that *Linum album* in Hamedan province grows at altitude 1551-2176 m. The majority of traits had significant differences at 5% level except for number of lateral stems, L, W and L/W of stem leaves and W and L/W of bracts meanwhile, 17 traits had significant differences at 1% level. Classification of populations based on 26 quantitative traits by cluster analysis set up 5 groups. Special characteristics of each group were described. Correlations between the populations and geographical factors were discussed. To introduce the best populations for cultivation and domestication of *Linum album* still more detailed investigation is needed.

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607

ALLELOPATHIC EFFECTS OF *ROSMARINUS OFFICINALIS* L. ON SEEDS GERMINATION OF *RAPHANUS SATIVUS* AND *AMARANTHUS RETROFLEXUS*

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Allelopathic compounds influence biochemical and physiological processes of their adjacent plants. Rosemary allelopathic quality which is a perennial plant and is related to Laminaceae family over the germination of seeds and the growth of *Raphanus sativus* seedlings and *Amaranthus retroflexus* was considered in a series of examinations. First, aqueous extract of fruit set stage rosemary with 10 percent density (100 grams of the growing part per 1000 ml water) were prepared and then aqueous extract (0, 2.5, 5, 7.5 and 10%) were made and the effect of over seeds germination and mentioned seedling growth was taken into consideration. The experiment was made in a completely randomized design with three replications and the LSD test was used to compare the data average. The results of this study indicated that rosemary aqueous extract significantly ($p \leq 5\%$) decreased germination, root and shoot length and allometric ratio. Also, there were no significant difference between concentrations of 7.5 and 10% observed in all traits. Our results showed that rosemary extract had strong allelopathic effects and inhibited seed germination of weeds recommended in production of natural herbicides [1,2].

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609

EFFECT OF HUMIC ACID ON PERFORMANCE AND NANO IRON CHELATED HERBS AND ESSENTIAL OIL OF LAVENDER (*LAVANDULA ANGUSTIFOLIA*)

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This study investigated the effect of humic acid on nano iron chelated on yield and essential oil of lavender herbs, A factorial experiment in a randomized complete block design 4 replications and 2 treatments were conducted at the Experimental Station usual; the first factor consisted of humic acid at 0, 1500, 2500, 4000 milligrams per liter Foliar application of chelated iron nano second factor at 0, 3/1, 3/5, 7/10 mg per kilogram of soil; The results showed that different concentrations of humic acid on germination traits but there are significant differences; The results also showed that the humic acid concentration of 2500 mg l-highest rate of germination, seedling vigor, root length and dry weight of shoot and root to shoot ratio accounted for; humic acid consumption in terms of improvement in plant height, plant fresh weight, Plant dry weight, number of leaves, fresh weight, dry weight, leaf length, leaf stomatal conductance, chlorophyll index, photosynthesis, Increased butyric acid, propionic acid and acid Valeric, linalool and geramboul oil is extracted; Based on the results obtained from the use of humic acid 2500 mg and 5.3 mg of nano-iron chelates in normal circumstances has the greatest impact on herbs and lavender essential oils will increase the yield and quality.

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617

CALLUS INDUCTION AND DEVELOPMENT OF RELIABLE MICROPROPAGATION PROTOCOL FOR *SALVADORA PERSICA*

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Salvadora persica belongs to family Salvadoracea, also known as miswak or tooth brush tree. Its different parts contain chemical compounds that show the plaque inhibiting and antimicrobial activities against oral pathogens. So, it is used for the cure and care of mouth and teeth. The present study was accomplished with aim of callus induction and development of reliable micropropagation protocol for this valuble plant. For callus induction, leaf explants was cultured on MS basal medium fortified with 2, 4-D (2-4 mg/l) with combination of BA (0.25-0.5 mg/l), Kin (0.5 mg/l) and NAA (2 mg/l). Callus initiation was observed best in MS medium fortified with 2mg/l NAA and 0.25 mg/l BA. The highest callus growth in terms of dry weight (94.33±9.29 mg) was observed in MS medium fortified 2mg/l 2, 4-D and 0.5 mg/l Kin. For micropropagation, the nodal segment contain auxiliary bud was cultured on MS basal medium supplemented with 2,4-D (2-4 mg/l) in association with BA (0.25-0.5 mg/l). The highest shoot induction (6.2±3.347 per explants) and length (5.74±1.00 was observed in MS medium supplemented with 2mg/l 2, 4-D with combination of 0.5 mg/l BA. Regenerated shoots were rooted best (50%) on half strength MS medium contain 2mg/l IBA with length of 1.4± 0.5 cm. Rooted shoots were transferred to pots containing peat moss and sand in a ratio of 1:1. The recorded survival rate of the plants was 80.3%. Plants looked healthy with no visually detectable phenotypic variations.

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618

CHANGES IN THE LEVELS OF SECONDARY METABOLITES OF *PLANTAGO OVATA* UNDER DROUGHT STRESS

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Plants in natural and agricultural conditions are continuously exposed to several biotic and abiotic stresses. Among these stresses, drought stress is one of the most important environmental factors limiting plant growth and productivity and considered as a serious threat for sustainable crop production in the conditions of changing climate [1]. Therefore, the introduction of drought tolerant plants can be useful in resolving this problem. Plants belonging to the genus *Plantago* have economic and medicinal importance and their seeds and leaves are used [2-4]. Thus, the objective of this research was to study the effect of drougth stress on levels of secondary metabolites of *Plantago ovata* Forsk. leaves.Sterilized seeds of *P. ovata* were germinated into pots filled with sand and peat. After germination of seeds and growth of plants to 3 to 4 leaf stage, the plants were divided according to the irrigation periodic intervals of 2, 5, 8, 11, 14 and 18 days. Five replicates were used for each treatment. Plants were harvested to measure the amount of secondary metabolites after 36 days. The total flavonoid, total saponin and total iridoid contents of leaves were measured according to the methods described in the scientific literature [5,6].The levels of total flavonoid and saponin were increased from control group to 8-day treatment group with increasing levels of stress. The highest value of total flavonoid (0.53%) and saponin (0.11%) were observed in 8-day treatment group and the lowest value of them were recorded in 18-day treatment group for total flavonoid (0.20%) and in control group for total saponin (0.08%). The level of total iridoid was increased from control group to 11-day treatment group with increasing levels of stress. The highest and the lowest value of total iridoid were observed in 11-day treatment group (1.08%) and 18-day treatment group (0.71%), respectively.The secondary metabolites play an important role in the adaptation of plants to environmental changes and stresses. The results of this study showed that with increasing levels of drought stress, the total amount of secondary metabolites of *P. ovata* was also increased. Then, it can be concluded that this plant is adapted to dry weather conditions. Therefore, because of the economic and medicinal importance of *P. ovata*, this plant is cultivable in arid areas.

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621
COMPARISON BETWEEN DIFFERENT DRYING METHODS ON PHYTOCHEMICAL CHARACTERISTICS OF CATNIP

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In this century, a wide study was performed on medicine plants and discovery of drugs with natural active compound opened a new perspective for medical society and pharmacists researchers [1]. Catnip (*Nepeta cataria* L.) belongs to Lamiaceae family, is a perennial plant which cultivated in the entire world [2]. Catnip as an herbal plant contains Nepetalactone [3]. Drying is one of the oldest methods for maintenance of post-harvest agricultural crops which it includes elimination of moisture by evaporation to specific threshold for long term storage [4]. If drying performed by correct method, extent of active compound has no change [5]. Therefore, this research was carried out in order to test the effects of different drying method on phytochemical characteristic of Nepeta cataria. Experimental treatment includes (1) fresh harvest (2) sunny drying (3) shaded drying (4) drying by oven 35 C (5) drying with oven 45 C (6) drying with oven 55 C (7) drying with microwave power 200 and (8) microwave power 100 in an experiment using completely randomized design in three replications. The results showed that the highest percent of essential oil was obtained with drying by oven 55 C and the lowest percent was observed with dying by sunny area and shaded area. Also for other essential oil components such as Sainene, β-pinetine and Nepetalactone, the highest content were obtained with drying by oven 55 C and then with drying by microwave power 200. But Z-β-Ocimene, E-β-Ocimene and trans-Caryophyllene showed the highest content with drying by shaded area. Overall the best results for essential oil and essential oil content of Catnip were obtained with drying by oven 55 C.

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636
ANTIOXIDANT ACTIVITY OF SELECTED IRANIAN HERBAL ESSENTIAL OILS

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Free radicals contribute to maney human health defects such as cancer, Alzheimer and cardiovascular diseases. . To find active agents that can reduce the effects of free radicals several research have been conducted and effects of antioxidants such as herbal compounds and derivatives as a food supplement are studied. Oxidation can be stopped or slowed down by antioxidants such as herbal essential oils. In this study, antioxidant activities of four different native Iranian herbal medicines including *Citrus Limonum, Ferula golbaniflua, Trachyspermum ammi*, and *Myrtus Communis* as well as the combination of them are investigated. Antioxidant activity was determined using the 2,2'-azino-bis-(3-ethyl-benzthiazoline-6-sulfonic acid) scavenging method and the data reported as Trolox equivalent antioxidant capacity (TEAC) (µM) The antioxidant activities for individual essence and combination of different essence are studied and results are compared with Trolox (water soluble vitamin E analogue) effects using standard curve. The results revealed that *Trachyspermum ammi*, *Myrtus Communis*, in the first place then *Ferula golbaniflua* in the second place has the highest antioxidant activity and *Citrus Limonum* has the lowest antioxidant activity as a single essence. According to the results obtained when the essentilal oils are mixed together have a significant synergistic effect, e.g. combination of *Citrus Limonum*/ *Myrtus Communis, or Citrus Limonum/ Trachyspermum ammi*/ *Myrtus Communis* . Numerous studies have confirmed the benefits of organic antioxidants and the role they play in maintaining good health and reducing your risk of heart disease, Parkinson's, Alzheimer's, and cance. From, these results the essential oils can be recommended for treating disease related to free radicals and to prevent cancer development.

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638
PRIMING EFFECTS ON GERMINATION IN COMMON PLANTAIN (*PLANTAGO LANCEOLATA* L.)

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To evaluate the effects of priming and some seed pre treatments on germination of plantain, a laboratory experiment was conducted in 2014. Treatments consisted of hydropriming (0, 24, 36 and 48 h), sulfuric acid (0, 10, 20 and 30 s), 7 days of stratification (dry and moist at 0 and 5 °C), alternate light/dark period and various concentration of potassium nitrate (0, 3, 6, 9 mg/l). A complete randomized design with three replicates was employed. Results showed that hydropriming had a significant imapct on germination, so that the greates germination was obtained in hydropriming at 24 h. Alternate light/dark had also an increasing effect on seed germination by 32 %. Moist stratification was able to incraese seed germination by 20 % compared to dry stratification. However, potassium nitrate and sulphuric acid caused a decrese in seed germination of plantain. Generally, the results of the present study showed that hydropriming at 24 h, alternate light/dark and moist stratification are promissing treatments to incraese germination of this medicinal plant [1,2].

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640

STUDY OF THE EFFECT OF ORGANIC AND CHEMICAL FERTILIZERS ON QUALITATIVE AND QUANTITATIVE CHARACTERISTICS OF LEMON BASIL (*Ocimum citriodorum* Vis.)

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A two years experiment was conducted during 2013 and 2014 in order to study the effect of organic and chemical fertilizers (as NPK) on qualitative and quantitative characteristics of Lemon Basil (*Ocimum citriodorum* Vis.). The experiment was arranged in randomized complete blocks design (RCBD) with 7 treatments each of which with 3 replicates. Treatments included vermicompost tea (1:5), vermiwash, chemical fertilizer (NPK: 20-20-20 1.5g/L) alone or in combined form, plus control (without adding fertilizer). Treatments were applied as soil drench in weekly manner for six weeks. Plant characteristics including leaves chlorophyll content, plant biomass, seed yield and essential oil content were measured. The combination of vermiwash and vermicompost tea increased chlorophyll content, essential oil yield and plant herbal yield. The results emphasize the possibility of using organic-based fertilizers as a substitute for chemical fertilizers for improving herbal yield in sustainable agriculture.

645

STUDY OF SOME MORPHOLOGICAL AND BIOCHEMICAL CHARACTERS AMONG NINE *SALVIA* L. ECOTYPES

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The genus *Salvia* L. belongs to the Lamiaceae family that shows a variable assemblage of nearly 1000 species especially in the areas of Central and South America, Central and Eastern Asia, Mediterranean region and Southeast Africa [1,3]. There are about 56 species of this genus distributed in Iran [4]. Plants from this genus are renowned for their biological activities such as antibacterial, antioxidant, antitumor, antidiabetic and antimicrobial activities [4]. Information on seasonal variation of morphological and biochemical characters are crucial to optimize harvesting protocols [2]. This study was conducted for investigating some morphological and biochemical characters among nine ecotypes of four *Salvia* genus species named *Salvia. nemorosa*, *S. spinosa*, *S. verticillata* and *S. virgata* based on Randomized Complete Block Design (RCBD) with three replications in the research field of Agricultural Education Center of Qazvin during 2013 and 2014 years. The results indicated that the interaction between ecotypes and years was significant about studied characters. Also the average values of traits revealed that the most plant yield was belonged to Qazvin ecotype of *S. nemorosa* and *S. virgata* in the first year, Isfahan ecotype of *S. nemorosa* and Qazvin ecotype of *S. virgata* in the second year. Also Qazvin ecotype of *S. spinosa* was better about essential oil and dry methanolic extract percentage in both studied years. The results of stepwise regression revealed that dry weight of flowers and leaves had high effect on dry plant weight, while flowers and leaves number in plant had more effect on dry methanolic extract percentage. Essential oil and dry methanolic extract percentage had mutual impacts, too. So it can be generaly concluded that some morphological and biochemical characters in these studied species are closely influenced by each other.

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655

USING NON-LINEAR REGRESSION MODELS TO DESCRIBE THE EFFECT OF FLOODING STRESS ON SEED GERMINATION OF *SALVIA* SPP.

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In this experiment, quantitative information about effect of flooding stress on seed germination in *salvia* spp. is gained by using non-linear equations. The significant target of this essay was to describe a seed germination behaviors of *salvia* spp. . This experiment was conducted in Institute of Medicinal Plants (IMP) in Iran. three species, which were used in this study, involved: *S. hypoleuca*, *S. nemorosa* and *S. macrosiphon*. Flooding stress, were included five levels of, 0, 1, 3, 6 and 10 days. Multiple non-linear equations were used to demonstrate the connection among seed germination and flooding stress. Results indicated that the response of *Salvia* spp. seed germination to flooding stress is best depicted by a Polynomial, Exponential and sigmoidal functions. Six physiological germination Indices, including, Mean Germination Time (MGT), Germination Percentage (GP), Vigour Index (VI), Dry Weight (DW) and Shoot: Root Ratios), were meted and simulated until to demonstrate the germination behavior of *Salvia* spp. . By increasing the flooding stress these Indices were decreased simultaneously. Sigmoidal, Logestic, 3 parameters was the best equation which describe GP of *S. nemorosa*, VI and DW of *S. hypoleuca*, Shoot: Root ratios of *S. macrosiphon* with R^2Adj of 98/93, 98/67, 99/96 and 99/8 respectively and Polynomial, Cubic has the best fitting for GP of *S. hypoleuca*, DW of *S. macrosiphon* and MGT of *S. macrosiphon* and *S. nemorosa* with 97, 1, 99 and 99 R^2Adj, respectively. Shoot: Root ratios of *S. nemorosa*, MGT of *S. macrosiphon* and VI of *S. macrosiphon*, with R^2Adj of 97, 99 and 1 respectively were best describe by Sigmoidal, Hill, 3 parameters. Polynomial, Quadratic was the best equation wich feet DW of S. nemorosa by R^2Adj of 94. Information gained from this research, progress our information about germination behavior of *Salvia* spp. under flooding stress.

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659

EVALUATION OF LOW IRRIGATION STRESS ON SEED YIELD OF DIFFERENT CUMIN ECOTYPES

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Cumin is one of the most important medicinal plants in arid and semiarid regions which is one of the most important export crops for countries such as Iran. To study the effect of drought stress on seed yield of different cumin ecotypes, an experiment was conducted in normal and terminal drought stress conditions in the research field of College of Abouraihan, University of Tehran, Iran. 49 cumin (*cuminum cyminum* L) ecotypes originated from different parts of Iran were cultivated in frame of a simple 7×7 lattice design with two replications during cropping season 2012-2013. Low irrigation (30% FC) stress was applied from flowering stage in stress experiment. After harvest, seed yield amount was measured for all ecotypes. The results showed that in both conditions there are significant differences among all ecotypes. Combined analysis of variance showed significant difference between two conditions. There was also significant difference in ecotype × condition interaction. There were both cross over and non-cross over types of interaction. Results showed that the lowest seed yield amount belong to ecotypes of Esfarayen from Northern-Khorasan and Kooh-banan from Kerman in stress condition and ecotypes of Esfarayen from Northern-Khorasan and Feridan from Esfahan have the lowest seed yield in normal irrigation condition. Ecotypes of Rafsanjan (Kerman) and Darmian (Southern-Khorasan) had the highest seed yield among evaluated ecotypes. Also these cumin ecotypes could be proposed for cultivation in arid regions with hot climate.

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660
REGIONAL CHANGES OF SOME SECONDARY METABOLITES IN TWO POMEGRANATE CULTIVARS

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Punica granatum L. is believed to be a native plant of Iran [1]. It is known to be one of the healthiest fruits due to its high antioxidant activity and high content of anticarcinogenic compounds [2]. It has been reported that pomegranate juice is an important source of anthocyanins which gives the fruit and aril its red color, phenolics and tannins [3]. Fresh juice contains a small amount of pectin, ascorbic acid, and flavonoids [4]. Recent biological studies have established that certain compounds in pomegranate juice that significantly reduce low-density lipoproteins oxidation can also reduce blood pressure and possess antiatherosclerotic effects [5]. In this experiment, the contents of phenol, flavonoid, anthocyanin and antioxidant activity were studied in two cultivars (Malas and Yousefkhani) grown in three regions (Ali-Abad, Sari and Saveh). These regions have very different climatic conditions concerning temperature, humidity, *etc*. Anthocyanin accumulation in plants is sensitive to environmental conditions [6]. The expression of the anthocyanin biosynthetic genes has been induced by low temperature and repressed by high temperature in various plants [7]. The results showed that there was a significant difference between the two cultivars in the content of anthocyanin ($P<0.001$) and the maximum content was present in Yousefkhani cultivar. Anthocyanin content was also significantly different among the regions ($P=0.045$) and the maximum and minimum amounts were found in Ali-Abad (40.07 mg/100ml) and Saveh (30.54 mg/100ml), respectively. Conversely, antioxidant activity and the amounts of flavonoid were not significantly different among the cultivars and the regions studied. Phenol content was significantly different in different regions ($P<0.001$) as attained maximum and minimum values in Ali-Abad region (9.74 mg GAE/100ml) and Saveh region (6.6 mg GAE/100ml), respectively. Schwartz *et al* [2] have been reported previously that phenol and anthocyanin contents of some pomegranate cultivars were higher in Mediterranean climate than the desert climate. There was not any significant difference between the two cultivars in the amounts of phenol. According to the results of this study, growth region had significant effects on the content of phenol and anthocyanin in the mentioned cultivars and the highest content of phenol and anthocyanin was present in pomegranates grown in Ali-Abad region.

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662

THE EFFECTS OF ENCASULATED NANO- AND MICROPARTICLES OF PEPPERMINT EXTRACT ON MEAT QUALITY OF BROILERS SUBJECTED TO HEAT STRESS

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In order to investigate the effects of encapsulated nano- and microparticles of peppermint alcoholic extract on the meat quality of broilers, 320 day-old broiler chicks (Ross, 308) were assigned to 4 experimental treatments including basal diet (control), basal diet plus peppermint extract, basal diet plus encapsulated nanoparticles of peppermint extract and basal diet plus encapsulated microparticles of peppermint extract in a completely randomized design with 4 replicates and 20 birds in each. The heat stress (34 ± 1°C) was applied once daily (from 1000 to 1600 h = 6/d) from d 35 to 42 of experiment. The pH values were not statistically significant between experimental treatments. 2-Thiobarbituric acid-reactive substance (TBARS) values of breast and thigh meats were not affected by micro encapsulated particles, whilst its value in breast and thigh meats were significantly lower in birds treated with alcoholic extract of peppermint and particularly encapsulated nanoparticles of peppermint extract ($P<0.05$). The amounts of crude fat was lower in breast and thigh meats of birds received alcoholic extract, encapsulated nano- and microparticles of peppermint extract than control ($P<0.05$). In general, results indicated that encapsulated nanoparticles of peppermint alcoholic extract have potential to improve oxidative stability and meat quality.

664

EFFECTS OF ENHANCED UV-A RADIATION ON CONCENTRATION OF PHENOLIC COMPOUNDS OF ROSMARY

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The quality and quantity of secondary metabolites in plant are changed in the adaptation response to the various types of environmental fluctuations. Some of these secondary plant products (active ingredients) have medicinal properties that can be useful to human health [1,2]. In the present study, the effects of enhanced UV-A (360 nm) radiation on *Rosmarinus officinalis* L., an aromatic and medicinal plant, were analyzed. For this purpose, the concentration of phenolic compounds, total flavonoid and the antioxidant capacities for leaf extracts were evaluated. The plants were exposed to a range of UV-A for 40 days, each day for 1, 2 and 4h, in a greenhouse experiment. Based on the results of the current study, the lowest and the highest concentration of total phenol (112.48 and 216.45 mg/g extract weight), whole flavonoid (52.57 and 110.75 mg/g extract weight) and antioxidant capacity (83.12% and 97.59%) resulted from the lack of UV radiation and exposure for four hours, respectively. Among the phenolic acids, identified in rosemary, the highest concentration of carnosic acid, rosmarinic acid, vanillic acid, caffeic acid and Naringenin (14.01, 5.3, 0.040, 0.058 and 1.37 mg/g FW, respectively) were obtained in plants exposed to UV for four hours, and the least amounts of these compounds (6.03, 2.1, 0.0086, 0.007, 0.64 mg/g FW, respectively) detected in the control plant. Finally, based on the findings of the present study, increased ultraviolet radiation of UV-A, which is not harmful to human health, has the potential to increase the production of phenolic active ingredients with a higher antioxidant capacity in rosemary.

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665

STDY OF NANO- AND MICROPARTICLES ENCAPSULATED PEPPERMINT EXTRACT ON IMMUNE SYSTEM OF BROILERS UNDER HEAT STRESS CONDITION

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This study investigated the effects of encapsulated nano- and microparticles of peppermint alcoholic extract on the immune system of broilers subjected to heat stress. A total of 320 day-old broiler chicks (Ross, 308) were assigned to 4 experimental treatments including basal diet (control), basal diet plus peppermint extract, basal diet plus encapsulated nanoparticle of peppermint extract and basal diet plus encapsulated microparticle of peppermint extract in a completely randomized design with 4 replicates and 20 birds in each. The heat stress (34 ± 1°C) was applied once daily (from 1000 to 1600 h = 6/d) from d 35 to 42 of experiment. Results showed that birds receiving nano- and microparticles of peppermint alcoholic extract had greater relative weight of bursa than birds receiving peppermint alcoholic extract and control group ($P< 0.0001$). In addition, birds fed diet supplemented with nano- and microparticles of peppermint alcoholic extract had greater total number of white blood cells than other experimental treatments ($P<0.0001$). H/L ratio was lower for birds treated with nano- and microparticles encapsulated peppermint alcoholic extract and also alcoholic extract of peppermint than control ($P<0.01$). In general, this study indicated that encapsulated nano- and microparticles of peppermint alcoholic extract have potential to improve the function of immune system of broilers subjected to heat stress.

670

CHEMICAL COMPOSITION AND TOXICITY OF SOME MEDCINAL PLANTS AGAINST *EPHESTIA KUEHNIELLA* (LEPIDOPTERA:PYRALIDAE)

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Ephestia kuehniella is a major pest in industrial flour mills in temperate climates. The control of these pests in storage systems is mainly based on fumigants such as methyl bromide or phosphine. However, there is a global concern about their negative effects, such as ozone depletion, environmental pollution, toxicity to non-target organisms, pest resistance and pesticide residues in foods. Thus, development of an alternative and benign method is necessary in order to control such pests. Recent researches have shown that essential oils and their constituent have potential to be used as alternative compounds to currently used fumigants. Thymus daenensis, Satureja khuzestanica,.and Zataria multiflora are three medicinal plants from Lamiaceae endemic to Iran. Toxicity of these essential oils against Ephestia kuehniella was evaluated by fumigation method using Petri dishes (21 mL). [1]. Plants materials were obtained from Medicinal Plants and Drugs Research Institute of Shahid Beheshti University, then the dried materials were subjected to hydrodistillation using Clevenger type distiller for the extraction of essential oils. Extracted essential oils were dried via anhydrous sodium sulphate and stored at 4 ˚C in darkness. The essential oils were analyzed by GC/MS. The major identified compounds in two plant species (Zataria multiflora - Thymus daenensis) were Thymul (24.96% -72.34%) and Carvacrol (26.74% - 7.07%), respectively. However, in Satureja khuzestanica the major compound was Carvacrol (83.77%). The appropriate concentrations of essential oils were tested against the third and the fourth larvae instar at 27±1˚C and 65±5% RH. Each concentration was replicated four times with each replicate consisting of 10 larva. The control consisted of a similar setup but without essential oils. Mortality was recorded after 24 hours post treatment. Probit analysis was done using polo-plus software. Results showed that the LC50 values of Thymus daenensis, Zataria multiflora and Satureja khuzestanica essential oils against third instar larva were 4514.177, 3538.225 and 3179.368 µl/l air and against forth instar larva were 6513.913, 6077.190 and 6030.786 µl/l air, respectively. Also, the results indicated that Satureja khuzestanica and Thymus daenensis had the most and the least toxic effects toward the tested insect, respectively showing a positive relationship between amount of Carvacrol and the insect fumigant toxicity. These data suggest that essential oils of all the three plant species have potential to be employed in the pest management programs designed for a safe and effective control of Ephestia kuehniella.

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671

FUMIGANT TOXICITY OF ESSENTIAL OILS EXTRACTED FROM THREE *SATUREJA* SPECIES (LAMIACEAE) AGAINST *EPHESTIA KUEHNIELLA*

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Mediterranean flour moth, *Ephestia kuehniella* (Lep.: Pyralidae) larvae feed on dry plant products especially cereals and found worldwide. Currently, in order to control this insect pest synthetic chemical pesticides are used. However, there is a great concern regarding the side effects of the pesticides on the non-target organisms, environment, foods and feeds. Thus, essential oils have been proposed as a new ecologically safe method for insect pest control in closed environment. As a result, aim of the current study was to investigate toxicity of the three plant species including *Satureja khuzestanica*, *S.bakhtiarica* and *S.rechingeri* from Lamiaceae family against the last instar larvae of the flour moth. Essential oils were extracted basically according to Aslan et al.[1]. Breifly, plant materials were dried in dark and then they were subjected to hydrodistillation using Clevenger type distiller for the extraction of essential oils. Extracted essential oils were dried via anhydrous sodium sulphate and stored at 4 ˚C in darkness until they were used. Toxicity assays of essential oils against the fifth instar larvae were done based on keita et al.[2]. The experiments were carried out in Petri dishes (21mL) at 27±1˚C and 65±5% RH under dark conditions. There were five concentrations 5714,6286,6762,7239,7857 µl/l air of the essential oils tested against larvae and each concentration was replicated four times with each replicate consisting of 10 larvae. The control consisted of a similar setup but without essential oils. Mortality was recorded 24 and 48 hours post treatment. To calculate lethal values Probit analysis was done using polo-plus software. Results showed that the LC_{50} values of essential oils from *Satureja rechingeri*, *Satureja bakhtiarica* and *Satureja khuzestanica* against 5th instar larvae after 24 hours exposure were 7263.146, 7302.777 and 7567.972 µl/l air and after 48 hours exposure were 7097.639, 7150.448 and 7495.027 µl/l air, respectively. As indicated essential oils from *Satureja rechingeri* was more toxic to flour moth larvae than the other two essential oils e.g. *S. bakhtiarica* and *S. khuzestanica*. It could be concluded that *Satureja* species essential oils were toxic to flour moth larvae and these essential oils needs to be further investigated in order to obtain a clear picture regarding their use in the IPM programs against the insect pest.

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674

ESSENTIAL OIL REPELLENCY OF TWO PLANT SPECIES, *THYMUS DAENENSIS* CLAK AND *ZATARIA MULTIFLORAE* ON THE MEDITERRANEAN FLOUR MOTH LARVAE

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Ephestia kuehniella (Zell.) (Lep.; Pyralidae) is the major pest, which causes severe losses to infested products. So, the control of this pest is based on use of the synthetic insecticides. However, synthetic insecticides have many drawbacks, including pest resistance, health hazards and risk of environmental contamination. Thus, there is a need to develop safe alternatives way to replace use of chemical insecticides . Plant essential oils may act as fumigants, contact insecticides, repellents, deterrents and antifeedants. So, the aim of this study was to investigate the repellency effect of essential oils from two plant species including *Thymus daenensis* and *Zataria multiflorae* against the last larval instar of *E.kuehniella*. A choice bioassay system was used to evaluate repellency of the two oils in a filter paper arena test using Petri dishes (21mL) [1]. Half filter paper disks of 6 cm diameter were treated with 0.5 ml of acetonic solutions of the two oils (0.008-0.016µl/cm^2) and then left them to dry. Thus, half of the bottom of a Petri dish was covered with the treated filter paper, while the other half was covered with a filter paper disk impregnated with only acetone (as control). Then, ten 5th larva instar were put into each Petri dish and the lid was sealed with parafilm. Each treatment was replicated four times. The test was carried out under the control condition with 27±1˚C and 65±5% RH. Repellency was recorded after 2, 4 and 24 hours post treatment. Finally, percentage of repellency (PR) was calculated. Results showed that the two oils tested had a strong repellent activity towards *E. kuehniella* fifth instar larva in comparison with control. Also, the concentration–response analyses showed that the repellency activity was increased when insects were exposed for a longer time. However, repellent activities of the two essential oils against fifth instar larvae were not significantly different. The greatest amount of the repellency was obtained at 24 h exposure time which was 0.011 µl/cm^2, both in *Thymus daenensis* and *Zataria multiflorae*. These findings indicated that low concentration from the two oils have strong repellent activity on the last instar larvae of *E. kuehniella*, besides sensitivity of the immature stages was reversely proportional to their old. Therefore, it could be concluded based on the results obtained from the current research that plant essential oils in addition to their insecticidal effect, have strong repellency effect showing their great potential as an insectistatic effect.

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678

PHYLOGENIC RELATIONSHIPS OF SOME IRANIAN GENOTYPES AND EUROPEAN CULTIVARS OF CHICORY (*CICHORIUM INTYBUS* L.)

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Chicory (*Cichorium intybus* L.) is an important industrial crop which is used for inulin production. Inulin is widely applied as food ingredient, bioactive prebiotic compound, fat replacer, sweetener, food stabilizer and thickener agent due to its health promoting properties owing to its indigestibility by human enzymes and its fermentation in the colon. For the first time, attempts were made to investigate 13 endemic chicory genotypes including *C. pumilum* along with 5 root chicory cultivars, 4 witloof chicory verities and a crispum endive (*C. endivia*), as an out-group in RCBD with three replications in research farm of agricultural and natural resource collage of Tehran university, to find their phylogenic relationships based on some diagnostic morphological traits. Among endemic genotypes only Firizi genotype, which collected from Chenaran mountainous region in Khorassan-e razavi province, continued its growth for the following year. Other endemic genotypes such as hairy commercial Iranian genotypes, with long time cultivation in Iran for distilling industry, were passed away after overwintering. In general, with the exception of Firizi landrace which was classified in *C. intybus* collection, the other endemic genotypes exhibited the maximum similarity with *C. endivia*, as all of which formed a monophyletic clade. Also, cross among crispum endive and hairy commercial Iranian chicory genotype (Kazeron2) led to progenies with intermediate traits of their parents. It can be concluded that first step for industrial chicory breeding program is to find biannual chicory genotypes which they are resistant to bolting as all inulin fractions are affected adversely by this important characteristic. According to the phylogenic analysis and cross results, it seems that hairy commercial Iranian genotypes are from *C. endivia* and might be classified as its subspecies. So, commercial Iranian chicory genotypes aren't suitable genotypes to improve root yield of chicory as industrial cultivar for inulin production [1,2].

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683

EVALUATION OF ESSENTIAL OIL QUANTITY FROM NATURAL HABITATS IN IRAN OF SALVIA STAMINEA MONTHR ET AUCH. EX BENTH

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Salvia Staminea belongs to the labiatae family, has a wide distribution in our country. Plants collected from different areas could be used to find good richest essential oil sources. Research for this purpose took place at flowering stage. Arial flowering samples of plants were gathered from eight regional including Atishgah and Siahkolan village of Karaj, Ghosfandsara and Abali in Tehran province, Gachsar and Kandovan in Jade- Chalus and Khanalamot and Ghastatinlar in Ghazvin province. Plants were dried in the shadow in special bags and then herbs of any accession were used to evaluation of essential oils quantity. Plant materials were extracted by Clevenger for 4 hours. Oil color was slight yellowish in all assessed areas. According to recorded data for oil yield, Siahkolan with 0.66 percentage (v/w) and Ghosfandsara with 0.22 percentage (v/w) were determined as highest and lowest amount respectively. Oil yield percentage of other areas was Ghastatinlar with 0.47, Kandovan with 0.45, Atishgah with 0.42, Abali with 0.41, Gachsar with 0.32 and Khanalamot with 0.28 percentage. Among the accession population of Siahkolan could be used as domestication and breeding aims.

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684

EFFECT OF SOME PRETREATMENTS ON SEED GERMINATION *SALVIA STAMINEA* MONTHR ET AUCH. EX BENTH. IN ORDER TO OF DOMESTICATION THIS PLANT.

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Salvia Staminea belonging to Labiatae family has a wide distribution thorough the Iran. It is an important medicinal plants with antibacterial and antioxidant activities. Determining the best pretreatments for increasing the rate and percentage of seed germination can be an important step for domestication and breeding of many wild plants. Seeds of *Salvia Staminea* were collected from the wild from Siahkolan in Alborz Province. The following pretreatments were used: Scratching by sandpaper; 1, 2 and 3 weeks stratification; 2, 5 and 7 min. Soaking in sulfuric acid; 24 and 48 h washing in running water; boiling water; 2000, 4000 and 8000 mg/L of GA_3; 200, 400 and 800 mg/L of KNO_3, as well as control. Calculated rate of germination, germination start (GS), mean germination time (MGT), time of 50% germination (T_{50}) and germination of Percent. Results showed that the highest percentage of germination in treatment of GA_3 800 ppm with mean 95.2% calculated, While the percentage of control treatment was 47.5%. Start of germination the best of pretreatment of GA3 200 and 400 ppm with of mean 3.5 day. Also the highest rate of germination of pretreatment of GA3 400 ppm with mean 3.2 day calculated. The most Index T_{50} of GA3 200 ppm with mean 4.44 day calculated. Pretreatment of GA3 200 ppm with mean of 6.2 day, Were faster than other treatments. According to results of present experiment pre- treatments of GA_3 200 and 400 ppm are suggested as suitable treatments for seed germination in S. *staminea* in order to domestication and planting.

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685

CHEMICAL COMPOSITION OF ESSENTIAL OIL AND ANTIOXIDANT ACTIVITY OF *LEVISTICUM OFFICINALE*

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Levisticum officinale (lovage) is a perennial herb of the Apiaceae family and originates from Iran and Afghanistan. Lovage is consumed as a tea to stimulate digestion and it can be applied to wounds as an antiseptic. In folk medicinal practice it is applied as an anti-hyperlipidemic, an antiseptic and as a herb for improving sexual performance. In the present study, The Essential oil was extracted by hydro-distillation from aerial part of *Levisticum officinale* and analyzed by GC and GC-MS. The study led to the identification and quantification of Eighty components in the essential oil. The main constituents of the essential oil were determined as follows; 3-n butyl phtalide (32.44 %), butylidene phthalide (19.98%), heptacane (2.49%), delta cadinene (1.98%), tricosane (1.77%) and hexadecanoic (1.47%). Based on our current knowledge, delta cadinene (1.98%) and 9.12.15-octadecatrien-1-ol (1.36%) were identified in this study for the first time in the essential oil. Results of antioxidant assay demonstrated IC_{50} values for aqueous extract in DPPH and FRAP assay were 166.2 µg/ml and 24.56 mM Fe^{2+} / g respectively. Contents of phenolics and flavonoids of aerial part of plant were 8.40 mg GAE/g D.W, 78.56 mg quercetin/g D.W and 299µmol/g D.W, respectively. In conclusion, *L. officinale* is determined as a good natural antioxidant, which could prevent disease related to free radicals accumulation.

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686

STUDY OF MORPHOLOGICAL DIVERSITY OF SOME POPULATIONS OF *SALVIA STAMINEA* MONTHR ET AUCH. EX BENTH IN IRAN

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Salvia staminea of the Labiatae family, which pharmacological studies have confirmed some medicinal properties such as antibacterial, carminative and anti oxidant activities were used for morphological investigation. Plants used in present study, were collected in early June of 2011 during of flowering, according to Flora Iranica, which is the most important reference for Iranian flora. We found *S. staminea* populations in 8 natural habitats. In order to domestication of this valuable plant, morphological diversity was studied among populations, by using 30 morphological treats. Treats including petiole length, length of flowering stem, sub stems length, number of sub stems length and diameter of calyx showed higher CV amount, which demonstrate notable diversity of mentioned treat among population. There was significant correlation between some of desirable treats. A significant positive correlation was recorded between plant height with length of flowering stem, Leaf length and width, the calyx teeth and sub stems length. Cluster analysis base on all of treats, separated population to main three groups. Based on favorite morphological treats same clustered population, grown in Siahkolan and Kandovan are suggested for domestication and cultivation programs.

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687

ANTIFUNGAL EFFECTS OF EXTRACT OF YARROW FLOWERS (*ACHILLEA OFFICINOLIS*) AND EXTRACT OF CHAMOMILE FLOWERS (*MATRICARIA CHAMOMILLA*), IN CONTROLLING OF CONTAMINATION *SAPROLEGNIA* FUNGI IN RAINBOW TROUT (*ONCORHYNCHUS MYKISS*) EGGS.

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In this research we process in effect of anti-fungal sources of (Achillea officinolis) and (Matricaria chamomilla) and controlling Saprolegnia fungal, therefore, in laboratory condition and in manufactory condition to compare with Malashit green and considered as a most important anti-fugnal drug in aquaculture industry, and effect of anti-fungal sources was researched. In this research after preparing extract of Achillea officinolis and Matricaria chamomilla do the most common evaluation methods of anti-fungal effect in laboratory condition.by using microbroth dilution and intermixture method and researching the inhibitors density of fifty percent fungal growth(MIC50).and the study sources density(MFC) against Saprolegnia in laboratory condition. And amount of MIC`S sources Achillea officinolis and Matricaria chamomilla on the fungal`s Saprolegnia is opposed 100mg/ml 150 mg/ml and also amount of MFC for Achillea officinolis and Matricaria chamomilla sources is opposed to 150mg/ml 200 mg/ml. in the laboratory condition firstly was prepared broodstock for purposes of (age, weight, size and etc.) and losses for each of the in each level of eggs was recorded and finally to be evaluated.the this result of effect `s sources and fungal from level of germinate to the level of development shows the certain effect of Malashit green and two other remedy groups of sources in compare with main groups drug interaction(p<0/05). Also between different group.Malashit green group was the most effective remedy and anti-fungal and allocate highest rate of borning 9337 eggs (p<0/05). The activity of Malashit green`s meaningfully is more than Achillea officinolis group (p<0/05), While the percent of borning eggs for Malashit group is 1 ppm and have not any different meaningfully.

688

GENETIC DIVERSITY OF WILD TANACETUM PARTHENIFOLIUM POPULATIONS USING MORPHOLOGICAL MARKER AND ITS ASSOCIATION WITH ECOLOGICAL FACTORS.

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Tanacetum parthenifolium is one of the most important medical herbs that grow wild in iran. Genetic diversity of 100 genotypes of T.parthenifolium from 10 papulations using morphological marker and its association with ecological factors were studied. ANOVA suggested significant different among 10 population of T.parthenifolium for morphological traits such as full flowering time, frond width (cm), involucres width (cm), average number of capitul in inflorescense. In species of T.parthenifolium significant correlation coefficient were showd between the latitude with average number of capitul in inflorescense, monthly precipitation mean (mm) with small diameter (cm). Caleibar population with better characteristics in inflorescence (inflorescence length, capitule length, capitule width) and Galikesh population with better characteristics in number of cauliflorus could be suggested for breeding programs.

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691
ASSESSMENT OF GENETIC DIVERSITY AMONG WILD IRANIAN TANACETUM CHILIPHYLLUM POPULATION USING MORPHOLOGICAL TRAITS.

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Tanacetum chiliphyllum is an useful medical herb that grows wild in Iran. Genetic diversity of 100 genotype of T.chiliphyllum from 10 population using morphological traits were studied. Anova showed significant different among 10 population of T.chiliphyllum for morphological traits such as full flowering time, plant height (cm), big diameter (cm), small diameter (cm), involucres width (cm) ,average number of capitul in inflorescense, inflorescense width (cm). In species of T.chiliphyllum significant correlation coefficient were showed between the plant height with big diameter, plant height with small diameter, big diameter with number of cauliflorus, plant height with average number of capitul in inflorescense. Golpaygan population with better characteristics in number cauliflorus and Amol population with better characteristics in number of capitul in inflorescense could be suggested for breeding programs.

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699
EVALUATION OF YIELD COMPONENTS AND OIL CONTENT OF PUMPKIN UNDER DIFFERENT NITROGEN LEVELS

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In order to evaluate the effect of different nitrogen levels (0, 6, 12, 18 and 24 g N m^{-2}) on yield components and oil content of pumpkin, an experiment was conducted at the Agricultural Research Farm of Bu-Ali Sina University based on randomized complete block design with three replications. In this research number of seed per fruit, seed weight, grain yield, oil percentage, and oil yield were evaluated. Based on results, effect of experimental treatments on all traits was significant. The highest seed weight (143.6 mg) was revealed at N24 treatment which had no significant difference with N18 treatment. The lowest value for this trait was achieved at control treatment (N0). Also, the highest (50%) and the lowest (45%) values for oil percentage were revealed at control (N0) and N18 treatments, respectively. Maximum grain and oil yields (84.70 and 38.38 g m^{-2}, respectively) belonged to N18 which had no significant difference with N24 treatment. Control treatment (N0) in comparison with N18 reduced grain and oil yields of pumpkin up to 35 and 28%, respectively. Therefore, consumption of 18 g N m^{-2} produced maximum grain and oil yields.

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702
DEFICIT IRRIGATION OF PUMPKIN: EFFECTS ON OIL YIELD AND WATER AND NITROGEN USE EFFICIENCY

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Pumpkin is one of the most important medicinal plants. Management practice effects on water and nitrogen use efficiency as well as oil yield have not been well documented for pumpkin. It is thought that reduction of crops production occurs due to shortage of nitrogen and irrigation. Therefore, we applied deficit irrigation to pumpkin with contrasting nitrogen supply. Treatments included three doses of nitrogen supply (120, 180 and 240 kg N ha^{-1}), in combination with three levels of irrigation (300, 600 and 900 mm irrigation water ha^{-1}). Field experiment was conducted at Agricultural Research Station of Bu-Ali Sina University in the growing season of 2012. Water and nitrogen use efficiency; WUE and NUE, and grain and oil yields were measured. The ANOVA revealed that the N and irrigation treatments and their interaction exerted significant effects on WUE and NUE as well as grain and oil yields. With decreasing irrigation water from 900 to 300 mm ha^{-1} and increasing N rates from 120 to 240 kg ha^{-1}, nitrogen use efficiency decreased significantly. The highest WUE for grain and oil yields were achieved at the pumpkin plants which irrigated by 600 mm water ha^{-1} and received 180 kg N ha^{-1}. Therefore, it seems that consumption of 600 mm irrigation water ha^{-1} and application of 180 kg N ha^{-1} can produce the highest grain and oil yields, while increasing WUE and decreasing N leaching.

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703

EVALUATION OF POLLINATION SYSTEM EFFECT ON SEED TRAITS OF MILK THISTLE UNDER NORMAL AND DROUGHT STRESS CONDITIONS

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Medicinal compounds of Milk thistle (*Silybium marianum*) drive from seeds.Thisplantis cultured for Silymarin production, commercially. Genetic variation of population mainly affect by reproductive properties of plant. Therefore, knowledge of reproductive and pollination system is essential for domestication of plants and designing of genetics and breeding studies [1]. This study aimed to evaluate the effect of pollination system on seed traits of Milk thistle under normal and drought stress. This experiment was performed on 10 Milk thistle ecotypes from Khorassan, Khouzestan, Mazandaran, Isfahan, Kohgiluyeh and Boyer-Ahmad provinces and one accession of Hungary, in a split plot design at Isfahan University of Technology. For inbreeding, before flowering half ofcapitols of each plant were put in a mesh pocket and the other half were given cross pollination permission. Analysis of variation showed the significant effect of ecotype on seed color, length and diameter of seed. The pollination system had a significant effect on seed dimensions, 1000 seed weight, number of seed and seed weight per capitol. The effect of drought stress on traits of length and diameter of seed was significant. Based on mean comparison results, it was determined that, the ecotype from Kohgiluyeh and Boyer-Ahmad had the highest mean in terms of seed dimensions and 1000 seed weight, and the ecotype from Sari had the highest mean in terms of number and seed weight per capitol. The traits of seed dimensions, 1000 seed weigh, number and seed weight per capitol had the higher mean in selfing system than cross pollination. In addition, seed length was increased under drought stress. The above results are representative of high variation between ecotypes, positive effect of selfing on seed traits of Milk thistle and increasing of seed dimensions under drought stress.

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704

CHANGES IN OIL CONTENT AND SILYMARIN OF MILK THISTLE AFFECTED BY REPRODUCTIVE SYSTEM AND DROUGHT STRESS.

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Milk thistle (*Silybum marianum*) is known as a valuable medicinal plant and containing the medicinal compound, Silymarin. The main medicinal and nutritional usages of Milk thistle and its oil are treatment of the liver diseases, reducing body cholesterol, and antioxidant and anticancer properties. Development of high yielding varieties with more Silymarin content is main purpose of breeding of milk thistle. In addition, the seeds of this plant contain high level of oil that has the potential to be introduced for human use [1]. Knowledge of reproductive system of plant species will be useful to determine genetic variation and their adaptation for planting them in new environments. This study aimed to evaluate changes of oil and Silymarin content caused by selfing, under normal and drought stress conditions. The experiment was performed on various ecotypes under two moisture conditions, normal and drought stress. For creating of inbreeding before flowering, half of the capitols of each plant were put in a mesh pocket and the other half were allowed cross pollination. Analysis of variation showed that the pollination system (self- and cross pollination) and moisture stress had a significant effect on oil and Silymarin content. Mean comparisons showed 15% reduction in oil content as a result of selfing and 14% increasing in oil content as a result of moisture stress. Results indicated that if the breeding objective is increasing oil in this plant, then using high heterogeneous population under water deficit can increase oil production.

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707

COMPARISON OF TOTAL PHENOL AND FLAVONOID CONTENTS IN THE LEAF OF *CITRUS* ROOTSTOCKS

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Citrus leaves have flavonoid and phenolic compounds which are frequently used in the pharmaceutical industry. This research was carried out with the purpose of comparing the amount of total phenol, total flavonoid features in citrus leaves rootstocks. rootstock trees was included: Sour orange, Citromelo, Citrange and Trifoliate orange. This study was done in the completely randomized design in citrus research station (situated in Kotra, Tonekabon) in three replications and phytochemical analyses were done in the horticulture labratory of Gorgan agricultural science and natural resources university. Total phenol and flavonoid were measured using spectrophotometer respectively with the reactors of folin ciocalteu and aluminum chloride and after making methanol extract with 80% methanol. Accordingly, the highest level of phenol compounds was seen in the Sour orange leaves (18.2 Mg of gallic acid per gram dry weight) and the lowest level was in Citromelo leaves (12.7 Mg of gallic acid per gram dry weight). Also, the most total flavonoid exists in the Sour orange leaves (0.74 Mg of quercetin per gram dry weight) and the least exists in Trifoliate orange leaves (0.53 Mg of quercetin per gram dry weight). The most wet and dry weight (respectively 41.92 and 29.8 gr) was recorded in sour orange leaves and The lowest was seen in citrange leaves (respectively 17.81 and 6.93 gr) [1,2].

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708

RESPONSE OF *CUCURBITA PEPO* YIELD PARAMETERS AND LAND EQUIVALENT RATIO TO GREEN BEAN INTERCROPPING

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Intercropping is a suitable method towards sustainable agriculture and environmental conservation. Accordingly, in order to evaluate the effect of green bean additive intercropping on *Cucurbita pepo* yield, an experiment was carried out at the Agricultural Research Station of Bu-Ali Sina University, as a randomized complete block design (RCBD) with three replications. Treatments included sole cropping of *Cucurbita pepo*, additive intercropping of 25% green bean + *Cucurbita pepo*, additive intercropping of 50% green bean + *Cucurbita pepo*, additive intercropping of 75% green bean + *Cucurbita pepo* and additive intercropping of 100% green bean + *Cucurbita pepo*. Analysis of variance (ANOVA) showed that yield parameters of *Cucurbita pepo* included seed number fruit^{-1}, fruit diameter, and fruit weight, as well as grain yield were affected significantly by experimental treatments. The highest values for seed number fruit^{-1} (288 seed fruit^{-1}), fruit diameter (67 cm), fruit weight (2.93 kg) and seed yield (93 g m^{-2}) were achieved at sole cropping of *Cucurbita pepo*. In all intercropping treatments indices of land equivalent ratio and competition index was >1 and <1, respectively. Additive intercropping of 75% green bean + *Cucurbita pepo* indicated that the highest land equivalent ratio (1.46). Therefore, this treatment increased land use efficiency and produced maximum total yield.

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713

GENETIC VARIABILITY IN IRANIAN ECOTYPES OF MEDICINAL PLANT MILK THISTLE (*SILIBUM MARIANUM*) UNDER NORMAL AND DROUGHT STRESS CONDITIONS

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Milk thistle (*Silybum marianum*) is known as an effective medicinal plant in treatment of liver diseases. Genetic and breeding studies are very limited in this plant [1]. Drought stress is a most important abiotic stress affected the production of plants [2]. This study aimed to evaluate genetic variation of morphological traits and quantification of drought tolerance rate of Milk thistle. Genetic material of this study was including of 25 Milk thistle ecotypes from various province of Iran along with a foreign genotype from Hungary. All of the accessions were planted in a complete block design at two moisture conditions (normal and stress) at the Isfahan University of Technology Research Farm. Analysis of variation showed that the ecotypes were significantly different in terms of most traits of study especially phenological trait, seed yield and its components. No difference was found for days to seedling emergence and number of seed per copitule. The result of this research is representative of high variation in this germplasm, which can be used for future studies. The effect of drought stress only was significant on days to flowering and 1000 seed weight showing high tolerance of this plant to drought stress. Results showed that Giulan ecotype had the maximum average of days to flowering and Khouzestan ecotype had the maximum average in term of 1000 seed weight and seed yield. These results show that the Khouzestan ecotype is the best ecotype in terms of yield under Isfahan conditions and can be used in crossing programs.

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726

EFFECTS OF ORGANIC FERTILIZERS ON ESSENTIAL OILS CONSTITUENTS AND SOME CHARACTERISTICS OF PURPLE BASIL

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Basil (*Ocimum basilicum* L.) is one of the most important medicinal plants as its essential oil used in different industries including pharmaceutical, cosmetic and food. Fertilizer management is utmost important factor in success of pharmaceutical crops cultivation. Application of organic manures is important in production of these plants with the aim of elimination or significant reduction of chemical inputs and increases of soil fertility and improvement of plant growth and quality. Therefore, an experiment conducted on basil in research field of Agriculture Faculty of Zanjan University. A complete randomized blocks design with ten treatments and three replications were used. Treatments were cattle manure, vermicompost and poultry manure in three levels (5, 10, and 15 ton/ha) and control. Different characteristics such as plant height, leaf area, number of lateral branches, leaf dry weight, total fresh weight, essential oil content and essential oil percentage evaluated. According to the results, all studied characteristics affected by different types of organic manure and the highest records were obtained at 15 ton/ha vermicompost. Percentage of essential oil was also significantly affected by organic manure treatments and the most percentage of essential oil was respectively obtained in 15 ton/ha vermicompost (1.12%) and 10 ton/ha vermicompost (1.10%). In addition, analysis by GC and GC/MS showed that the main components of the essential oil (such as methyl chavicol and linalool) affected by organic amendments and using the three types of organic fertilizers increased the linalool content of essential oils. The maximum amount of linalool obtained from treatments of 15 ton/ha cattle manure and vermicompost fertilizers. The lowest methyl chavicol content of essential oils obtained from 15 t/ ha vermicompost treatment.

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740
MORPHOLOGICAL DIVERSITY IN IRANIAN FENUGREEK LANDRACES

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Fenugreek (*Trigonella foenum-graecum* L.) is one of the most valuable plants of Fabaceae family mainly originating in India and Northern Africa. It has been cultivated since ancient times in many parts of the world including Iran for both medicinal and culinary purposes. Fenugreek leaves and seeds are widely consumed as a spice in food preparations and an ingredient in medicine. Fenugreek seeds have been widely studied for their reputed anti diabetic and hypocholesterolaemic effects [1,2]. Present study was conducted to investigate morphological traits of eight Iranian dwarf fenugreek landraces including Khomeini Shahr, Yazd, Shooshtar, Ardestan, Rehnan, Abarkooh, Dezfool, and Yasooj to select the superior landrace in Isfahan during April-September 2014. A RCBD design with four replications was used. The results showed that, landraces did not show significant difference in stem length and number of branches and leaves per plant, while pods number and length and also number of seeds per pod had significant differences between the landraces ($p \geq 0.05$).The highest pods per plant (6.6), pod length (10.44 cm), and seeds per pod (16.64) were observed in Yasooj landrace. The results indicated that Ardestan with 3.6 pods per plant, 7.37 cm pod length, and 11.69 seeds per pod had the lowest seed yield. Based on these results, Ardestan mass was selected as a superior landrace for future molecular analysis and breeding program.

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752

EFFECTS OF NANOPARTICLES ZNO ON CARTENOIDS AND FLAVONOIDS CONTENTS IN LEPIDIUM DRABA SEEDLINGS

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Plant secondary metabolites are unique sources for pharmaceuticals, food additives, flavors and other industrial materials. Accumulation of such metabolites often occurs in plants subjected to stresses including various elicitors or signal molecules. Carotenoids and flavonoids are non-enzymatic antioxidant metabolites. Antioxidants are chemicals that intract with and neutralize free radicals, thus preventing them from causing damage. Antioxidant are also known as free radical scavengers. Carotenoids are a group of phytochemicals that are responsible for different colors of the foods. They are recognized as playing an important role in the prevention of human diseases and maintaining good health. They are also important dietary sources of vitamin A. Flavonoids are the most common of plant secondary metabolites that have various pharmaceutical properties including anti-oxidants, anti-inflammatory and anti-microbial. The negative and positive effects of Nano-ZnO have been reported for various plant species, while the mechanism that brings about these effects has not yet been clearly understood. Here, the effects of different concentrations (zero (as a control), 25.50, 100, 250, 500 and 1000 mg/L) of Nano-ZnO on the contents of carotenoids and flavonoids in 7-day-old *Lepidium draba* seedlings are investigated. The results showed that the contents of carotenoids and flavonoids drastically decreased in all treatments compared of the control. Nano-ZnO caused a significant effect due to their accumulation along with the generation of reactive oxygen species in plant tissues, thus signifying its hazardous effect on *L. draba*.

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755

FLOW CYTOMETRIC 2C DNA VALUE OF PERSIAN POPPY (*PAPAVER BRACTEATUM* LINDL.): A RELIABLE METHOD FOR DISTINGUSHING UNDEFINED *PAPAVER* SPECIES

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Papaver bracteatum Lindl. (2*n* = 2*x* =14) commonly known as Persian poppy is a medicinal plant endemic to northern and western regions of Iran. It is primarily known for containing valuable amounts of the pharmaceutically important alkaloid of thebaine as the predominant alkaloid in different plant parts particularly capsules, roots and stems. It is closely related to *P. orientale* L. (2n = 4*x* = 28) and *P. pseudoorientale* (Fedde) Medw (2*n* = 6*x* = 42) and highly resembles them in morphological charachteristics. It has distinct phytochemical characteristics where the predominant alkaloid of the latter two species are oripavine and isothebaine, respectively. Hence, it is important to distinguish *P. bracteatum* from other species of the Papaveraceae by simple and low-expense criteria. To determine 2C DNA value of *P. bracteatum*, flow cytometric (FCM) studies were performed, using BD FACSCanto II flow cytometer, PI staining method and *Pisum sativum* (2C DNA = 9.09 pg) as a reference standard. Young and well developed leaves emerged from seeds collected from three locations in Northern Iran (Plour, Rineh in Tehran province and Youshl location in Mazandaran province, known as natural habitats of Persian poppy) were used for the analysis. The 2C DNA amounts were analyzed by conducting a completely randomized design (CRD) with three replications, showing no significant difference between three locations. The mean 2C DNA content for the studied *P. bracteatum* was 6.15 ± 0.05 pg. This amount differs from the previously reported values of 9.80 and 2.17 pg [1, 3] most likely because of the author`s lack of access to reliable accurate estimation methods as well as possible misidentification of locally available *Papaver* sp. seed lots for *P. bracteatum*. Our results clearly verified the effectiveness of FCM analysis as a rapid and reliable strategy for discriminating *P. bracteatum* from other identified or unidentified *Papaver* species with similar morphological traits.

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763

FLOWER STRUCTURE AND HYBRIDIZATION METHOD IN THYME

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Thyme is one of the most useful and valuable medicinal plants in the world. Flower structure and the method of hybridization must be known before any breeding program initiate. The botanic structure of flower and the method of hybridization were studied in Thyme spp. The study of flower with the help of binocular showed that each flower consistd of four stamen and one pistil. There were three types of flowers in different populations of Thyme; hermaphrodite with normal stamens, hermaphrodite with very short stamens and imperfect female flowers. The number of seeds formed through open pollination and self pollination demonstrated that there was no self-incompatibility in Thyme while open pollination was preferred by plant. The maximum pollen viability appeared to be 48 hours based on FDA test. The results of making crosses using forceps and scissors revealed that 4 hours before flowering (dirigible stage) was the best time for emasculation. The stamen needed 48 hours to get prepared to receive pollen. The most appropriate time for artificial pollination was approximately one hour after flowering of male parent.

765
DETECTION OF *OLEUROPEIN* FROM OLIVE BY FOURIER-TRANSFORM INFRA-RED SPECTROSCOPY

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Oleuropein is the active ingredient or glucoside, found in green olives and olive leaf which is known in alternative medicine for its medicinal benefits. In general, High Performance Liquid Chromatography (HPLC) uses to follow up the *oleuropein* content. This research offers Fourier-transform infra-red (FTIR) as a new method for its determination. Olive leaves gathered from Iranian native olive cultivars, Zard and Roghani. Samples were lyophilized and stored in tight containers at −18 °C until the analysis. The ethanolic extraction 80:20 (v/v) was concentrated under nitrogen steam till complete dryness. FTIR spectra of extracts were assessed at frequency regions of 3500 - 1000 cm^{-1} [1, 2]. The regions between 1800-1000 cm^{-1} and 3500 -3200 cm^{-1} did overlap on the reference *oleuropein* through which the accuracy of *oleuropein* extraction method would be confirmed. Indeed, FTIR could be an appropriate alternative in *oleuropein* detection however its determination needs to define another new approach.

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767

SOMATIC EMBRYOGENESIS IN *CANNABIS SATIVA* L.: A PRELIMINARY EXPERIMENT TOWARDS TRANSGENIC CANNABIS

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Cannabis sativa L. is cultivated in many parts of the world for fiber, oil, seeds and for its medicinal and psychoactive properties. As an important multi purpose plant its genome and transcriptome are available now which enables us to manipulate different favorable traits in cannabis and provide a basis for the breeding of marijuana and hemp strains with improved pharmaceutical and agronomic characteristics [1]. Plant tissue culture and subsequently gene transformation are considered prominent techniques to gain higher and more qualified secondary metabolites production such as cannabinoids [2]. Due to recalcitrant nature of cannabis plants for tissue culture and genetic manipulation, a preliminary experiment was studied to induce the embryogenic callus and embryo in this plant. This study describes a successful attempt to develop a standard and efficient protocol of somatic embryogenesis in a registered accession of drug type cannabis, 891385. Callus was induced on MSB medium supplemented with different concentration of 2,4-D and kinetin or dibenzoyl during 5-7 days and from different explants included stem, leaf and petiole segments. Nevertheless, the mature well expanded leaves produced more qualified callus than other explants. The maximum amount of callus and somatic embryos were obtained in MSB6 and MSB1 medium. Also effects of light and darkness and wounding were investigated. Results represented a higher and quicker production of callus in darkness and followed by wounding.

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771

INVESTIGATION OF SUCROSE EFFECTS ON THE CONTENT OF PHENOLIC COMPOUNDS IN *LEPIDIUM DRABA* SEEDLING.

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Lepidium draba is a medicinal plant belongs to the brassicacea family. Flavonoids a major group of secondary metabolites, which exhibit a wide range of biological functions in plants. Anthocyanins are a group of flavonoid compound, as well as a group of important secondary metabolites and one of most important antioxidant compound that only destroy free radicals, but prevent the more production of them in plant. Anthocyanins also play benefical health roles as potentially protective factors against cancer and heart disease. Sucrose is one of the main products of photosynthesis in plants, and the most common form of carbohydrate transported from source to organs. In plants, sugars play important roles as both nutrients and signal molecules. Sucrose a recognized as pivotal integrating regulatory molecules that control gene expression related to plant metabolism, stress resistance, growth and development. In this study, the effects of sucrose at different concentrations (zero (as a control), 25, 50, 100, 200, 400 mg/L) were examined on anthocyanin and total flavonoid content in 7-day-old ***L. draba*** seedlings in a completely randomized design with three replications. The results showed, that the total flavonoid content in the combination treatment significantly reduced compared to control. In contrast, the production of anthocyanins in seedlings of 50 mg/L sucrose concentration was significantly reduced compared to the control sample and the concentration of 100 mg/L was significantly increased compared to control. Sucrose might induce the production of health promoting compounds through is role of signaling, generating osmotic pressure or serving as a substrate.

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773

EFFECTS OF CHITOSAN AND SALICYLIC ACID ON GROWTH RATE AND HYOSCIAMINE PRODUCTION IN HAIRY ROOTS CULTURE OF *HYOSCYAMUS RETICULATUS* L.

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Hyoscyamus reticulatus L. is an important medicinal plant belongs to solanaceae family [1]. The main tropane alkaloids are scopolamine and hyoscyamine which have been used for pertussis and bronchitis remedy because of their anti tension pain decreasing effects [2, 3]. Elicitors could be used as enhancers of plant-secondary-metabolite synthesis and could play an important role in biosynthetic pathways to increase production of commercially important compounds. In this study, hairy roots of *H. reticulatus* were established by transformation with *Agrobacterium rhizogenes* and were cultured in MS medium for two weeks. PCR analysis with specific primers *rol*B gene was performed to confirm the transgenic roots. Then hairy roots were cultured for 4 weeks in 250 ml Erlen shake flasks containing 30 ml MS hormone free liquid media. The effect of different chitosan (0, 50, 100, 150 and 200 mg/L, for two times (6 and 9 days) and Salicylic acid (SA) (0, 0.01, 0.05, 0.1, 0.5 µm/L for 14 days) concentrations on morphological and biochemical traits of hairy roots were evaluated. the tropane alkaloids contents were assayed by GC-MS. Analysis of Fresh and dry weight revealed that there are significant differences between treatments and control but no significance difference detected between SA and chitosan concentrations. Moreover, elicitation has a negative effect on the root growth. After 14 days of induction with elicitors, an twofold increase in the level of hyoscyamine was observed in compared with control cultures.

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776
EFFECT OF PURSLANE EXTRACTE ON LAYING HENS PERFORMANCE

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So far, the use of antimicrobial growth promoters in animal nutrition has been beneficial for the improvement of growth performance and prevention of diseases (1). However, their long-term usages lead to increasing emergence of antibiotic-resistant bacteria and accumulation of antibiotic residues in animal products and environment (1). Therefore, alternatives to these antibiotics, which can promote poultry performance without generating drug-resistance, are urgently needed. Regarding that, researchers are trying to substitute those with different natural feed additive materials, such as herbal plant and their extract. Compared with chemical drugs, medicinal herbs have shown greater potential as alternatives due to their beneficial effects on performance, as well as their antimicrobial activities (2). The aim of the present study was to evaluate the effects of purslane extract on egg production (EP), egg weight (EW), egg mass (EM), feed intake (FI) and feed conversion ratio (FCR) of laying hens. One hundred and twenty 44-week-old layers (Leghorn, Hy-Line W36) were allocated randomly in 4 groups with 5 replicates and received diets supplemented with 0 (control), 0.1, 0.2 and 0.3 g kg^{-1} purslane extract in a completely randomized design for 56 days. Egg weight (gr), egg production (%) and egg mass (gr/hen/day) were recorded daily, whereas, feed intake (gr/hen/day), and feed conversion ratio (gr/gr) were measured weekly. The results of this experiment indicated that EW, EP EM, FI and FCR were not affected with inclusion of different levels of purslane extract. However, some parameters such as EW, EP EM and FI increased numerically. It was concluded that supplementation of purslane extract had no positive significant effect on laying hens performance.

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780
INDIRECT SHOOT REGENERATION OF *ARCTIUM LAPPA* FROM HYPOCOTYL AND COTYLEDON EXPLANTS

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With revealing the adverse effects of chemical medicines, medicinal plants have been considered further. *Arctium lappa*, a species of *Asteraceae* family, is known as greater burdock and different parts of it, has medicinal properties. It is native to Eurasia [1]. A fructan with antitussive activity was isolated from its root [2]. Antioxidant, antimicrobial and antiallergic activities of this plant have been reported [3, 4, 5]. *In vitro* plant regeneration of hypocotyl and cotyledon was optimized for this plant. The experiment was laid out as a completely randomized design in a factorial arrangement with three replications. Callus inducing was investigated by different concentrations and combination of 2,4-D and BAP, while shoot regeneration from callus was conducted by NAA and BAP. Optimum callus formation and shoot regeneration frequency were achieved using MS medium supplemented with 2 mg/l 2,4-D, 1mg/l BAP and 0.5 mg/l NAA, 1 mg/l BAP respectively.

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782
EFFECTS OF LEAD AND CADMIUM HEAVY METALS ON GERMINATION TRAITS OF *THYMUS VULGARIS*

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Heavy metals are often present naturally in soils, but many human activities (*e.g.* mining, agriculture, sewage processing, the metal industry and automobiles) increase their prevalence in the environment resulting in concentrations that are toxic to animals and plants. Plants possess a range of potential cellular mechanisms that may be involved in the detoxification of heavy metals and thus tolerance to metal stress. Metal toxicity causes multiple direct and indirect effects in plants that concern practically all physiological functions. In order to investigate the effects of lead and cadmium heavy metals on germination traits of thymus vulgaris, an experiment was conducted as factorial based on completely randomized design in laboratory of Payam Noor University of Mashhad in 2013. Treatments included heavy metals of lead and cadmium in 4 levels (0, 50, 100 and 150 ppm). The measured traits were germination rate and percentage, root and shoot length, seedling weight and fungus pollution percentage in Petri dishes. The results indicated that the effects of different levels of lead and cadmium were significant on root and shoot length of *Thymus vulgaris*. With increasing amount of cadmium and lead, root and shoot length deceased. Also, germination percentage of this species was affected by cadmium. As cadmium treatment increased, germination percentage of thymus vulgaris increased. The effects of studied treatments on other traits were n't significant, statistically. In general, the highest value of germination traits such as germination rate and percentage, seedling weight and fungus pollution of Petri dishes of thyme was obtained in 50 ppm of lead and cadmium treatment.

783

MUCILAGE CONTENT AND SEED YIELD OF PSYLLIUM (*PLANTAGO PSYLLIUM* L.) IN RESPONSE TO FOLIAR APPLICATION OF CHELATED NANO-IRON AND NANO-POTASSIUM FERTILIZER

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This study investigated the effect of foliar application of chelated nano-iron and potassium fertilizers on yield and quality of psyllium. The factorial experiment was carried out in a basic plan of randomized complete block design with 12 treatments and 3 replications. The treatments of this experiment were consisted 3 levels of nano-iron (0, 1 and 2 $g.L^{-1}$) and 4 levels of nano- potassium (0, 2, 3 and 4 $g.L^{-1}$) fertilizers. The interaction of chelated nano-iron and potassium fertilizers had a significant effect on seed yield ($p < 0.01$) and shoot dry weight ($p < 0.05$). The independent effects of chelated nano-iron and potassium fertilizers were significant in the most traits ($p < 0.01$) and the number of seeds per plant and yield of seed mucilage ($p < 0.05$). Interaction effect between 2 $g.L^{-1}$ of chelated nano-iron fertilizer and 3 $g.L^{-1}$ of chelated nano-potassium fertilizer and also the independent effect of each one had most impact on measured traits, especially yield of shoot dry weight, seed yield, mucilage content and yield of mucilage. The result of this study revealed that the used of chelated nano-iron and potassium fertilizers had positive effect in increase the efficiency of mucilage content and seed yield of psyllium.

786

THE EFFECT OF A COMMERCIAL POLYMER-BASED COATING ON THE VIGOUR AND EARLY SEEDLING EMERGENCE

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The purpose of this study is to develop a qualitative and commercially-accepted formulation for plant seed coating so that the seed can be protected from insects during the different stages of planting. In addition, this coating is useful to facilitate This innovative formulation comprises an active ingredient which can be an insecticide, bactericide and/or fungicide substance. The other important ingredient is a polymer which is not only a cost-effective one, but also has a potential to release the bio-active material from polymeric matrix during a period of time. The other inactive substances such as pigments and stabilizers have been chosen from the locally available materials. Using Minitab 16 Software, a number of experiments was designed (DOE, Design of Experiments) according to the different levels of the ingredients' amounts. The effect of these various formulations on the vigour and seedling emergence as the responses was measured. Finally, the most effective formulation which contains about 20% w/w polymer and its optimized production condition have been introduced [1,2].

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790
THCA SYNTHASE AND CBDA SYNTHASE EXPRESSED DIFFERENTIALLY DURING DEVELOPMENTAL STAGE OF DRUG AND FIBER TYPE OF CANNABIS

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Cannabis sativa L. is considered as a controversial plant and is believed to be one of the ancient cultivated crops used as a multi-purpose plant for its fiber, medicinal products, food and oil for several years. Cannabis is considered as the only source of cannabinoids, compounds with distinguished antimicrobial, anti-cancer and tumor and anti-MS effect, which makes it a valuable natural product for the pharmaceutical industries. To further investigate the expression pattern and cannabinoids production during different developmental stage of cannabis, relative expression of key enzymes CBDAs and THCAs, responsible for principal cannabinoids production namely tetrahydrocannabinol (THC) and cannabidiol (CBD) was studied in drug (891385) and fiber type (921018) registered accessions of cannabis through q RT-PCR of samples obtained from vegetative, flowering and senescence stages of male and female plants. THC and CBD contents in related samples were also measured using HPLC. Rubisco showed more stability and less bias and fluctuation among different treatments compared to 18S rRNA and was selected as internal control gene to normalize the data using ΔΔCt method. Results showed that CBDAs and THCAs were expressed differentially during different developmental stages. Relative expression of genes was consistent with THC and CBD production. The highest expression of THCAs and CBDAs was observed in female flowers of mature drug type cannabis and leaf for vegetative stage of fiber type cannabis respectively [1,2,3].

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793

MORPHOLOGICAL AND PHYTOCHEMICAL DIVERSITY IN THREE WILD-PLANT POPULATIONS OF APIACEAE FAMILY OF URMIA

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Apiaceae is a big family which involves a lot of medicinal plants. In the present work three plant populations of this family including, *Scandix pecten-veneris*, *Falcaria vulgaris* and *Daucus carota* L. were studied on gathered plants from Urmia regions. *S. pecten-veneris* is a leafy vegetable wildly used in Mediterranean diet as a rich source of antioxidant and omega-3 fatty acids. *F. vulgaris* which consumed as a vegetable in some region of Iran is useful for the healing of skin ulcers, stomach disorders. Also it is a rich source of vitamin C, protein, phyto-strols and starch [2]. *D. carota* extracts in traditional medicine is used for hepatic and renal insufficiency as well as for skin disorders. In the present study, we investigate morphological and phytochemical diversity of some populations of these medicinal plants in order to future breeding and domestication aims. Four populations of *Scandix* and *Falcaria* and five of *D. carota* were collected from natural habitats of Dare ghasemlu, Emamzade gharib, Rajan, Band, Janveslu and Anbi. In morphological diversity 15 traits were used for classification of populations. In addition in phytochemical investigation the essential oil content, total phenol, total flavonoid and DPPHac % were evaluated among studied populations. The plant extracts showed significantly different data in total phenol, total flavonoid and antioxidant activity. The highest phenolic content in *S. pecten-veneris* was found in Anbi (386.42 $\mu g.g^{-1}$) and in *F. vulgaris* was found in Emamzade gharib sample (311.42 $\mu g.g^{-1}$) and *D. carota* was recorded in Dareh-e Ghasemlu collected plants (315 $\mu g.g^{-1}$). The highest flavonoid content of *S. pecten-veneris* was observed in Emamzade gharib (188 $\mu g.g^{-1}$), in *F. vulgaris* was found in Janveslu populations (157.75 $\mu g.g^{-1}$) and in *D. carota* was found in Emamzade gharib (161 $\mu g.g^{-1}$). It seems that phytochemicals from Apiaceae family show promise as natural antioxidants.

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794

EFFECTS OF PHOSPHORUS FERTILIZATION ON PLANT GROWTH CHARACTERISTICS AND PRODUCTION OF SECONDARY METABOLITE GALEGINE IN *GALEGA OFFICINALIS*

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The medicinal plant *Galega officinalis* can decrease blood sugar level and its active substance, galegine, can be administered for diabetic treatments [1]. Due to slow growth rate in this plant, strategies should be employed to improve early establishment of seedling in the field. Phosphorus is vital during early stages of germination, hence facilitates high biomass production [2]. Therefore this study aimed at effects of phosphorus fertilization in the soil on plant growth characteristics and its influence on the content of secondary metabolite galegine. Seeds of Galega were directly sown in a clay soil supplemented with 30 tons/ha animal manure. Before seed sowing, four contents of phosphorus (0, 100, 200, 300 kg/ha) were applied to the soil according to a completely randomized blocks with three replications. Physiological and phytochemical factors such as number of lateral shoots/plant, date of flowering, plant height at flowering stage, flowering percentage, weight of 1000 seeds, seed yield, fresh and dry weight, content of galegine alkaloid in foliage and total active substances production were studied. Results showed that phosphorus content of the soil (control) was sufficient for plant establishment (18 ppm soluble phosphorus) which were reflected in favourable growth rate and high dried foliage. Phosphorus application significantly affected content of galegine in foliage mass and total active substances production. Highest content of galegine in dry mass and total galegine yield achieved in 200 kg/ha phosphorus. In this treatment mean content of galegine in three harvests within two years reached to 83.6 mg/100 g dried foliage.

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796

INTERACTIVE EFFECTS OF SALISYLIC ACID AND DROUGHT STRESS ON GROWTH, PHOTOSYNTHETIC PIGMENTS AND ESSENTIAL OIL CONTENT OF LEMON VERBENA (*LIPPIA CITRIODORA* L.).

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A pot experiment was conducted in Department of Horticultural Sciences, Shiraz University under greenhouse conditions to study the effect of salicylic acid (SA) on Lemon Verbena (*Lippia citriodora* L.) under drought stress. The experiment was factorial in a randomized complete design with 3 replications. The treatments were four irrigation levels (control (FC), 75, 50, and 25% FC) and three salicylic acid concentrations (0, 150, and 300 ppm) along with their interactions. The results of statistical analysis showed significant effects of the drought stress and SA on plant growth parameters, photosynthetic pigments and essential oil content. Results indicated that drought stress had negative effects on plant growth and productivity. Under drought stress conditions, fresh and dry weights and photosynthetic pigments reduced but essential oil content significantly ($p \leq 0.05\%$) increased. Application of SA significantly increased the fresh and dry weights, chlorophyll, carotenoids and essential oil contents of leaves. In this experiment, SA treatment, with enhancing growth rate and changing physiological parameters, decreased adverse effects of drought stress and increased the plant yield.

801
BIOPRIMING EFFECTS OF TRICHODERMA HARZIANUM AND METARHIZIUM ANISOPLIAE ON GERMINATION AND SEEDLING GROWTH OF FLAXSEED

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Flax (*Linum usitatissimum* L.) belongs to Linaceae family have medicinal importance. Its seeds contains omega-3 and used in the traditional medicine, internally (directly or as a tea) and externally (oil extraction) for the treatment of respiratory disorders, eye infections, flu, fever and rheumatism. Bio-priming is a new technique of seed treatment that integrates biological (inoculation of seed with beneficial organism to protect seed) and physiological aspects (seed hydration) to increase seed quality. In order to study the effects of *Trichoderma* and *Metarhizium* fungus as biological factors on seed germination of flaxseed, a two-factors factorial experiment based on completely randomized design with five replications were performed in the seed science and technology laboratory, Yasouj University. Factors were including; flaxseed variety with two levels (Norman and fibrous) and seed bio-priming with 14 levels, involving 10 strain of *Trichoderma harzianum* (T10, T13, T17, T29, T32, T36, T39, T40, T41 and T43) and 2 isolates of the *Metarhizium anisopliae* (M1 and M2), hydrated seeds with distilled water for 1 hour (hydropriming) and non-treated seeds (control). Germination characteristics of treated seeds were evaluated. The results showed that bio-priming treatments improved germination characteristics relative to control in both cultivars. Among these, seeds treated with T40 and T36 isolates in the Norman cultivar and M2 and T39 in the Fibrous cultivar significantly had higher germination percentage, germination rate, seedling vigor index compared to control or hydroprimed seeds. Whereas, T32 isolate had negative effect on measured characteristics. However, Norman showed better response to bio-priming treatments compared to Fibrous.

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804

EFFECTS OF NITROGEN FERTILIZATION ON PLANT GROWTH CHARACTERISTICS AND ESSENTIAL OILS PRODUCTION IN *VALERIANA OFFICINALIS*

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Valerian (*Valeriana officinalis*) is very well known for its medicinal properties including nervous tension, insomnia, anxiety and stress [1]. Nitrogen fertilization has remarkable influence on vegetative growth, root and rhizome yield as well as essential oils content in valerian [2,3]. To improve cultivation system in valerian, the current study focused on optimizing nitrogen content to achieve highest production of root and rhizome as well as essential oils production. Seeds of valerian were sown in late summer in a nursery and seedlings were transplanted in mid-fall in the field. Four nitrogen treatments (0, 50, 100, 200 Kg/ha) were applied in two critical stages of growth i.e. in early spring of next year (at the time of plant emergence) and in the mid-spring (flower stalk initiation). The experiment was designed according to a completely randomized blocks with three replications. Growth and developmental factors such as time from plant emergence until flowering, plant height at flowering stage, flowering percent, 1000 seed weight, seed yield, dried root yield, fresh and dry weight of roots, essential oils content and total essential oils production were studied. Collectively results showed that best treatment for highest vegetative growth leading to high seed yield was 100 kg nitrogen/ha and maximum essential oils production obtained from 200 kg nitrogen/ha.

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805

IDENTIFICATION OF ESSENTIAL OIL AND FLORAL SCENT COMPOSITION IN PERSIAN MUSK ROSE FLOWER

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Persian Musk rose (*Rosa moschata* var. *nastarana*) known as 'Nastaran' is one of the most important species used to produce rose water, attar of rose, and essential oils in the perfume and medicinal industry. However, despite the importance of Musk rose scent, the investigations of flower fragrance of this species are still in its primary stage. In this study, Nastaran essential and fragrance were analyzed by a gas chromatograph coupled to mass spectrometery (GC-MS) and its chemical compositions of floral scent were extracted by headspace (HS) methods. Forty three compounds including phenylpropanoid, terpenoid and fatty acid derivatives were separated by GC-MS; however, HS separated 14 compounds in which phenylpropanoid derivatives were as main compounds of perfume. The main floral headspace components were phenyl ethyl alcohol (73.3%), however this components consisted 1.94% of the essential oils of Nastaran.

805

THE EFFECT OF DRYING ON COMPOSITION OF ESSENTIAL OIL OF PERSIAN MUSK ROSE

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Postharvest processes such as drying may influence quantity and quality of medicinal plants' essential oil. In this study the effects of drying on the essential oil composition of fresh and dried Persian Musk rose flowers were evaluated. 1-nanodecene and n-heneicosane had the highest percentage in the plant essential oil obtained from fresh and dried flowers, respectively. As compared to dried flower, higher concentrations of the main plant secondary metabolites, phenylethyl alcohol, citronellol and geraniol, were found in the essential oil of fresh flowers. According to higher quality of essential oil, it was concluded to use fresh flowers for essential oil production.

811

EFFECTS OF ORGANIC FERTILIZERS AND LEAD AND CADMIUM HEAVY METALS ON GERMINATION TRAITS OF *CALENDULA OFFICINALIS* L. AND *TANACETUM PARTHENIUM* L.

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In order to investigate the effects of organic fertilizers and heavy metals on germination traits of Calendula officinalis L. and *Tanacetum parthenium* L., two separated experiments were conducted as factorial based on completely randomized design in laboratory of Payam Noor University of Mashhad in 2012. Treatments included organic fertilizers humic acid in two levels (0 and 4 ppm) and vermi compost in two levels (0 and 50% by volume) and heavy metals lead and cadmium in two levels (0 and 50 ppm). The results of germination traits of *Calendula officinalis* L. indicated that the vermicompost and cadmium effects and vermicompost and cadmium interaction were significant on germination percentage and shoot length. the highest germination percentage was obtained in 50% vermicompost and 100 ppm cadmium teartment. Also, the highest shoot length belonged to 50% vermicompost and 0 ppm cadmium treatment. Germination rate was affected by vermicompost effect and cadmium and lead interaction, significantly. By applying vermicompost, germination rate increased. The highest germination rate was obtained in 50 ppm cadmium and 0 ppm lead treatment. Humic acid, vermicompost and lead interaction, humic acid, lead and cadmium interaction and vermicompost, lead and cadmium interaction were significant on root length of *Calendula officinalis* L. The results of germination traits of *Tanacetum parthenium* L. indicated that Treatments had no significant effect on germination percentage, statistically. Application of Vermicompost affected germination rate, significantly, so that with applying vermicompost, germination rate increased. Also, shoot length was affected by applying humic acid and vermicompost and interaction of humic acid and lead, interaction of humic acid and cadmium and interaction of vermicompost and cadmium. With applying organic fertilizers (vermicompost and humic acid), shoot length increased. Effect of humic acid, vermicompost, lead and cadmium and interaction of humic acid and lead was significant on root length. With increasing Treatments in plant growth environment, with the exception of cadmium, root length increased. Investigation of humic acid and lead showed that the highest and lowest root length was obtained in 50% vermicompost and 50 ppm lead treatment and control (Without the application of organic fertilizers and heavy metals), respectively.

833

EFFECT OF (*ROSMARINUS OFFICINALIS* L.) EXTRACT AS A FUNCTIONAL COMBINATION ON COOKED SAUSAGE'S COLOR CHANGE

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One of the problems in maintenance of meat related to compounds that use as preservative in thisproduct. The use of large amounts of nitrates and nitrites in meat products can cause nitrosamine and promotethe carcinogenic risk.Researchers effort is that the nitrates and nitrites be replace with other materials. In this study the effect of *(Rosmarinus officinalis* L.) extract (90ppm)alongsidethree levels of sodium nitrite (25, 50,75ppm) on color properties (b*, a*, L*) and its durability was examined.In all of the maintenance time, light indicator (L*) for samples containing (*Rosmarinus officinalis* L.) extracts be significantly lower than control sample (120 ppm). The red indicator samples containing 25 and 50 ppm during maintenancetime did not significantly change but seen reduced the red indicator (a*) in control sample.This study showed that a part of nitrite can possibility replace with (*Rosmarinusofficinalis*L.) extract, without any negative effect on its color characteristics.

835

ECOLOGICAL WEED CONTROL MANAGEMENT IN *CALENDULA OFFICINALIS* L.WITH APPLICATION OF SPENT MUSHROOM COMPOST

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There is a growing concern and demand for healthy food on behalf of both policy makers and the public. Calendula officinalis L. production systems which, in both technical and social terms are forms of ecological production are still operated in many parts of Iran. Agronomic practices such as application of organic fertilizers, non-chemical methods for pests and weed control, complete family labour work for production and processing, share-cropping and socio-cultural environment surrounding the whole process of marigold is in compliance with organic farming principles. Alternative treatments in which application of chemical pesticides is at its lowest level have been under increasing consideration. There are various references showing that application of bottom mushroom bed residue compost bring different benefits such as weed reduction, water capacity and soil structure improvements. In order to study the effect of application rate of mushroom bed residue compost on density and biomass of weeds in marigold, a field experiment based on a randomized block design with four replications is under study in the research field unit of Ferdowsi University of Mashhad. Treatments included 0, 12.5, 25, 37.5 and 50 t/ha of the compost. Results of first sampling showed a significant effect of compost on weed population and density. Maximum weed control was observed with application of 37.5 t/ha, however, detailed results of the present study will be available after taking second weed sample and comparing next year.

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836

CYTOGENETICS STUDIES IN DIFFERENT POPULATIONS OF *TANACETUM CHILIOPHYLLUM* FROM NATURAL RESOURCES GENE BANK

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The genus *Tanacetum* is represented by 26 species growing wild in Iran, that 12 species are endemic includes annual and/or perennial plants, that found primarily in the Mediterranean region in Asia Minor, in the western part of Central Asia and in the Caucasus [4]. Eight populations of *Tanacetum chiliophyllum* L. (tansy) medicinal plant belonging to the tribe Anthemideae within the family Compositae, from different Iranian origins were studied in aspect of cytogenetical marker. Root tips were examined for karyological studies. Chromosome counts from eight populations confirm the base chromosome number at x=9 with numerous 2n=2x=18 diploid and 2n=4x=36 tetraploid. This data agree with results of other researcher[1,2]. The most chromosomes in all populations were metacentric and a few chromosomes were sub-metacentric and were located in Stebbins classes (SC) 1A. This data is a new record for *Tanacetum chiliophyllum* in natural resources of gene bank. The karyotypes are classified in types 2A or 2B, showing the presence of a primitive symmetrical karyotype in the genus *Tanacetum*. An updated checklist of karyological data of the genus is also presented. Karyological data may be very helpful in establishing systematic and evolutionary relationship within the genus [3]. This is why, in the framework of cytotaxonomical research on the genus *Tanacetum* L. [1,3].

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837
CHROMOSOME STUDY IN DIFFERENT POPULATIONS OF *TANACETUM PARTHENIFOLIUM* FROM NATURAL RESOURCES GENE BANK

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Tanacetum L., the third largest genus after *Artemisia* L. and *Anthemis* L., belonging to the tribe Anthemideae of Compositae, consists of ca. 160 species worldwide [1]. In Flora Iranica area, this genus is represented by 18 sections and altogether 54 species [1]. Mitotic chromosomes were studied in meristematic cells of root tips (1-2 cm in length) obtained from seeds [2].The karyotypes of ten populations *Tanacetum parthenifolium* collected in natural resources gene bank of Iran were determined and evaluated by cluster analysis and principal-components analysis. Chromosome numbers were 2n=2x=18 (9 populations) and 2n=4x=36 (1 population). The most chromosomes in all populations were metacentric and a few chromosomes were sub-metacentric. Karyotype analysis indicated that the populations studied differed significantly in the size of the short arms and long arms, and the arm ratio of each pair of homologous chromosomes, indicating structural rearrangements of the chromosomes have been involved in diversification of the populations. By symmetric indices showing the presence of a primitive symmetrical karyotype in the genus. Several systematic and evolutionary aspects of the genus are discussed on the basis of karyological data. Using principal component analysis (PCA), of the karyotypic parameter showed that the first three principal components justify 90% of total variance. The results of Cluster analysis (Ward) based on cytological data correctly separate populations refer to size and form of chromosomes. Hence, this grouping confirm with classification based on first and second component analyses.

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845

STUDY OF SALINITY TOLERANCE IN *LEONURUS CARDIACA* L.

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Use of herbal drugs are growing up by people of developed and developing countries. Regarding to development of saline lands which led to erosion of agricultural lands, use of salt tolerant plants come into great importance. This experiment was conducted to study of salt tolerance in a medicinal plant, *Leonurus cardiaca* L.. Four salinity levels were applied by irrigation with solutions containing NaCl that made EC of 0 (control), 4, 8 and 12 ds/m. Also, four ecotypes of Taleghan, Khansar, Sarab and Kerman were included as plant material. The experiment was run as factorial experiment based on randomized complete block design with three replications. The results showed that effect of population and salinity interaction was significant for most of the measured attributes. The lowest and highest shoot dry weight were found Taleghan under 12 ds/m salt and Kerman under control condition, respectively. Root dry weight in Sarab with 8 ds/m salt and Taleghan with 12 ds/m salt had the lowest and highest values, respectively. Associations of the traits displayed positive significant correlations for root and shoot dry weights with plant height. Also, negative significant correlation was observed among leaf surface and root dry weight. Totally, different response of the ecotypes of *Leonurus* to salt stress conditions appeared existence variation among Leonurus germplasm which may be helpful for selecting salt tolerant genotypes.

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848

EFFECT OF NUTRIENTS AND TIME OF HARVESTING ON QUANTITY AND QUALITY OF ESSENTIAL OIL FROM PEPPERMINT UNDER GREENHOUSE CONDITION

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The experiment was conducted to investigate the effect of fertilizer NH4NO3, P2O5, K2SO4, alone and in combination and time of harvesting on quantitative and qualitative characteristics of peppermint (Mentha piperita L.) under controlled conditions in all seasons, in the experimental research on municipal greenhouse in Bojnoord, North Khorasan Province. Treatments was consist of 50mg ammonium nitrate, triple super phosphate and potassium sulphate per kilogram of soil (equivalent to approximately 100kg/hec) are used in this study included ammonium nitrate (NH4NO3 33%). Triple superphosphate (P2O546%) and potassium sulphate (K2SO450%) and complete fertilizer. The concentration of fertilizers was 151.5, 108.7, 100 and 250 kg for ammonium nitrate, triple superphosphate, potassium sulphate and complete fertilizer, respectively. The experiment was conducted in a completely randomized design with 9 treatments and 4 replicates of each treatment. Beginning of summer an autumn, plants harvest and their essential oils extracted. Essential oils were used for qualitative and quantitative analysis was performed by GC and GC-MSS. The percentage of essential oils were different in different treatments between 1.5-3.4% in harvest(1) and 1.17-2.2% in harvest(2). The oil yields was variable 6.5-17.2 and 5.1-7.2 milligrams per plants in harvest(1) and (2). The highest of the PK in harvest(1) and NK in harvest(2) treatments that were significantly different from other treatments ($P<0.05$). The main components of the essential oil obtained from the analysis in two harvest include Menthol, Menthone, Menthofuran, Cineol, Linalool, Pulegone. Between the constituents of the oils in different treatments was significant ($P<0.05$).

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851

THE EFFECT OF DIFFERENT LEVELS OF CADMIUM AND SALICYLIC ACID ON PHOTOSYNTHETIC PIGMENTS AND PROLINE ON GERMAN CHAMOMILE

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Cadmium is a heavy metal that causes oxidative stress in plants. Cadmium is highly toxic to plants and animals [1].German chamomile *(Matricaria chamomilla)* belongs to the family Asteraceae. It is an annual, herbaceous, with cut and needles leaves placed alternately on the stem, attaining a height of 30 to 70 cm [2]. This study was performed to investigate the effects of different concentrations of salicylic acid (0, 0/5 and 1 mM) on photosynthetic pigments and proline on chamomile under different levels of cadmium (0, 10, 20 and 30 mg per kg of soil) in pot condition. A factorial experiment was conducted in a completely randomized design in a greenhouse at university of Zabol with three replications. Results showed that the plants treated with cadmium, decreased all characters except proline. According to the results, the use of salicylic acid in form of foliar, especially at 1 mM concentration in cadmium stress, increases the amount of proline and photosynthesis pigments in chamomile, that decreases the negative effects of heavy elements compared to the control plants (zero concentration of salicylic acid). Generally use of salicylic acid leads to increased proline and examined pigments and increases the resistance of plants to cadmium stress.

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853

THE EFFECT OF DIFFERENT LEVELS OF ARSENIC AND SALICYLIC ACID ON PHOTOSYNTHETIC PIGMENTS AND THE AMOUNT OF CARBOHYDRATES ON MEDICINAL PLANT (*THYMUS VULGARIS* L.)

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Thyme (*Thymus vulgaris* L.) is considered as one of the most important species within Lamiaceae family which usually is being used as food and aromatic composition [1]. Moreover, this plant is one of the most valuable medicinal plants, due to essential oil and medicinal compositions, and its usage as drug, spice, and perfume is worldwide [2]. This study was conducted to investigate the effects of different concentrations of salicylic acid (0, 1, and 2 mM) on the morphological characteristics of medicinal thyme under different levels of arsenic (0, 10, 20 and 30 mg per kg of soil) in pot condition. A factorial experiment was conducted in a completely randomized design in a greenhouse at university of Zabol with three replications. The results showed that the plants treated with arsenic, decreased all photosynthetic pigments except the amount of carbohydrates. According to the results, the use of salicylic acid, especially at 2 mM concentration, under arsenic and heavy metal stresses, was able to increase photosynthetic pigments in thyme, resulting in reducing the negative effects of heavy element and reduce the amount of carbohydrates compared to control plants (zero dose salicylic acid). Foliar application of salicylic acid had no significant effect on the examined characteristics in comparison with the control plants. Generally use of salicylic acid leads to increased photosynthetic pigments that increase plant resistance against arsenic stress.

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861
EFFECTS OF BAP HORMONE LEVELS ON *IN VITRO* MICROPROPAGATION OF MYRTLE

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Tissue culture techniques provide a useful approach for the propagation of *Myrtus communis*, a woody *Myrtaceae* valued as an ornamental and for secondary metabolites [1]. *In vitro* propagation techniques could be a useful approach both for the establishment of protocols for rapid multiplication and for studies of genetic manipulation [2]. The aim of this study was to evaluate the effects of BAP hormone levels on *in-vitro* micropropagation of Myrtle. The experiment was conducted in a completely randomized design with four replications. Treatments comprised of deferent levels of BAP hormone including 0 (control), 1, 2 and 4 mg/l. Surface sterilization was performed by washing explants with tap water for 30 min, immersing in 70% ethanol for 30 second, and finally disinfecting by $Ca(ClO)_2$ 0.5 for 5 min. Explants were planted in MS medium and incubated at 25 centigrade under 16-h photoperiod under cool white fluorescent tubes, which produced 40 µmol $m^{-2}.s^{-1}$. After three weeks, regeneration characteristics including main shoot height, lateral and adventitious shoot number, bud break percent, and leaf number were evaluated. There was significant difference among treatments in all characteristics. The highest main shoot length (4.43 cm) was recorded in 4 mg/l BAP. There was no significant difference among treatments 0, 1 and 2 mg/l BAP in terms of adventitious shoot induction. 4 mg/l BAP had the highest number of adventitious shoot per explant (2.14). No adventitious shoot observed in control. Similar to adventitious shoot, the highest lateral shoot number was recorded in 4 mg/l BAP (1.34). In terms of bud break percentage, except 1mg/l BAP (87 %), other treatment had 100 % of bud growth. 4 mg/l BAP produced significant increment in leaf number per explant (41). Other treatment had the average number of 10.5 leaves per explant. In general, the results showed that 4 mg/l BAP had the best effect on *in-vitro* micropropogation characteristics of Myrtle.

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862
EVALUATION OF DIFFERENT STERILIZATION TREATMENTS ON *MYRTUS COMMONIS IN VITRO* ESTABLISHMENT

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Myrtle (*Myrtus communis* L.) is a drought-tolerant evergreen shrub that can be used as an ornamental hedgerow [1]. The leaves and berries are a source of essential oils that have medicinal, insecticidal and sensory value [2]. Establishment procedure is the first and the vital stage in plant tissue culture. Contamination and browning are phenomenon often observed in establishment stage in *in vitro* plant micropropagation [4]. Browning, usually is a result of phenolic compounds oxidation and can affected by plant species and cultivar, sampling season and media composition [3]. In this experiment, the effects of different types of sterilization treatments on browning and disinfection of Myrtle explants are evaluated. Treatments comprised of $Ca(ClO)_2$ 0.5 and 1% for 5 min, $Ca(ClO)_2$ 3.5% for 20 min, NaClO 0.5% for 5 min, NaClO 20% for 30 min and NaClO 40% for 20 min. Surface sterilization is performed by washing explants with tap water for 30 min, immersing in 70% ethanol for 30 second, and finally applying sterilization treatments. Explants were planted in MS medium and incubated at 25 centigrade under 16-h photoperiod under cool white fluorescent tubes, which produced 40 µmol $m^{-2}.s^{-1}$. Bacterial and fungal infection percentage, explants browning, phenolic compound oxidation and bud breaking were evaluated. Results showed that treatment effects were significant in terms of bud break percentage, phenol oxidation and bacterial contamination. The highest bud breaking percentage (91%) was recorded in $Ca(ClO)_2$ 0.5. Increment in disinfectant concentration and time, had adverse effect on bud growth. No bud growth was recorded in NaClO 20 and 40%. Phenolic compound oxidation was recorded only in NaClO 0.5% for 5 min. Explants browning was not observed over all treatments. There was significant difference among disinfection treatments in terms of bacterial contamination. The highest contamination were recorded in $Ca(ClO)_2$ 1% and NaClO 0.5% treatments (36 and 23 percent, respectively). Based on disinfection efficiency and bud breaking percent, $Ca(ClO)_2$ 0.5% was the best sterilization treatment.

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863
PHYSICAL DORMANCY BREAKING IN MYRTLE (*MYRTUS COMMUNIS*) SEED

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Myrtle (*Myrtus communis* L.), a woody evergreen shrub valued as an ornamental and for its secondary metabolites [2]. Medicinal use of myrtle extracts have been reported as antimicrobial, stimulant, astringent, antiseptic, and bactericide [1,3]. Different dormancy-breaking pretreatments were assessed in order to improve germination of Myrtle seeds. The experiment was designed as a completely randomized design with five replication at the Iranian Research Organization for Science and Technology (IROST) in 2014. Seeds were subjected to different treatments including untreated seed (control), mechanical scarification with soft sandpaper for 20 second, one and five minutes, mechanical scarification with hard sandpaper (P80) for 30 second and one minute and chemical scarification with cold sulfuric acid for 5, 10, 20 and 30 minutes. The seeds surface sterilized by 70% ethanol for 30 second flowing by NaClO 5% for 5 minutes and subsequently rinsed three times with sterilized water. In all treatments, seeds were placed on double layered Wathman No.1 filter paper moistened with 5ml of distilled water in sterilized Petri dishes. Seeds were incubated at constant temperature of 25 $^{\circ}C$ for 21 days. The highest seed germination was obtained by treating the seeds with cold acid for 20 or 30 minutes. Scarification with hard sandpaper for 30 second and one minutes improved seed germination only 10 and 12 percent, respectively. The highest seed germination rate was recorded in seeds treated by cold acid for 20 and 30 minutes (2.08 and 1.97 respectively). The lowest germination rate was observed in scarifications by soft sandpaper. The results showed that chemical stratification by acid is the most effective way in breaking dormancy. Therefore, the reason of seed dormancy in Myrtle is hard coated seeds that produce barrier against growth of embryo or radicle by inhibition of water absorption and gas-exchanges.

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876

EVALUATION OF YIELD, COMPONENTS OF YIELD AND ESSENCE PERCENTAGE OF BLACK CUMIN (*NIGELLA SATIVA* L.) ON DROUGHT STRESS AND FOLIAR APPLICATION WITH SALICYLIC ACID ON KERMAN CONDITION

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To study the effects of drought stress and foliar application with salicylic acid on yield, the components of yield and the percentage of essence of (*Nigella sativa* L.), a field experiment was conducted at researched farm of University of Kerman in the spring of the 2014. The experiment was conducted as a split plot based on randomized complete block design with three replications. The first factor was drought that included in three levels: no tension (90percent field capacity), moderate tension (70 percent field capacity) and severe tension (50percent field capacity). The other factor was included four concentrations of salicylic acid: zero Mm (foliar application with distilled water), five, 10 and 15 Micro molar salicylic acid for foliar application. The data are analyzed with SAS and means are compared with dunkan. The results showed that drought and salicylic acid on the number of grains in folicules, the number of grains in the herb, 1000 kernel weights, biological yield, percentage of essence, essence and grain yield and harvest index was significant [1]. The effect of interaction of salicylic acid and drought stress on the number of grains in a folicules and the percentage of essence was significant [2]. Therefore to obtain maximum yield of grain and essence on drought condition, we could apply moderate concentration of SA (S3= 10Mm) in Black cumin.

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878
ACTIVITY OF PHENYLALANIN E AMMONIALYASE IN *AGASTACHE FOENICULUM* UNDER DIFFERENT CONCENTRATIONS OF METHYL JASMONATE

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Agastache foeniculum [Pursh] Kuntze is a perennial, herbaceous medicinal and spice member of Lamiaceae family [2]. The leaves and inflorescences of this plant are used in herbal teas, cakes, sweets, salads and desserts; the leaves are also used in treating heart conditions, chest pain, inducing sweating to reduce fever and in poultices. Methylchavicol is the main component of this plant's essential oil [1]. The phenylpropanoid pathway starts with L-phenylalanine, which is transformed to t-cinnamic acid catalysed by phenylalanine ammonialyase (PAL). PAL is an important branch point enzyme that links primary and secondary plant metabolism [3]. The effect of different concentrations of methyl jasmonate (MeJa) (0, 0.1 and 1 mM) on enzymatic activity of PAL was investigated by means of a hydroponic system. The PAL activity was assessed after 4, 8 12 and 24 hours after treatment. The experiments were carried out based on a completely randomized design. The results showed that the PAL activity significantly increased in treated plants with 1 mM MeJa for 24 h compared with 0.1mM MeJa and control.

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881

EFFECTS OF INTERCROPPING ON THE YIELD AND SOME PHYSIOLOGICAL TRAITS OF TWO PLANTS FENUGREEK AND ANISE

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To evaluate the effect of intercropping on yield and some physiological traits of two plants fenugreek and anise a field experiment was carried out in the Agricultural Research Field of Yasouj University in 2012, as a randomized complete block design with three replications and ten treatments. Treatments were concluded: Pure cultures of fenugreek and anise, single, double and three- row intercropping of fenugreek and anise by no weed control and weed control conditions. Treatments on physiological traits such as yield, oil percentage of the total protein nitrogen biomass and seed, fenugreek and anise essential oil yield and oil yield were significantly different from each other. Land equivalent ratio in all intercropping treatments than between one and 1.04 to 1.39, which was higher LER indicated superiority of a mixed culture than in pure culture is the culture patterns.

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882

THE EFFECT OF MANURE ON YIELD OF ESSENTIAL OIL COMPOUNDS OF LAVENDER (*LAVANDULA OFFICINALIS*)

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In a sustainable agricultural system, identification of the fertilizers which are nature friendly and suitable for plants is essential. So these fertilizers are more important in medicinal plants cultivation [1].In order to investigate effect of manure on composition of essential oil yield of lavender (*Lavandula officinalis*), this experiment was conducted the form of randomized completed block design with three replication in Alborz research station, Research Institute of Forests and Rangelands in 2013. treatments were cow manure in four levels (0, 10, 20 and 30 ton/ha).The result of analysis variance indicated that significant difference between treatments compositions such as Pinocarvone ($p \leq 0.01$) and Terpineolene ($p \leq 0/05$). Mean comparison indicated that lowest P-Cymene (440.36 g/ha) belong to control and maximum of P-Cymene (628.07 g/ha) belongs to consumption 20 ton/ha. The maximum amount of Terpineolene (554.86 g/ha) observed of 30 ton/ha. lowest Pinocarvone (263.16 g/ha) belongs to use of 20 ton /ha. maximum Borneol Composition (9568 g/ha) was obtained from the level 20 tons per hectare. maximum amount Terpineol- α belongs to control. So control with 569.8 g/ha had the lowest combined E-Caryophyllene and use of 30 ton/ha (759/1 g/ha) had the maximum amount of E-Caryophyllene. Compounds such as Pinene-α, Camphene, Sabinene, Pinene-β, Delta-3 Carene, Terpinene-α, Limonene, 1.8-Cineole, Cis-Sabinene hydrate, Camphor, Terpinene-4-ol and Delta-Cadinol in all treatments were in one group.

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888

THE EFFECT OF GARLIC EXTRACTS ON PLANTS DAMPING-OFF DISEASES CAUSED BY *PHYTOPHTHORA* SPP.

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The aim of this research was to find an alternative to synthetic fungicides currently used in the control of plants damping-off diseases caused by Phytophthora species. The study was carried out to evaluate the antifungal efficacy of garlic extracts (*Allium sativum* L.) and Metalaxyl fungicide against *Phytophthora melonis*, *P. drechsleri* and *P. capsici* causal agent damping- off in plants of Pepper, Melon and Cucumber in *in vitro* and greenhouse conditions [1]. Fungal radial growth for each concentration of garlic extracts on Phytophthora species was measured. Also, the median effective concentration (EC_{50}) values (µl/ml) of garlic extracts measured [2]. The chemical composition of the essential oils was determined by gas chromatography-mass spectrometry (GC-MS). Results of *in vitro* indicated that plant extract of garlic caused a significant decrease in the mycelial growth of phytophthora species and it had Fungistat properties. The maximum and minimum inhibitory effect of plant extract was observed for *P. capsici* (EC_{50} = 43.293 ppm) and *P. drechsleri* (EC_{50} = 286.465 ppm), respectively. EC_{50} of fungicide of Metalaxyl on mycelial growth of *P. capsici*, *P. drechsleri* and *P. melonis* were 20. 869, 20.055 and 17.702, respectively. The profile of the extract components of *Allium sativum* showed that Diallyl tetra sulphide (31.32%), Allyl disulphide (26.78%), Nitrosothymol (8.64%), 1H-1,2,4-Triazole, 3-thiol-5-methyl (8.4%) and Allyl sulphide (6.15%) were the main compounds. Microscopic observation shown morphological changes in hyphal cell of Phytophthora species as discoloration, hyphal swelling and lyses of hyphe. The results of greenhouse showed that plant extract significantly increased growth factors in plants of Pepper, Melon and Cucumber as dry weight of stem and root, length of stem and root compared to control ($P \leq 0.05$). This results shows that the antifungal activity of plant extract of *Allium sativum* on Phytophthora species. Garlic extract was found to be fungicidal against a broad range of soilborne fungal organisms and may be used in the production of organically growth vegetables. Also, This agent exhibits ani-bacterial, anti-fungal and anti-viral properties, becuas in biological substances extracted from garlic is found to be an importan anti-microbial and antilipidemic agent [3]. Therefore, garlic extract may be a cost effective way of protection crop against plant pathogens, because plant extract contain several antimicrobial compounds, the development of resistant pathogens may be delayed [4].

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889

EFFECT OF SALICYLIC ACID ON GROWTH PARAMETERS AND ANTIOXIDANT ACTIVITY OF SAVORY (*Satureja hortensis* L.) UNDER SALINITY CONDITION

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Crop plants encounter environmental stresses, both abiotic and biotic stresses. Abiotic stress has main impact on the crop productivity worldwide, reducing average yields and quality for major crop plants. Salinity stress is one of the main abiotic stresses, which limits crop growth and yield in different ways. Salicylic acid also plays a role in response to abiotic stresses. This study was aimed to study the effect of salicylic acid and salinity stresses on morphological (plant height, wet and dry weight of plant, leaf are index) and antioxidant activity of savory. Thus, an experiment was arranged in factorial based on randomized complete blocks design with three replications. Treatments consisted of salicylic acid (0, 0.25, 0.50 and 1.0 mM) and salinity (0, 25, 50 and 75 mM). Results showed that salinity stress caused a decrease in plant height, leaf are index, wet and dry weight; while decreased the antioxidant activity. The interaction effect of salinity and salicylic acid showed that salicylic acid spray improved some of the measured parameters. So that, the concentration of 1 mM salicylic acid resulted in better improvement of plant height, wet and dry weight than the control plants. The concentration of 0.25 mM salicylic acid also resulted in more leaf are index and antioxidant activity that the control plants. It can be concluded that salicylic acid may have different effects in different concentrations and can be applied in different ranges of concentrations based on the purpose to decrease the destructive effects of several stresses.

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895

EFFECT OF SALICYLIC ACID ON GROWTH PARAMETERS AND SOME PHYTOCHEMICAL ATTRIBUTES OF SAVORY (*SATUREJA HORTENSIS* L.)

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Salicylic acid (SA) and other salicylates are known to affect various physiological and biochemical activities of plants and may play a key role in regulating their growth and productivity. In other to study the effects of salicylic acid on quantitative and qualitative attributes of savory (*Satureja hortensisi*), an experiment was carried out based on randomized complete blocks design with three replications. Treatments consisted of salicylic acid (0, 0.25, 0.50 and 1.0 mM), which were applied three times in 10-day intervals. Morphological and phytochemical traits such as plant height, number of main stem nodes, crown diameter, wet and dry weight of plant, chlorophyll a, b and total chlorophyll were measured. Results showed that salicylic acid significantly affected the measured parameters. So that, the 1 mM concentration of this treatment increased all measured parameters of treated plants in comparison to the control plants. Briefly, it can be concluded that application of salicylic acid can improve some morphological and phytochemical attributes of plants.

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897

THE EFFECT OF FOLIAR APPLICATION OF PUTRESCINE ON QUANTITATIVE AND QUALITATIVE OF *SALVIA SCLAREA*

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The polyamine's are a group of natural plant regulators, that identification plant hormones. The polyamine play many role in plant growth. In order to evaluate the effect foliar application of putrescine on quantitative and qualitative on *Salvia sclarea*, an experiment was conducted under field conditions in 2014, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in the form of a randomized complete block design with three replications. Putrescine was in five levels (0, 100, 200, 300 and 400 mg/L.). The seeds planted at field in autumn 2013. The foliar application of putrescine was started in spring at 3 stages (the plants have 6, 10 and 16 leaves). The plant harvested at the end of growing season (September 2014). The results of analysis variance indicated a the effect of foliar application of putrescine was significant on characteristics large and small canopy diameter, petiole long, number of leaves, and shoot yield. Also, there was no significant effect on leaf length, leaf width, petiole diameter, leaf yield, essential oil percentage and essential oil yield. The comparison of means showed that the highest petiole yield with 1993kg/ha and 2982.2 kg/ha were observed in 100 and 200mg/L foliar application of putrescine, respectivly. The results indicated that lowest petiole yield (1956 kg/ha) belong to 200mg/L foliar application of putrescine.The comparison of means showed that the highest shoot yield with 4678.7 kg/ha and 4741.6 kg/ha were observed in 100 and 200mg/L foliar application of putrescine, respectivly. The resuts indicated that lowest shoot yield (3478.9 kg/ha) belong to 200mg/L foliar application of putrescine.

907

THE EFFECT OF DROUGHT STRESS AND HUMIC ACID ON MORPHOLOGICALTRAITS AND YIELD OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.) .

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In order to investigate the effect of drought stress and humic acid on root traits of Rosemary (*Rosmarinusofficinalis* L.), an experiment was conducted under field conditions in 2014, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in split plot in the form of a randomized complete block design with three replications. The main factor was drought stress in three levels (including 30%, 60% and 90% field capacity) and the sub factor was foliar application of humic acid in five levels (including 0, 100, 200, 300 and 400 mg/L.).The results of analysis variance indicated that drought stress significantly affected on plant height, small and large canopy diameter, canopy area, main stem, leaf width ($P \leq 0.01$) and leaf long at $P \leq 0.01$. The results indicated that drought stress significantly affected on annually stem yield, woody stem yield and total shoot yield at $P \leq 0.05$. Mean comparison of drought stress indicated highest plant height (49.2cm), large canopy diameter (40.53cm), small canopy diameter (30.66cm), canopy area (93.2cm), main stem diameter (1.38 cm) and leaf long (3.03 cm) were achievedin the moderate stress (60% FC). So mean comparisonindicated that highest leaf yield (4147.5 kg/ha), annually stem yield (2284.5 kg/ha), woody stem yield (848.6 kg/ha) and total shoot yield (7280.7 kg/ha) belong to moderate stress (60% FC).Mean comparison of humic acid indicated most annually stem yield (1640.9 kg/ha), woody stem yield (694.9 kg/ha) and total shoot yield (5550 kg/ha) were achieved in the 300 mg/L. of humic acid.

908
INTERCROPPING CHICKPEA (CICER ARIETINUM L.) AND BLACK CUMIN (*NIGELLA SATIVA* L.)

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Nigella sativa is an annual flowering plant in the family Ranunculaceae, native to south and southwest Asia. It grows to 20–30 cm (7.9–11.8 in) tall, with finely divided, linear (but not thread-like) leaves. The flowers are delicate, and usually colored pale blue and white, with five to ten petals. The fruit is a large and inflated capsule composed of three to seven united follicles, each containing numerous seeds. The seed is used as a spice, sometimes as a replacement for original black cumin [1,2]. This experiment was conducted in a randomized complete block design with three replications in West Azerbaijan province- city Nagadeh, Iran during growing reason of 2012-2013. Treatments included 100% Black Cumin + 10% Chickpea, 100% Black Cumin + 20% Chickpea, 100% Black Cumin + 30% Chickpea, 100% Black Cumin + 40% Chickpea and 100% Black Cumin + 50% Chickpea and sole cropping of Chickpea and Black Cumin. Yield and components yield in monoculture of each crop was more than other treatments. The highest grain yield and biological yield of chickpea were achieved in monoculture with 1105 and 14479 $kg.ha^{-1}$, respectively. The results showed that the maximum seed yield and biological yield of Black Cumin were obtained at monoculture with 750 and 2310 $kg.ha^{-1}$, respectively. The highest of percentage of grain protein (23%) and essential oil percentage (1.47%) were related to treatment 100% Black Cumin + 50% Chickpea, respectively. Based on this results, the highest land equivalent ratio (LER=1.74), actual yield loss (AYL=6.45) and intercropping advantage (IA=1.70) were obtained by treatment 100% Black Cumin + 10% Chickpea, respectively. Therefore, it seems that treatment 100% Black Cumin + 10% Chickpea is remarkably effective to increase the economic income and land use efficiency.

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911
INVESTIGATION OF SOME HABITAT CHARACTERISTIC OF MEDICINAL SPECIES SMYRNIUM CORDIFOLIUM BOISS. IN BOYER AHMAD REGION

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smyrnium cordifolium boiss. Is belongs to Apiacea. The purpose of this study was to investigate some habitat characteristic of *Smyrnium cordifolium* species in Boyer Ahmad region. In the study area, 6 transects were established randomly. For every 10 meters along each transect were established plots with a size of 2 x 2 m. Canopy cover percentage and the number of *smyrnium* along with total canopy cover of other accompanying plant species were estimated in each plot. The location of each plot was recorded using hand held GPS. in the some number of Plats soil parameters such as soil texture, organic carbon content, electrical conductivity and pH were determined. the results showed that, in general, in this study, 41 species of 20 families and 38 genera were collected and identified. Astaraceae families with 14% (6 species), Apiaceae family with 12% (5 species), family Poaceae with 10% (4 species) and 10% of the Rosaceae family (4 species) were the most important families in the area. The results showed that the density of *Smyrnium* Is /87 basis in square meters. The results showed that this plants often growth in semi humid cold climate, elevation range of 1500 to 2700 m above sea level, soils with C= 2/57, PH= 7/12. Flowering plants started from early June and continue to early July.

914

THE EFFECT OF BOILING WATER TREATMENT ON SEED DORMANCY BREAKING AND SEED GERMINATION OF THE *ROBINIA PSEUDOACACIA* L.

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Acacia tree is one of the beautiful trees that has medicinal value, too. Seeds of this plant contains dormancy which should be broken by various treatments in order to germinate. Boiling water is one of the treatments that causes *Robinia pseudoacacia* seed dormancy breaking. In order to investigate the effect of boiling water treatment on *Robinia pseudoacacia* seed germination , an experiment has been designed at Caspian Forest Seed Center laboratory. In this study, hundred seeds of *Robinia pseudoacacia* has been divided into four containers and were soaked in boiling water for 24 hours and then were planted in a container filled with sterile sand according to randomize data. Results showed that 59.75 % of these seeds has been germinating after 5 days. So boiling water recommended as an appropriate treatment for seed dormancy breaking of *Robinia pseudoacacia* [1,2,3].

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915
DETERMINATION THE WATER PRODUCTIVITY AND HARVEST INDEX OF DEVELOPED SAFFRON

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Saffron is Spices and medicinal produc With the`export value. This product is known to have belonged to Iran.Agriculture as the largest water consumer for its efficient water use requires an appropriate irrigation scheduling. For an optimum irrigation the amount of potential evapotranspiration is needed. The aim of this study was to measure potential evapotranspiration and Water productivity and Harvest index of saffron in the Agricultural Research farm of shiraz University located in Bajgah area. This experiment was conducted in three water balance lysimeter. Total potential evapotranspiration was 726 and 783 mm for the third and fourth year growing season respectively. Harvest index was 1.07 and 0.654 percent for the third and fourth year growing season respectively. As well Water productivity in the third growing season is greater than fourth year growing season. That can be Said Due to the outbreak of cold weather in the middle of flowering plants, And thereby is stop at this year's flowering.

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919

THE EFFECT OF DROUGHT STRESS AND HUMIC ACID ON ROOT TRAITS OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.) .

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In order to investigate the effect of drought stress and humic acid on root traits of Rosemary (*Rosmarinusofficinalis* L.), an experiment was conducted under field conditions in 2014, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in split plot in the form of a randomized complete block design with three replications. The main factor was drought stress in three levels (including 30%, 60% and 90% field capacity) and the sub factor was foliar application of humic acid in five levels (including 0, 100, 200, 300 and 400 mg/L).Results indicated that drought stress significantly affected on main root long, long of lateral root, main root diameter, diameter of root influence, total root yield and yield of hairy roots at $P\leq0.01$. Results indicated that humic acid significantly affected on main root diameter ($P\leq0.05$) and yield of hairy roots at $P\leq0.01$. So results of the interactions indicated that significantly affected on yield of hairy roots at $P\leq0.05$. Mean comparison of drought stress indicated most main root long (16.96cm) was achievedin the severe stress (30% FC). So mean comparisonindicated that highest main root diameter (16.57mm) belong to control (90%FC). The result showed that highest long of lateral root (42.73 cm) and diameter of root influence (80.3 cm) were achieved in the moderate stress (60% FC).Mean comparison also showed that highesttotal root yield and yield of hairy roots with 1473.07 kg/ha and 895.07 kg/ha, respectively, were achieved in the moderate stress (60% FC).Mean comparison of humic acid indicated most main root diameter (15.25mm) was achievedin the used to 300 mg/L of humic acid. So the result showed that the highest yield of hairy roots (584.8 kg/ha) were achieved in the 400mg/L. of humic acid. Mean comparison of interaction factors showed that yield of hairy roots was the highest (1057.3 kg/ha) in 60% of field capacity and 300 mg/L. of humic acid.

943

INTERACTION BETWEEN SALT STRESS AND MICROELEMENT NUTRITION ON MORPHO-PHYSIOLOGICAL TRAITS OF BASIL (*OCIMUM BASILICUM* L.)

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Basil (*Ocimum basilicum* L.) is one of the most important medicinal plants that have numerous application in pharmaceutical and food industries [1]. Salt stress is one of the most important factors that affect growth of plants by influence on plant nutrition. In this experiment, the effects of salt stress accompanying nutrient deficient on morpho-physiological traits of green and purple basils were studied. Salt stress was adjusted at two levels; control and 150 mM NaCl. Nutrient deficient treatments were complete nutrient solution, ¼ Fe, ¼ Mn and ¼ Zn solutions. NaCl was gradually added to boxes when plants reached to six leaf ages. Photosynthesis parameters such as net photosynthesis (Pn), stomatal conductance (gs), transpiration (E), Co_2 substomatal (C_i), water use efficiency (WUE) and quantum yield (QY) and physiological traits (relative water content (RWC) and ion leakage) and morphological traits (leaf number, leaf area, leaf length and wide, plant height, fresh and dry weights of aerial part and root) were measured at flowering stage. Result showed that salt stress accompanying nutrient deficient especially Zn significantly affected Pn, gs, E, C_i, WUE, QY, RWC and ion leakage of both basils. Leaf number, leaf area, leaf wide and length, plant height, fresh and dry weights of aerial part and root were significantly decreased by nutrient deficient under salt stress. Green basil was more sensitive to salt stress than purple basil. Zn was more essential for plant growth than Fe and Mn. Overall, it is concluded that plant nutrition with microelements specially Zn can improve plant respond to alt stress.

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944

THE EFFECT OF HARVEST TIME ON ESSENTIAL OIL CONTENT AND COMPOSITION OF HOLY BASIL (*OCIMUM SANCTUM*)

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Holy basil (*Ocimum sanctum*) is one of the most important medicinal plant belongs to Lamiaceae family. Holy basil is a popular home remedy for many ailments such as bronchitis, liver diseases, catarrhal fever, lumbago, hiccough, gastric disorders, genitourinary disorders and skin diseases [1]. In order to evaluate the effect of harvest time on essential oil content and composition of holy basil, an experiment was conducted at research farm of Department of Horticultural science, Shahid Chamran University of Ahvaz based on randomized complete block design, with three treatments and three replications. The treatments were harvest times; first, second and third harvests. Plants were harvested at flowering stage in May, August and November for first, second and third harvests, respectively. Plants were dried in shade place and room temperature. Essential oils were extracted by Clevenger apparatus with three hours distillation time. The oils were analyzed by gas chromatograph and gas chromatograph equipped to mass spectrometry. There was not significantly difference in essential oil content between three harvests. Main essential oil components at three harvests were alpha pinene (1.21- 1.40%), beta phelanderene (0.75- 1.18%), beta pinene (1.77-2.57%), 1, 8 cineol (18.40- 24.79%), ocimene (3.43-5.24%), alpha terpinyl (0.99-1.36%), methyl chavicol (11.18-12.05%), chavicol (0.79-1.10%), eugenol (30.29-37.85%), methyl eugenol (0.9-1.06%), caryophylene (0.86-1.03%), beta farensine (1.34-1.68%), bisabolene (5.77-7.73%) and alpha bisabolene (4.23-4.60%). The highest eugenol (37.85 %) was obtained at second harvest. The lowest value of eugenol was observed at first harvest. According to result on essential oil content and composition, three harvests of holy basil are recommended.

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946

LETHAL EFFECTS OF THREE PHARMACEUTICAL FORMULATIONS ON EGGS OF THE MEDITERRANEAN FLOUR MOTH, *ANAGASTA KUEHNIELLA* (LEP.; PYRALIDAE)

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There are many investigations concerning the use of plant essential oils as substitutions for common residual pesticides. In the present research, fumigant toxicity of three pharmaceutical formulation including Phenelin® (containing essential oil of *Foeniculum vulgare*), Tussivin® (containing essential oils of *F. vulgare* and *Zataria multiflora*) and Rosemary® (containing essential oils of *Rosmarinus officinalis*) was evaluated against one-day old eggs of the Mediterranean flour moth, *Anagasta kuehniella* (Zeller) (Lep.; Pyralidae) under laboratory conditions (27±2 ºC, 60±5% R.H., L14:10D). Doses were determined by performing dose-setting experiments. Final bioassays were carried out with 6 doses and 6 replications. Percentage mortalities were corrected by Abbott's formula [1]. LC_{50}s, LC_{90}s and fiducial limits were estimated via probit analysis [2] using Polo Plus ver. 2.0 software. When the 95% fiducial limits did not overlap, values were considered to be significantly different [3,4]. LC_{50}s (95% FLs) of Phenelin®, Tussivin® and Rosemary® evaluated as 172.48 (164.87-180.15), 498.04 (459.42-548.39) and 653.11 (580.01-760.59) µL/L air, respectively. All values were significantly different. In addition, LC_{90} (95% FLs) values estimated as 370.86 (338.11-416.99), 17046.30 (1390.53-2390.07) and 3282.55 (2341.60-5328.53) µL/L air, respectively. Thus, Phenelin was almost 3.0 and 3.8 times more toxic than Tussivin® and Rosemary®, respectively. These results indicate the considerable ovicidal effects of the three formulations and therefore their probable application for controlling the Mediterranean flour moth and other related stored-products lepidopterans.

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947

EFFECT OF PEG-INDUCED DROUGHT STRESS ON SEED GERMINATION OF DIFFERENT WILD POPULATIONS OF TWO ACHILLEA SPECIES

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Achillea millefolium and *A. fillipendulina* are important medicinal species that are grown in a variety of climates in Iran. Different germination characteristics compared among different wild populations of two species to determine the superior populations in each species under drought stress. Water potential between 0 and -0.9 MPa were obtained using polyethylene glycol 6000 (PEG-6000) solutions. Results indicated that in both species a significant reduction was obtained on the most germination parameters including: percent and rate of germination, vigor index, dry weight, radicle length, radicle to shoot ratio and seedling length. The percentage and rate of germination, shoot length and radicle to shoot ratio were significant among different populations. These results indicated a strong genetic potential for drought tolerance during germination within each species. Population 17255 from *A. millefolium* and population 18043 from *A. fillipendulina* showed the highest amount of germination characteristics, which could be suggested for arid and semi-arid areas. Overall, Population 17255 from *A. millefolium* and population 18043 from *A. fillipendulina* were able to express greater drought tolerance and consequently could be used as a valuable resource for breeding programs.

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949

OVICIDAL TOXICITY OF THREE IRANIAN PHARMACEUTICAL FORMULATIONS AGAINST THE MEDITERRANEAN FLOUR MOTH, *ANAGASTA KUEHNIELLA* (LEP.; PYRALIDAE)

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Extensive application of residual insecticides against stored-products pests had left negative effects on human health and environment [1]. According to the results obtained from many investigations, plant essential oils are suitable substitutions for common residual pesticides [2,3]. In this study, ovicidal toxicities of three Iranian pharmaceutical formulations: Persica® (containing essential oils of *Salvadora persica*, *Mentha spicata* and *Achillea millefolium*), Carmint® (containing essential oils of *M. spicata*, *Coriandrum sativum* and *Melissa officinalis*) and Hypiran® (containing essential oil of *Hypericum perforatum*) were assesed against one-day old eggs of the Mediterranean flour moth, *Anagasta kuehniella* (Zeller) (Lep.; Pyralidae). Laboratory conditions set as 27±2 ºC, 75±5% R.H. and L14:10D. By using dose-setting experiments, final bioassays for Persica®, Carmint® and Hypiran® were carried out with six doses ranging from 56.57-131.57, 78.94-157.89 and 72.36-26.15 µL/L, respectively. All experiments repeated six times with 50 eggs in each replication. Abbott's formula [4] was used for correction of percentage mortalities. Probit analysis [5] was done to estimate LC_{50}s, LC_{90}s and fiducial limits by Polo Plus ver. 2.0. Results indicated that the three formulations had good ovicidal efficacies. LC_{50}s (95% FLs) of Persica®, Carmint® and Hypiran® evaluated as 91.33 (73.78-122.22), 114.87 (111.64-118.12) and 133.60 (120.81-147.27) µL/L air, respectively. Based on overlap of FLs [6,7], values were significantly different. LC_{90} (95% FLs) values estimated as 162.66 (121.77-481.34), 185.14 (175.58-197.50) and 291.62 (249.71-363.82) µL/L air, respectively. Results showed that Persica® had a better ovicidal effect. However, by considering the LC_{50} values of two other formulations their potentials for control of this species and other similar stored-products moths is revealed.

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955

STUDY OF THE MEDICINAL PLANT ETHNOBOTANICAL SPECIES OF ABADEH IN FARS PROVINCE

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Iran is rich in medicinal plants and the climatic, geographical location and growth of the plant, is one of the best parts of the world [2]. Despite having the potential, the utilization of these plants are cultivated in Iran, despite the remarkable history of this area is not considered. Most medicines made from plants, traditional and indigenous knowledge through the study of ancient peoples has occurred [1]. Ethnobotany to study how the use of a nation's plants. So register and secure the information through ethnobotany research is necessary and important [3]. Hence, the present study aimed to investigate the medicinal plants ethnobotany Abadeh city areas in the northern province south side of the Zagros mountain range, which is a rich source of medicinal plants, has been done [3]. In this research, after field research in the area of foothills and go to the local people and markets medicinal plants, most plants have been identified. Based on the research resources of its medicinal effects were studied. Of the 31 species of medicinal value can be cited *Cichorium intybus*, *Foeniculum vulgare*, *Saliva hydrangea*, *Thymus vulgaris*, *Ferula gummosa* and *Peganum harmala*. Expectorant and antitussive effect collection of *Thymus vulgaris*, *Peganum harmala* antimicrobial activity and *Cichorium intybus*, wash the liver and kidneys and blood donors of proven. Also *Foeniculum vulgare* and *Saliva hydrangea* has carminative and antispasmodic and sedative effects of and therapeutic properties of *Ferula gummosa* on gastrointestinal diseases have been reported. Given the importance ethnobotany, further studies are recommended in Fars province.

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957

STUDIES ON *IN VITRO* SOMATIC EMBRYOGENESIS IN BER (*ZIZIPHUS MAURITIANA* LAMK.)

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Ber (Ziziphus), while the pharmaceutical and cosmetic industry is an important medicinal plant of tropical fruits are abundant properties. Because of the limitations in traditional breeding methods (crossing and selection) and the other ber features a high heterozygosity, use of new technologies as complementary Molecular traditional correction techniques to improve the economic characteristics is required. Study on somatic embryogenesis in many scientific aspects and applications. Somatic embryogenesis in comparison with other methods of asexual reproduction is superior because it allows mass propagation of plants using bioreactor provides. This study, in order to obtain optimal protocols for direct and indirect embryogenesis from different explants with Bengali (*Ziziphus mauritiana Lamk*.). In this study, the basal medium MS, Tuesday explants including leaves, buds, terminal and axillary bud, four hormone-containing 2,4-D (1 level), BA (8 levels), IAA (2 levels), NAA (2 levels) and sucrose (2 levels) was used. The results indicated the interaction effects of BA, IAA and medium containing 6 mgl^{-1} BAwith 0.03 mgl^{-1} IAA best combination hormonal treatment for induction of callus in lateral bud explants. Medium containing 30 gl^{-1} of sucrose, with 0.0 l mgl^{-1} 2,4-D and 3 mgl^{-1}BA causing the embryo had formed calluses. On MS medium containing 0.1 mgl^{-1} BA 0.1 mgl^{-1} NAA interaction leads to the formation of somatic embryos that formed embryos were grown in the same medium.

958

EFFECT OF GROWTH REGULATORS ON PROLIFERATION BER FOUR (ZIZIPHUS SPP.) IN VITRO CULTURE

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Micropropagation of ber can provides rapid replication it and also growth regulators can helpful in microproagation and rapid replication of ber as for importance of proliferation to obtain the best protocol, the study was conducted to enhance in vitro four species ber, two species Bengali (ziziphus Mauritania) large oval and large seedless and also two species Iranian ber (ziziphus spina Christi) round normal and small seedless. Carried this study in format of factorial design perfectly by chance selected axillary bud explants after surface disinfection in medium of Murashik and Sgock (MS) performed according to purpose of the experiment has %3 sucrose and 8 g/L agar, with growth regulators of benzyl adenine (BA) indole acetic asid (IAA) and 2ip in variety treatments were cultivate for proliferation. Factors measured in this experiment was a number of small branch in all the mediums was registered after 5 to 6 weeks. the results Statistical analysis of this research showed that the maximum proliferation obtained in culture mediums contains 6 mg/L BA with 0.03 mg/L IAA that they have not the statistically significant difference with treated 6 mg/L 2ip with 0.03 mg/L IAA in one percent probability level. Type of large seedless Bengali ber has a most proliferation with average 2/93 number of subcategory; that was observes with other treatments at the %1 level. The comparison results of interaction average growth regulators BA, 2ip and IAA and type of species showed that in medium containes 6 mg/L BA attendant 0.03 mg/L IAA has been obtaimed maximum amount of the fine branches in large seedless Bengali ber from rooting medium culture of containes 10 mg/L IBA was the best rooting compound.

962

EFFECT OF DROUGHT STRESS AND SALICYLIC ACID ON YIELD, OIL AND ESSENTIAL OIL OF BLACK SEED (*NIGELLA SATIVA* L.)

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Black seed (*Nigella sativa* L.) is extensively used in traditional medicine, for healing various respiratory and gastro-intestinal diseases [1]. Whole seeds or their extracts have antidiabetic, antihistaminic, antihypertensive, anti-inflammatory, antimicrobial, antitumour effects [2,3]. On the other hand, drought stress is one of the major problems of agriculture in the arid and semiarid regions of the world, especially in Iran [4]. In order to study the effect of drought stress and salicylic acid levels on grain yield, oil and essential oil of black seed, a field experiment was conducted using factorial layout based on randomized complete blocks design with three replications. Field experiment was conducted at Research Center for Agriculture and Natural Resources, Mashhad, Iran, in 2014. There were two factors, including irrigation at two levels (irrigation after 80 mm evaporation from class "A" pan as control and drought stress from flowering stage until physiological maturity) as first factor. Five levels of salicylic acid (0, 20, 40, 60, 80 and 100 μM) were considered as second factors. Results showed that by increasing levels of drought stress, plant height, number of follicle per plant, grain, oil and essential oil yields of black seed significantly decreased. However, salicylic acid had a significant effects on decreasing severity of drought stress. Based on results, the highest the grain, oil and essential oil yields of black seed were observed in level of 80 μM salicylic acid.

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965

COMPARISON OF THYME EXTRACT WITH SOME CHEMICAL ACARICIDE COMPOUNDS ON POPULATION SIZE AND BROOD REARING RATE IN HONEYBEE *(APIS MELLIFERA)* COLONIES

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A study was conducted to evaluate the effects of thyme extract, apistan, bayvarol, and fapcosin, as acaricide on the reproductive performance in honey bees. A total of 24 bee hives with comparable population were used in a completely randomized design with 4 treatments of 6 replicates each for 5 weeks during which the apistan strip was used permanently, but the others were introduced for 3 times. The treatment period was initiated in Mar.12.2014 and ended in Apr.16.2014. Following the treatment period, the hives were tested for brood rearing rate and population size with a 20-d interval for 2 times. result showed that the effect of acaricide was not significant at the either times following the destruction of the mites in the hives, there were not significant differences between brood rearing mean rate and population size at the first and second evaluation time (P = 0.055). Thus, It can be conculded, , that *Thymus* extract could be an adequate alternative to the deleterious chemicals conventionally used as herbal acaricide, given the exclusion of plausible side effects as well as the economical and availability issues.

971

EFFECT OF VERMICOMPOST ON ESSENTIAL OIL COMPOUNDS OF LAVENDER (*LAVANDULA OFFICINALIS* L.)

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In order to investigate effect of vermicompost on yield of essential oil compounds of lavender (*Lavandula officinalis*), this experiment was conducted in the form of randomized completed block design with three replication in Alborz research station, Research Institute of Forests and Rangelands in 2013. Treatment used Included application vermicompost in four levels 0, 5, 10 and 15 ton/ha.The result of analysis variance indicated that significant difference between treatments compositions such as P-Cymene، Camphor and E-Caryophyllene ($p< 0.01$) α-Pinene, Sabinene , β-Pinene, Delta-3-Carene, α-Terpinene,Limonene, 1,8-Cineole, Cis-Sabinene hydrate,Terpinene-4-ol and Delta-Cadinol ($p\leq 0.05$). Mean comparison indicated that maximum amount of α-Pinene (3144.2 g/ha) and Sabinene (1032.8 g/ha) was obtained from 15ton/ha of vermicompost. So Maximum amount compositions such as Camphene, β-Pinene, Delta-3-Carene, α-Terpinene, Limonene, 1.8-Cineole, Borneo, Terpinene-4-ol and Delta-Cadinol belongs to using of 15 ton/ha of vermicompost and lowest the mount of this compounds were obtained from other treatments (control, 5 and 10 ton/ha of vermicompost). the P-Cymene (797.64 g/ha) and Cis-Sabinene hydrate (626.13 g/ha) maximum amount belongs to 15ton/ha of vermicompost. Lowest amount of Camphor obtained from control. the lowest amount combination of E-Caryophyllene with 487.8 g/ha belong to control.

974

IMPROVEMENT OF ALOE VERA GEL TURBIDITY BY USING OF CELLULASE FOR APPLICATION IN FOOD INDUSTRY

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Aloe vera is an ancient medicinal plant containing thousands of healing substances such as polysaccharides, vitamins, and other benefit materials. The *Aloe* genus belongs to the Lily family and has many species in over the world, but *Aloe Barbadensis* Miller is using in most cases. Aloe contains gel substance between the leaves. All the healing characteristics of Aloe related to these gel materials. Aloe gel contains about 99% water, and only 1% solids materials. About 60% of solid materials are the polysaccharides. Aloe commercial crude materials, such as Aloe gel, Aloe gel concentrate and Aloe gel powder are used for various applications. All these crude materials can be used in Pharmaceutical, Cosmetic and Food industries[1]. In Aloe crude material processing, in one step Aloe gel are grinded, Aloe grinded gel is highly turbid and viscous. For reducing of turbidity and viscosity of gel, some researchers propose enzymatic treatment. By this treatment, gel turbidity drop and gel are become more clear than before[2].The aim of this study was to enzymatic treatment of Aloe gel to produce the proper gel with optimum turbidity. For this study, enzyme concentration, temperature and process time were chosen as variable parameters and experiments were design by RSM (Response Surface Methodology) to get optimum treatment condition. Gel was treated with cellulase and then enzyme was deactivated thermally at 80 ˚C. results showed that, using 3% w/w enzyme to gel solid material, treatment temperature 55˚C and treatment time 10 min give the optimum turbidity of gel for enzymatic processing.

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975

TOTAL PHENOLIC, FLAVONID CONTENT AND ANTIOXIDANT ACTIVITY VARITION IN YARROW (*ACHILLEA MILLEFOLIUM*) AS AFFECTED BY SALT STRESS

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Yarrow is one of the important aromatic and medicinal species of Asteraceae family. *Achillea* shrub growing to 90 cm tall [1]. The_Leaves and flowers medicinal properties are unique and they are rich in volatile oils and phenolic compounds such as tannins, anthocyanins, antioxidants and flavonoids. Cultivation conditions could affect production of valuable medicinal compounds among which drought and soil salinity are negatively influence plant growth metabolism. Salinity influences on a plant's metabolism from different aspects and causes some changes in plant's physiology and morphology [2]. The pot experiment was conducted at Isfahan University of Technology in a randomized complete block design with four treatments of salinity including (control, 5, 10 and 15 dSm^{-1}) and three replicates. The results showed that all extracts indicated significantly different scavenging properties ($P<0.05$). Lower IC_{50} value indicated higher antioxidant activity. The lowest IC50 values obtained in 10 dS m^{-1} (347.220 µg/ml). The results are expressed as means LSD. Salt treatments increased the leaf total phenolic (TPC), significantly ($p < 0.05$). The highest TPC and TFC was obtained in 15dSm^{-1} with the amount of 36.04 mg TAE g−1 DW and 3.88 mg TAE g−1 DW, respectively. Finally, it can be concluded that in *A. millefolium*, the highest antioxidant activity and polyphenolic compounds were gained in severe (15dSm^{-1}) and moderate (10 dSm^{-1}) salt condition.

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976

THE EFFECT OF SALT STRESS ON PHYSIOLOGICAL TRAITS OF *ACHILLEA* PACHYCEPHALLA RECH.

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Salinity has considerable adverse impacts on productivity of agricultural plants. Soil salinity, resulting from natural processes or from crop irrigation with saline water, occurs in many arid and semi-arid regions of the world [1]. *Achillea* is a genus of the well known medicinal plant family of Asteraceae and comprises by numerous species and wild-growing plants. Nineteen *Achillea* species have been identified in Iran in which nine are endemic [2]. *A. pachycephala* is and endemic species of Iran. In this experiment, four different salinity levels including (control, 5, 10, 15dSm^{-1}) were used. The experiment was conducted in a randomized block design in three replicates and some physiological properties were measured. The results of data analysis showed significant differences between control, 5 dSm^{-1} treatment and 10 dSm^{-1} treatment. The data are expressed as means LSD**.** The results revealed that RWC Index and chlorophyll content decreased as a result of salt stress, while salt stress led to increase in prolin content. The highest amount of RWC (46%) and chlorophyll content (15.4%) were obtained in control treatment. The highest prolin content (2.18 µg/gr) was also obtained in15 dSm^{-1}. In overall, *A. pachycephala* was considered as a tolerant species to salt stress condition.

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981
THE EFFECT OF DROUGHT STRESS ON TRAITS OF *SALVIA SCLAREA*

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Drought stress is an *important environmental factor* that *limit plant* growth .In order to evaluate the effect of drought stress on the *Salvia sclarea*, an experiment was conducted under field conditions in 2014, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in the form of a randomized complete block design with three replications. Drought stress was in three levels (30, 60 and 90% of field capacity). The seeds planted at field in autumn 2013. The treatment (drought stress) was started in spring. The treatment was done by TDR and measured of humidity weight of soil. The plant harvested at the end of growing season (September 2014). The results of analysis variance indicated a the effect of drought stress was significant on characteristics large and small canopy diameter, leaf length, leaf width, petiole long, petiole diameter, number of leaves, leaf yield, petiole yield and shoot yield. Also, there was no significant effect on essential oil percentage and essential oil yield. The comparison of means showed that the highest length (13.23 cm), large and small canopy diameter (78.93 and 70.16 cm, respectively), and the number of leaves (251.47 number/plant) achieved in control (90%FC). The comparison of means showed that the highest leaf width (8.86 cm), petiole long (17.26 cm) and petiole diameter (1.2 cm) were belong to 30% FC. So comparison of means showed that highest leaves yield (1993kg/ha), maximum petiole yield (366.1 kg/ha) and highest shoot (5654.1 kg/ha) was observed in 90%FC.

985
EFFECT OF SPERMIDIN ON SOME PHYSIOLOGICAL CHARACTERISTICS OF LAVENDER (PIMPINNELLA ANISUM L.)UNDER SALT STRESS

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Spermidin is one of the hormones that its function is increasing for resistance to stresses such as salinity [1]. The aim of this experiment was to investigate the effect of spermidin on physiological characteristics of lavender (*pimpinnella anisum* L.) under salinity stress conditions. Therefore, a factorial experiment based on completely randomized design in three replications was performed. The experimental treatments were salicylic acid in 4 levels (0, 1, 1.5 and 2 mM) and NaCl at 4 levels (0, 50, 100 and 150 mM). One week that after the plants establishment in new bed, spermidin was used as foliar spray at three stages and for seven-day intervals. The result showed that 150 mM salinity increased proline and electrolyte leakage of leaf more than other levels of salinity stress, and the highest proline and the lowest electrolyte leakage in leaf were gained for spermidin in 1.5 mM. However, salinity and spermidin treatments had no significant effect on leaf relative water content. In essence, the results showed that foliar spray of spermidin could be cause to stress resistance of lavender plant on salt-prone areas.

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986

EVALUATION OF SOME HERBICIDES ON GROWTH AND YIELD OF BALANGU (LALLEMANTIA ROYLEANA BENTH)

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In order to study the effect of some herbicides on balangu yield and growth, a completely randomized design was carried out with three replications. Treatments included, full season hand weeding, full season of weed competition with balangu, 2 times hand weeding at 25 and 45 days after balangu planting respectively and the application of trifluralin, metribuzine, oxiflurfen, pendimetalin, eradican herbicides at their recommended dose and their reduced dose application plus hand weeding at 50 days after balangu planting. Results showed, the effect of mentioned treatments were significant on balangu seed yield, biomass, height and lateral branches number . The highest balangu seed yield (711 kg ha $^{-1}$) was recorded in full season hand weeding treatment, with no significant different when oxiflurfen herbicides applied in recommended (1.5 liter ha^{-1}) , oxiflurfen applied in reduced dose (1 liter ha^{-1}) plus hand weeding at 50 days after balangu planting and also trifluralin applied (1 liter ha^{-1}) plus hand weeding at 50 days after balangu planting . The lowest balangu traits were indicated from the application of metribuzine, pendimetalin and trifluralin (2 liter ha^{-1}), specially when eradican applied . Results showed that application of oxiflurfen herbicide (1 liter ha^{-1}) and trifluralin (1 liter ha^{-1}) could be useful in balangu weed control as selective herbicides.

994
ISOLATION *B*- AMYRIN 11-OXIDASE GENE FROM (*GLYCYRRHIZA GLABRA*) ROOTS

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Licorice roots and stolons are commercially desired parts of *Glycyrrhiza glabra* that contain a number of important chemical compounds. Glycyrrhizin is the most sweet-tasting triterpene saponin in roots and stolons of *Glycyrrhiza* plant, and its sweetness is measured about 200 times as much as that of the sucrose, and is a conjugate of two molecules of glucuronic acid and glycyrrhetinic acid, and oleanane-type triterpene [1]. Various pharmacological activities of glycyrrhizin, including anti inflammatory, immunomodulatory, antiulcer, and antiallergy activities has been reported. It has also antiviral agent, various DNA and RNA viruses including HIV and severe acute respiratory syndrome (SARS) associated with coronavirus [3, 4]. Glycyrrhizin is most likely derived from the triterpene -amyrin, an initial product of the cyclization of 2,3-oxidosqualene. The subsequent steps in glycyrrhizin biosynthesis are believed to involve a series of oxidative reactions at the C-11 and C-30 positions, followed by glycosyl transfers to the C-3 hydroxyl group. Here we report the successful identification of, a cytochrome P450 monooxygenase (P450) gene, as a glycyrrhizin-biosynthetic gene. Total RNA of *G. glabra* was extracted from approximately 100m g fresh root tissue using the rnxplus reagent (Sinaclon). Single-strand cDNA was synthesized from total RNAusing the primers oligo (dT) and reverse transcriptase M-MLV (Fermentase).based on the *G. uralensis* cDNA recorderd in Genbank , primer pair was designed to amplify the open reading frame (ORF) *G. glabra* amyrin 11-oxidase using PCR.

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997

THE ELICITATION EFFECTS OF TWO *TRICHODERMA* STRAINS (T8-7 AND CHIT) ON FENUGREEK

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Fenugreek (*Trigonella foenum-graecum* L.) is one of the medicinal plants grown in the Mediterranean countries. It is an annual herbaceous plant belonging to the Fabaceae family with alternate trifoliate leaves. The leaves and seeds, which mature in long pods, are used to prepare extracts or powders for medicinal use. It is widely considered as an antidiabetic and anticholesterol herb [1]. In Iranian traditional medicine the seeds are used as tonic and blood sugar lowering. The seeds of the plant contain many active compounds such as iron, vitamin A, B, C, phosphates, flavonoids, saponins, alkaloids such as trigonelline and amino acids [2]. *Trichoderma* is a fungal genus, first described in 1794, that includes anamorphic fungi, isolated primarily from soil and decomposing organic matter [3]. The interaction between *Trichoderma* and plant has been reported to evolve a symbiotic rather than a parasitic relationship between the fungus and plant. Elicitors from *Trichoderma* promote the growth of the plant, root system and nutrient availability [4]. There is no report about use of *Trichoderma* as an elicitor to increase Fenugreek growth characteristics. For these reasons, two strains of *Trichoderma* (T8-7 and Chit) were added to plant cultures to investigate the possible plant-fungus interactions that may be effective on growth characteristics (root dry and fresh weight (RDW and RFW), root length (RL), shoot dry and fresh weight(SDW AND SFW), shoot length (SL)) of two Fenugreek genotypes (Hamedan and Ramhormos). Significant differences were observed between the treatments and genotypes. The results showed that, the highest RDW was detected in Hamedan and Ramhormos genotypes (0.037 and 0.106 g, respectively) treated with T8-7 strain of *Trichoderma* and 1.45 fold greater than the corresponding controls. Based on the results obtained, Ramhormos genotype treated with T8-7 strain of *Trichoderma* had the highest SDW and SFW (0.66 and 5.72 g, 1.50 and 1.27-fold increased). These positive effects of *Trichoderma* spp. would make it as an interesting candidate for improving productivity and it can be concluded that, addition of *Trichoderma* spp. to media can be extremely helpful in enhancing productivities in field process.

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999

EFFECT OF BIO, CHEMICAL AND NANO FERTILIZERS ON YIELD AND ACTIVE SUBSTANCES OF *LALLEMANTIA IBERICA*

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Medicinal plants are valuable sources in Iranian natural resources whose understanding and scientific cultivation can play an important role in people's health and job creation. *Lallemantia iberica* belongs to the tribe Stachyoideae-Nepeteae, family Lamiaceae and this family has 46 genera and 410 species and subspecies in Iran. *Lallemantia iberica* originated from Caucasian region that has been found in Asia (Syria, Iran and Iraq) but it now appears in central and Southern Europe [1]. The Lallemantia genus has 5 different species which are distributed in different places of Iran (North, East North, East South, Alborz and other areas). *Lallemantia iberica* is introduced with popular name Balangu and traditional name Balangue shahri and with other synonyms *Lallemantia sulphurea*, *Dracocephalum ibericum* [2]. People use leaves, oil, seed and it has traditional uses as reconstiuent, stimulant, diuretic and expectorant [1]. Considering the importance of medicinal plants growth and application of fertilizers with sustainable agricultural production in order to eliminate or reduce chemical input to achieve desirable and sustainable quality, an experimental research was conducted based on a factorial on basis of randomized complete block design with 9 treatments and 6 replicates in 2013. Factors including: biophosphate, nitroxin, nano fertilizer and chemical fertilizer. The Results showed that the vegetative yield, essential oil content and essential oil constituents of Dragon's head (*Lallemantia iberica*) were significantly affected by treatments. The most significant essential oil content was obtained by applying nano fertilizer. Twenty three compounds were identified in the essential oils of *L. iberica*. Main constituents of the essential oil are pinocarvone, ß-caryophyllene, ß-cubeben, linalool and verbenon. The results of current experiment show that nano fertilizer and biophosphate have stimulatory effects on the quantity and quality of the essential oil in Dragon's head and thus have considerable potential for providing nutritional elements in essential oil production of Dragon's head, especially for the sustainable production systems.

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1002

THE EFFECT OF MANURE ON SOME TRAITS OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.)

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Today, because of the known harm effects of chemical fertilizers, use of organic fertilizers in order to achieve sustainable agriculture has been wide spread by farmers and researchers. Also, using of medicinal because the chemical medication are harm to users On the other hand, Rosemary plant is one of the most important plant in various industries, pharmaceutical, cosmetic. In order to investigate effect of manure fertilizer on some morphological traits of rosemary (*Rosmarinus officinalis* L.), this experiment was conducted in Alborz research station in 2013. The experiment was conducted in a randomized complete block design with three replications. Treatment include manure in three levels (0, 10 and 20 ton/ha). Results indicated that fertilization application significantly affected on woody branches yield ($p<0.01$), plant height, larger diameter of canopy and annual stem yield of ($p<0.05$).The results of mean comparison showed that the hieghest plant height (44.7 cm) and annual branches yield (5300 kg/ha) with the use of 20 ton/ha of manure obtained. Hieghest annual stem yield (1900 kg/ha), woody branches yield (2083.3 kg/ha) and larger diameter of canopy (44 cm) belonging to 10 ton/ha of manure. The results showed that in the first year, using of 10 ton/ha had the highest yield in rosemary plant at Karaj region of Iran.

1006

THE EFFECT OF DIFFERENT CONCENTRATION GIBBERELLIC ACID ON BREAKING DORMANCY OF WATERMINT (*MENTHA AQUATICA*) SEEDS

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Watermint (*Mentha aquatica*) is one of Aromatic and perennial herbaceous plant. Watermint has many medicinal characteristics and Its natural habitats is being destroyed.This study investigated the effect of GA_3(Gibberellic acid) with concentrations (0, 200, 400, 600 ppm) and chilling seeds (temperature 5 Ċ and duration 10 weeks) that used as second control on germination of dormant watermint seeds with compeletly randomized design in light condition. The findings showed that all concentrations of GA_3 and chilling seeds significantly increased percentage of germination than control ($GA_3$0ppm). In other words, with increasing the concentration of GA_3, the percentage of germination was significantly increased. Additionally, GA_3 (600ppm) and chilling seeds had highest percentage of germination(65.66% and 63%, Respectivly) and don't showed different significantly. In conclusion, GA_3 (600pmm) can substitute chilling in breaking dormancy of watermint seeds.

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1007

ALLELOPATHIC EFFECT OF WATERMINT (*MENTHA AQUATICA*) ALCOHOLIC EXTRACT ON GERMINATION SOME KIND OF WEEDS

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Nowadays, Finding natural components and compatible to environment as new herbicides is very important. Watermint (*Mentha aquatica*) is one of aromatic and perennial herbaceous plant. Watermint has many medicinal and biological characteristics. This study investigated inhibitory effect of different concentrations of watermint alcoholic extract (0%, 2%, 5% and 10%) on seed germination of Winter Wild Oat (*Avena ludoviciana*), Russian Knapweed (*Acroptilon repens*), Knotgrass (*Polygonum aviculare*) and Marsh Mallow (*Descurainia Sophia*) with factorial design in laboratory.The result showed that germination significantly decreased in Russian Knapweed than other weeds. Further more, Russian Knapweed and Knotgrass had lowest germination percentage (34.08% and 44.6% , respectively). In addition,watermint extract had lower effect on germination of Winter Wild Oat than other weeds. Finally, germination in all weeds significantly decreased with increase extract concentration and all concentrations significantly decreased germination than control (0%).

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1008

STUDY OF BIOMASS AND OIL YIEDS OF SAVORY POPULATION OF FOUR SPECIES IN ECOLOGICAL CONDITIONS OF KHORRAMABAD

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The genus of Satureja with persion name of "Marze" consist of 30 species in world. This genus have 16 species in Iran. (1). Savory oil (Satureja spp.) has a special position among medicinal plants because of theire valuable component carvacrol and thymol.In order to study essential oil% variation in different accessions of savory population, seeds of four species (Satureja macrantha، S.sahendica، S.spicigera، S.backtiarica) and 9 population were collected from their habitates. Collected seeds were evaluated to be from the correct genus and species by the help of experts in the Iranian Research Institute of forests and Rangelands. Seeds were planted in proper transplanting trays and at 8-10 leaves stage, healthy plants were transplanted in special pots and finally were moved to the main field Lorestan and in unrandomized complete block desigen with three replications in planted in Sarab Changaee Station about four kilometers from Khorramabad to Koohdasht Road. There were 16 plants with 1 meter distance in each plot. Plants were regularly monitored during the growing period. At full flowering stage, flowering shoots were harvested to measure their essential oil content. To do this, samples were dried under shadow in proper temperature. In laboratory, their essential oils were extracted by the method of water distillation. The yield were calculated. The data were analyzed and the meian were compaored by Dankan method. The Results of analysis of variance showed significant differences between species and accessions . The accession S.spicigera (originated from Gilan province) with average values of 945 kg ha-1 biomass 6 kg ha-1 essential oil had higher production.

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1012
EVALUATION OF ANTIFUNGAL EFFECT OF SEVEN ESSENTIAL OILS ON MYCELIAL GROWTH OF *ALTERNARIA ALTERNATA*

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Alternaria alternata is one of the most important plant pathogens with worldwide distribution, which can grow on a wide range of crops and cause a lot of losses to plants. One of the most recent methods, for plant disease managment is protection of plants from pathogenic microorganisms via application of essential oils. The novel technology, which is most compatible with principle aims of organic production and processing. Seven essential oils (oregano, Shirazi thyme, fennel, savory, thyme, cumin and pepermint) were tested for in vitro antifungal activity on *Alternaria alternata* by invert petriplate method by using Whatman filter paper No.1. Five diffrent volumes 5, 10, 15, 20 and 40 µL of sessential oils were used and the plates were assessed after a week. Antifungal index (AI%) was calculated as follows: Antifungal index (AI%) = ($[D_c - D_t] / D_c) \times 100$ where Dt is the diameter of fungal colony in the experimental dish (cm) and D_c is the diameter of colony in the control dish (cm). Minimum inhibitory volume (MIV) was defined as the least volume of essential oil which caused complete inhibition of fungal growth. In order to assess fungistasis or fungicidic effect, the mycelial plug from treatments with completely inhibited growth was transfered to petri dishes containing PDA, then the growth of plug was inferred as fngistasis. The results indicated that oregano, Shirazi thyme, cumin, fennel and savory had the most inhibitory effect on fungal grwoth (AI = 100 %). Among the most effective essential oils, Shirazi thyme had the least MIV (5 µL). All essential oils were fungistatic[1,2].

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1013

INVESTIGATION AND IDENTIFICATION OF ENDANGERED MEDICINAL PLANTS IN THE ALBORZ PROVINCE AND MAINTAINING AND PROMOTING THE PRINCIPLES AND METHODS OF OPERATION OF THESE PLANTS

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Alborz Province is located in the South West of Tehran and Alborz mountain range with an area of 162 square kilometers. A mountainous land and flat frequency range in which they are growing medicinal plants. Due to genetic erosion of plant species, especially pasture, grazing and illegal, uncontrolled human intervention in order to benefit more from nature (Such as stone, plaster, mining and burning of rangeland plants to produce fuels and slope between the strap and the dry land inefficient and inappropriate utilization of cereals and other principles of medicinal plants people) And in addition to unknown environmental factors and edaphicy. Cause further destruction of crops is especially medicinal plants. To identify the plants and planning for conservation and sustainable development of the present study was to plant resources. In this study, after identifying regions of interest on the map, for samples of plant species in habitat mapping, determining sites for field geology, field operations and recorded, collection of the study, collected the seeds of the plant, evaluation of the chemical composition and palatability of species, seed testing and plant collection, Study of medicinal properties of plants, the research team was dispatched to the region and to identify and collect medicinal plants and seeds were measured for 5 years. In the period 1100 plant species were collected and identified. At the end of the investigation it was determined that 300 plant species are threatened with extinction. Some important and valuable species, including endangered or extinct were (Ferula gummosa) (Ferula assefotida) (pimpinella anisum) (malabaila secacul) (Heracleum persicum)(Foeniclum vulgara)(Amygdalus scoparia) (Althaea officinalis) (Hyssopus officinalis) (Anthmis tinctoria) (Arthmisia absinthium) (Cichorium intybus)(Carthamus tictorius) (Rhus coriaria) (Berbris cratapina).The other species have become extinct or endangered include alyssum, Arugula, Ziziphora, Hardhay, licorice, purslane, thistl - mango and pointed mastic. To protect and extension the understanding of plants is necessary to empower beneficiaries of Natural Resources Herb action is necessary. In addition, the design of publications and promotional posters and papers should be paid to the introduction of species. This requires knowledge about the socioeconomic and health status of the community can utilize these plants. Broadcasting is an extraordinary role in maintaining and harvesting of medicinal plants facing extinction may be correct. Generally, the continuation of this process gradually leads to the development of medicinal plants in Alborz Province.

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1014

EFFECTS OF SOIL AND SOILLESS CULTURES ON MORPHO-PHYSIOLOGICAL PARAMETERS, ESSENTIAL OIL CONCENTRATION AND CONTENT OF ROSE-SCENT GERANIUM

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Recently, production of horticultural crops (flowers, fruits and vegetables) under controlled environment conditions such as soil and soilless systems is increasing significantly. While, there is insufficient scientific information about production of medicinal plants in greenhouse conditions especially under different soil and hydroponic cultural systems. The aim of this study was to compare the effects of soil and hydroponic (soilless) growing systems on morphological traits, essential oil concentration and yield of *Pelargonium graveolens* L. in a completely randomized design with three replications. Despite non-significant effects of cultural systems on essential oil concentration; biomass, plant height, number of leaves and essential oil yield were significantly affected by planting method ($P<0.01$). So that, soilless system showed higher performance compared to the soil system. Accordingly, in compared with soil system, biomass and essential oil content (yield) were 39% and 70% higher in soilless or hydroponic system, respectively. Based on the results, soilless or hydroponic system had higher essential oil yield than soil system; although evaluation of essential oil compounds and quality under open field and controlled conditions as well as soil and soilless cultures, could be recommend in later and supplement experiments.

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1015
PHYTOCHEMICAL INVESTIGATION OF *SMYRNIUM CORDIFOLIUM* BOISS.IN MAHMUD-ABAD RANGELAND IN KOHGILUYEH & BOYER-AHMAD PROVINCE

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According to *Smyrnium cordifolium* Boiss. plant spreaded dispersion in Kohgiluyeh & Boyer-Ahmad province [1] , this research did the study quantitative and qualitative indicators of this plant essence in this province. For this purpose , after the plant collecting and then drying in laboratory temperature [2] , in the way of hydrodistillation and then their chemical compononets seperated and identified with devices GC-FID and GC/MS [3]. Based on the quantitative results of this study , a total of 12 chemical components were identified in volatile oil extracted from this plant and the average of essential oil production according to V/W percentage in three times pepeatition was about 0.24%. In the case of quality indicators , five chemical compounds Curzerene , Menthofuran , Caryophylene oxide , □-Cedrene and □-Elemene introduced as indicator components and a major portion of Oxygenated-Sesquiterpenes. The main contribution of Oxygenated-Sesquiterpenes compared to other terpene compounds. Considering the desirable characteristics of essential oil of *Smyrnium cordifolium*, is recommended further studies on broader levels.

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1024
RESPONSE OF BLACK CUMIN (BUNIUM PERSICUM L.) TO DIFFERENT AMOUNTS OF NITROGEN AND IRRIGATION WATER

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A split plot experiment was conducted to investigate the effect of nitrogen and irrigation water on the yield and yield components of Black Cumin(*Bunium Persicum,L)* in Razavi Khorasan Agriculture and natural Resource Research Center. Irrigation treatment included 1,2,3 and 4 (blank) irrigation times during growth season, were laid out in mainplots and Nitrogen levels included 0,40,80 and 120 kgN/ha, were laid out in subplots. Results showed that Nitrogen levels application had significant effect on cumin seed yield, cumin straw yield, number of umbels in plant, seed number in umbels per plant, and plant height($p<0.05$). The effect of irrigation water on cumin seed yield, cumin straw yield, number of umbels in plant and seed number in umbel was significant($p<0.05$).The interaction effects of Nitrogen and irrigation water were not significant on any factors.All nitrogen levels increased straw yield, but seed yield increased only at 40 kgN/ha . 2 and 3 irrigation times increased seed yield but 1 and 4 irrigations times decreased seed yield . In general use of 40kgN/ha and 2 irrigation times is recommanded under mashhad conditions.

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1029

ANALYSIS OF GENETIC VARIABILITY AND POPULATION STRUCTURE OF SOME LALLEMANTIA SPECIES USING ISSR MARKERS

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Lallemantia, genus of family Lamiaecae, is one of endangered medical plants in Iran. In the present paper, in order to ascertain the conservation priorities and strategies for this plant, genetic diversity within and among twenty populations was estimated. The population consists of 74 genotypes belonging to species called . *royleana benth*, *L. iberica* and *L peltata* was investigated by means of 17 ISSR primers. The average percent of polymorphism in all accessions was 100. Evaluation of genetic diversity within species with a mean Nei's gene diversity (h) and Shannon's information index (I) showed that diversity within species of *L. royleana* (H=0.359 , I=0.533) was more than other species while genetic diversity within species of *L. ibeirca.* (H=0.134 , I=0.195) was less than other species. with mean Nei's gene diversity at species level is 0.37. the overall estimate of Shannon's information index being 0.55. The low gene flow value (Nm = 0.354) and high coefficient of genetic differentiation (G_{ST} = 0.585) and high fixation index (F_{ST} = 0.581) demonstrated elevated genetic differentiation among the population and can be predicted that these populations are not in Hardy–Weinberg proportions. The highest genetic distance and similarity was observed between 1 and 3 populations (Genetic distance 0. 05, genetic similarity 0.94), respectively. Cluster analysis based on Dice and Ward Method classified the genotypes in five groups. Analysis of molecular variance (AMOVA) showed 78 % of variation at intra-species level, whereas 22% variation was recorded at inter-species level. The results also demonstrate that the ISSR markers system is useful for identification ,analysis of genetic diversity and Germplasm management in several species of Lallemantia.

1034

THE EFCCT OF DIFFERENT TIMES OF HARVEST IN NONE IRRIGATED AND IRRIGATED CONDITION ON THE AMOUNT OF ANTHOCYANINS IN LEAVES OF *Vitis vinifera L.*

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Grape (*Vitis vinifera L.*) is a very old plant that Egyptians knew it before Christ. Grape is a climbing shrub; its stems are knotted with alternating leaves in dark green. Grape leaves contain sucrose, levulose, Inosite, starches and some organic acids.Tail of a cluster of grapes has tannin, resin materials, potassium tartarate, and organic acids. Raw grape has organic acids like Malic acid, formic acid, Succinic acid, oxalic acid, Glycolic acid, and sugar. Grape leaves are astringent and effective in eliminating gout and jaundice. Vine leaves were collected from early August to late November 1389 in different cropping conditions (none irrigated and irrigated) apart from each other every 30 days from the research farm of the Barj essence pharmaceutical company. The leaves were then dried in the shade and ambient temperature.Specimens collected and identified by the Botanical Center have Herbarium codes. For the measurement of anthocyanins in leaves, the Perkin-Elmer spectrophotometer model lambda EZ210 from Merck was used. Solvents and chemicals were also purchased from Merck. The differential pH spectrophotometric method was used in order to measure the total content of anthocyanins pigment in hydro-alcoholic extracts. This method is based on structural changes in anthocyanins contents upon changes in environmental pH. Monomeric anthocyanins pigment concentration in leaves base on cyanidin-3-glycoside was calculated using the following formula. The final results were reported as percent of anthocyanins in leaf dry weight.

$\boldsymbol{mg/L} = \frac{(\mathbf{A}\times\mathbf{MW}\times\mathbf{DF}\times\mathbf{1000})}{(\epsilon\times\mathbf{L})}$The standard range for leaves is 0.075 percent. The results showed that the anthocyanins in the leaves harvested from none irrigated crop are lower than the defined standard range(0/058-0/069%).While the leaves collected from irrigated crop were in a better conditions(0/060-0/090%).The findings also stated that the amount of anthocyanins present in none irrigated crop have not been affected by harvest time. That was not the case in irrigated crop and the best time to harvest was in October(0/082%) and November(0/090%).

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1048

EFFECT OF DIFFERENT LEVELS OF SEED PRIMING ON GERMINATION AND GROWTH CHARACTERISTICS OF FENNEL (VULGARE FOENICULUM) UNDER SALT STRESS.

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Priming is one of the seed enhancement methods that might be resulted in increasing seed performance (germination and emergence) under stress conditions such as salinity, temperature and drought stress. The objective of this research was to evaluate the effect of different priming times on seed germination and growth of stress sweet fennel (*Foeniculum vulgare*) under salinity stress. Treatments were combinations of 4 levels of salinity stress (control, 5, 10and 15 ds m-1) and 4 levels of priming times (control, 6, 12 and 24 hours) with 3 replications. Results indicated that with increasing salinity, germination traits such as germination percent, rate and plumule length decreased, but seed priming with several times showed lower decrease. In all of the salinity levels, primed possessed more germination rate and plumule length than control. In the experiment, with increasing levels of salinity Fennel seed germination and growth indices were negatively affected But with increasing hours of priming Negative effects of salinity significantly was moderated. The result of this experiment is consistent with the hypothesis that under undesirable conditions such as salinity stress, priming with distilled water can prepare a suitable metabolic reaction in seeds and can improve seed germination performance and seedling establishment.

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1054
EVALUATION OF SEED INDEXES OF JOJOBA (ARIZONA CULTIVAR), A CASE STUDY IN FARS PROVINCE (JAHROM) OF IRAN

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Jojoba (*Simmondsia chinensis*), a diploid (2n=2x=54) member of the Simmondsaiceae family [1] and native plant of Sonaran deser [2] is a dioecious, desert and wind-pollinated shrub that can tolerate saline and drought stresses [3]. Its seeds containing a liquid wax (about 50%) [4] which can be used in lubricants, cosmetics, pharmaceuticals and also as an alternate fuel oil with fewer pollutants and as a replacement for sperm oil in manufacturing of inks, varnishes, waxes, detergents, resins and plastics [5]. In this investigation, 28 jojoba genotypes (16 years old females) of the only research jojoba garden in Mohammad Abad vilage, Jahrom, Fars province of Iran were studied for seed traits including: weight (gr), shellding weight (gr), seed to shellding weight ratio, 100 seed weight (gr), single seed weight (gr), total seed number, average of length (mm), average of width (mm) and their ratio. Cluster analysis using Ward method and Squared Euclidean distance coefficeint divided 28 genotypes into 3 groups that indicats a reasonable genetic diversity in this jojoba population. Shellding weight, seed to shellding weight ratio, 100 seed weight and total seed number had high positive correlation with seed weight (yield). Stepwise regression model justified more than 99% of variation between genotypes for shellding weight, seed to shellding weight ratio, total seed number and average of length. The results also showed a high phonotypical diversity among genotypes so that the I_6 and J_2 plants can be introduced as high yield genotypes for propagating them with traditional and new methods of propagations such as tissue culture for developing the cultivation of this miracle plant in some part of Iran for the frist time.

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1055

DISTRIBUTION OF MEDICINAL PLANTS IN THE DAYER CITY AT BUSHEHR

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Dayer is a city of Bushehr in southern of Iran, on the Persian Gulf coast. It has 3 parts: the central and Bord Khun and Abdan. As regards, the traditional use of medicinal plants in the region was immense, So Study of medicinal plants is useful for understanding their traditional application.The purpose of this study was to identify Medicinal plants, which are the most used. Their distribution was identified using the knowledge and experience of indigenous and introduced the properties and characteristics of these plants.After identification of plant samples using authentic flora, full details of each species were recorded. In this research 32 species of medicinal plants were collected and identified and distribution was mentioned. Abundance of species are: 6 species was belonging to the family of Apiaceous (umbelifereae), Labiatae and papilionacea (4 species), Composite and Astraea and Aracardiaceae (3 species), Oleacea and Boraginaceae and Malvaceae (2 species), Liliaceous and Polygonacea and Cucurbitaceous and Plantginaceae and poacea (1 species).

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1065
EFFECT OF DIFFERENT ARSENIC AND SALICYLIC ACID CONCENTRATIONS ON PHOTOSYNTHETIC PIGMENTS AND PROLINE OF *MATRICARIA RECUTITA*

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At the heavy metals present such as Arsenic which on of the most important of environmental stress, that to leading reduction of photosynthesis rate, growth reduction, destroyed of chloroplast tylacoeid and produced types of ROS [1]. Salicylic acid (SA) is considered as a hormone- like substance, which plays an important vole in vegulating a number of physiological processes and provide protection agains biotic and abiotic stresses in plant and effected on growth, absorption and transdaction of ions and chlorophyll content [2]. In this study, the effects of salicylic acid on arsenic toxicity in chamomile plants (*Matricaria recutita*) were studied by investigating the on content of photosynthetic pigments (chlorophylls a, b and a+b), carotenoids and proline parameters. The experimental design was a factorial ina completely randomized design with three replications. The experiment was conducted in 2013 at the Zabol University greenhouse. salicylic acid were applied at three levels (0, 1.5 and 3 mM) comprising first factor and arsenic (As) as second factor at four levels (0, 15, 25 and 35 mg/kg Soil). Results indicated that arsenic led to decreasing amounts of photosynthetic pigments (chlorophylls a, b and a+b), carotenoids and increasing amount prolin. Foliar application 3 mM of salicylic acid, in stress condition arsenic, could increase the amount of proline and photosynthesis pigments in plant chamomile, leading to a reducing the negative effects of heavy elements compared to the control treatment. These results suggested that salicylic acid could be utilized efficiently for Reducing of heavy arsenic stress on photosynthetic pigments in heavy element affected area.

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1072

THE EFFECT OF ALTITUDE ON SOME SECONDARY METABOLITES IN VERVAIN IN NORTH KHORASAN (ESFARAYEN).

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Vervain (*Verbascum nigrum)* is one of the perennial plants which belongs to scrophulariaceae family. This species contains active components such as flavonoids which especially participate in wound healing and eliminating free radicals by inhibition of nitric oxide synthesis. This research was carried out with the purpose of comparing the amount of total phenol, total flavonoid and antioxidant features in different altitudes. The study was done in Completely Randomized Design (CRD) with three replications. Antioxidant features, the amount of phenol and flavonoid were measured by using DPPH, folin siu caltue reagent, chlorid aluminium and potassium acetat reagent respectively with spectrophotometer. According to the data variance analysis, altitude has significant effect on total phenol, total flavonoid and antioxidant features in leaves extraction. The results showed that the highest amount of total phenol (0.447 mg/g $_{DW}$) was observed in 1700 meter (m) altitude and the lowest (0.175 mg/g $_{DW}$) was in 2145 m altitude. Also, the most total flavonoid (0.26 mg/g $_{DW}$) exists in 2330 m height and the least (0.131 mg/g $_{DW}$) exists in 1985 m height. According to the results, highest antioxidant features (98.62%) were in 2030 m altitude.

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1075

COMPARISON OF ESSENTIAL OIL COMPONENTS AND ANTIOXIDANT ACTIVITY BETWEEN SALVIA SYRICA AND SALVIA ARISTATA IN THEIR NATURLE HABITATS IN WEST AZERBAYJAN PROVINCE, IRAN.

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The aim of this work is to compare volatile components composition between two salvia species and the testing of target compounds for their free radical scavenging activity. The essential oil of the air-dried parts of plant was extracted by hydro distillation and the chemical composition of the essential oils of *Salvia. syriaca* and *Salvia. aristata* collected in West Azerbaijan (Iran) was studied by means of GC-MS analysis. In this study, the invitro antioxidant activities of the essential oil of two salvia species were examined by DPPH assay. 11 compounds were for *S. syriaca* with total oil of 90.98%; 7 compounds were for *S. aristata* with total oil of 98.23%. . In *S. syriaca*, the main compounds were 1, 8-cineole (46.45%) and camphor (27.58%). In *S. aristata*, the main compound was benzene, 1, 3-bis m-pheoxypheoxy (95.42%). Antioxidant activity was 31% for *S. aristata* and 24% for *S. syriaca*. based on the results presented here, these two species are rich of volatile components which have anticancer and antioxidant potentiality.

1079

CORIANDRUM SATIVUM CHANGES AFFECTED BY SALICYLIC ACID

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Salicylic acid is a plant hormone that plays important roles in some plant physiological activities and as a signal can make increases in secondary metabolites of medicinal plants as *Coriandrum sativum* which is used to reduce anxiety and insomnia. Therefore, this study was conducted to evaluate the effect of several concentrations of salicylic acid foliar spray (0, 4000, 8000 and 12000 µM.l) on some traits of the plant. The project was conducted as randomized complete blocks design in a factorial arrangement with 3 replications. The results indicated that Salicylic acid significantly affected root length ($\alpha \leq 0.05$) and plant dry weight, leaf proline, chlorophyll index and plant essential oil percent ($\alpha \leq 0.01$). The highest plant dry weight (79.58 mg), root length (4.22 cm) and chlorophyll index (44.33) belonged to 12000µm.l of salicylic acid application. The highest leaf proline (14.33 µg.gfw) and essential oil percent (0.147%) observed in 4000 µm.l of treatment. In short, with the respect to the cultivation target (pharmaceutic and spice use/cultivation in arid areas) the best concentration could be selected.

1080

CALLUS INDUCTION AND OPTIMIZATION OF CELL SUSPENSION CULTURE IN *MENTHA PIPERITA* L.

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Peppermint (*mentha piperita* L.) , a hybrid mint, is a cross between the watermint (*mentha aquatica*) and spearmint (*mentha spicata*) of the Lamiaceae family that is important in medicinal and healthcare industry .The biological active compounds of *Mentha piperita* in a mixture of several monoterpenoids generally known as the menthol. The purpose of this study was optimizing in vitro culture of *mentha piperita* for menthol production. Callus was inducted with two kind of explants (leaf and stem) on Gamborg (B_5) or Murashige and Skooge (1962) medium containing 3% sucrose and enriched with different concentration of Dichlorophenoxy acetic acid (2,4-D), Banzylaminepurine (BAP) and Kinetin (KIN). The Duncan's Multiple Range Test resulted that the leaves explants was produced the maximum fresh callus weight on MS media supplemented with 1 mgl^{-1} of 2,4-D and 0.5 mgl^{-1} BAP. Afterwards, calli were cultured on MS liquid media complemented with 1 mgl^{-1} both of 2,4-D and BAP. Cell suspensions culture were sub cultured weekly via replacement of 10 ml of fresh media in cell suspension bottles. In vitro Growth Index was calculated 8 week after culture. The growth curve indicated that cell was established in exponential and linear step between 5-11 days after culture. This protocol could be utilized as a valuable method for genetic variation and menthol production in future.

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1095
COMPARISON OF MORPHOLOGICAL CHARACTERISTICS AND ESSENTIAL OIL CONTENT OF FENNEL SEEDS IN DIFFERENT ECOTYPES

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Fennel seeds contain essential oil, which are used in the pharmaceutical industry. For this purpose ecotype effect on some morphological characteristics and essential oil content of fennel seed was tested. Design of this expriment was completely randomized with 3 replications. This study was conducted in 1392(2014) in the laboratory of the Department of Horticulture, Gorgan university of agricultural and natural resources. Seed samples were collected from Kerman, Zanjan, Yazd, Hamedan and Shahre kord ecotypes. Measured Characteristics in this experiment were seed length, seed diameter, weight of thousand seeds and essential oil content. Taking of essential oil was performed using a Clevenger apparatus. According to results of analysis, ecotype variance in seed diameter and weight of thousand seeds and in seed length were significant at 1% and 3% probability level, respectively. The comparison also showed that the highest seed length (10.01 cm) and lowest seed length (6.017 cm) were related to Shahre kord and Zanjan ecotypes, respectively. Also, highest seed diameter (3.41 cm) was found in Shahre kord ecoytpe and lowest seed diameter (2.25 cm) was found in Fars ecotype. Comparision of means showed that the highest weight of thousand seeds (10.15 g) was related to Yazd ecotype. According to comparision of means, maximum level of essential oil (3.96%) and minimum level of it (0.95) were found in Hamedan and Yazt ecotypes, respectively.

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1097
THE STUDY OF GERMINATION AND CALLUS INDUCTION OF *DRACOCEPHALUM KOTSCHYI* BIOSS. IN *IN VITRO* CONDITION

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Dracocephalum kotschyi Bioss. is an important medicinal and aromatic plant that use in pharmaceutical industry. In addition, this species is used Iranian traditional medicine [2, 3]. The aim of current study was to examine the seed germination and the effect of plant growth regulators and type of explant on callus induction of *Dracocephalum kotschyi* Bioss. Various concentrations of BAP and NAA belong to auxins and cytokinins as two important plant growth regulators, and hypocotyls, cotyledons as explants were investigated in callus induction of *Dracocephalum kotschyi* Bioss.[1, 4]. Results indicated that the best treatment for germination was 10 minutes H_2SO_4 + 20 minutes sodium hypochlorite 5 % and 15 minutes H_2SO_4 + 20 minutes sodium hypochlorite 5 % and best treatment and explant on callus induction of *Dracocephalum kotschyi* Bioss. was MS medium containing 3 mg l^{-1} BAP + 1 mg l^{-1} NAA and 5 mg l^{-1} BAP + 2 mg l^{-1} NAA in cotyledon explants.

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1098

STUDY OF SUPERIOR LINES OF SAESME MEDICINAL PLANT IN BUSHEHR PROVINCE.

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It has been more than five thousand years that human beings have explored the incredible benefits of sesame . Sesame have 50% oil. The oil contains 70% unsaturated acids such as linoleic acid, oleic acid oleic acid, and some saturated acids like palmitic acid and arachidic acid sesame is one of valuable herbs in south of Iran, its seed is used for production of oil and also variety of medical usages.Since medicinal plant are highly used worldwide, the compatible lines with place of productions should be recognized and introduced.Because of long aquatic border, Boushehr province can have a great role , in export of sesame. Besides, by improvement of sesame cultivation, various job opportunities can be emerged.This research has been carried out, to compare best lines of sesame according to function and other characteristics of the seeds.To reach this aim, 18 best lines was cultivated in an experiment designed 9km from Borazjan, each plot contained 4 lines(with 5meter length) with 50 centimeters space between each line, the space between plant in lines were10 -15 centimeters.In the f growth process of the lines, the “number of pods in the plants , height of plants, number of seeds in each plant, were recorded.Results of Variance Analysis, showed meaningful difference (1%) between different lines.Camparison of) yield average of seeds ,represented that, line9 with 1547 Kg of seeds per hectare, stands on the top, and line6 with 771/5 kg per hectare stands on the bottom.

1100
PHYSIOLOGICAL RESPONSES OF *MENTHA PIPERITA* TO SIGNALING MOLECULE

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Jasmonates (jasmonic acid and methyl jasmonate) are greatly distributed in plants and known as the signaling molecules. Plants use of these compounds for responding to abiotic and biotic stress. *Mentha piperita* belongs to Mint family. Essential oil of mint plants have considerable commercial value that is used for food, cosmetics and pharmaceuticals industries. This study was carry out to determine changing in MDA, ramones, glucose and manose amount in *Mentha piperita* plants after 24 h treatment with different concentrations of MeJA (0, 0.1, 0.5 mM). MDA content was lowest in plants exposed to 0.1 mM MeJA whereas treatment with 0.5 mM exhibited a higher rate of lipid peroxidation. Amounts of ramnose, glocose and manose gradually decreased during MeJA treatment. These results show that MeJA increases lipid peroxidation and decreases carbohydrates.

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1102

ACARICIDAL EFFECT OF *FOENICULUM VULGARE* ESSENTIAL OIL ON TWO SPOTTED-SPIDER MITE, *TETRANYCHUS URTICAE* (ACARI: TETRANYCHIDAE)

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The two-spotted spider mite, *Tetranychus urticae* has high importance, because of world widespread distribution, extensive host range, severe damage, great rate of population growth and ability in creating resistance against pesticides[1]. This pest is commonly controlled by application of the synthetic insecticides and acaricides. The number of confirmed resistant insect and mite species to synthetic pesticides has continued to rise, apart from risks associated with the use of these chemicals. Spider mites have evolved resistance to >80 acaricides to date, and resistance has been reported from >60 countries[2]. There is an urgent need to develop safe, environmentally friendlier and efficient alternative that have potential to replace synthetic pesticides and are convenient to use. In the search for alternatives to conventional pesticides, essential oils extracts from aromatic plants have been widely investigated. Their toxicities, arresting and repellent effects to stored-product and greenhouse pests have been of especial interest during the last decade[3]. In the present study, the acaricidal potential of *Foeniculum vulgare* essential oil was tested against the adults of *T. urticae*. Air-dried plant materials were distilled for 8 h using a circulatory Clevenger-type apparatus. The essential oil was dried over anhydrous sodium sulphate and stored at +4ºC until tested. The amounts of the essential oils applied were 3.33, 6.66, 13.33, 26.66 and 53.33 µl/L air. The essential oil vapours of this plant species tested was toxic on adults of *T. urticae*. The value of LC_{50} on adults was 8.90 µl/L air. Also with increasing oil concentration, mortality rate of adults was increased. According to result the *F. vulgare* essential oil is appropriate in integrated pest management of two-spotted spider mite and can be consider as bio-pesticide.

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1108

THE EFFECTS OF ENCAPSULATED NANO- AND MICROPARTICLES OF MENTHA PIPERITA (PEPPERMINT) EXTRACT ON PERFORMANCE OF BROILERS UNDER HEAT STRESS CONDITION

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The aim of current study was to investigate the effects of encapsulated nano- and microparticles of Mentha piperita (Peppermint) alcoholic extract on performance of broilers subjected to heat stress. A total of 320, one-day-old (Ross, 308) broiler chicks were allocated to 4 dietary treatments, with 4 replicates of 20 birds each, using completely randomized design. The dietary treatments included: 1) basal diets(control), 2) basal diet plus peppermint alcoholic extract (200ppm), 3) basal diet plus encapsulated nanoparticles of peppermint extract (200ppm), and 4) basal diet plus encapsulated microparticles of peppermint extract (200ppm). The heat stress (34 ± 1˚C) was applied once daily (from 1000 to 1600 h = 6/d) from d 35 to 42 of experiment. No significant different was observed in feed intake and body weight gain between birds treated with alcoholic peppermint extract, encapsulated micro- and nanoparticles of peppermint extract and those birds received basal diet, whereas birds treated with alcoholic peppermint extract, encapsulated micro- and nanoparticles of peppermint extract showed better feed conversion ratio (FCR) than control on 42 d of experiment ($p<0.05$). In conclusion, this study showed that not only alcoholic peppermint extract but also encapsulated micro- and nanoparticles of peppermint alcoholic extract can improve FCR of broilers subjected to heat stress.

1114
EVLUATION OF WHEAT STRAW MULCH FOR WEED CONTROL IN *DRACOCEPHALUM MOLDAVICA*

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Dracocephalum moldavica L. is poor competitors with weeds because of their short stature, and limited vegetative growth. Hand weeding is not practical, because it is highly labor intensive and needs to be repeated often. The use of cereal straw mulch may suppress weeds in organic vegetable production. The objective of this study was to evaluate the effect of wheat straw mulch for broadleaf and grass weed control in *D. moldavica* and to determine the appropriate rate of mulch for this purpose. Treatment was the wheat straw mulch at the rate of 0, 1, 1.5 and 2 kg m^{-2} which spread evenly after planting in the plots. Field experiment was carried out with a completely randomized block design. Weed biomass significantly affected by mulch application. Results indicated that mulching with wheat straw is failed to control of Sonchus spp. and Xanthium strumarium. However, straw mulch at the rate of 1, 1.5 and 2 kg m^{-2}, respectively, provided 96, 92 and 100% control of *Chenopodium album*; 78, 100 and 100% control of *Amaranthus retroflexus, and* 46, 47 and 100 % control of *Echinochloa cruss-galli* compared with no mulching plots. The results of our study revealed that the rate of 1.5 kg m^{-2} is enough for effective control of broadleaf weeds such as *C. album and A. retroflexus*, while, the rate 2 kg m^{-2} or greater in needed to achieve effective control of grass weeds such as *E. cruss-galli.* Additionally, wheat straw mulch was not effective on Sonchus spp. and Xanthium strumarium, therefore in the region where these weeds are the main broadleaf weeds, other weed control measure such as herbicides, cover crop and etc. should be evaluated to achieve acceptable weed control.

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1115
EFFECT OF *MELISSA OFFICINALIS* ON WHITE BLOOD CELLS AND PERFORMANCE OF SUCKLING MALE AND FEMALE LAMBS

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Melissa officinalis L., commonly known as lemon balm, is a perennial herb belong to *Lamiaceae* family [1]. Some antioxidants were identified in lemon balm, such as phenolic compounds, mainly rosmarinic acid [2] carotenoids and ascorbic acid [3]. The antioxidant and immunomodulatory properties of phenolic compounds might improve immune function, which could benefit health [4]. The present study aims to determine dietary supplementation of *Melissa officinalis* (MO) on growth of Sanjabi sukling lambs, total white blood cells (WBC) count and diffrentional white blood cells. Sixteen sukling lambs (8 male and 8 female) with average liveweight of 4.18± 0.14 kg were fed the same basal diet containing 50% concentrate and 50% alfalfa providing 2.682 Mcal energy and 162.8 gr protein per kg of diet dry matter. The lambs were randomly assigned to two treatment groups; one control consisting 4 male and 4 female which only received basal diet and second treatment group consisting of 4 male and 4 female which received 10% MO instead of 10% concentrate. Daily body weight was recorded during the experiment. Blood samples were taken via jugular vein at birth, 7, 30, 60 and 90 days of age. Average daily gain (ADG) and final body weight of MO group were grater ($p< 0.05$) than that of control but milk and dry matter intake were not affected by MO replacement ($p > 0.05$). There was no significant differences between males and females concerning these parameters. Total WBC count, percent of lymphocyte and neuthrophile were influenced by MO supplementation ($p<0.05$). However, percentage of monocyte, lymphocyte and neuthrophile were different between males and females ($p<0.05$). It can be concluded that, inclusion of lemon balm to the ration of suckling lambs could improve growth performance and altered some diffrentional WBC count.

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1117
EVALUATION OF CHEMICAL AND BIOLOGICAL PROPERTIES OF *DUCROSIA ANETHIFOLLIA* BIOSS. ENCAPSULATED IN SOLID NANOFILMS

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Ducrosia anethifollia Boiss. is one of the aromatic herb is distributed in Iran, Afghanistan, Pakistan, Syria, Lebanon, Iraq, and other Arab states. In this study, improvement of solid film properties incorporated with *D. anethifollia* essential oil (EO) as a potential antioxidant/antibacterial wound dressing was investigated. The combined mixture effects of *D. anethifollia* EO with poly vinyl alcohol (PVA) and poly vinyl pyrrolidone (PVP) as compared to control (PVA and PVP) were investigated by using different properties of Nano-films. The combination of EO+ PVA and EO+ PVP activity reduced (density, pH, resistant electrical and size of particle) and increased (electrical potential, total dissolved solids, electrical conductivity, negative loading electrical, viscosity and antioxidant activity) as compared to the control (PVA and PVP) respectively.

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1118
CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF ESSENTIAL OILS FROM *DUCROSIA ANETHIFOLLIA* BOISS.

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The *Ducrosia anethifollia* Boiss. is a medicinal plant belongs to Apiaceae family. In this study, the essential oil (EO) of *D. anethifollia* was isolated by hydrodistillation using a Clevenger apparatus from dried aerial parts. Gas chromatography (GC) and GC/MS detected 41 compounds from their EOs. The major EOs components identified were: decanal (44.857%), dodecanal (11.559%), n-decanol (8.222%), (2E)-dodecanal (5.754%) and alpha-pinene (5.021). The EO antioxidant activity was evaluated by using 2, 2'-azinobis 3-ethylbenzthiazoline-6-sulfonic acid (ABTS) assay. It was shown that the *D. anthifollia* EOs have high antioxidant activity.

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1122

COMPARISON OF MORPHOLOGICAL CHARACTERISTICS OF GERMAN CHAMOMILE IN DIRECT PLANTING OF SEEDS AND SEEDLINGS IN DROUGHT CONDITIONS.

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The occurrence of new climatic conditions which, in turn, results in drought stresses in many parts of the country, demands more attention to optimal utilization of the limited capacity of water resources by cultural practices. The replacement of direct seeding with seedling has been shown to improve field establishment of some plant species including vegetable crops. The application of seedling instead of direct seeding could circumvent drought-related stresses in the field establishment as well as improving yield quality and quantity of medicinal plants. German chamomile (*Matricia chamomilla* L.) is known as a medicinal plant and the importance of its derivatives as pharmaceutical substances continues to play important roles in the valid pharmacopoeia.The present study was carried out in a randomized complete block design to compare both methods in the field performance of morphological features in German chamomile. Several traits including the number of flowers, plant height, number of branches, fresh and dry weight and plant canopy were investigated. The results of analysis of variance showed significant effect of seedling application on these traits compared to direct seeding. The application of seedlings significantly increased the flowering period and flower yield. Moreover, plant height, canopy, branches and dry weight were increased by 19.2, 79, 68.8 and 62.6 percent, respectively, compared to direct seeding. Taking all together, the results simply indicate the cost-effectiveness of seedling application compared to direct seeding in production of chamomile in drought stress conditions.

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1124

EFFECTS OF HYDRO ALCOHOLIC EXTRACT OF FENNEL (*FOENICULUM VULGARE*) ON BLOOD AND IMMUNITY INDICES IN COMMON CARP (*CYPRINUS CARPIO*) FINGERLINGS

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Improvement of efficiency of immunity system is the one of important methods for preventing diseases in fishes. Natural immunity stimulators especially with plant origin cause less damage to fish and environment. In this research that was done in summer 2014 at the Dr. Keyvan Research Center for Fisheries Science and Marine Technology at Islamic Azad University´ Lahijan Branch; the effects of *Foeniculum vulgare* extract on hematological indices and immunity factors of carps were analyzed.Total number of common carp fingerlings were 90,with average weight of(9.25±1.92)gr in the Completely Randomized Design with 3 treatments and 3 repealications(10 fishes in each replication) were fed up with 0.5 and 1% extract per Kg food and control group(without adding extract to the food) for two months. At the end of period the blood samples were taken from the caudal artery or vein and hematologicl indices including hematocrit, count RBC and WBC (with lewis solution and Neubauer chamber), differential count (Gimsa solution), Hb(with siyanomit Hemoglubine), mean corpuscular hemoglobin(MCH), mean corpuscular volume(MCV), mean corpuscular hemoglobin concentration(MCHC) and immunity factors including IgM(by Turbidity metery method)and lysozyme(with Ellis method)and liver enzymes(ALT and AST)(with photometric method)were determined.The results showed maximum number of RBC and WBC(in order of 8500 and 1380000 numbers in mm^3), maximum hemoglobin(7.7gr per deciliter), maximum hematocrit(37%) and also in differential count, the highest percent of neutrophils(30%) , in 1% *Foeniculum vulgare* treatment. In immunity factors, the highest amount of IgM(16.8mg per deciliter), the highest amount of lysozyme and total immunoglobin were determined to this treatment. ALT and AST in 1% treatment had the least amount. Statistical significant differences in hemoglobin and hematocrit between treatments and control and number of RBC, neutrophils, lymphocytes, lysozyme and total immunoglobulin and liver enzyme (AST), between 1% treatment and control and amount of IgM of blood and liver enzyme (ALT) between all surveing groups were observed($p<0.05$). Other blood indices were not affected by extract ($P>0.05$). Generally, we concluded that oral administration of *Foeniculum vulgare* extract , caused the improvement of blood indices and innate immunity factors in common carps.

1129
THE EFFECT OF PHYTOHORMONES ON LAVENDER (*LAVANDULA ANGUSTIFOLIA* MILL.) ORGANOGENESIS

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Lavender (*Lavandula officinalis* now *L. angustifolia*) is a genus of flowering plants in the mint family, Lamiaceae. It is an aromatic shrub with multiple stems growing 30 to 60 cm tall. It is native to Asia, Europe and Mediterranean regions and grows on hilly areas and coastlines. The evergreen leaves are narrow and long and covered in fine hairs, which normally contain the essential oils. The leaves are also pinnately toothed, or pinnate. The plant blooms between April and June, and flowers are purple produced on violet bracts. All parts of the plant have a strong and scented odor and a bitter taste. The flowers and leaves are used as an herbal medicine. Lavender essential oil is extracted by distilling flowers and leaves. Essential oil has higher levels of linalyl acetate (40%), butyric acid, propionic acid, valeric acid, free linalool Considering the lack of information about lavender tissue culture, the current experiment was aimed to study the effect of phytohormones on lavender callus induction and organogenesis. The lavender explants (leaf and apical meristem) were cultured onto MS media supplemented with different phytohormones. According to the observations, 5 $mg.l^{-1}$ NAA and 5 $mg.l^{-1}$ 2ip treatment caused leaf and root formation, which were originally derived from dense and green calli. The MS medium containing 5 $mg.l^{-1}$ IBA and 5 $mg.l^{-1}$ Kin was effective just on leafy explants so that explants formed into leaves after callus induction. Application of 5 $mg.l^{-1}$ NAA and 5 $mg.l^{-1}$ BAP on apical meristem explants produced leaf and stem after callus induction. However, complete plants were produced after sub-culturing the samples. In conclusion, MS medium supplemented with 5 $mg.l^{-1}$ NAA and 5 $mg.l^{-1}$ BAP was selected as the best medium for lavender tissue culture.

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1130
HALOPRIMING EFFECS ON SEED GERMINATION AND SEEDLING GROWTH OF ANISE (PIMPINELLA ANISUM L.) UNDER LABORATORY AND FIELD CONDITION

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Anise (*Pimpinella anisum* L.) has been widely used in traditional medicine for its significant medicinal effects. One of the main problems that prevent successful cropping of this plant is that it fails to show good germination under artificial bed such as field conditions. Seed priming is a method which is able to provide rapid and uniform seed germination and seedling emergence. Therefore, experiments were conducted in 2014 to study the effects of halo-priming on seed germination and seedling emergence of anise under laboratory and field condition. In this study, the effect of seed priming with a solution of Calcium Chloride ($CaCl_2$) at three levels (-3, -6 & -9 bar), Potassium Nitrate (KNO_3) solution at three levels (-4.8, -9.6 & -14.05 bar) were investigated in a completely randomized design with three replications. Seed priming with distilled water for 12 hours also included as check. The result of laboratory trial showed that traits such as germination percentage, germination rate and length of radical and plumule significantly ($P \leq 0.01$) affected by all treatments. Seed priming with KNO_3 which provided -4.8 bar osmotic potential resulted in higher germination percentage, germination rate and length of radical and plumule. Conversely, in the field condition treatments with KNO_3 resulted in lower germination percentage, germination rate and seedling height. Seed priming with $CaCl_2$ which provided -6 bar osmotic potential resulted in higher germination percentage, germination rate and seedling height under field condition. Our result suggested that selection of seed priming method for anise can not be derived from laboratory data; therefore, field studies should be conducted to achieve appropriate seed priming method.

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1131

THE EFFECT PEG 6000 AND GA_3 AS SEED PRIMING MATRIAL ON GERMINATION AND GROWTH INDICES OF ANISE (*PIMPINELLA ANISUM L.*)

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Seed germination and seedling emergence are two main processes in plant development to obtain optimal seedling numbers that results in higher seed yield. Seed priming is a simple and low-cost technology that can improve seed germination and early crop growth leading to earlier and more uniform stands with yield associated benefits in many field crops. Therefore, laboratory and field experiments were conducted in 2014 at the University of Zanjan to study the effects of seed priming with polyethylene glycol 6000 and Gibberellic acid on germination and growth of *Pimpinella anisum L* treatments were: seed priming with PEG 6000 at concentrations which giving an osmotic potential of -3, -6 and -9 bar, and GA_3 at the rate of 300, 600 and 1200 µmol/lit. Seed priming with distilled water for 12 hours also included as check. Experiments were conducted with three replicates on the basis of completely randomized block. Germination percentage Seed germination rate of anise was significantly affected by seed priming ($P \leq 0.01$) both in laboratory and field experiments. In the laboratory trial, the highest germination percentage, germination speed and length of plumule were obtained for seeds primed with a consentration of PEG which provided an osmotic potential of -6. However this result was not supported by field experiment. The results of field trial showed that seed priming with PEG which provided an osmotic potential of -9 bar resulted in higher germination percentage, germination speed, seedling dry weight and seedling height.

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1133

THE RELATIONSHIP BETWEEN ANTIOXIDANT COMPOUNDS CONTENTS AND ANTIOXIDANT ENZYMES UNDER WATER DEFICIT STRESS IN THE THREE IRANIAN CULTIVARS OF BASIL (*OCIMUM BASILICUM*)

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Water deficit stress is a one of the abiotic stress in agriculture worldwide exerting a considerable influence on plant growth and productivity. This study was carried out to elucidate modulatory effects of antioxidant components and enzymes in response to water deficit stress. Three cultivars of *Ocimum basilicum* grown in pots were subjected to control (100% FC), mild (75% FC), moderate (50% FC) and severe (25% FC) water deficit stress treatment. According to the results, the production rate of H_2O_2 content enhanced in cultivar 2 by increasing the water stress levels while the levels of different plant pigments did not differ significantly with increasing water stress levels. We also found higher SOD activity in cultivar 3 under both control and stress experimental conditions compared with other cultivars. In addition, cultivar 2 showed higher enzymatic activity of CAT, APX, GPX, PPO and the other cultivars. Interestingly, some of low molecular weight volatiles of essential oil constituents were induced by water deficit treatment. Methyl chavicol, linalool and squalene, major oil constituents, dramatically increased under treatments. Finally, the association of the status of enzymatic and non- enzymatic antioxidant as meaningful tool to depicting water deficit stress tolerance is discussed in the cultivars under water deficit stress conditions.

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1139
EFFECT OF SUBSTRATE AND MIRONUTRIENT FERTILIZERS, IRON AND ZINC ON THE CONCENTRATION OF IRON, ZINC, COPPER AND MANGANESE IN LEAVES OF ALOE VERA

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Aloe (*Aloe vera* L.)is one of the most important Medicinal Plants in the world. It is cultivated because of it's the short growing periods and result ineconomic value and medicinal crops. A factorial experiment based on randomized complete block design with 3 replications in 2014 was conducted to investigate the effects of substrate and iron and Zinc micro nutrient fertilizers on trace elements in the leaves of *Aloe Vera* in green house of Ghasreshirin. The experiment consisted offour substrate s respectively:a)local soil(clay loam), b) a mixture of50% sand, 30% clay loam soiland(20%) animal manure, and c)a mixture of40% sand, 30% clay loam soiland30% animal manure andd)a mixture of30% sand, 40% clay loam soiland30% of animal manureandfertilizertreatmentsincludedfour levels(0, 1gr Fe, 4gr Znand 1gr Fe + 4gr Zn in 0.75 square meter), respectively. Micro-nutrients concentrations of iron, zinc, copper and manganese inleaves were measured at the end of growing stages. The results showed thatthe concentrations of iron and manganese and manganese concentrations under the substrate and fertilizer were significant at 1%level respectively, but ZnandFe content were significant at 5%level underfertilizer effect, while Zn content under substrate and Cu concentration were not significant under substrate and fertilizer influence. Manganeseand ironcontent was significant under interaction ofsubstrate and fertilizer at the 1% and 5% respectively, but zinc and copper concentrations were not significantly affected by theinteraction between the substrateand fertilizer.

1140

APPLICATION OF RESPONSE SURFACE METHODOLOGY (RSM) TO OPTIMISE HYDRO-ALCOHOLIC EXTRACTION OF PHENOLIC ANTIOXIDANT FROM *CAPPARIS SPINOSA* LEAVES

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Caper (*Capparis spinosa*) is perennial shrub and is the common name of the genus *capparis*, family capparidaceae, and this genus is represented by several species (about 250). Caper is known to contain a wild variety of antioxidant compounds including phenolic compounds, which are found in the different parts of plant (roots, seeds, leaves, bud and fruits). Other compounds are flavonoids, indole and aliphatic glucosinolates. Flovonoids, as a major active constituent, display a remarkable role in various pharmacological activities including antiallergic, anti-inflammatory and antioxidant effects. For this means,the extraction of phenolic compounds from *Capparis spinosa* leaves was optimized by the simultaneous maximization of the yield in total phenol (TP), total flavonoids (TFA) and antioxidant activities, using the response surface methodology (RSM). A first set of experiments allowed us to identify the ethanol concentration (X_1) extraction temperature (X_2) and solvent-to-material ratio (X_3) in the extraction solution, whit high total phenolic and flavonoid contents and high antioxidant activities, as the main responses affecting the extraction efficiency. A rotatable central composite design consisting 15 experimental runs with three replicates at the center point was then applied and second-order polynomial model was used to describe the experimental data regarding evaluated responses. An optimization study using RSM was performed and 3D response surface was plotted from the mathematical models. The optimal conditions based combination responses were X_1= 45%, X_2= 40 °C and X_3= 49 ml/g for total phenol and X_1= 34%, X_2=45 °C, X_3= 47 ml/g for total flavonoid and X_1= 67%, X_2= 55 °C and X_3= 47 ml/g for antioxidant activities. It seems that RSM can be developed industrially as a useful tool for optimization of hydro-alcoholic extract of caper.

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1141

EVALUATING NON-LINEAR REGRESSION MODELS FOR USE IN GROWTH ANALYSIS OF *CUCURBITA PEPO* L.

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Growth analysis is a valuable method in the quantitative analysis of crop growth and development, and crop production. There are many regression models to describe the sigmoidal growth patterns. Considering the fact that the parameters of nonlinear regression models have physiological meanings, they are preferable in relation to linear regression models [1]. The aim of this study was to collect and evaluate the widely used non-linear regression models in the growth analysis studies (Logistic, Gompertz, Richards, Weibull, Truncated Expolinear, Symetrical Expolinear and two kinds of Beta model to describe the dry matter accumulation, and Logistic, Gompertz and Beta models to describe the leaf area index variation patterns). All models were fitted to the dry matter and LAI data of medicinal pumpkin. Results showed that all of the used models in this study very well described the variation pattern of dry matter accumulation and LAI in relation to time (day after planting). Consequently, these models can be used in the growth analysis studies. Beta 1 model for estimating parameters of Crop Growth Rate, Relative Growth Rate and Net Assimilation Rate was used.

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1142

EVALUATION OF DRY MATTER PREDICTION AND MEDICINAL PUMPKIN YIELD UNDER DIFFERENT CULTIVATION PRACTICES AND ENVIRONMENTAL CONDITIONS

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There are limited quantitative information about dry matter accumulation and yield of medicinal pumpkin. The aims of this study are evaluation of Extinction coefficient, Rue (Radiation Use Efficiency), dry matter prediction and medicinal pumpkin yield under different cultivation practices and environmental conditions. The Extinction coefficient was 0.73 and RUE was estimated at 1.5 gr/MJ [1]. Planting date and row spaces had a significant effect on RUE. Overall, this model very well predicted the dry matter of medicinal pumpkin (based on all the information of treatments during two years of the experiment) and the high correlation (R^2=0.86) among the observed and the predicted was obtained. In order to predict the seed yield, HI mean (4.9%) was used and the model predicted the seed yield among the observed and predicted with high correlation (R^2=0.76).

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1143

USING NONLINEAR REGRESSION MODEL FOR ESTIMATION OF CARDINAL TEMPERATURES IN TOW MEDICINAL PLANTS

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Medicinal plants have been used as a source of remedies since ancient times. Most of medicinal plants in Iran are herb and they have dormancy and specially biology cycle. For planting of these plants you must know about their biology cycle. Understanding response of seed germination of medicinal plants to temperature, selecting the best nonlinear regressions models for prediction of medicinal plants seed germination, characterizing germination pattern and prediction cardinal temperature of medicinal plants. For understanding of the medicinal seed germination response to temperature, an experiment was conducted in University of Tehran, Iran; in 2011. The germination rate of three medicinal plants included; wild oat (*Avena fatua* L.) and *Descurania Sophia* (L.) calculated at different temperatures (0, 5, 10, 15, 20, 25, 30, 35, 40 and 45 °C) based on completely randomized design with 3 replications. In this research used three nonlinear regression (segmented, dent-like, beta) models for fitting germination rate. The analysis of variance showed that temperature had significant effect on seeds germination rate. Among models, the segmented model was the best model for three plants and the cardinal temperatures estimated by this model. The base (Tb), Optimum (To) and ceiling (Tc) temperature for wild oat and *D. Sophia* were estimated respectively 1.6, 29.3; 2.01, 30.6 and 1.2, 35. The germination models based on temperature can use for prediction of cardinal temperature.

1163
THE EFFECT OF DIFFERENT CONCENTRATION METHODS ON THE TOTAL PHENOLIC CONTENT OF GRAPEFRUIT JUICE CONCENTRATE

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Grapefruit is an excellent source of many nutrients and phytochemicals, able to contribute to a healthy diet. It is a good source of organic acid, sugar and phenolic compounds. In recent years, more attention had been paid on phenolic compounds from grapefruit, and some publications have suggested they might play an important role on the antioxidant capacity of grapefruit juice. Phenolic acids and flavanones are the two main groups of phenolic compounds in citrus fruit juices. In this study, grapefruit juices were concentrated by conventional and microwave heating at different operational pressures (7, 36, and 100 kPa). The effects of each used heating method on the total phenolic content of juices were investigated by Folin-Cicalteu method. The effect of various heating methods on the profile of the grapefruit was conducted using high performance liquid chromatography (HPLC). The main phenolic acid in grapefruit juice quantified by HPLC was p-hydroxycinnamic acid, ferulic, p-coumaric, sinapic, caffeic and chlorogenic acids. The final juice concentration of 42° Brix was achieved in 135, 120, and 60 min at 100, 36, and 7 kPa respectively using a rotary evaporator. Applying microwave energy decreased the required times to 50, 45, and 41. Results showed that total phenolic degradation was more pronounced in rotary evaporation compared to microwave heating method.

1165
EVALUATION OF PHYTOCHEMICAL AND ANTIOXIDANT PROPERTIES OF THYME (*THYMUS VULGARIS* L.) BEFORE AND FLOWERING STAGES IN GHAFLAN KOUH AND BOZGHOOSH REGIONS OF MIYANEH

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Thyme (*Thymus Vulgaris* L.) is a perennial sub shrub medicinal plant longing to the Lamiaceae family. The study for evaluation of phytochemical and antioxidant properties of Thyme before and flowering stages the aerial parts were collected from Ghaflan kouh and Bozghoosh regions of Miyaneh from Eest Azerbaijan province in 2014. Then air-dried flowering stems of the plant were submitted to hydrodistillation using a Clevenger-type apparatus according to the method recommended in British Pharmacopoeia. The essential oil was analyzed by combination of GC-FID and GC-MS. The total yields of oils based on dry weight were 2.25%, 2.00% and 2.50% (w/w) from Ghaflan kouh and 1.50%, 1.40% and 2.00% (w/w) from Bozghoosh, respectively. Therty, Eighteen and Therty-one compounds were identified from Ghaflan kouh and Bozghoosh regions, respectively among which thymol, Brono and p-cymene have been the three major and common constituents and also had high concentrations. With respect to essential oil and valuable phenolic compound in Ghaflan kouh specimen, it is suggested for medicinal applications.

1166
EFFECT OF FOLIAR FERTILIZER ON QUANTITATIVE INDICES AND ACTIVE INGREDIENTS ON THE LEAVES AND ROOTS OF NETTLE (*URTICA DIOICA*)

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Foliar fertilization or foliar feeding, spraying and absorption of nutrients accomplish from the leaves and stem of the plant. It has been done several experiments about the effects of foliar fertilization by high- consumed and low-consumed on the qualitative and quantitative indexes of growth in agricultural and horticultural crops but there is no evidence on herbs particularly nettle. In our country, nettle often grows and collects in the wild around the rivers and streams. Because fertilization through root in many areas is impossible, it seems foliar fertilization is the only method for increase quantity and quality content of leaves and roots of nettle in this area. An experiment was carried out in a complete randomized design with three replications to investigate the effect of foliar fertilizer on quantitative indices and active ingredients on the leaves and roots of grown and homogenized nettle in plots. The treatments were no-spray (control), a stage-spry (The last week of May), the two stage-spry (Prior and the second week of June) and three stage-spry (Previous and the last week of June), respectively. the leaves were collected in early October and roots in late December after spraying and determined fresh weight, dry weight and the amount of active ingredient.The results showed that the two stage-spry treatments increased fresh and dry weight of roots (not leaves) significantly and three stage-spry treatments increased active ingredients on roots and leaves of the nettle compared to control significantly that it can be economically viable.

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1171
EFFECTS OF STEROID HORMONES ON GROWTH AND ANTIOXIDANT ACTIVITY OF GERMAN CHAMOMILE.

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German chamomile (*Matricaria chamomilla* L.) from Asteraceae family has of great medicinal importance due to having essence and secondary metabolites. Mammalian sex hormones such as testosterone, progesterone and 17-beta-estradiol belong to the group of steroidal hormones [1]. Nowadays, these hormones were found in numerous plant species and were extracted from different tissues and organs such as roots, leaves and flowers of these plants [2, 3]. In this experiment the effects of these hormones at 0, 0.01, 0.1, 1 and 10 mg/l concentration was investigated on seedling growth of German chamomile as a factorial experiment based on completely randomized design (CRD) with three replication. The results showed that these hormones increase shoot length, root weight and shoot weight at various concentrations. The maximum amount of shoot length, root weight and shoot weight was occurred at 0.01 mg/l of progesterone, 10 mg/l of testosterone and 0.01 or 0.1 mg/l of 17-beta-estradiol. On the other hand, these hormones were effective in increasing of antioxidant enzymes of peroxidase, polyphenol oxidase and catalase in seedlings of German chamomile. Therefore, using these hormones can improve the growth conditions of German chamomile.

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1172
STUDY OF RELATIONSHIP BETWEEN PHENOLOGY WITH YIELD IN GERMAN CHAMOMILE LANDRACES (*MATRICARIA CHAMOMILLA* L.)

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Chamomile is an important medicinal plant in the world that has many applications in pharmacy, nutrition and sanitary industrials. Chamomile has medicinal attribute such as antiseptic and therapeutic use, antispasmodic, antimicrobial, and anti-inflammatory. Chamomile crop recently been exploited to boost cultivation areas in Iran. Hence, in the present study, were done evaluation of relationship between phenological traits with flower yield and essential oil in Iranian chamomile landraces. Fourteen chamomile landraces collected from different area of Iran and Soroksari cultivar from Hungary were planted in the randomized complete block design with three replications. This research was conducted for two seasons (2006 and 2007) at the Fozveh Station of Isfahan Agriculture Research Center. Several phenological traits, flower yield and essential oil content were measured. Phenological traits measured based of growing degree-days (GDD). Analysis of variation was used to demonstrate the interaction between various factors in affecting the traits. A Duncan test was used ($p < 0.05$) to determine the significant differences between means of traits. Simple correlation and stepwise multiple regression analysis were performed using SAS software. In the regression analysis, Flower yield per unit area and essential oil content were the dependent variables and the phenological characteristics were considered as independent variables.Results showed that correlation between flower yield with 50% flowering and end of flowering was positive and significant. There was no correlation between essential oil content and developmental stages. Stepwise regression for flower yield per unit area showed that only 50% flower bud trait was entered the model and only 30% of the total variation flower yield per unit area be justified. Also, for essential oil content, there wasn't a trait entered to model. To achieve good yield, crop duration must closely match the available growing season. Crop duration and especially timing of flowering is affected strongly by genotype, temperature and photoperiod. Changes in the timing of life-history stages of crops could be great economical importance, because they could have direct impacts on yield formation processes and final crop yield. Our results indicated that there wasn't relationship between essential oil content and developmental stages in chamomile. But flower yield had relationship with reproductive phase particular flowering.

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1173
EVALUATION OF EFFICACY OF MORPHOLOGICAL TRAITS IN DISTINCTION OF GERMAN AND ROMAN CHAMOMILE

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German and Roman Chamomile (*matricaria spp.* and *anthemis spp.*, family Asteraceae) is one of the most important medicinal plants native to southern and eastern Europe, northern Africa, and Asian countries. Also is native to Iran that grows as a wild plant. The medicinal part of the plant is the flower and the medicinal substance is an essential oil. Chamomile has medicinal attribute such as antiseptic and therapeutic use, antispasmodic, anti-inflammatory and antimicrobial. Iranian chamomile landraces have a long history of use as tea and several applications in the traditional and industrial pharmacy. Chamomile crop recently been exploited to boost cultivation areas in Iran. In order to evaluate the efficacy of morphological traits in identification and distinction of chamomile genus (German and Roman), 66 chamomile landraces were selected. 47 German chamomiles include of 22 landraces of *matricaria chamomilla* L., 8 landraces of *matricaria aurea* (Loefl.) Sch. Bip., and 17 landraces of *matricaria inodora* L., as well as, 19 Roman chamomiles include of 9 landraces of *anthemis cotula* L. and 10 landraces of *anthemis altissima* L. that collected from different areas of Iran were used. The augmented design with four blocks and five controls were used to assess morphological traits in Fozveh station of Agriculture Research Center of Isfahan. Different morphological traits and essential oils were measured. The cluster analysis was performed using Ward's method with Euclidean distance squared for standard variables by SPSS software. According to the cluster analysis based on morphological traits, 66 landraces were classified into two main groups that 10 landraces of *anthemis altissima* L. were located in one group and other 56 landraces were located in second group. Also, results of matrix of genetic distance showed that landraces of *anthemis altissima* L. species had maximum distance with other species. Results indicated that the highest genetic similarity was between populations within a species. Landraces of every species of German chamomile were placed into one group that was able distinct from other species. *Anthemis cotula* L. had minimum genetic distance with three species of German chamomile and in dendrogram of cluster analysis were located in between of *Matricaria inodora* and *matricaria aurea*. Results of cluster analysis showed that the morphological traits were able to separate the German and Roman chamomile. Also, the morphological traits were very useful for identification, distinction, and separation of chamomile species from each other.

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1177
EFFECT OF ORGANIC FERTILIZERS ON YIELD AND YIELD COMPONENTS OF DILL (*ANETHUM GRAVEOLENS*L.)

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Side effects of chemical components, environmental problems and huge attention towards the plant therapyhad causedthat thehundred hectare of arable land in the developed countries be devoted to the cultivation of medicinal plants, especially in the last decade [1]. *Anethum graveolens* L.,known as dillis one of the most common herbs with a long history of application as a remedy and spices in food[2].In order to evaluate the effects of organic fertilizers on yield and yield components of dill, an experiment was conducted as a split plot on complete randomized block design with three replicatesat the Campus of Agriculture and Natural Resources, Razi University, Kermanshah, Iran during 2013-2014 cropping season.The main plot (factor A) and subplot (factor B) were manure in three levels (0,10 and 20 tons.ha^{-1}) and vermicompost in three levels (0,7 and 15 tons.ha^{-1}), respectively.The following traits including grain yield, number of umbrellas per plant and umbelet in umbrella were studied.Results indicated that the factor A was not significant for grain yield and umbelet in umbrella, but factor B was significant for grain yield ($P \leq 0.01$).The A×B was significant ($P \leq 0.05$) just for thenumber of umbrellas per plant.The combination treatment of0×7 tones of manure and vermicompost caused the highest number of umbrellas per plant.The highest grain yield (2267 kg.ha^{-1}) was obtainedfrom the combination treatment of20×7 tones of manure andvermicompost, respectively.

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1188

EFFECT OF PRIMING ON GERMINATION CHARACTERISTICS OF LALLEMANTIA (*LALLEMANTIAROYLEANA*L.) UNDER NORMAL SALINITY

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In order to evaluate the effect of priming on seed germination of Lallemantia (*Lallemantiaroyleana*L.), a factorial experiment in a completely randomized design (CRD) with two factors of NaCl in 4 levels (0, 2, 4 and 6 dS/m) and GA3 pre-soaking at 3 levels (0, 250 and 500 ppm) with three replicates was conducted. Results of analysis of variance showed thatthe effect of pre-soaking and salinity wasnot significant. According to results of means comparison table, the highest germination rate (100%) was obtained in 500 ppm of GA_3 with no salinity, the highest seed vigor (12.127) was observed in control treatment and the most abnormal seedlings was measured in 250 ppm of GA_3 with lowest salinity (0 dS/m). The most of normal seedlings related to 500 ppm of GA_3 in 4 dS/m of NaCl. The lowest mean germination time belongs to 250 ppm of GA_3 in 2 dS/m of NaCl. Generally applying 500 ppm of GA_3 without any salinity for 24 hoursis recommended for the best germination performance.

1189

EFFECT OF DIFFERENT *LEMON VERBENA* POWDER LEVELS AND VITAMIN C ON PERFORMANCE OF BROILERS IN HEAT STRESS CONDITION

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Poultry industry is developing in high ambient temperature regions. Many parts of Asia, Africa and South America are located in this climate. Heat stress results in reduced feed intake, body weight gain, carcass yield and increased mortality and FCR and makes it difficult to reach the sufficient poultry meat production in tropical regions [1]. Vitamin C is one of the most applicable factors to overcome the heat stress in poultry which has been studied in many researches [2]. The leaves of lemon verbena contain verbena essential oil which consist the components of limonene, citral, geraniol, neral, linalool and researchers has already proven its antimicrobial effect *in vitro* which would imply stimulating growth performance *in vivo* [3]. Thus the aim of this study was to investigate the effect of lemon verbena powder and vitamin C on performance and blood parameters of broilers reared under heat stress. The experiment was carried out with a total of one hundred sixty day-old male Ross 308 broiler chickens in a completely randomized design. They were commercially raised for first 24 days before the beginning of the study. From 25 d of age the birds were assigned to four diets including control diet and treatment diets which supplemented with 2 levels of lemon verbena (0.5 and 1.0%) and one level of vitamin C (250 mg/kg) in 16-floor pens with 10 chickens each and reared to 42 d of age. Temperature initially set at 32 °C for first 3 d of age and decreased by 2.5 °C per week. To induce chronic heat stress, birds were exposed to an ambient temperature of 35±2°C for 8 h daily (from 09:00 AM until 17:00 PM) from 25-42 d of age. Result showed that dietary supplementation of 0.5% lemon verbena increased ($P<0.05$) average weight gain and feed intake by 5.81 and 3.29%, and reduced feed conversion ratio by 2.59% compared to control group. Casamassima et al. (2012) investigated the influence of 2.5 and 5 mg/kg lemon verbena extract on lambs and showed that both levels of extract increased ADG and FI. In another experiment the levels of 5 and 10 mg/kg lemon verbena extract on pigs was assessed and only the higher level improved the growth performance as compared to the control group [4]. In conclusion, lemon verbena and vitamin C improved some performance data which somehow suppressed the negative effects of heat stress.

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1191
STUDY EFFECT OF LOW IRRIGATION AND POLY AMINE (SPERMIDIN) ON YIELD OF *SATUREJA HORTENSIS* L. IN KERMAN

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Water stress is the condition that available water is less than a plant needs for maximum growth. Poly amine compounds have important role in plant response to stress that depend on plant species and type of stress. In order to study effect of water stress and spraying poly amine (spermidin) on yield and some plant parameters of Savory *Satureja hortensis* L. , this experiment was conducted in Kerman Natural Resources Research Station in 2014, using RCBD with split plots and 3 replications. 3 levels of irrigation (1- conventional (without water stress) as control; 2- irrigation cut off in plant vegetative growth satage; 3- irrigation cut off in plant reproductive stage) and 3 concentrations of poly amine (0, 1, and 2 mM) in sub plots were compared. Morphologic and phonologic traits of Savory plant were recorded and data were statistically analyzed by MSTATC software and means were compared by multi-range Duncan's method. ANOVA results show that water stress in various stages of plant growth affected yield and yield components, significantly. Spraying of poly amine had significant ($p< 0.01$) role in decreasing of negative effects of water stress on Savory plant. As water stress increased, Savory plant yield decreased. Increase in (spermidin) concentration resulted in increase in plant resistance to water stress in Savory plant.The highest economical yield (0.41 Kg/m2) was observed in treatment of irrigation cut off in reproductive stage that was sprayed by 2 mM spermidin.

1192

THE EFFECT OF SILICON ON WATER CONTENT AND PHOTOSYNTHETIC PIGMENTS AND LIPID PEROXIDATION IN (*BORAGO OFFICINALIS* L.) UNDER SALINITY

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Salinity stress is a limiting factor for plant growth and development and has negative effects on the plant physiological processes. Many compounds are being used to reduce harmful effects of salinity. In this research the effect of silicon (2.5 mM) was investigated in 30-day basil plants (*Borago officinalis* L.) under the salt stress (0, 50, 100, 150 mM NaCl). The experiment was performed as factorial in completely randomized design with three replications. Results showed with increasing in NaCl concentration the level of photosynthetic pigments (Chlorophyll a, b and carotenoids) decreased significantly. While, Plant treatment with silicon (2.5 mM) caused to remain significantly the level of photosynthetic pigments upon salt stress. The total water content of (*Borago officinalis* L.) seedlings during salt stress (100 mM, 150 mM) was significantly lower. On the other hand, silicon also improved this parameter in salinized basil at 150 and 200 mM NaCl, significantly. Also, Results showed that salt stress increased lipid peroxidation in (*Borago officinalis* L.) significantly, while silicon treatment (2.5 mM) reduced significantly its harmful effects ($p<0.01$). According to the obtained data, it could be concluded the silicon (2.5 mM) could increased (*Borago officinalis* L.)seedlings tolerance to salt stress.

1193

THE RELATIONSHIP OF CORM SIZE AND SOIL CHEMICAL CHARACTERSTICS WITH SAFFRON YIELD IN SOUTH KHORASAN AGROECOSYSTEMS

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Saffron (*Crocus sativus L.*) is one of the most important exports products in Iran. Acorrding to the growing demand for medicinal plants, particularly saffron, more attention to research about its production is very important. Therefore, in order to study the effect of corm size and soil chemical characteristics on yield, this research was conducted in South Khorasan agroecosystems in 2012.The information of corm size and soil samples were collected from 45 farms in three regions including Birjand, Khosf and Mahmuyi. Three replicates from one to five years with minimum area 20×20 cm^2 were randomly selected. corms were removed from the soil and number, fresh weight, diameter and length of each was separately measured. Soil testing including measure must of soil texture, pH, electrical conductivity of saturation extract (EC_e), organic matter precentage, amount of calcium and magnesium in solution was performed. The results showed that the fresh weight of corm, corm length and diameter had positive linear relationship with saffron yield as a higher yield was obtained from a larger corm size. There was a negative linear relationship between the number of corm and saffron yield, so that the yield was reduced by increasing the nomber of corms. The result of soil revealed that there was a negative relationship between yield with pH, EC and Mg^{++} amount of soil solution, but there was a positive relationship with amount of Ca^{++} and organic matter precentage.

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1198

COMPARISON OF PLANT GROWTH LOCATION ON AMOUNT OF LEMON VERBENA ESSENTIAL OIL (*LIPPA CITRIODORA*) IN MAZANDARAN PROVINCE

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Lemon verbena is aromatic and perennial plant of verbenacea family that can be cultivated in different areas in Iran. This plant is mainly contains essential oil and can be used in curing some diseases. The purpose of this study was to evaluate the amount of essential oil in different regions of Mazandaran province (Sari, Amol, Kojoor, baladeh, Ramsar). The research was done in Completely Randomized Design (CRD) with four replicates in laboratory of Sana Institute in sari. Extraction of essential oil was done by Clevenger device and essential oil measurment was calculated as weight percentage. The results showed that the growth place has significant effect in production of essential oils at 1% level. Based on means comparison results, the most amount of essential oils was observed in collected leaves from Ramsar (0.4%) and the lowest was extracted in the high altitudes of Kojoor and baladeh areas (0/2%) that There were no significant differences with each other.

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1201
STUDY ON HERBAL MEDICINE GROCERIES IN KHORASAN RAZAVI

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Herbal medicine groceries (HMG)have big role for herbal medicine consumption by people.Some of the most important factors in relation to HMG are including:Hebal medicine prescription by HMG, Herbal medicine with low quality, selling some poisonous or ineffective plants instead of medicinal plants cultural and social factors in relation to herbal medicine consumption by people. This study has carried out in 2014 in agricultural and natural resources research center of KhorasanRazavi with financial support of Khorasan management and programming organization. In this study a questionnaire with 19 optional question and 1 explanation question 50 questionnaire were filled by HMG of Khorasan30% of HMG prescribed herbal medicineontheir own illegally. In 70% of customers mainly were female. In 60% of HMG customers were aged between25-45. 48.8% of HMG agents were supplied their herbs from natural resources. Other results are complete paper.

1204
SWEET BASIL (*OCIMUM BASILICUM* L.) RESPONCES TO ZINC APPLICATION AND IRRIGATION REGIMES

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Sweet basil (*Ocimum basilicum* L.) is an annual and aromatic herb plant belonging to the Lamiaceae family. The essential oil of basil used in perfumery and food industries. Zinc has essential and considerable physiological and metabolic functions that alleviate drought stress effects in plants. To evaluate the effects of zinc application under different irrigation regimes on some physiological and metabolic parameters of sweet basil, a pot experiment using a factorial based on randomized complete block design with three replications was conducted. Experimental treatments included five zinc nutrition levels (control (no zinc application), 1 and 2 mg/kg in soil application and 1 and 3 g/l in foliar application) and three irrigation regimes (50, 70 and 90% of field capacity). The results showed that irrigation regimes had significant effects on evaluated parameters. As the soil water content decreased, leaf relative water content (RWC) decreased but proline and soluble sugars accumulation, total protein and phenol content increased. The effects of zinc application treatments were significant on evaluated parameters. All parameters increased with zinc application and in this regard foliar application was more effective than soil application of zinc. Overall, the findings of this study showed that increased accumulation of compatible solutes (proline and soluble sugars) and some metabolites due to zinc application can ameliorate the effects of water deficit stress on sweet basil.

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1209
ESTABLISHMENT OF *CAPPARIS SPINOSA* L. CELL SUSPENSION CULTURE

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Capparis spinosa possess incalculable number of pharmaceutical and ethnobotanical importance that contains important bioactive agents and has the potential of producing useful biochemical compounds valuable for various pharmaceutical and food industries. The effect of some plant growth regulators and their combinations on induction of suspension cultures of *Capparis spinosa* examined. Initiation of cell suspension culture of *Capparis spinosa* was studied by inoculating fresh friable fragments of callus on Murashige and Skoog (MS) medium supplemented with two levels of 2,4-dichlorophenoxyacetic acid (2,4-D) (2.5, or 3.5 μM) and kinetin (0.1 μM), or different concentrations NAA (2 OR 2.5 μM) and BA (0.5 μM). The cultures were incubated in 100 ml flasks at 110 rpm on a horizontal shaker. Optimal cell growth (5.78 mg ml^{-1}) was achieved in liquid Murashige and Skoog medium, supplemented with 2.5 μM NAA + 0.5 μM BA. The secondary metabolite, quercetin, was identified in cellular extracts of the suspension cultures.

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1214
EFFECTS OF DIFFERENT FERTILIZERS AND CORM WEIGHTS ON AVAILABILITY OF SOIL PHOSPHORUS AND POTASSIUM NUTRIENTS UNDER SAFFRON CULTIVATION

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Biofertilizers are considered as an alternative approach instead of chemical fertilizers that improve soil fertility and plant growth. In order to study the effects of biofertilizers and mother corm weights on availability of soil phosphorus and potassium nutrients under saffron cultivation as planting beds, an experiment was conducted as factorial based on a complete block design with three replications at Research Greenhouse, College of Agriculture, University of Birjand during 2014. Three fertilizers such as humic acid, Yaramila complex (specific fertilizer for saffron) and control (without fertilizer) and three corm weight included 4-6, 7-9 and 10-12 g were considered as experimental treatments. The results showed that the simple effect of different fertilizers was significant ($p \leq 0.01$) on availability of soil phosphorus and potassium nutrients. The highest of soil absorbable phosphorus and potassium were observed in humic acid (337 and 22.1) and their lowest were for control (235 and 7.37). The maximum of soil absorbable phosphorus and potassium in 10-12 g were recorded for Yaramila complex and for other corm weights were achieved in humic acid. since application of bio-fertilizers had a positive effect on availability of macronutrients in saffron, so these fertilizers could be considered as an ecological approach for sustainable management of saffron fields.

1217
EFFECTS OF DIFFERENT IRRIGATION REGIMES AND SUPER ABSORBENT APPLICATION ON ESSENTIAL OIL AND GRAIN YIELD OF *PIMPINELLA ANISUM*

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An experiment was conducted in 2010, to evaluate the effect of water stress (irrigation after 40, 80,120 and 160 mm of evaporation from pan class A) and super absorbent application (0, 60, 120,180 and 240 kg/ha of A200) on the percentage and yield of essential oil, harvest index of essential oil, grain yield and harvest index of seed of anise plant (*Pimpinella anisum*). The field experiment was factorial based on RCBD with four replications. Analysis of variance showed that the effect of irrigation on grain yield and harvest index of seed were significant. Also, the grain yield was significantly affected by the super absorbent. The interaction between irrigation and super absorbent were significant on percentage and yield of essential oil, and harvest index of essential oil. The highest percentage of essential oil and essential oil yield (3.16%, 42.28 kg/ha, respectively) were obtained from irrigation after 80 mm of evaporation using 240 kg/ha super absorbent. Under irrigation after 80 and 120 mm of evaporation from pan with the increasing amount of superabsorbent per unit area, the amount of oil gradually and significantly increased. Therefore, super absorbent performance in reducing stress effects is clearly visible. Heidari [1] reported that the amount of oil increases with increasing severity of water deficit. Despite increasing oil content under drought stress in some plants such as chamomile, essential oil yield considerably reduced [2]. The highest harvest index of essential oil (1.41%) was obtained under 80 mm of evaporation with 60 kg/ha super absorbent application. The highest seed yield and harvest index of seed (1249 kg/ha and 46.35%, respectively) were obtained under irrigation after 80 mm of evaporation. And with increasing irrigation interval, the grain yield and harvest index of seed gradually and significantly reduced. So, the lowest yield was obtained in the severe water stress (643.9 kg/ha). Interpolation grain yield with different levels of superabsorbent is a quadratic function that the highest (1127.3 kg/ha) and lowest (897.29 kg/ha) grain yield in quantities of 240 and 0 kg/ha, respectively. Water stress by reducing photosynthesis and reduction assimilate allocation to different parts of the plant can be reduced plant growth and yield [3], but super absorbent polymers can increase the availability of water for plants to reduce the effects of drought stress [4].

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1220

EFFECT OF MUNG-BEAN PLANT DENSITY ON PHOTOSYNTHETIC PIGMENTS AND BIOLOGICAL YIELD OF AMARANTH (*AMARANTHUS CAUDATUS* L.) UNDER WATER DEFICIT STRESS

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Amaranth (*Amaranthuscaudatus)* is an annual herbaceous plant or shrub from Amaranthaceae family that at maturity can reach to 3 meters or more. Amaranth is one of the few non-grasses with the potential of becoming a cereal like grain crop. The fiber in Amaranth grain is more than wheat grain and unlikewheat, flourfromgrainamaranthisgluten-free.Its leaves are edible consumption and are rich in potassium and vitamins(A and C). Amaranth produce a high protein seed compared to other non-legume grain crops. Its valuable source of protein exceeds that of wheat or any other cereal grain, including that of lysine, which is normally low in grains.Amaranth is an extraordinary plant, due to its rapid growth and ultra-efficient photosynthesis. This plant requires less than two-third of current plant moisture, which makes it a valuable plant in those parts of the world where lack of water limits agricultural production. Previously, Vandermeer [1] stated that the intercropping is able to maintain the sustainability performance compared to monoculture, especially in low-input conditions. Therefore, in order to evaluate the effects of drought stress and plant density of mung-bean on the chlorophyll contentand yield in Amaranth, an experiment was conducted in 2013 at the Research Farm of the Faculty of Agriculture, University of Tabriz. The field experiment was arranged as split plot based on RCBD with three replications. Irrigation treatments ($I_1$and I_2: irrigation after 70 and 140 mm evaporation from class A pan) and the mung-bean densities (0, 20, 40 and 60 plants/m^2) were allocated to main and sub-plots, respectively.The content of chlorophyll *a*, *b*, *ab* and carotenoid were considerably increased with decreasing water availability. This increasecan berelated to a decreasein specific leaf area. (SLA). The highest yield was recorded for plants under I_2(irrigation after 140 mm evaporation from pan). This increase can be attributed to the high proportion of leaf weight under stress conditions. The highest biological yield of Amaranth (2403.05 g/m^2)was observedunder limited irrigation (I_2)at 20 plants/m^2 of mung-bean and the lowest biological yield (1359.39 g/m^2)was recorded under well watering (I_1) at 0 plants/m^2 of mung-bean. Chlorophyll content and biological yield of Amaranth in terms of well and limited irrigation conditions (especially in limited irrigation) in intercropping system were higher than monoculture. Intercropping systems caused to improve plant utilization of environmental resources, particularly in low input conditions.

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1222

EVALUATION OFTHE USE OFSUPER ABSORBENTONWATER USE EFFICIENCYUNDER DROUGHT STRESS CONDITIONSIN*PIMPINELLA ANISUM*

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To improve water use efficiency for anise (*Pimpinellaanisum* L.) production, because of its importance, study on irrigation management on this plant was more essential. In order to evaluate effect of super absorbent application on water use efficiency for seed and essential oil production under water deficit, a factorial experiment was conducted based on RCBD with four replications in 2010. Treatments were irrigation regimes (irrigation after 40, 80, 120, and 160 mm evaporation from pan class A) and super absorbent (0, 60, 120, 180, and 240 kg/ha of A200). Results showed the effect of interaction betweenirrigationandsuper absorbent were significant on water consumption, water use efficiency, per formanceand economic value of polymer use efficiency for the seed and oiles sential production.Comparison of the data shows that the maximum water consumption (31.19 m^3/ha) was obtained under well irrigation (40 mm evaporation from pan) and without super application. In the all of irrigation regimes with increasing super absorbent application in per Hectare, theamountof waterconsumption was reduced. As, the minimum waterconsumption (9.55 m^3/ha) was obtained under sever water deficit (160 mm evaporation from pan) and 240 kg/ha super absorbent application. Super absorbent polymersare used to increase the water retentionin the soil[1].Inall irrigation regimes by increasing theuse ofsuper absorbent water use efficiencyforseed and essential oil production increased. Under irrigation after 80 mm evaporation from pan the highest water use efficiency for grain and essential oil production was obtained with 240 kg/ha super absorbent application. Hotaman*et al* [2]showed that application ofpolymerscausewater retentionin the soil, releasingitslowly, increase the duration ofthe plantaccesstowater and water use efficiency for seed and essential oil production increases. As a result, theuse efficiency of polymeris reducedby increasing theamount ofpolymer application. The highest polymer use efficiency for seed and essential oil production under all irrigation regimes was obtained from 60 kg/ha super absorbent application. In general,increasing the use of superabsorbent polymers for the production of seed and essential oil,polymer useefficiencywill be reduced,andthisis trueatall levels of irrigation.The economic value of polymers use efficiency for seed and oil essential production was similar to polymer use efficiency.So that, despite producingthe highestyield at thehigh level ofsuper absorbent its economic valuedecreases.

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1233

THE EFFECT OF DIETARY SUPPLEMENTATION OF MEDICINE PLANT OF MELISSA OFFICINALIS ON PERFORMANCE AND WOOL GROWTH IN MALE AND FEMALE SUCKLING LAMBS

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The Lamiaceae are a promising source of natural antioxidants due to the large amount of phenolic acids found in many species of this family [1] Antioxidants have the capacity to neutralize free radicals, which cause oxidative damage to biological molecules [2]. wool production is the result of primary and secondary follicle cells activity [3]. Sixteen suckling lambs (8 males and 8 females) with average liveweight of 4.18 ± 0.14 kg were used to investigate the effect of dietary supplementation of *Melissa officinalis* (MO) on growth performance and wool growth of Sanjabi suckling lambs. The animals fed a basal diet containing 50% concentrate and 50% alfalfa providing 2.682 M Cal energy and 162.8 gr crude protein per kg dry matter. The lambs were randomly assigned in to two treatment groups; one control consisting 4 males and 4 females which only received basal diet and second treatment group consisting of 4 males and 4 females which received 10% MO instead of 10% concentrate. Daily body weight was recorded during the experiment. Wool samples were taken from the right side 5×5 cm^2 at birth and then every 15 days until 90 days of age. Average daily gain (ADG) and final body weight of MO group was grater ($P < 0.05$) than that of control. Milk and dry matter intake were not affected by MO ($P > 0.05$). There was no significant difference between males and females concerning these parameters. However, raw wool in MO group was significantly higher than that of control group ($P \leq 0.05$); In contrast clean fiber growth was not significantly different between control and MO groups. It can be concluded that, inclusion of lemon balm to the ration of suckling lambs could improve growth performance and raw wool growth.

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1234

THE EFFECT OF DROUGHT STRESS AND PLANTING DENSITY ON GROWTH INDICES OF *NEPETA POGONOSPERMA*

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Nepeta pogonosperma is a perennial plant from Lamiaceae family. In order to investigate the effect of drought stress and planting interval on some growth indices such as LAI, TDW, CGR, and RGR according to Growing Degree days of *Nepeta pogonosperma*, an experiment was conducted under field conditions in 2012, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in factorial in the form of a randomized complete block design with three replications. Planting interval factor was in four levels (20×20, 30×30, 40×40 and 50×50 cm), and drought stress factor was in three levels (30, 60 and 90% of field capacity). Result indicated that the maximum LAI were 2 and 3.5 in the control (90% FC) and high planting density (20*20 cm) factors, respectively, which were achieved after taken 1700 GDD. The maximum and minimom TDW were $30g.m^{-2}$ and $20g.m^{2}$ in the control (90% FC) and hard stress (20%FC), respectively. The maximum TDW was $32g.m^{-2}$ in high planting density (20*20 cm) that was achieved after taken 1700 GDD. The results showed that the maximum CGR was $1g.m^{-2}$*14GDD were observed in medium stress (60%FC). So the maximum CGR was $1.2g.m^{-2}$*14GDD were observed in high planting density (20*20 cm and 30*30cm). The results indicated that RGR reduction started after first samples harvested (after taken 300 GDD) in all factors. It had distinguished that best growth indices were belong to non stress condition and in order to achieve the maximum shoot yield in firest year, 20×20 cm planting interval and campletly irrigation (90%FC) may be used. but attention to closely of 60%FC growth indices to control and highest percentage and yield of essential oil of this treatment, in order to achieve the maximum essential oil yeild in firest year, 20×20 cm planting interval and medium stress (60%FC) are accepted as a suitable treatment in production of this plant.

1235
THE EFFECT OF SALINITY AND DROUGHT STRESSES ON THE GERMINATION OF *NEPETA RACEMOSA*

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Nepeta species are widely used in the traditional medicine of various countries (Rapisdara *et al*., 2001; Tzakou *et al*., 2000). Various antifungal, antibacterial and antiviral activities of these species are attributed to nepetalactone compound (Aydin *et al*., 1998; Sajjadi, 2005). The effect of salinity and drought stresses on the germination of *Nepeta racemosa* was investigated in 2013 at the laboratory of the Research Institute of Forests and Rangelands, Tehran, Iran. The experiment was conducted in factorial in the form of a completely randomized design with three replications. Treatments included three soil type (saline soil from Ghom, saline soil from Roudshur in Najm Abad area of Eshtehard, and a normal field soil) and five drought stress levels (100, 80, 60, 40 and 20% of the field capacity). Results indicated that soil type significantly affected germination percentage and daily germination speed at $P \leq 0.01$ and weight index of seed vigor at $P \leq 0.05$. Drought stress significantly affected germination percentage, daily germination speed, seedling length, plumule length, radicle length, radicle fresh and dry weight, plumule fresh and dry weight, seedling fresh and dry weight, and weight and length indices of seed vigor and $P \leq 0.01$. The interaction of soil type × drought stress had only a significant effect on daily germination speed. Mean comparison of germination percentage in different soils indicated that germination percentage was the highest in saline soil from Ghom (58.24%). Mean comparison of germination percentage in different stress levels also showed that germination percentage was the highest in 100 and 80% of field capacity (78 and 85.6%, respectively) and the lowest in 40 and 20% FC (27 and 6.5%, respectively). Germination of the seeds in low moisture conditions indicates that *Nepeta racemosa* seeds have low moisture requirement and can absorb water in dry soils.

1238

THE EFFECT OF DROUGHT STRESS ON ESSENTIAL OIL COMPOSITION OF *NEPETA POGONOSPERMA*

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Iran is an arid and semiarid region and most of the agricultural lands face drought stress; this is the main reason for reduced yield. In order to investigate the effect of drought stress on essential oil composition of *Nepeta pogonosperma*, an experiment was conducted under field conditions in 2012, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in the form of a randomized complete block design with three replications. Drought stress was in three levels (30, 60 and 90% of field capacity). sampling was conducted at full flowering stage from aerial parts of the plants. Samples were dried in open air and shadow. so their essential oil was produced by hydro-distillation. To analyze the essential oil composition, GC and GC-MS were used. Analysis of variance showed that the effect of drought stress was significant on α-thujene, α-pinene, sabinene, β –pinene, myrcene, α-terpinene, p-cymene, 1,8-cineole, e-β-ocimene, γ-terpinene, terpinen-4-ol, α-terpineol, Nepetalactone 1, Nepetalactone 2, E-caryophyllene, β-bisabolene at 0.01% level. Mean comparison indicated that the maximum α-thujene (0.11%), α-pinene (0.48%), sabinene (0.54%), β –pinene (1.94%), myrcene (0.27%), α-terpinene (0.52%), p-cymene (0.39%), 1,8-cineole (16.29%), e-β-ocimene (0.59%) , γ-terpinene (0.72%), terpinen-4-ol (0.64%), α-terpineol (1.03%), Nepetalactone 1 (27.29%), Nepetalactone 2 (0.89%), E-caryophyllene (0.44%), β-bisabolene (1.21%) were achieved in the sever stress (30% FC) and the minimum of all composition were achieved in the control (90% FC). The results of this study showed that main composition of *Nepeta pogonosperma* were 1,8-cineole (16.29%) and Nepetalactone 1 (27.29%). So in order to achieve the high quality plants, 30% FC may be used.

1239
THE EFFECT OF DROUGHT STRESSES ON THE GERMINATION OF *NEPETA RACEMOSA*

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The *Nepeta* genus has 67 annual or perennial herbaceous species in Iran which grow as wile species in different areas of Iran; 39 of them are endemic to Iran (Mozaffarian, 1994). The main compounds in the essential oil of species from *Nepeta* genus are nepetalactone and 1,8-cineole (Fakhr-Ranjbar, 2004). To study the effect of drought stress on the germination of *Nepeta racemosa*, this experiment was conducted in 2013 at the laboratory of the Research Institute of Forests and Rangelands, Tehran, Iran. The experiment was conducted in the form of a completely randomized design with three replications. Treatments included 0, -1, -2, -4, -6, -8 and -10 MPa osmotic potential induced by polyethylene glycol (PEG). Results indicated that drought stress significantly affected germination percentage, average time required for germination, daily germination speed, seedling length, plumule length, radicle/plumule length ratio, radicle fresh and dry weight, plumule fresh weight, seedling fresh and dry weight, length and weight vigor index at $P \leq 0.01$ and seed germination index at $P \leq 0.05$. Mean comparison indicated that non stressed treatment had the highest germination percentage (93.96%). Germination percentage was 66.36% in -1 bar treatment, 19.7% in -8 bar and 6.6% in -10 bar. Radicle length was the highest in -1 bar (18.42 mm) and the lowest in -10 bar (11 mm). Radicle dry weight of the plant varied from 0.009 g in the control to 0.0002 g in -10 bar.

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1241

GERMINATION OF ARTEMISIA POPULATIONS IN THE PRESENCE OF NaCl AND $CaCl_2$

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Collected seeds of artemisia from Karaj, Tehran and Ghom habitats, Iran, were tested in laboratory conditions using a factorial experient in the form of a completely ranomized design with three replications. Treatments included seeds of the three populations, three temperatures (10, 25 and 35°C) and four salinity levels (0, 100, 200 and 300 mM) induced by NaCl + $CaCl_2$ (50:50). Analysis of variance indicated that all three factors significantly affected germination percentage, germination speed, plumule length, radicle length, seed vigour index and seed germination index. Tehran population had the highest (60.3%) germination percentage and Ghom population had the lowest (38.02%). Radicle length was the highest (5.15 cm) in Tehran population. 25°C had the highest germination percentage (57.27%) and 10°C had the lowest (40.03%). Root length was the highest in 25°C (4.02 cm) and the lowest in 10°C (2.41 mm). Among the salinity stress levels, the control had the highest germination percentage (59.18%) and 300 mM had the lowest (28.18%). Mean comparison of the interaction of population × temperature indicated that Tehran population × 25°C had the highest germination percentage (69.25%) and Ghom × 35°C had the lowest (32.16%). Radicle length was the highest in Tehran × 25°C (8.34 cm) and the lowest in Karaj × 10°C (1.69 cm). Interaction of population × salinity indicated that Tehran × 0 mM had the highest germination percentage (76.88%) and Karaj × 300 mM had the lowest (33.25%). Radicle length was the highest (7.43 cm) in Tehran × 0 mM and the lowest (0.66 cm) in Karaj × 300 mM. Interaction of temperature × salinity indicated that 25°C × 0 mM had the highest germination percentage (68.88%). Radicle length was the highest (5.38 cm) in 25°C × 0 mM and the lowest (0.84 cm) in 20°C × 300 mM. The three fold interaction of population × temperature × salinity indicated that Karaj × 25°C × 0 mM had the highest germination percentage (84.66%) and Karaj × 10°C × 300 mM had the lowest (15%). Karaj × 35°C × 100 mM had the highest germination speed (0.63 seeds / day) and Karaj × 10°C × 200 mM had the lowest (0.23 seeds / day). Ghom × 10°C × 100 mM had the highest plumule length (3.7 cm) and Karaj × 25°C × 300 mM had the lowest (0.2 cm).

1242

COLLECTION AND IDENTIFICATION, OF MEDICINAL PLANT SEEDS IN CHAHARMAHAL & BAKHTIARI PROVINCE FOR COMPLETE AND SUPPORT GENE BANK

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Agriculture and seed production had a key role in the previous civilization. Nowadays more than 80 percent feed requirements of human societies is depend on plants and their seeds,especially cereals.As population and feed requirements are increasing ,genetic potential of different plants have a great rolls for solving human kind problems [1]. This study was carried out in order to collect, identify, seeds of medicinal plants to strengthen the national gene bank, in Chaharmahal Va Bakhtiari province, from 2008 to 2012. For the implementation of this plant, the plant geography of the province devided into three areas, as stepic, semi- stepic and high mountain, initially. Then the list of medicinal plants included in each of these areas, also according to previous studies. Then valuable species were identified. After this stage by visiting each areas, seeds of medicinal plants along with their herbarium samples collected. Collected samples after cleaned and saving their informations in special form, were sent to gene bank of Research Institute of Forests and Rangelands. During the five years of the implementation of the study, 415 seed samples from a height of 1162 m to 3302 m (above sea level) were collected along side of natural sites of the province. Among the plant genus, Labiatae with 39 samples, Cruciferae with 22 samples, Compositae with 21 samples, Umbelliferae with 18 samples, Liliaceae with 16 samples, has the highest frequency, respectively. Also among the plant species, the highest frequency of collected seeds were belong to Salvia (28 samples), Nepeta (21 samples), Allium (16 samples), Teucrium (13 samples), Ziziphora (10 samples), Ferula (10 samples). Seeds were collected for six month in a year. Phenology of medicinal species of province showed that, the most suitable time for collecting the seeds were early June to mid October.

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1243

A COMPARISON OF MORPHO-PHYSIOLOGICAL TRAITS IN ARTEMISIA OF THREE DIFFERENT HABITATS FROM IRAN

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Artemisia samples were collected from three different natural habitats in Iran by the means of nine 10 m^2 plots in each habitat. The interval of plots was 100-500 m, and 20-40 samples were collected from each plot. Natural habitats were in Karaj (from the saline river), Tehran (from the beginning of Tehran-Ghom highway) and Ghom (from the far end of Tehran-Ghom highway). Results of evaluating the collected samples indicated that the effect of population and the effect of plots inside each habitat were significant on plant height, root length, the number of tillers, minimum and maximum canopy diameter, the number of lateral branches, flowering shoot, total shoot, root weight, total biomass, essential oil percentage, soluble sugars, proline, Na, K, Mg, Ca and Cl ($P \leq 0.01$). Mean comparison indicated that Ghom population had the highest plant height (44.77 cm) and Tehran population had the lowest (37.23 cm). Karaj had the highest flowering shoot (57.47 g/plant) and Ghom had the lowest (29.6 g/plant). Stem weight was the highest (90.38 g/plant) in Tehran population. Tehran population had also the highest single plant dry weight (301.04 g) and essential oil percentage (0.67%). Mean comparison of plotting areas indicated that plot three had the highest essential oil percentage (0.55%) and area one had the lowest (0.17%). Area one had also the highest soluble sugars (0.96 mg/l) and proline content (0.96 mg/l). Total chlorophyll content was the highest in area one (0.71 mg/l) and the lowest in area three (0.63 mg/l). Na (6.96 ppm), K (17.97 ppm), Mg (5.26 ppm), Ca (25.52 ppm) and Cl (31619.1 ppm) were all the highest in area one. Studying the interaction of population × plotting area indicated that the response of plants to environmental conditions and especially soil salts varies even inside a certain area. So, morphological traits, shoot yield and root weight were different in three plots of each habitat.

1252

ALLELOPATHIC EFFECT OF YARROW (*ACHILLA WILHELMSII* L.) ON SEED GERMINATION INDICES OF PLANTAIN (*PLANTAGO MAJOR* L.)

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In recent years the use of allelopathic effects of weed management seems to have attracted many professionals . Experiment to investigate the effect of aqueous extracts of medicinal plant yarrow (*Achilla wilhelmsii* L.) on germination indices of plantain an experiment was conducted in completely randomized design with three replications in 2014 in the laboratory of Seed Technology of Yasouj University. Treatments consisted of zero, 25, 50, 75 and 100% concentrations of aqueous extract of aerial parts yarrow. The results showed that the extract of aerial parts yarrow residues on germination percentage, root and shoot length, root and shoot fresh and dry weight and seed vigor was significant. The effect of aqueous extract of yarrow residues on the uniformity of seed germination of plantain was not significant. The highest percentage and rate of germination was belonged to the control treatment (distilled water) and by decreasing the aqueous extract concentrations, increased the percentage and rate of germination. The lowest percentage and rate of germination was belonged to 100% concentration of aqueous extract that had not significant difference by 75% concentration. Finally this results showed effects of allelopathic aqueous extract aerial parts of yarrow on growth and germination of plantain as a bio- herbicide.

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1253

ALLELOPATHIC EFFECT OF YARROW (*ACHILLA WILHELMSII* L.) ON SEED GERMINATION INDICES OF LAMBSQUARTERS (*CHENOPODIUM ALBUM* L.) AND RED SORRED (*RUMEX ASETOSA* L.)

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In order to study effect of aqueous extracts of medicinal plant yarrow (*Achilla wilhelmsii* L.) on germination indices of Iambsquarter (*chenopodium album* L.) and red sorred (*Rumex asetosa* L.), an experiment was conducted in completely randomized design with three replications in 2014 in the laboratory of Seed Technology in Yasouj University. Treatments consisted of zero, 25, 50, 75 and 100% concentrations of aqueous extract of yarrow aerial parts. The results showed that the maximum percentage of seed germination was for both the control (distilled water) in the 86.61 and 90.47 percent respectively for the red sorred and lambsquarters. The minimum percentage of seed germination was obtained in 100% aqueous extracts that was respectively 48.57 and 25.71 for the red sorred and lambsquarters. Using extracts 25, 50, 75 and 100 percentage was reduced germination, respectively 15.33, 21.93, 28.53 and 43.92 percentages to red sorred and 18.94, 31.51, 70.56 and 71.58 % to lambsquarters. Using extracts 25, 50, 75 and 100 percentage was reduced germination rate, respectively 43.77, 50.15, 56.92 and 73.96 to the red sorred and 29.98, 47.72, 84.77 and 87.91 seed to the lambsquarters. The results showed that the aqueous extract of yarrow on the root and shoot length, root and shoot fresh and dry weight and both seed vigor was significant. Finally these results showed allelopathic effects of aqueous extract aerial parts of yarrow on growth and germination of lambsquarters and red sorred as a bio-herbicide.

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1263
EFFECT OF BIOLOGICAL, ORGANIC AND CHEMICAL FERTILIZERS ON YIELD AND YIELD COMPONENTS OF ANISE (*PIMPINELLA ANISUM* L.)

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In order to study the effects of biological, Organic and chemical fertilizers on yield yield components in anisum a field experiment was carried out in the agricultural research field of Yasouj University in 2013, as a randomized complete block design with three replications and seventeen treatments. Treatments were concluded: vermicompost (0, 5, 10 ton/ha) and bio fertilizers Azotobacter(Barvar-1), biological phosphorus (Barvar-2) and mixed of Barvar-1- Barvar-2, chemical nitrogen, bio fertilizers of nano and mixing treatments of vermicompost 2.5, 5, 7.5 $t.ha^{-1}$ with biological fertilizers Barvar-1,2 and mixing of Barvar-1,2. Results showed that the maximum height (48.63 cm) number of lateral branches (12.43) and umbels per plant (22.86) was obtained by applying 10 t/ha^{-1} vermicompost. Also maximum of grain yield (595.90 $kg.h^{-1}$) was obtained by applying 10 t/ha^{-1} vermicompost while it was not significant with treatment 7.5 t.ha-1 vermicompost with Barvar-1,2. and minimum of these was obtained from control treatment. It seems that biofertilizers can consider as a replacement in anisum production and we can introduce treatment 7.5 t.ha-1 vermicompost with Barvar-1,2 as a situated of 10 $t.ha^{-1}$ vermicompost from an economical standpoint.

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1275

EFFECT OF ORGANIC AND INORGANIC FERTILIZERS APPLICATION ON SECONDARY METABOLITES OF SAFFRON (Crocus sativus L.)

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Saffron (Crocus sativus L.) is an autumnal flowering geophyte whose dried stigmas, well known for their aromatic and colouring power, have been used since immemorial time as a spice in human nutrition, for medicinal purposes and as a dye Its quality depends on the concentration of three major metabolites: crocin, safranal and picrocrocin which are responsible for colour, aroma and bitter taste of saffron, respectively. The use of saffron as a medicinal plant has a long history and it has been used as a sedative and analgesic in traditional medicinal preparations [1]. In order to investigate the effects of different fertilizers on secondary metabolites of saffron an experiment was conducted in experimental field of Payame Noor University based on completely randomized design (CRD) with three replications. Treatments were three different fertilizers including control (without any fertilizer), 100-250 Kg/ha N-P205 (Chemical fertilizer), 12 and 6 t/ha for FYM (Farm Yard Manure) and vermicopost (organic manures), respectively. After flower harvesting, the separated stigma were dried and amount of crocin, safranal and picrocrocin was determined using UV–vis spectrometric method [2]. The application of chemical and non-chemical fertilizers improved the production of secondary metabolites compared with control in saffron. Based on results the effect of treatments on crocin was significant and vermicompost resulted highest and lowest amount of crocin measured in control treatment. Safranal content of stigma did not affect by treatments, but highest amount of safranal observed in vermicompost and chemical fertilizer, whereas the lowest amount observed in control. Effect of experimental treatments on picrocrocin also was significant and highest amount of this component observed in vermicompost. The results indicated that the use of vermicompost as a bulky organic manure can enhance the production of secondary metabolites and improve antioxidant activity of this herb.

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1276

THE EFFECT OF CHEMICAL FERTILIZERS ONYIELD OF ROSEMARY (*ROSMARINUSOFFICINALIS* L.)

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Rosmarinusofficinalis is one of the important medicinal and aromatic plants in Iran that belongs to the lamiaceaefamily.In order to investigate effect of chemical fertilizer on some morphological traits of rosemary (*Rosmarinusofficinalis* L.), this experiment was conducted in Alborz research station in 2013. The experiment was conducted in a randomized complete block design with three replications. Treatment include chemical fertilizer in three levels ($N_0P_0K_0$, $N_{50}P_{25}K_{25}$ and $N_{100}P_{50}K_{50}$). Results indicated that fertilization application significantly affected on plant height, leafyield, annualshoot yield and annual stem yield of ($p<0.05$).The results indicated that fertilization application not significantly affected on the number of lateral stems, stem diameter, larger and small canopy diameter, woody stem yield, Leaf length, leaf width, essential oil yield and essential oil percentage (p<ns).The results of mean comparison showed that the hieghest plant height (51 cm),leaf yield (395 kg/ha) and annual shoot yield (5234 kg/ha) with the use of $N_{100}P_{50}K_{50}$obtained. Hieghest annual stem yield (1450 kg/ha), belonging to $N_{50}P_{25}K_{25}$. The results showed that, using of $N_{100}P_{50}K_{50}$had the highest yield in rosemary plant at Karaj region of Iran.

1284
EFFECT OF DROUGHT STRESS ON MORPHOLOGICAL CHARACTERISTICS AND YIELD OF THYME (*THYMUS SPP*)

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Importance of medicinal plants, particularly in the pharmaceutical industry, and their limitation in the nature, are the reasonsforagronomic aspects investigation of theseplants.Thyme is one of the most important medicinal plants. This plant is usingas an anti flatulence, digesting food, antispasmodic, antitussive, phlegm, and anti-bacteria.Thymol and carvacrolare main ingredient of essential oil of this plant [1,2]. Four species of thyme werestudied in a factorial experiment based on randomized complete block design with three replications.Factors which examined in this study included four species of thyme (*Thymus vulgaris*), (*Thymus kotschyanas*), (*Thymus armeniacus*), (*Thymus transcaucasicus*) and two irrigation levels (25 and 50% SWD than field capacity).Plant height, length and width of plant canopy , number of nodes, average of the three final nodes, fresh weight, dry weight, dry weight ratio of, the economic performance and harvest index were the studied traits.Analysis of variance indicated drought stress significantly effectedon growth and yield traits.Drought stress decreased the plant height, length and width of plant canopy and the distance between the nodes. Weight, harvest index and economic performance in most genotypes under water stress (irrigation at 50% moisture evacuation) was reduced.The maximum andminimom level of economic performance was related to*Thymus vulgaris* at25% moisture evacuation by 39.5^{g} per plant and*Thymus Transcaucasicus*at50%moisture evacuation by 12.73^{g} per plant respectively.Also highest and lowest of plant height was related to the *Thymus Vulgaris* and *Thymus Transcaucasicus*genotypes respectively.The correlation coefficientsof economic performancewith plant height (r=0.83**), and with the number of nodes (r=079**), were high and positive.

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1287

THE EFFECT OF ETHANOLIC-AQUEOUS EXTRACT OF GOLPAR IN POPULATION REDUCTION OF THE CAUSAL AGENTS OF CITRUS BLAST IN VITRO AND UNDER GREENHOUSE CONDITION

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Citrus blast caused by *Pseudomonas viridiflava*(Pv) and *Pseudomonas syringae*pv. *Syringae*(Pss) is one of the most important diseases in the northern citrus growing provinces of Iran. This disease causes considerable losses to citrus orchards in conducive climatic conditions.*Heracleumpersicum*, commonly known as Golpar or Persian Hogweed, is a flowering plant in the family Apiaceae, indigenous to the Alborz region, the northern part of Iran. The seeds of Golpar are widely used in Iranian folk medicine [1]. So far, antioxidant, antimicrobial and antifungal activities of this plant were reviewed. In this study, antibacterial activity of ethanol-aqueous extract of *Heracleumpersicum*, that provided by percolation method, was evaluated against citrus blast bacteria using disc diffusion method in vitro condition. The results indicated that extract of ethanolic-aqueous of Golpar has remarkable antibacterial activity with 180 and 240mm diameter of inhibition zone, against Pv and Pss, respectively. To evaluate the ability of extract for reduce the population of pathogenic bacteria, antibiotic resistant mutant (Pv-M and Pss-M) was obtained using the gradient plate technique[2]. One day after spraying suspensions of pathogens (1×10^4 cells/ml) on Alemow (*Citrus macrophyllaWester*) and Orang (*Citrus aurantium*) seedlings, plant extract with final concentration of 500 mg/lit were sprayed on seedlings.The experiment was conducted with three replications for each treatment. At five different stages (24, 48, 72, 96 and 144 h) after incubation, pathogen populations were counted. Statistical analysis of the results was carried out using the randomized complete block experimental design and showed that extract could reduce the pathogen population up to 60 percent. This decline can be very effective in reducing disease severity and the ice-nucleating activity of Pv and Pss. Also these results could serve as alternative material for avoiding the problem of resistance associated with current antibiotic and bactericide treatment.

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1291

ANTIFUNGAL EFFECT OF *DRACOCEPHALUM MOLDAVICA* ESSENTIAL OIL ON *IN VITRO* GROWTH OF *PENICILLIUM DIGITATUM* AND *ASPERGILLUSE FLAVUS*

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In the post-harvest losses, fungal attack is considered as an important factor in reducing the storage life of fruits and vegetables. Dragonhead (*Dracocephalum moldavica* L.) is an annual, herbaceous plant belonging to the labiatae family which originated from southern Siberia and Himalayas maintain. Recent pharmacological studies have confirmed some medicinal properties of essential oil (EO) including antioxidant, antiseptic, antibacterial and carminative properties. The disinfectant, antibacterial, antiviral and antifungal effects of *D. moldavica* mostly are in related with presence of citral (geranial + neral) in EO composition [1]. For this means aerial parts of plants were harvested at four physiological stages including: before flowering, beginning of flowering, full flowering and fruit set stage, then the harvested materials were air-dried in shade and their EOs were isolated by hydro-distillation in three replications. The oils were analyzed by GC and GC/MS. The compounds geranial, neral, geranyl acetate and geraniol were identified as main constitute of EOs. In the present work antifungal effect of EOs evaluated on two fungal species (*Penicillium digitatum*, *Aspergilluse flavus*) using medium mixing method, under factorial experimental and completely randomized design with three replications. Four types of EOs as first and four concentrations of EO (0, 250, 500 and 750 $\mu l.l^{-1}$) were considered as second factor. Results showed that antifungal activity of EOs affected by type of fungus and also the type of oil and its concentration. In the case of *A. flavus*, EOs obtained from before flowering and fruiting stage with a 500 $\mu l.l^{-1}$ concentration showed maximum anti-fungicidal activity. In addition fungus *Penicillium* treated with oils obtained from before flowering, flowering stages had highest anti-fungicidal activity in concentrations more than 750 $\mu l.l^{-1}$. The results of this study showed that the herb of *D. moldavica* can be introduced as an alternative to synthetic fungicides for controlling of plant pathogenic fungi in the postharvest of horticulture products.

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1295

EFFECTS OF *MENTHA PIPERITA* AND *MELISSA OFFICINALIS* POWDER ON PERFORMANCE OF HEAT STRESSED BROILERS

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Heat stress is one of the most serious problems in hot conditions, that negatively affects the production performance of poultry. Several researchers tried to reduce the negative effects of heat stress on poultry through using diet supplementation with feed additives such as antioxidants and herbal plants [2]. This study was conducted to investigate the effects of different levels of Mentha piperita (PP) and Melissa officinalis (MP) powder on performance and relative weight of internal organs of heat stressed broilers. A total of 200, one-day-old male broiler chickens (Ross 308) were randomly allocated to 5 treatments with 4 replicates and 10 chicks each, as a completely randomized design. The dietary treatments consisted of: basal diet (BD), BD+0.5% PP, BD+1% PP, BD+0.2 % MP, BD+0.4 % MP. The experiment was conducted from 25 to 42 day of age, before that, all the chicks were fed the same diet. During the experiment the birds were kept at 34°C±2 (9.00 to 17.00; for 8 hours). At the end of the experiment feed intake (FI) and body weight gain (BWG) were measured and feed canvertion ratio (FCR) was calculated. The results indicated that dietary supplementation with Mentha piperita and Melissa officinalis powder did not affect the FI and relative weights of the gizzard, liver, pancreas and spleen ($P>0.05$). Dietary supplementation with PP and MP significantly increased BWG and decreased FCR compared to the basal diet ($P<0.05$). The highest BWG and the lowest FCR were observed in the birds supplemented with 1% diet PP. These results was in agreement with the previous finding who observed that adding PP to the broiler diets improved performance and feed canvertion ratio [1]. In conclusion, the results of this experiment showed that using 1% of Mentha piperita powder in the diet improved broiler performance under heat stress.

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1297

SELECTING THE BEST TREATMENT FOR SEED GERMINATION OF TWO LICORICE SPECIES

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Licorice is a perennial plant with many therapeutic and industrial applications. This plant could be propagated via rhizome and seed. However it is difficult to propagate by the latter method as the seed coat is hard and make it impenetrable for imbibition and reduces germination percent. This study was designed to find the best treatment for improving the germination percentage of this plant. Licorice seeds of two species, *Glycyrrhiza glabra* and *G. uralensis* were subjected to different treatments including: 1) Sulfuric acid at concentrations of 0, 50, 75, and 98% for 1, 5, 10, 20 and 30 minutes. 2) Different succinic acid concentrations (0, 25, 50 and 75ppm) for 6, 12 and 24 hours. 3) Seeds were immersed in warm water (87 ºC) for 2, 4 and 6 minutes, followed by a quick immersion into the cold water which lasted for 30 seconds. 4) Mechanical scarification by using grind stone. The results showed that *G. glabra* exhibited the highest germination rate (98.33%) in response to sulfuric acid at concentration of 75% for 5 minutes. However, the lowest germination percent was 0.3%, by application of 75ppm succinic acid for 24 hours. Moreover, seed scarification by using of grind stone was the most effective treatment for *G. uralensis* with 98.3% germination. While, treatment by succinic acid at 50 ppm for 12 hours caused no germination in both species.

1304

ROLE OF PLANTING DATE AND CORM SIZE ON QUANTITATIVE YIELD OF SAFFRON IN VARAMIN PLAIN

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Saffron is an ideal plant for cultivation in arid and semi-arid zone. Increasing of saffron cultivation depend to identification and application of the scientific methods of cultivation and use proper operation of crop improvement. In order to select of the best of planting date and the corm size and to evaluation of their roles on quantitative yield of saffron, an experiment was conducted as factorial in a randomized complete block design with three replications at the Research Farm of College of Abouraihan, University of Tehran, is located in Varamin dry plain during growing season 2013-2014. Four planting date, 10 June, 7 and 27 September and 12 October and two corm size 5-9 g and 10-14 g were considered as treatments in furrow cultivation condition. Evaluated quantitative yield traits include such as number of flowers and dry weight of stigma were measured and were examined in a square meter and starting date of flowering were recorded. The results of this research showed that cultivation of large saffron corms (10-14 g) on planting date of 10 June, had Maximum yield, by production 62.7 number of flower in a square meter and 0.299 gram dry weight of stigma in a square meter. Early planting date of saffron on June or start of summer led to reduce of production costs and increase of saffron production [1]. Corm size of more than 5 g is suitable for planting in first year but corm size of more than 8 g plays a major role in flowering in the first year [2]. In general, these results indicate that flowering yield in first year is more influenced by corm size and planting of large corms (10-14 g) on 10 June will have a suitable production.

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1311
COMPARISON OF PHENOLS, FLAVONOIDS AND ANTIOXIDANTS ON THE PAULOWNIA TREE FLOWERS IN THE CITY OF GORGAN, IRAN

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Paulownia is a deciduous, fast growing, hardwood tree (family Paulowniaceae, previously in the family Scrophulariaceae) comprised of nine species and a few natural hybrids that are native to China . A number of Paulownia species are valuable sources of secondary metabolites including flavonoids with high antioxidant activities. The purpose of this research study of some phenolic compounds, flavonoids and antioxidants in the Paulownia flowers in the city of Gorgan. The variables measured were: dry weight, phenol, flavonoid and antioxidant respectively. Extraction with methanol and biochemical parameters were measured by spectrophotometry. The study was done in Completely Randomized Design (CRD) with three replications. The results showed that the amount of phenols, flavonoids, antioxidants and dry weight of the sample position of the Paulownia flowers were there significant differences in the level of five percent. The results of the comparison showed that the samples flower on the tree had the highest biomass (18.43 mg/g $_{DW}$) and phenol (0.51 mg/g $_{DW}$) while the lowest of these factors was measured in the samples of flowers downfall on the ground (14.20 mg/g $_{DW}$ and 0.46 mg/g $_{DW}$, respectively). The results showed that the highest antioxidant (39.65 mg/g $_{DW}$) and flavonoids (0.18 mg/g $_{DW}$) was observed in samples of flowers downfall on the ground and the lowest (0.14 mg/g $_{DW}$ and 27.94 mg/g $_{DW}$, respectively) was in the flowers on the tree.

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1317

EFFECT OF SALINITY AND DROUGHT STRESS ON GERMINATION CHARACTERISTICS OF PURSLANE (*PORTULACA OLERACEA* L.)

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Purslane (*Portulaca oleracea* L.) is an annual salt-tolerant plant, which could be considered as vegetable, fodder or medicinal plant in saline conditions. In order to study the effect of salinity and drought stress on germination characteristics and seedling growth of Purslane, two experiments was conducted in germination stage as a factorial arrangment based on completely randomized design with four replications. Salinity levels were 0, 100, 200, 300, 400 and 500 mmol/L prepared with mixture of NaCl, $MgSo_4$, $CaCl_2$, and KCl salts with the ratio of 6:2:1:1 and osmotic potential levels were 0, -0.33, -0.84, -1.02, -1.29 and -1.79 Mpa prepared with PEG 6000. Traits of percentage and rate of germination, plumule and radicle length, plumule/radicle length ratio, seedling fresh and dry weight, and seedling vigor index was measured. Analysis of variation and duncan test ($p < 0.05$) were used to demonstrate the salinity and drought in affecting the traits.Results showed that the effect of salinity levels on all traits was very significant, except germination percentage and seedling fresh weight, whereas, the effect of osmotic potential on all traits was not significant. The results showed that salinity level up to 500 mmol/L did not impose any significant differences in percentage of germination and seedling fresh weight compared with control, while drought up to -1.79 Mpa did not impose any significant differences in all traits compared with control. Purslane plumule/radicle length ratio increased significantly with increasing salinity. At the level of 500 mmol/L salinity, the germination of purslane did not stopped. The functional three- parameter logistic model with $R^2 \geq 0.95$ provided a successful estimation of the relationship between salinity and drought with final percentage of germination. It is indicated that the salinity level required to 50 % inhibition in germination was 656.9 mmol/L. Salinity is one of the increasing problems in the world which include the wide area of Iran. Due to constraint in increment in salinity lands and shortage in desirable soils for cultivation, recognition of medicinal plants that are salt tolerance is very important. As a result, purslane germination can be extremely tolerable to salinity and drought conditions. So it seems that this plant can be established in arid and semi-arid regions. Overall, it was found that the effect of salinity stress on purslane, caused by the toxic effect of ion salts and osmotic effects of salinity stress on reduction of germination and seedling growth was not significant.

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1318
SALINITY EFFECT ON MORPHOPHYSIOLOGICAL TRAITS OF ISABGOL (*PLANTAGO PSYLLIUM* L.)

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Isabgol used for antitussive and anti-inflammatory drugs, due to the existence of mucilage in the seeds. seeds of isabgol are used commercially for the production of mucilage. In order to study the effect of salinity stress on morphological and physiological traits of isabgol (*plantago psyllium* L.), an experiment was conducted in greenhouse as a randomized complete block design with four replications. Salinity levels applied were 0, 50, 100, 150, 200, 250, and 300 mmol/L using mixture of NaCl, $MgSo_4$, $MgCl_2$, and $CaCl_2$ with the ratio of 6:2:1:1. Irrigation with water salinity started after plant establishement in pots and continued to before plant harvest. Plant fresh and dry weight, plant height, leaf area, chlorophyll fluorescence, chlorophyll content, relative water content (RWC), and electrolyte leakage (EL) was measured. Analysis of variation and duncan test ($p < 0.05$) were done by SAS sofrware to demonstrate the salinity effect on these traits. Results showed that the effect of salinity levels on the all of mentioned traits was significant, except minimum fluorescence (Fo) and quantum efficiency of photosystem II (ΦPSII), whereas, this effect on fresh weight, leaf area, electrolyte leakage, and relative water content was very significant. The results showed that with increasing salinity levels, all measured traits were decreased, except Fm, ΦPSII, and RWC. Among measured traits, leaf area, variable fluorescence (Fv), and Fm had most sensitive to salinity increase, whereas, Fo and ΦPSII were not significantly affected by salinity in this plant. It is indicated that, in 250 and 300 mmol/L levels of salinity, the growth of plants stopped and plants could not complete their life cycle. Also, results showed that the significant decrease in morphological traits was initialled from 50 mmol/L salinity. Salinity is one of the increasing problems in the world which include the wide area of Iran. Study of salt tolerance in medicinal plants for cultivating in saline lands is valuable. In these conditions, morphological and physiological traits may be reduced, and growth may be delayed. In overall, isabgol is not a tolerant to high levels of salinity. Morphological traits are suitable and useful indicator and physiological traits are simple and fast indicator for assessment of salinity effect in isabgol.

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1323
SEED GERMINATION PARAMETES OF PURSLANE UNDER DIFFERENT SALINITY CONDITIONS

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Purslane is a herb with both nutritive and medicinal value but due to lack of information about these properties, most of farmers consider it as a nexus weed and eliminated it from their farms. Juice of Purslane shows antimicrobial functions and due to high amount of omega-3 fatty acides this plant is cardiovascular protective [1]. It also contains wound recovery agents [2] and anti-asthmatic properties [3]. This medicinal plant is widely distributed in different parts of the word [2,4]. Therefore it should have high potential of adaption. Increase of different environmental stress such as salinity, significantly limited the amount of agricultural production. We reached to this idea that if this plant is saline tolerant with high potential of medicinal properties it might be possible to cultivate it under different salinity conditions. In this study we examined the most critical stage of Purslane life under different salinity conditions. Germination characteristics of Purslane were investigated after exposure to different saline conditions (control, 4, 8, 12 ds/m NaCl) and number of germination seeds were recorded every 24 h until the day 7th after initiation of standard germination test based on ISTA rules [5]. Seedling growth paprameters were measuted at the end of experimental date and seedling vigor was determined. Interestingly not only salinity enhanced germination but also it improved seedling growth of Purslane under salinity of 4 and 8 ds/m compare to control. Seedling vigor is an important seed quality factor and the higher seedling vigor the better seedling emergence and establishment on the farm. This index was considerably improved under some salinity conditions. Our results showed that root growth of Purslane is highly promoted under salinity treatments and also it considerably higher than shoot growth. In final conclusion this plant is a valuable medicinal plant which due to high adaptability to saline conditions have a potential to decrease the limitation boundaries of plantation on saline farms.

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1325

THE EFFECT OF INTEGRATED NUTRIENT MANAGEMENT SYSTEM ON GROWTH, YIELD AND ESSENTIAL OIL OF *SALVIA OFFICINALIS*

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This experiment was conducted in 2012 at the research field of Alborz Research Station, Research Institute of Forests and Rangelands, Karaj, Iran, to study the effect of chemical and biological fertilizers on Sage (*Salvia officinalis*). The experiment was conducted in factorial in the form of a randomized complete block design with three replications and two factors: chemical N and P fertilizers in four levels (N_0P_0, N_0P_{150}, $N_{300}P_0$ and $N_{300}P_{150}$) and biological fertilizers in four levels (non inoculated control, mycorrhizal inoculation with *Glomus mosseae* + *G. intraradices*, bacterial inoculation with *Pseudomonas fluorescens*, and combined inoculation with *G. mosseae* + *G. intraradices* + *P. fluorescens*). Measured traits included: plant height, the number of tillers, leaf area, leaf yield, shoot yield, root weight and essential oil percentage and yield. Results indicated the significant effect of chemical fertilizer on all measured traits except for the number of tillers. Biofertilizer application had also significant effect on all measured traits except for essential oil percentage. The interaction of the two factors had only a significant effect on leaf area and leaf yield. Mean comparison of chemical fertilizers indicated that N_0P_{150} was the best treatment which resulted in the highest value of most of the measured traits. Among the biofertilizer treatments, mycorrhiza + *Pseudomonas* treatment was the most effective one on the vegetative traits; however, essential oil percentage and yield were the highest in *Pseudomonas* treatment. Mean comparison of the interactions showed that the highest essential oil yield (37.02 kg/ha) was achieved in N_0P_{150} × *Pseudomonas*.

1326

RESPONSE OF *SALVIA OFFICINALIS* L. GROWTH INDICES TO CHEMICAL AND BIOLOGICAL FERTILIZERS

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In order to evaluate the effect of biologic and chemical fertilizers on growth indices of Sage (*Salvia officinalis* L.), this experiment was conducted in 2012 in Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. Experimental design was factorial in the form of a randomized complete block design with three replications. Treatments included N and P chemical fertilizer (N_0P_0, N_0P_{150}, $N_{300}P_0$ and $N_{300}P_{150}$ kg/ha) and biofertilizer (control, *Glomus intraradices* + *G. Mosseae*, *Pseudomonas fluorescens* strain 187, and combined inoculation of *G. intraradices* + *G. Mosseae*, *P. fluorescens*). Studying the effect of chemical fertilizers indicated that LAI was the highest (3.2) in $N_{300}P_0$. TDW was the highest in $N_{300}P_{150}$, and CGR was also the highest (12) in $N_{300}P_0$. Studying the effect of biofertilizers also showed that the highest value of LAI (3), TDW (900) and CGR (14) was achieved in Myco + Pseu treatment. So, it can be concluded that among the chemical fertilizers, $N_{300}P_0$ treatment was the most effective one on most of the growth indices, and among the biofertilizer treatments, Myco + Pseu was the most effective one.

1328

EFFECTS OF NITROGEN FERTILIZER LEVELS AND ZEOLITE ON SOMEECONOMICAND BIOLOGICAL FUNCTION *STEVIA REBAUDIANA* IN KHUZESTAN CLIMATIC CONDITION

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Stevia (*Stevia rebaudiana*Bertoni) is a herbal plant with natural seweetnessand does not have calorie content. It could be also substituted with artificial produced sugar. The sweet of this plant uses for patients that need to control their blood sugar level. Extract of Stevia leaf could be up to 300 times sweeter than Saccharose. This experiment was conducted in a split plot based on a randomized complete block arrangement with three replications at the Research Field of Ramin Agricultural and Natural Resources University (khouzestan) in 1391-1392 (2012-2013). The main factor was nitrogen fertilizer with four levels (50, 100, 150 and 200 kg/ha pure nitrogen) and the secondary factor was zeolite with three different levels (0, 3 and 6 ton/ha).Results showed that the effects of zeolite and nitrogen amounts on Economic function(leaf) and biological function (stemandleaf)were significantat % 1 Level. The highest biological function was obtained by applying of 200 kg nitrogen and 6 tons of zeolite per hectare(2303/3 kg/ha) and the highest Economicfunction was obtained by applying of 200 kg nitrogen and 6 tons of zeolite per hectare(1666/7 kg/ha).[1,2].

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1329

EFFECT OF SALINITY STRESS ON SOME OF SECONDARY METABOLITES OF *PORTULACAOLERACEA*

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Salinity stress is one of the main environmental stress which influence plant growth. In order to study the influence of salinity on some secondary metabolites in *portulacaoleracea*, an experiment was arranged in factorial based on randomized complete blocks design with three replications. The Treatment consisted of four salinity levels (0, 50, 100 and 150 mM). In this study, the amount of mucilage, total phenol, total flavonoid, and antioxidant activity were measured. Results showed that the stress induced by high levels of salinity reduced the amount of secondary metabolites; whereas at a concentration of 150 mM phenol, flavonoid and antioxidant activity were reduced. Also, the maximum amount of mucilage is related to salinity (100 mM) but its amount decreased when the salinity reached to the level of 150 mM.

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1331

EFFECT OF SALINITY STRESS AND SALICYLIC ACID ON MORPHOLOGICAL ATTRIBUTES OF *PORTULACAOLERACEA*

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Salinity stress is one of the main abiotic stresses, which limits crop growth and yield in different ways. Salicylic acid also plays a role in response to abiotic stresses. .This study was aimed to study the effect of salicylic acid and salinity stresses on morphological (Flowering stem diameter, number of leaves and flowers, number of branches, plant height) of Portulaca. Thus, an experiment was arranged in factorial based on randomized complete blocks design with three replications. Treatments consisted of salicylic acid (0, 0.25, 0.50 and 1.0 mM) and salinity (0, 50, 100 and 150 mM). Results showed that salinity stress caused a decrease in flowering stem diameter, number of leaves and flowers, number of branches and plant height. The interaction effect of salinity and salicylic acid showed that salicylic acid spray improved some of the measured parameters, so that, the concentration of 1 mM salicylic acid resulted in better improvement of flowering stem diameter, number of leaves and flowers, number of branches and plant height than the control plants.

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1342
INVESTIGATION ON ROSMARINIC ACID INCREASING IN THREE SPECIES OF *SALVIA* L. GENUS UNDER DROUGHT STRESS CONDITION

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Biotic and abiotic stresses have notable impact on plants metabolites. Drought stress is one of the most important abiotic stresses because of its widespread influence around the world. Rosmarinic acid (RA) is a kind of important phenolic acids and it has anti-oxidant, anti-viral, anti-allergic and also anti-inflammatory characters [3]. Also this class of phenolic acid can be found in remarkable amount in Lamiacea family as *Salvia* genus [1,2]. In genus *Salvia* 57 species have been identified in which 17 species are endemic. This study was conducted in order to investigate drought stress impact on rosmarinic acid content in three species of *Salvia* genus named *Salvia virgate* (collected from Isfahan), *S. spinosa* (collected from Qazvin), and *S. sclarea* (collected from Gilan), based on Random Complete Block Design (RCBD) with three replications at stress and non-stress conditions. After sampling of areal parts, rosmarinic acid content was determined in metanolic extract of each powdered sample of plants by high performance liquid chromatography (HPLC). The results showed that rosmarinic acid content of the species *S. virgate* and *S. spinosa* increased from 3.73 (non-stress) to 7.96 mg/g and 0.62 (non-stress) to 0.74 mg/g plant dry weight in drought stress condition, respectively. While the amount of rosmarinic acid in *S. Sclarea* was reduced from 3.12 (non-stress) to 1.94 mg/g plant dry weight in drought stress condition. These results can be supposed because of plant growth habit that is related to the source region of each studied species.

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1343

EFFECT OF DIFFERENT LEVELS OF TURMERIC POWDER ON IMMUNOLOGICAL RESPONSES AND CARCASS OXIDATIVE STABILITY OF BROILER CHICKS

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The present study was conducted to investigate the influence of *Curcuma longa* powder on performance, immunological functions and meat oxidative stability of broiler chicks. A total of 425 day-old Ross 308 broiler chicks were purchased from a local hatchery and randomly distributed into the 5 dietary treatments. Experimental diets consisted of different levels of turmeric powder (0. 0.25, 0.5, 0.75, and 1% of diet) with 5 replicates of 17 chicks each, which fed during a 42 days feeding trial. The birds were vaccinated against Newcastle disease virus (NDV) at day 21 of trial and serum samples of three chicks per cage were collected at days 6 and 12 post vaccine inoculation. Sera were measured for antibody titer by hemagglutination inhibition test. Also, heparinized blood samples of 42 days-aged chicks were quantified for helper (CD_4^+) and cytotoxic (CD_8^+) T lymphocytes by flowcytometric method. The samples of pectoralis major (breast) were collected from two birds per pen (day 42 of age) to assess oxidative stability by malondialdehyde index. The results show that dietary turmeric supplementation up to 0.75% caused a significant ($P < 0.01$) increase in feed intake. Body weight gain was considerably improved ($P < 0.05$) by turmeric powder up to 0.5% of diet. Dietary inclusion of turmeric increased ($P < 0.05$) NDV antibody titer only at day 12 post vaccination. Interestingly, CD_4^+ to CD_8^+ ratio was greater ($P < 0.05$) in turmeric-supplemented chicks than that of control birds with the highest ratio assigned to the chicks fed on 0.5% turmeric-supplemented diets. Dietary turmeric supplementation reduced ($P < 0.01$) malondialdehyde value in a linear manner. From the present results, it seems that in addition to improving performance, utilization of turmeric powder up to 0.75% in broiler diets can modulate immune system as observed by CD_4^+ to CD_8^+ ratio.

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1344

APPLICATION OF SALICYLIC ACID ON INCREASING OFSECONDARY METABOLITESOF LEMON VERBENA(*LIPPIA CITRIODORA*)

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Medicinal plants are well-known natural sources of remedies for the treatment of various diseases since antiquity.according to a report by world health organization (WHO),the plants are one of the most important medicine sources for the man. produced plant Based Drugs, are types of Secondary Metabolites. Secondary metabolites are chemicals produced by plants under unnatural conditions.various elicitors such as chitosan, a-glucan, and yeast extracts and plant hormonal chemicals such as Salicylic Acidcan induce secondary metabolites in various plants[3].application of exogenous Salicylic Acid has been investigated to increase the contents of secondary metabolites in various plants. Lippiacitrodora is a perennial plant and belongs to verbenaceaefamily.Sedative andAntibacteria effects are properties of this herb. This plant has antioxidant, antimicrobial and antitumore properties due to phenolic compounds (flavonoids and phenolic acids) and terpenoids. The leaves are very aromatic and has frequently applied as a tea. This plant has several essential oil and its main components include cineol, Neral and Lymonen[1,2].effect of Salicylic Acid was studied to increase of Secondary Metabolites in *Lippia citrodora* with 4 treatments (100, 200 and 400 mg/l) salicylic acid in three replications was studied. The Clevenger and Gas chromatography–mass (GC-Mass) were used for essence extraction and detect of essence compounds respectively. The results showed that although hormonal treatments increased some of compounds, various concentrations had different effect. The The1,8-cineole was increased in 100mg/l salicylic acid. The naral and genarial compounds were increase with 400mg/l salicylic acid respectively

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1345

GARLIC SUPPLEMENTATION OF DIET COULD IMPROVE IMMUNOLOGICAL RESPONSES IN LEGHORN LAYING HENS

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The present study aimed to investigate the influence of dietary supplementation with garlic powder on performance and antibody responses of laying hens at peak of egg production. A total of 168 white Leghorn hens (Bovans) at 32 weeks of age were randomly distributed among 7 replicates of each of four dietary treatments (6 hens per cage). Dietary treatments included a control diet (without supplementation) and diets supplemented with 0.2, 0.4 or 0.8% of garlic powder. The experimental diets were fed for a 70 days period commenced after a 10 days adaptation period. The production performance including egg production, egg weight, egg mass, feed intake and feed conversion efficiency were measured by two 35 days intervals. At day 35 of main recording period, the birds were vaccinated against Newcastle disease virus (NDV) by spraying method; thereafter, sera samples were obtained from three hens per replicate on days 7 and 14 post vaccination. Egg production significantly ($P < 0.05$) affected by dietary treatments, with the highest hen-day egg production observed for hens supplemented with 0.4% of garlic powder. Similarly, the best egg mass was also assigned ($P < 0.01$) to this experimental group. Although feed consumption tended ($P = 0.08$) to be different among dietary treatments, however, no marked difference was observed regarding egg weight and feed conversion ratio. Antibody titer against NDV had a different pattern among the experimental groups so that the hens fed on 0.4 and 0.8% garlic-supplemented diets had the best antibody responses during both 7 ($P < 0.05$) and 14 ($P < 0.01$) days post vaccine inoculation. Unexpectedly, NDV titer of control hens was greater than that of 0.2% garlic-supplemented ones. The present findings indicate that dietary garlic supplementation (especially at the level of 0.4% of diet) could improve NDV antibody response and its persistency in laying hens.

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1346

COMPARATIVE EFFECTS OF THYME EXTRACT, BUTYRIC ACID AND VIRGINIAMYCIN ON PERFORMANCE, JEJUNAL MORPHOLOGY AND ILEAL MICROFLORA IN BROILER CHICKS

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This study was conducted to compare thyme extract and butyric acid with an antibiotic compound (virginiamycin) on growth performance, jejunal epithelial cell morphology and ileal microbial communities in broiler chickens. A total of 480 day-old Ross broiler chicks were randomly distributed between six replicate pens of four dietary treatments. The birds were housed in replicate pens each containing 20 chicks. Dietary treatments consisted of a negative control group (without supplementation), positive control group (virginiamycin, 20 mg/kg of diet), thyme extract (ethanolic extract, 500 mg/kg of diet), and butyric acid (0.25% of diet). Results show that the birds fed on diets supplemented with virginiamycin and butyric acid had the highest ($P < 0.01$) weight gains compared with negative control and thyme groups. On the other hand, the best feed conversion ratio was seen for birds supplemented with butyric acid, followed by those on thyme extract. There was a significant ($P < 0.05$) difference in feed intake so that the birds fed on negative and positive control diets consumed more feed than other groups. Dietary inclusion of butyric acid increased ($P < 0.05$) villus height in jejunal epithelial cell. On the other hand, crypt depth increased in negative control birds. Increase in villus height was associated with a subsequent increase ($P < 0.01$) in villus height to crypt depth ratio as an index of absorptive surface area in chicks fed on butyric acid-supplemented diets. Dietary supplementation of thyme extract and butyric acid could reduce ileal populations of *Escherichia coli* and *Clostridium perfringens* to the level seen by antibiotic treatment. The present findings indicated that dietary supplementation with both butyric acid and thyme extract could improve feed efficiency in broiler chicks. Moreover, results of microbial populations of ileal content showed that thyme extract and butyric acid can be used as the good antibiotic alternatives in poultry feeds.

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1348

EFFECT OF DIETARY SUPPLEMENTATION OF GENISTEIN ON PERFORMANCE AND ILEAL MICROFLORA OF BROILER CHICKS FED ON DIETS CONTAINING DIFFERENT PROTEIN LEVELS

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The present study aimed to investigate the influence of plant isoflavones on performance and intestinal microbial count of broiler chicks fed on different dietary crude protein (CP) levels. A total of 576 one-day-old Ross 308 broiler chicks were randomly allotted to the 4 replicates (12 birds each) of each 12 dietary treatments. Dietary treatments consisted of a 3 × 4 factorial arrangement of treatments including 3 different dietary CP levels (control, and 1 and 2 percentage points lower) and 4 supplemental genistein levels (0, 20, 80, and 320 mg/kg of diet), which fed during a 42 days feeding trial. Results show that although dietary treatments had no effect on feed intake, however, decreasing dietary CP level by 2 percentage points reduced ($P < 0.01$) weight gain, resulting in a marked ($P < 0.05$) decrease in feed efficiency. On the other hand, dietary supplementation of genistein caused the improvements ($P < 0.05$) in weight gain and feed conversion efficiency. Interestingly, supplemental genistein was more effective in diets containing lower CP levels, caused significant ($P < 0.05$) dietary CP × genistein interactions for body weight gain and feed conversion ratio. Although dietary CP level had no marked effect on ileal microbial populations, however, supplemental genistein (especially at the levels of 80 and 320 mg/kg of diet) reduced ($P < 0.01$) total bacteria and *Escherichia coli* counts. From the present results, it can be concluded that dietary CP level can be reduced by at least one percentage point in response to dietary supplementation of genistein in broiler chicks.

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1349

OPTIMIZATION AND COMPARISION OF DIFFERENT RNA EXTRACTION METHODS IN *SALVIA* LEAF TISSUE

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Salvia L. genus is belonged to lamiacea family and it has been identified 57 species of this genus in Iran of which 17 species are endemic. Medicinal effects of *salvia* are related to different compounds like terpenoides, monoterpenes and phenolic acids. These phenolic compounds and other secondary metabolites can be counted as one of the main problems in RNA extraction for molecular investigations. The aim of this study was optimization and comparison of different RNA extraction protocols in order to introduce an appropriate method in this plant. Therefore, three traditional methods along with a method using commercial Kit were evaluated for extracted total RNA quality and quantity [1.2]. Quality survey of extracted total RNA on 0.8% agarose gel using observed bands of 28SrRNA, 18SrRNA and SrRNA revealed that two traditional methods i.e. protocols using LiCl buffer and RE buffer plus 2% β-mercaptoethanol and also the protocol using RNX-PLUS commercial Kit showed low RNA quality with weak ribosomal RNA bands. While the fourth protocol with application of RE buffer without %2 β-mercaptoethanol was resulted high quality total RNA contained sharp bands for ribosomal RNA. Totally, regarding to the results of extracted RNA quality from leaf tissue of *salvia L.* genus, it can be concluded that the protocol containing RE buffer without %2 β-mercaptoethanol was more effective than other methods with respect to ribosomal RNA bands on gel and spectrophotometry results using 260/280 and 260/230 absorption ratios. Finally this method could be introduced as a rapid and effective protocol in RNA extraction because of lower extraction time and high performance in quality.

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1350

THE EFFECT OF VARIOUS CONCENTRATIONS OF ACTIVATED CHARCOAL AND LIGHT INTENSITY ON MICROPROPAGATION OF *MENTHAARVENSIS L.*

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Menthaarvensis L. is an important medicinal plant belonging to the family Lamiaceaethat the aerial parts of the herb on distillation yields essential oil containing a large number of aroma chemicals like menthol, menthone, isomenthone, menthofuran, carvone, linalool, linalyl acetate and piperitenone oxide which are used in pharma-ceutical, food, flavour, cosmetics, beverages and allied industries[1,2].This study evaluated the effect of Activated Charcoal and light intensity on shoot proliferation and micropropagationof *Menthaarvensis* L. After sterilization and establishment of explants on ½ MS (murashige and skoog,1962), leaves explants were cultured on MS, ½ MS and ¼ MS media supplemented with 0-2 g/l activatedcharcoal and transferred to growth room with 2500 or 4500 Lux light intensity. The result indicated that ½ MS complemented with 2 gr/l activated charcoal have highest effect on number and diameterof steams (12.6and 0.035 mm respectively). However, there were no significantdifferencebetween leaveslength and internodes. In addition, diameter of steamswas increased to 0.04 mm remarkably under 4500 lux light. In conclusion, ½ MS media iseffectiveand inexpensive media in order to propagate of *Menthaarvensis*.

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1352

ESTABLISHMENT AND OPTIMIZATION OF CALLUS INDUCTION IN *MENTHAARVENSIS*, AN IMPORTANT MEDICINAL PLANT

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Menthaarvensis L. is an industrial crop that is widely cultivated for its essential oil from which menthol is crystallized. The menthol and terpenes of the dementholated oil of *M. arvensis* are variously used in the food, perfumery and pharmaceutical industries [1]. The serious limitations in the mentha in vitro protocol were low frequency, inconsistent and less number of shoots and occurrence of callus phase during organogenesis. Therefore In this study, the leave explants were cultured on MS (Murashig and Skoog,1962) media supplemented with 0, 0.5, 1 and 2 mg/l 2,4-D (2,4-dichlorophenoxyacetic) or NAA (α- naphthalene acetic acid) alone or in combination with 0, 0.5, 1 and 2 mg/l of BAP (benzyl adenine) or Kin (kinetin) for callus induction. The first signals of callus induction were observed 2 week after culture on MS media with various concentration of NAA in combination with BAP. The colors of calli were related to various concentrations of different plant growth regulators. Therefore, the callus produced was friable and watery and a light brown to cream color. The fresh and dry weight of callus was calculated after 4 week of culture. The maximum fresh weight (12.73 g) was observed in MS media supplemented with 0.5 mg/l 2-4,D. However, the greatest amount of dry weight was obtained on MS media complemented with 1 mg/l(1 g) 2,4-D alone. This optimized method of callus induction could significantly apply for cell culture and suspension culture of *Methaarvensis* L.

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1355

GROWTH AND YIELD OF *STEVIA REBAUDIANA*(BERTONI): EFFECT OF PLANT DENSITY AND HARVESTING TIME

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*Stevia rebaudiana*Bertoni, belongs to Asteraceae is one of the most important sources of non-caloric natural sweeteners that have divers applications in different industries. Effect of plant density and harvesting time on growth and yield of *S.rebaudiana*was evaluated in a factorial experiment based on randomized complete block design with three replications in Research Station of Department of Horticultural Sciences and Landscape, University of Tehran in 2014. Treatments were two harvesting time (17 August and 17 September) and four levels of planting density (20*50, 25*50, 30*50 and 30*50 cm). Plant height and diameter, leaf fresh and dry weight and leaf to stem ratio were evaluated. Results indicated that harvesting time significantly affected all measured criteria. Harvesting at 17 September caused the highest plant height, plant diameter and leaf fresh and dry weight while the highest leaf to stem ratio was obtained at 17 August harvest. Also, plant density affected plant diameter significantly, in which planting density of 35*50 cm resulted in the highest plant diameter. Interaction effect of planting density and harvesting time had not significant effect on all studied criteria.

1356

GROWTH AND YIELD PERFORMANCE OF PERIWINKLE (*CATHARANTHUSROSEUS* L.) UNDER DEFOLIATION STRESS AND ORGANIC INPUTS APPLICATION

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Periwinkle (*Catharanthusroseus* L., Apocynaceae) is a medicinal plant that is well known for its alkaloids' phytochemicals. A factorial experiment based on randomized complete block design with three replications was conducted to investigate the effect of different organic inputs (arbuscularmycorrhizal fungi (*Glomusmose* L.) (15 $kg.m^{-3}$), vermicompost (7 $t.ha^{-1}$) and control) and defoliation stress (0, 25 and 50% of the leaves removal) in Research Station of Department of Horticultural Science and Landscape, University of Tehran in 2014. Criteria including plant height, plant diameter, herbal fresh and dry weight and leaf areawere investigated. Results showed that organic inputs significantly affected all measured criteria in which application of vermicompost, increased plant height, plant diameter and leaf area compared to control (no organic input)about 10.4, 12.5 and 33.8%,respectively. Also, non defoliated plants performed better than 50% defoliation stress in case of plant height and diameter. Interaction effect of organic inputs and defoliation stress significantly affected herbal fresh and dry weight in which application ofvermicompost with no defoliation stress caused the highest herbal fresh and dry weight.

1357

THE EFFECT OF ORGANIC FERTILIZERS AND PROPAGATION METHOD ON GROWTHAND YIELD OF STEVIA (*STEVIA REBAUDIANA*BERTONI.)

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The well-known sweetening property of stevia (*Stevia rebaudiana*Bertoni) and its extracts steviol glycoside caused the commercial importance of this species. In order to investigate growth and yield of *S.rebaudiana*Bertoni under organic fertilizers applicationand propagation method, a factorial experiment based on randomized complete block design with three replications was conducted in Research Station of Department of Horticultural Science and Landscape, University of Tehran in 2014. Treatments were includedorganic fertilizers (without organic fertilizers, vermicompost (5 and 10 $t.ha^{-1}$),cow manure (10 and 15 $t.ha^{-1}$) and two type of propagation method (seed and stem cutting).Criteria such as plant height and diameter, internode length, leaf fresh and dry weight were Measured. Results indicated that propagation method significantly affected leaf dry weight and plant height in which propagation by seed increased leaf dry weight around 20.1% compared to stem cutting propagation. Also, organic fertilizers had significant effect on leaf dry weight. According to the results, noapplication of organic fertilizer and 5 $t.ha^{-1}$ vermicompost caused the highest leaf dry weight, although there was no significant difference with 10 $t.ha^{-1}$ cow manure. Interaction effect of propagation method and organic fertilizers significantly affected plant height in which application of 10 $t.ha^{-1}$ cow manure with stem cutting propagation resulted in the highest plant height.

1359

CONTROL OF HYPERHYDRICITYIN*IN VITRO* REGENERATION OF*ZHUMERIA MAJDAEA*(LAMIACEAE)-AN ENDANGERED MEDICINAL PLANT FROM IRAN

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*Zhumeriamajdae*Rech.f&Wendelbo (Lamiaceae) with the common Persian name of "Mohrekhosh"isan endangered medicinal plant, which grows as an endemic species in a limited geographical range in Bandarabbas,Hormozgan province in southeastern of Iran [1].The aerial part of the plant is traditionally used as antispasmodic, antimicrobial, carminative especially in infants and for dysmenorrheal [2].Owing to over-exploitation of wild plants for local purposes, *Z. majdae* is now almost extinct and is listed as an extremely vulnerable species in Iran [3]. As the plant has also a low propagation rate in nature, a suitable method for *in vitro*-regeneration is needed. However, thehigh frequency of vitrified shoots was a majorconcern. Solving the problem of hyperhydricity (vitrification) would help in commercial production and conservationof the germplasm of this medicinallyimportant species. The effect of explant source (*in vitro* seedlings, one-year old pot plant and wild plant) and type (shoot tips and nodal segments) on the control of hyperhidricity during the *in vitro* propagation of the plant were studied. Explants were aseptically cultured on MS medium [4] supplemented with 4.44 µM BA.Our results show that hyperhydricity in *in vitro* regeneration system of *Z. majdae* could bedecreased by using shoot tips and upper nodal segments as explant. Maximum shoot proliferation (100%) without hyperhidricitywas also achieved in cultured nodal segments.

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1362

EVALUATION OF FATTY ACID DIVERSITY IN IRANIAN BITTER MELON (*CITRULLUS COLOCYNTHIS*) ACCESSIONS

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Bitter melon (*Citrullus colocynthis*) is an annual herbaceous, monoecous plant, which is grown mostly in tropical regions of the family Cucurbitaceae. In this study was aimed to evaluate morphological and fatty acid traits diversity of seven different seed accessions of Citrullu colocynthis, which were collected from different regions of Kerman and Esfehan. The fatty acid content was 35- 40% in different regions. The fatty acid compound Oleic, Linoleic, Stearic and Palmetic with Gas-Chromatography was matured. On the based of the phytochemical result, the highest of linoleic and oleic fatty acid respectively was in Orzoyeh accession (72/4%), Khorasgan 2 (13/8%). The simple correlation coefficients indicated negative correlation between stearic acid with seed length mean (r= -0/775) that higher length seed were lower stearic fatty acid. The cluster analysis Ward pathway Oghlodisy distance divided Colocynth accessions 5 groups. Khorasgan 7 and Orzoeh accessions constituted in tertiary group with the same seed morphological traits (length, width, 1000 seeds weight and diameter). Orzoyeh accession introduced as the best accession based on unsaturated fatty acid content and seed traits.

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1363

EVALUATION OF PHENOLIC COMPOUND IN IRANIAN BITTER MELON (*CITRULLUS COLOCYNTHIS*) ACCESSIONS

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Bitter melon (*Citrulluscolocynthis* (Linn.) Schrad) is an important medicinal plant belonging to the family of Cucurbitaceae. It is a well-recognized plant in the traditional medicine and was used by people in rural areas as a purgative, anti-diabetic and insecticide. The experiment was conducted based on Randomized completely block Design with 17 accessions which collected from different part of Iran. Total Phenolic compounds of pulp extract assessed by method of Folin-Ciocalteu Aliquot and widely distributed in plants, which have been reported to exert multiple biological effects, including antioxidant, free radical scavenging abilities, anti-inflammatory, anti-carcinogenic, *etc.* Preliminary phytochemical screening of the plant showed the presence of large amounts of phenolics and flavonoids. The results expressed as gallic acid equivalent. The result showed different rang of phenolic compound among evaluated accessions. The highest phenolic compounds were found in Kerman accession (8810.9 mg/L), while Arak accession had the lowest phenolic compounds (3337 mg/L) among all accessions.

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1370

SEVEN YEARS WORKING ON THE ANTIFUNGAL EFFECTS OF THE PLANT EXTRACTS AND ESSENTIAL OILS

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Investigation of plants containing natural metabolites for plant protection has been identified as a desirable method of plant disease control. This study as a large screening program was aimed to find out the antifungal activity of randomly-collected plant species in the west of Iran, especially from Kermanshah and Hamadan provinces. Therefore, paper disc and agar dilution methods [1 , 2] were used to find out the inhibitory effect of plant extracts and essential oils on the mycelia growth of economically phytopathogenic fungi during 2008-2015. Eight different fungi were exposed to 2084 extracts (5mg/paper disc) obtained from a high number of plant species in at least four replications using paper disc method. Seven hundred seventy eight out of 2084 extracts (35%) showed inhibition against at least one fungus. Results indicated that the mycelia growth of *Rhizoctonia solani* and *Penicillium expansum* were inhibited by 60% (66 from 110) and 24% (12 of 50) species, respectively. Based on this method, it can be concluded that *R. solani* and *P. expansum* are the most susceptible and tolerant fungi among the all studied fungi, respectively. In agar dilution method, ten fungi were exposed to 558 extracts in 2000, 1000, 500 and 250 ppm concentrations. The results revealed that 413 of which (74%) give the strongest inhibition against the growth of at least one of the tested fungi. Moreover, the effects of 121 plant essential oils were investigated against the growth of six fungi using agar dilution method. Results indicated that 114 of 121 extracts (94%) showed inhibition against at least one fungus. The results of this study and wide genetic diversity of plants with anti-fungal activity showed that the flora in the west of Iran could be regarded as a rich source of plants with anti-fungal activity which may form the basis of further investigation on fractionation for finding active fractions, the effect of origin of growing on the quality and quantity of active compounds, the amount of bioactive compounds in different plant parts and finally *in vivo* application of the extracts and essential oils. They will may also help to find out the active metabolites in active plants and subsequently help to use in reverse genetic engineering from metabolites to genes, as Chitwood [3] stated that the results of these kinds of research could help to develop new natural fungicide, chemically synthesized derivatives or to grow the plants with antifungal activity in a crop rotation program.

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1372

EVALUATION OF GENETIC VARIATION IN *AUTOCHTHONOUS* OLIVE (*OLEA EUROPAEA* L.) THROUGH FATTY ACID COMPOSITION

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Identification and collection of *autochthonous genotypes* in fruit trees are the first step in breeding programs. The main obstacle in performing such programs in "olive" is the insufficient data available on *autochthonous olives as native olive gemplasm of Iran.* In this study, we aimed to record trustable fatty acid composition (palmitic acid, palmitoleic acid, stearic acid, oleic acid, linoleic acid and linolenic acid) of those trees which were spread all over Iran and grown autonomously. Fatty acid profiles of olive fresh fruits were identified through gas chromatography (GC), the statistical analysis were conducted using Duncan's multiple range test (DMRT), and finally correlation analysis and cluster analysis were performed with SPSS software version 16 and Minitab. Significant differences between studied genotypes were observed. Although olive oil contains mainly monounsaturated fatty acids (52% and 75%), a moderate amount (0.8-1.8%) of linolenic acid (C18:2) was identifies as well. The clustering of the olives based on their fatty acid composition was carried out based on Euclidean distance and Ward's method algorithm. Based on fatty acid composition and subsequent discrimination analysis for confirming the number of clusters, olives were grouped into three different clusters. The cluster including genotypes of higher oleic acid content is supposed to be a potent candidate for further breeding programs.

1373

EFFECT OFDIFFERENT LEVELS OF SULFURIC ACID AND HOT WATER TREATMENTS ON GERMINATION CHARACTERISTICS *PEROVSKIAABROTANOIDES*KAREL

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Perovskiaabrotanoides is a native plant of Iranwhich belongs to Lamiaceae family. This plant has different medicinal properties.The roots have been used in traditional Iranian herbal medicine to Leishmaniasis remedy. The present study was aimed to assess different treatments on germination percent, germination rate, and root and shoot length. Experiment was carried out in completely randomized design whit three replicates. Treatments included sulfuric acid (H_2So_4) 15M at three level of 1, 3, 5 min and hot water (80˚C)in 5, 10 and 15 min.The results showed that hot water caused substantial decrease in germination percent and inhibition of root and shoot growth. .Sulfuric acid in 1 min treatment leads to more increasing of root (1.97 times) and shoot length (7.33 times), respectively. The highest and the lowest germination rate obtained in Sulfuric acid at 1 min (5.75) and hot water at 10 and 15 min (0), respectively. In overall, the treatments used in this research elevated germination rate in most cases, while thy reduced germination percent.

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1377

INVESTIGATING NATURAL HABITATS TWO ECOTYPE OF *THYMUS DAENENSIS* SUBSP. *DAENENSIS* AND CATDINAL GERMINATION TEMERATURES TO DETERMINE THEIR PHENOLOGICAL STAGES

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Thymus daenensis is an important endemic medicinal plant of Iran. In the present study, the germination behavior of two ecotypes of *T. daenensis* subsp. *daenensis*, Elam and Isfahan, was studied at various temperatures (3 to 40°C) to (1) calculate cardinal temperatures and (2) determine whether germination behavior varied between ecotypes (3) determine their phenological stages. Among the climatic factors, thermal regime has the greatest effect on plant development. To determine the cardinal temperatures, the relationship between germination rate and temperature was considered. Temperature had a significant effect on both final germination percentage and germination rate in both ecotypes. The optimum germination rate occurred within the temperature range 11.2 to 24.3°C for the Elam ecotype and 23 to 34.6°C for the Isfahan ecotype. The calculated base temperatures (*T*b) for the Elam and Isfahan ecotypes were between 0.3 and 1.3°C and 1.3 and 4.4°C, respectively. The ceiling temperature (*T*c) for the Elam and Isfahan ecotypes was 40.9 and 42.3°C, respectively. The Elam ecotype appears to be adapted for germination at lower temperatures to avoid summer drought and maximize the benefit of water availability in winter. Conversely, the Isfahan ecotype was adapted to germinate at higher temperatures.The regression models were applied to describe the germination rate-temperature relationship. To this aim three regression models including Beta (β), Intersected lines and, Plateau (Dent-like function) were applied. To determine the best model, the result was evaluated through regression coefficient (R^2) and root mean square error (RMSE). The comparison results showed that to determine cardinal temperatures for two ecotype best model is plateau model applied by WGI. Temperature had a significant effect on both final germination percentage (FGP) and germination rate (GR) in two ecotypes. Each stage of development should receive a certain amount of heat from the environment. Because of the variability in day length and daily temperatures as indicators of phenological stages, the °C.D can be a suitable indicator. Therefore, to maximize plant potential productivity, thermal requirement should be defined in different phenological stages of plants. To determine each phenological stage, at least 50% of the plants reached the phenological stage and then the total thermal time was calculated daily for each phenological stage. The phenological stages included early growth stages, started blooming, flowering, end of flowering, seed formation, seed filling, full seeding and seed loss. Due to lower base temperature of Elam ecotype in comparison to Esfahan's ecotype, Elam ecotype absorbed more temperatures of the environment during the growing process. So the GDD of Elam ecotype was more than Isfahan ecotype to achieve growth stage. Thus Elam ecotype and Isfahan ecotype need around 3900 and 2300 °C.d, for seed production respectively. Also flowering time of Isfahan ecotype was about one month earlier than Elam ecotype.Measured germination indexes(such as DGS, CUG, GI, MDG, MGT and etc.) in the present study, indicated to the fact that in order to avoid summer drought and make use of winter humidity *Elam* ecotype was adapted to lower temperatures. Although, *Esfahan* ecotype was adjusted to higher temperatures to profit more from spring and summer heat and prevent from winter cold.

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1378

ASSESSMENT OF GENETIC VARIATION AMONG AND WITHIN *STACHYS LAVANDULIFOLIA* POPULATIONS USING MORPHOLOGICAL CHARACTERISTICS

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The genus of *Stachys* belongs to the family of Lamiaceae and comprises about 200-300 species. The distribution of the genus covers Europe, Asia, Africa, and Australia. In Iran, 34 species of this genus has been reported, among which 13 are endemic. *Stachys lavandulifolia* Vahl. is one of the most valuable species in this genus, which widely distributed in Iran. In this research, the variations of morphological traits among 54 accessions belonging to four populations of Damaneh, Gavkhoft, Semirom and Ferydonshahr were assessed. Nine Morphological traits were evaluated in this study including plant wet weight, plant dry weight, plant height, leaf length, leaf width, number of main branch, number of floret and internodes length. The results of this research showed that Ferydunshahr population had the highest amount in respect to plant wet weight (173.93 gr), plant dry weight (57.8gr), number of main branch (36) and number of florets (12), while Semirom population possessed the lowest amount in plant wet weight (21.97gr), Plant dry weight (9.86gr) and number of main branches (13). Cluster analysis was also performed according to main morphological characteristics in which divides the genotypes in to four groups. Finally, Damaneh and Gavkhoft populations had the highest similarity in respect to evaluated morphological traits.

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1381

ESSENTIOL OILVARIATION AMONG ANDWITHIN *STACHYS LAVANDULIFOLIA*POPULATION

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*Stachyslavandulifolia*VahlisLamiaceae medicinal plantwith different applications in traditional and modern medicine.The herb is also effective to reduce the discomposure and use as nutrient for the stomach upset and the digestive rheumatism.In thisresearchthe variation of essential oil yield among and within 50 accessions originated fromfour populations of *Stachyslavandulifolia* were evaluated.The aerial parts were used and shade dried in air.Essential oil wasextracted using Clevenger apparatus. Results showedthat Fereydounshahar1 andGavkhoft possessed the lowest and the highest,(0.28%)and(0.86%)essential oil yield, respectively. Cluster analysis was also performed according to essential oil yield in which divides the genotypes in to four groups.Finally, Gavkhoftpopulationcan beintroduced as high source of essential oil yield in this species.

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1389

MORPHOLOGICAL RESPONSE OF *CNICUSBENEDICTUS* TO CHANGING ENVIEONMENT SIMULATED BY DIFFERENT LEVELS OF IRRIGATION AND PLANT DENSITY

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To investigate drought stress and plant density effects on yield and yield components of *Cnicusbenedictus*,a research was performed in Maybod Branch, Islamic Azad University duringcultivation season of 2014. The research was carried out on Split-Plot design based on RCBD with three replications. The drought stress factor was evaluated by class "A" evaporation pan in three different evaporation areas of 4, 8 and 12 cm considered asthree irrigation levels of full irrigation, - mild stress and intensive stress, respectively. The plant density factor was evaluated in planting distances of 30, 40, 50 cm on each row with 50 cm distance between adjacent rows (12, 10, 8 plants/m^2). The results of ANOVA showed significant difference among drought stress and plant density levels for most of the measured traits. Increase of water stress led to decrease yield (biomass) and yield components. Also, it was found interaction effect among the two factors for some of the traits which appeared their significant roles in exploring the plant responses to changing environmental conditions.

1405

BIOSYNTHESIS AND CHARACTERIZATION OF SILVER NANOPARTICLES USING HERBAL EXTRACTS OF STACHYS LAVANDULIFOLIA AND STUDY THEIR ANTIFUNGAL ACTIVITY ON *SPENCERMATINSIA VITICOLA*

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Nanotechnology is a rapidly growing field in which producingnanoparticles with size, shape, and variable distribution is controlled and its potential use to serve humanity is considered.The use of living organisms such as plants as an intermediary in the synthesis of nanoparticles from inorganic compounds can be another way besides chemical and physical methods for producing nanoparticles. In this study, silver nanoparticles were synthesized using Stachys lavandulifolia extract. The color change of extract from brown to russet after treatment with silver nitrate at room temperatureis the primary index of the production of silver nanoparticles. Spectroscopic analysis of UV- visible indicates the existence of absorption peak at 420 nm which ischaracteristic of visible - ultraviolet wavelengths, and that approved the synthesis of nanoparticles. Transmission Electron Microscopy was used to study the morphology of the nanoparticles and the results indicated the presence of spherical and stable nanoparticles.Also the exact size of silver nanoparticles and their variation range was measured by particle size analyzer (PSA) and it was between 2 and 40 nm. Evaluation of antifungal properties of synthesized silver nanoparticles on two Spencermatinsia Viticola fungi, was performed in a completely randomized design and zone of inhibition test, and these results showed that the extracts containing nanoparticles has the antifungal properties compare to the control extract.

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1417
EFFECT OF DROUGHT STRESS AND MICROELEMENTS ON GROWTH AND GROWTH CHARACTERISTICS OF CHICORY

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Chicory (*Cichorium intybus* L.) is a biennial taproot-bearing crop species from Asteraceae family that naturally grows in different regions of Iran, especially in the northern areas, Azerbaijan, Fars and Khorasan (Van Arkel *et al., 2012*). The root accumulates inulin, which is used in many applications by the food and non-food industries. Chicory leaves contain the glucoside cichorin, kaempferol and pectin (Stevens et al., 2001). In order to study the effects of foliar application of zinc sulfate and iron sulfate under drought stress on growth and growth characteristics such as leaf area index (LAI), crop growth rate (CGR), net assimilation rate (NAR) and total dry weight (TDW) of chicory, a field experiment was conducted during the 2012 growing season. The experiment was carried out as split plot based on complete randomized block design with three replications. Three drought stress levels including irrigation at 60 (without stress), 90 and 120 mm evaporation from evaporation pan (class A) were assigned to main plots and foliar application of microelements in four levels (Fe, Zn, Fe+zn, control) were randomized in subplots. Based on the results of the analysis of variance, the highest values of LAI (2.45) and CGR (22.4 gr/m^2) were obtained from irrigation at 60 mm with the simultaneous application of Fe and Zn. Simultaneous application of Fe and Zn at 90 and 120mm irrigation levels increased LAI 12 and 26% and CGR 17 and 36% respectively, compared to control. At 90 and 120mm irrigation levels, application of Zn and Fe resulted in decrease of line slope of NAR compared to non-use of these elements. There was a significant difference between the maximum total dry weights of plants (TDW_{max}) under different treatments. The highest value of TDW_{max} obtained was 358.3 gr/m^2.

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1420

INTRASPECIFIC VARIATION IN GENOME SIZE OF SOME IRANIAN ENDEMIC ECOTYPES OF *TRIGONELLA MONANTHA* L. MEDICINAL PLANT

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The genus *Trigonalla* comprises about 135 species distributed all over the world out of which 31species within 12 sections are known to be endemic to Iran. *Trigonalla monantha* is an Iranian endemicwildly growing medicinal plant commonly known as PersianFenugreek[1].Because of its high protein content (up to 36%) and favorable amino acid composition, fenugreek seed is equal in nutritional valuewith soybean.Fenugreekseed is used for medicinal purpose specially for diabetic people and as a condiment[2].To determine 2C DNA value of *T. monatha*, flow cytometric (FCM) studies were performed, using BD FACSCanto II flow cytometer, PI staining method and *Solanum lycopersicum* (2C DNA = 1.96 pg) as a reference standard. Perfect seeds were collected from 10 locations in four Iranian provinces including Hamadan, Kermanshah, Tehran and Alborz. The mesuread 2C DNA values were analyzed by conducting a completely randomized design (CRD) with three biological replications.The ANOVA results revealed significant differences ($P < 0.001$) between examined ecotypes. Meanscomparisonshowed four different classes, using*Duncan'*stest: E9 and E2 with4.57± 0.035 pg and 2.87 ± 0.020 pg had the highest and lowest genome size, respectively.This is the first report on genome size of *Trigonalla monantha.*,verfying the clear intraspefic variation in genome sizeof Fenugreek species.

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1423

INTRASPECIFIC VARIATION IN GENOME SIZE OF SOME IRANIAN ENDEMIC ECOTYPES OF *FERULA ASSA-FOETIDA* L. MEDICINAL PLANT

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Ferula assa-foetida (2*n* = 2*x* = 22) is an Iranian endemic medicinal plant distributed in various geographicalregions all over of the country. The *Ferula*genus from Apiacea familyhas been found to be a rich source of gum-resin. Asafoetida (*Ferula assa-foetida*L.) is a herbaceous wildly grown plant native in Iran. In Iranian traditional medicine, asafoetidagumextract has been used as a remedy for abdominal pain, constipation, diarrhea and as an antihelminthic. Several phytochymically and industrially important compoundssuch as gum fraction (comprised of 25% glucose, galactose,arabinose, rhamnose and glucuronic acid), resin, ferulic acid esters, free ferulic acid, coumarin derivatives, volatileoils including sulphur containing compounds andvarious monoterpenes have been isolated from this plant[1].To determine 2C DNA value of *Ferula assa-foetida*L, flow cytometric (FCM) studies were performed using BD FACSCanto II flow cytometer, PI staining method and *Solanum lycopersicum* (2C DNA = 1.96 pg) as a reference standard. Prefect seeds were collected from 14 locations within six Iranian provinces including Kerman, Khorasan, Esfahan, Yazd, Fars and Kohkiloyeh-Boyerahmad. The mesuread 2C DNA values were analyzed by conducting a completely randomized design (CRD) with threereplications.The ANOVA results revealed significant differences($P < 0.001$) between examined ecotypes. Means comparison showed six different classes, using*Duncan'*stest: (E8 and 11)had the highest (4.69 ± 0.029 pg and 4.67 ± 0.018 pg, respectively) and E2 (4.09 ± 0.038 pg)the lowest genome size. This is the first report on genome size of *Ferula assa-foetida.*,confirming the clear intraspefic variation in genome size of Asafoetida species.

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1425
EFFECT OF MICROWAVE RADIATION PERIOD ON GERMINATION OF CUMIN

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To assess the effect of biophysical seed priming with microwaves on germination and vigor of cumin seed an experiment was conducted at the Department of Agronomy, Faculty of Agriculture, Urmia University during 2014. Seeds were treated with 20 W microwaves radiation for 10T 20T 30T 40T 50T 60T 70T 80 and 90 Sec. the results indicated that treated seeds for 30T 40 and 50 Sec significantly improved germination parameters than other treatments. Exposed of seeds to microwave radiation for 10T 20 and 30 Sec had not significant effect on germination as compared to control. Despite this, seed treated with microwaves for 60T 70 and 80Sec, leading to a weakening of germination of cumin seed. Studied traits were final germination percentage (FG%), germination index (GI), mean germination time (MGT), time to reach 50% germination (T_{50}) and coefficient of uniformity of germination (CUG).

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1430

EFFECTS OF ALFALFA (*MEDICAGO SATIVA*) AS MEAL AND EXTRACT ON SOME GASTRIC ENZYMES OF COMMON CARP (*CYPRINUS CARPIO*)

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Herbs and Herbal products have an important role in aquaculture at present. Recently, using from herbal extract has been increased in aquaculture. The aim of this study was evaluation of effects of different levels of *Medicago sativa* (as extract and meal) as a dietary supplement in juveniles of Common carp (*Cyprinus carpio*) on gastric enzymes. 270 common carp (with mean weight: 18±2 gr) were distributed in 27 fiberglass tanks were poured with 250 litres of dechlorinated water. After adaptation, fish were fed as satiation with different levels of alfalfa extract (1, 2, 3 and 4 per cent) and alfalfa powder (3, 6, 9 and 12 per cent) and one diet without any supplement as control group. After eight weeks of experimental trial, 5 fishes were randomly collected from each tank and euthanized with Eugenol (clove oil extract). The intestine was dissected, washed with normal saline and hemogenized and diluted in extract solution and enzyme extracts were collected. Amylase, Lipase and Alkaline Phosphatase were measured by colorimetric assay by Auto analyser (BS-200, Mindray-China). Results showed that *Medicago sativa* (as extract and meal) has affected gastric enzymes in Common carp, so, maximum lipase and amylase activity was seen on diet which was supplemented with 12 per cent of alfalfa meal with 0.005 U/mg Protein and 0.56 U/mg Protein, respectively. Also, the highest alkaline phosphatase activity was seen on diet which was supplemented with 3 per cent of alfalfa extract with 0.38 U/mg Protein. Alfalfa composed from different components such as enzymes, vitamins and some amino acids [1] which led to increase in gastric enzyme activity. Yan et al. (2008) reported that using from alfalfa meal at the level of 5% in diet of Yellow River Carp has changed Growth Performance and Pigmentation [2].

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1431

EVALUTION OF MORPHOLOGICAL AND PHYTOCHEMICAL OF STACHYS*(STACHYSLAVANDULIFOLIA*VAHL) IN FIELD CONDITIONS.

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In this study, the genetic diversity of Betoni*(StachyslavandulifoliaVahl)* populations was evaluated by morphological and phytochemical markers in field conditions . Seeds of six Betoni populations collected from West Azerbaijan , Alborz, Qazvin, Isfahan and Lorestan provinces were planted at the research farm located in the Chenark village in the northwestern of Karaj. The results showed that the populations were classified in to three groups. The first group was populations of Isfahan, Lorestan and Qazvin, the second group was Gachsar and GerehZagh and finally the third group was the population Damrjy. The results of factor analyses explain (61.89%) of variation of all data. Essential oil percentage in Qazvin and Gachsar populations was from 0.015 to 0.049% (w/w). A total of 42 combinations were identified in the essential oil of Betoni that ranged from 98.7 to 93.8% of the total amount of oil Sesquiterpenes were formed main compounds identified in the essential oil. The main components of the oil include: beta-pinene (19.4%), germacrene D (14.3%), gamma-terpinene (13.1%), alpha-pinene (8.4%), bicyclogermacrene and beta Flandren (8%), 1,8-cineole (6.8%).

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1434

PHYTOCHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF DIFFERENT POPULATIONS OF STACHYS LAVANDULIFOLIA VAHL FROM IRAN.

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Toexamine the chemical variability in inflorescences of wild populations of StachyslavandulifoliaVahl (S. lavandulifolia) collected throughout six provinces (alborz,ardabil,lorestan,Qazvin, Azerbaijanwest ,esphahan), Iran. The essential oils of S. lavandulifoliaVahl from seven locations were obtained by hydro-distillation and analysed by gas chromatography and gas chromatography-mass spectrometry. The results revealed that distinct differences in the content of compounds depending on region of sample collection. The main constituents of the essential oils were β -pinene (19.4%), α-pinene(6.6%-9.3%),β-phellandrene (6.9%) and germacrene D (5%-14.3%). The results of the present study indicated that essential oil components of S. lavandulifoliaVahl can be varied with genetic (ecotype), environmental conditions and geographic origin. In general, the essential oils of various populations of S. lavandulifoliaVahl were rich in monoterpenoids and sesquiterpenoidsa.

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1435
ALLELOPATHIC EFFECT OF CHAVILL SHOOT (*FERULAGO ANGULATE* L.) ON GERMINATION INDICES OF SORREL (*RUMEXACETOSELLA* L.) AND LAMBSQUARTERS (*CHENOPODIUM ALBUM* L.)

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In recent years, the use of allelopathic effects on weed management has attracted many researchers. This research was carried out under laboratory conditions in 2014 at laboratory of seed technology in Yasouj University. Experiments were done by completely randomized design with three replications. Treatments were consisted of zero, 25, 50, 75 and 100% aqueous extract concentration of aerial parts of Chavill. The results showed that the aqueous extract of Chavill were significant on rate and percentage of germination, shoot and root length, fresh and dry weight of shoot and root, and vigor. The highest percentage and rate of germination was belonged to the control treatment (distilled water) as with decreasing the aqueous extract concentrations, increased the percentage and rate of germination. Also, the sorrel seed, the highest germination rate was belonged to the control, but in relation to the germination percentage, there was no significant difference between controls and treated with 25% aqueous. The lowest percentage and rate of germination was belonged to 100% concentration of aqueous extract that had not significant difference with 75% concentration. Finally, with concern to the results of the experiment, use of aqueous extract of chavil can be a good choice for introducing as a bioherbicide.

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1436

EFFECT OF SEED TREATMENT WITH MAGNETIC WATER ON GERMINATION AND VIGOR OF CUMIN SEEDS

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Using the biophysical treatments in agriculture is a growing trend. One of these treatments is magnetic water. Magnetic water effects on improving the quality and quantity of different crops has been proven in various studies. In order to evaluate the effect of soaking time in magnetic water on germination and vigor of cumin seeds conducted an experiment in Department of Agronomy, Faculty of Agriculture, Urmia University during 2014. For magnetic water, tap water (tap water contains) was passed from a static magnetic field of 1300 Gauss with 5 liters per minute flow rate. Cumin seeds were immersed in magnetic water for 0 (control), 3, 6, 9, 12, and 16 h.To more accurate evaluation and compare the results cumin seeds were treated in distilled water for 0 (control), 3, 6, 9, 12, and 16 h (according to magnetic water).the results shown that treated seed with magnetic water for 9 and 12 h have significant effect on improved germination and vigor of cumin seed.Studied traits were final germination percentage (FG%), germination index (GI), mean germination time (MGT), time to reach 50% germination (T50) and coefficient of uniformity of germination (CUG).

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1437
DORMANCY BREAKING OF *ECHINOPHORA CINEREA* SEEDS

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Echinophora cinerea is a member of the Umbliferaea family, has high medicinal values and importance. It is an aromatic plant endemic and has pleasant flavor and stimulates some micro organism in fermentation process. E. cinerea or E. platyloba used as stimulant and invigorator of stomach in folklore. Its anti microbial anti cancer effects have been shown recently. In addition it has a good oil composition. In Iran, wild populations of E. cinerea are distributed in ranges, pastures or dry farmlands. In order to its valuable characterization in medicin, it may be important to regenerates from the seed. Because of high numbers of offspring, small size and so fine dispersal to colonization of new areas and having good potential to withstand a much wider range of environmental constrains, so seeds are a fine tool to multiplication and domestication of E. cinerea cultivation. The seeds of E. cinerea are dormant, this however has evolutionary, and survival benefits for the plant but restrict its germination. Therefore, we decided to break the dormancy and introduce the seeds as an auxiliary regeneration facility. Then this study was aimed to evaluate different methods of seeds dormancy break of E. cinerea collected from Zagros Mountain in Iran, Shahrekord. Different dormancy break treatments and methods like mechanical and chemical scarification, leaching, hot water, cold and warm stratification, freezing, gibberellic acid and KNO3 were performed at different levels for seeds. Just cold stratification of seeds for 14 weeks in 4°C improved germination and resulted to increase germination up to 70%. GA_3 application accelerated the responses to low temperature. The other techniques for dormancy breaking didn't show punctual effect yet.

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1446

EFFECT OF GARLIC POWDER (*ALLIUM SATIVUM*) AS FEED ADDITIVES ON THEPERFORMANCE, CARCASS AND EGG QUALITY OF LAYING JAPANESE QUAIL

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This study investigated the effects of feeding garlic-supplemented diet on performance and egg quality in laying Japanesequail. A basal diet was supplemented with garlic at level of 4% to make diet. The garlic-free diet was used as control treatment. The diet were fed to 44 day-old laying japanese quail. The quials were distributed to one treatment group of 72quail each replicated four (18quials per replicate) in a completely randomized design. The results showed However, performance of the quails were not significantly affected, but for body weight was significant ($P<0.05$). Alsothe garli powder at the weight live at slaughtering and liver weight ($P\leq0.05$) increased.The results of this study revealed that garlic powder has detrimental effect on breaking strength(kg) and Egg Haugh unit of the quails ($P<0.05$).Therefore, concluded that dietary containing of garlic powder in the rations may be used for economical of laying quails.

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1448
INTERCROPPING OF MEDICINAL PUMPKIN WITH GRAIN LEGUME: EFFECTS ON SEED AND FATTY ACID YIELDS

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Low input agriculture, including sustainable agricultural, offers new challenges to agronomy. The objective is to use cropping strategies with limited use of external inputs able to maintain the production level while increasing the product quality and decreasing the environmental risks. Intercropping can be a good subject for such strategies which it is defined as the agricultural practice of cultivating two or more crops in the same space at the same time. In this regard in order to evaluate the effect of bean intercropping on reduction of nitrogen consumption and quality of yield performance in pumpkin production, an experiment was carried out at the Bu-Ali Sina University during growing season of 2013, as a factorial based on randomized complete block design with three replications. Treatments included planting patterns (sole cropping of pumpkin and additive intercropping of 25, 50, 75 and 100%bean with pumpkin) in integrated with three levels of nitrogen fertilizer (0, 90 and 180 kg N/ha). In this research, seed, oil, oleic acid and linoleic acid yields were evaluated. Effect of planting patterns, nitrogen and their interaction on all traits was significant. The highest values of seed yield, oleic acid yield and linoleic acid yield were achieved at additive intercropping of 75%bean with pumpkin under consumption of 90 kg N/ha. Therefore, additive intercropping of 75%bean with pumpkin reduced nitrogen consumption and increased qualitative and quantitative yield of pumpkin.

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1449

COMPARSION EFFECTS OF ETHANOLIC EXTERACTION OF CHICORY ROOT (*CICHORIUM INTYBUS L.*) AND ANTIBIOTIC GROWTH POROMOTOR ON PERFORMANCE AND MORTALITY IN BROILERS

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Nowadays, poultry receive various supplementations such as antibiotics, growth promoters, vitamins, minerals, and even phytogenic plants to improve their performance and immunity. Using antibiotics as food additives for long periods in poultry diets can lead to antibiotic resistance and high residue levels in animal products such as meat and egg. Among the food additives, medicinal plants have drawn more attention these days due to their historical background and their prophylactic and growth promoter effects. Thus, the use of medicinal plants and probiotics in poultry diets for animal production and health has become more popular worldwide as an alternative to antibiotics.One of these plants is chicory (*Cichorium intybus*, Asteraceae) known as a promoter for immune system and growth in ancient nations such as Iran [1].In this study, One handred ninety two, one-day-old Ross-308 broilers were used in a completely randomized design with 4 treatments and 4 replicates (12 chicks per replicate). Studied treatments were: 1) control group fed with basal diet, 2) group fed basal diet plus 450 g/ton of feed antibiotic growth promoter (AGP) Flovomycin, 3) group fed basal diet plus 500 g/ton chicory ethanolic extract, 4) group fed basal diet plus 100 g/ton chicory ethanolic extract for 42 days.At the end of each week, feed intake (FI), weight gain (WG), mortality and feed conversion ratio (FCR) were measured. Results showed that the feed intake increased for three weeks in AGP and for the other weeks in treatment of 500 g/ton. The weight gain at second week in treatment of 500 g/ton of chicory extract had significant increase with control group and at the forth week with antibiotic group (P<0/05). The FCR in the treatments of chicory was better and treatment of 500 g/ton of chicory extract had significant decrease with antibiotic growth poromotor and control group (P<0/05). The chicory extract decreased the mortality but it wasn't significant.

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1451
RESPONSES OF SUMMER SQUASH FATTY ACIDS TO IRRIGATION INTERVALS

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Pumpkin is an important annual medicinal plant. The grains of pumpkin contain medicinal raw materials that are used for producing pharmaceutical products such as peponen, pepostrin and gronfing to overcome prostatic hypertrophy and urinary tract irritation. Pumpkin oil is rich in unsaturated fatty acids. So, present experiment in order to evaluate the effect of different irrigation intervals on the yield and fatty acids of pumpkin, was conducted at the Research Farm of Bu-Ali Sina University using randomized complete block design with four treatments (6, 9, 12 and 15 days) and three replications. Effect of treatments on all traits was significant. Means comparison showed that the highest linoleic fatty acid (40.10%), oleic fatty acid (37.18%) and grain yield (84.84 g m^{-2}) was obtained at 6 days irrigation interval with had no significant difference with treatment of 9 days irrigation interval. Also, in comparison with 6 days irrigation interval the lowest values for these traits with reduction of 6.60, 5.64 and 55.23% were revealed at 15 days irrigation interval. Therefore, it seems that the treatment of 9 days irrigation interval is suitable for production the highest seed and fatty acids of pumpkin.

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1457

THE STUDY OF THE GROWING BAD EFFECT ON RHUBARB FUNCTION IN FARIMAN NATURAL PIP

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The rhubarb is one of the unique medicinal herbs that usually grows in elevations higher than 1700 meters naturally . In the early spring , the bush is prohibited to be exposed to the sunshine by the traditional methods , in this way the petioles grow up and get long , thick and watery .To examine the effects of system and different beds on function and quality of rhubarb and also the comparison between culture traditional method and the suggested method ,. An experiment was done 3 times in 1392 and 1391 . the experiment was based on completely random blocks and in split plot design including : 3 systems (stone , meshy polyethelyn pipe , galvanized container) as main borders and four growing beds (sand , soft soil , natural soil around the bush and pitmass) as subordinate borders . The process started in 1391 Isfand , simultaneously with the starting activity of the plant blasts that had been marked previously and lasted until the end of 1392 , khordad . The measurement parameters were : the date of leaf development of bed , the stalk number in every bush . Wet weight , dry weight and the amount of effective material . T he consequences presented that the invented system of netted polyethylene pipe of the size 500 and in the height of 60 c.m associated with the natural soil bed around the bush , caused to the most significant difference with other treatments in function.

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1459
EFFECTS OF *CHAVILL* EXTRACT ON THREE PROBIOTIC AND ONE HARMFUL SPECIES OF INDIGENOUS BACTERIA AT *IN VITRO* CONDITIONS

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This study investigates the effect of Chavill extract on growth and survival of probiotic bacteria in three levels of *Chavill* extract, four bacteria and three replicates. In the first experiment, the ability of the *Chavill* extract in skim milk medium was examined to survey Characteristics such as survival, proliferation and death of the beneficial and harmful indigenous bacteria of digestive tract. Treatments included three levels of 0, 1, and 3 % *chavill* extract for three probiotic bacteria species (*Lactobacillus acidophilus, Lactobacillus casei and Lactobacillus Plantarum*) and one harmful bacteria specie (*Salmonella typhimurium*). Three different concentrations of *chavill* extract were prepared and added to the skim milk medium culture. A total of 10^7CFU/ml bacteria from four species were added to the medium and incubated for 24h. After incubation, the bacteria were cultured and then counted. The findings of this experiment show that by increasing of *chavill* extract concentration to 1%, probiotic bacteria numbers increase compared to control treatment and the differences are significant and the number of harmful bacterium (*Salmonella typhimurium)* which has significant difference with control was decreased. Using 3% *chavill* extract compared to 1% *chavill* extract increased the number of *Lactobacillus acidophilus* and *Lactobacillus Plantarum* bacteria, decreased the number of *Lactobacillus casei* bacterium and inhibit growth of *Salmonella typhimurium* bacterium (this bacterium wasn't seen in the treatment).

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1462

EFFECT OF SUBSTRATECULTURE (PERLITE, AND VERMICOMPOST) ON SOME BIOCHEMICAL AND ENZYMATIC *MELISSA OFFICINALIS* UNDER DROUGHT STRESS

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In order to study the effects of stress on the effects of substrate culture on *Melissa officinalis* two medium of perlite and vermicompost and drought was considered. The experiment was performed in a completely randomized design with 4 replications and some biochemical parameters in the face of drought were studied. According to the results proline shoot (in both the substrate), anthocyanins, flavonols in perlite substrate and the content of phenolic compounds and glycinebetaine in drought treatment increased significantly (at 5%) in the substrate vermicompost. In conclusion, it seems that the substrate vermicompost have a higher capacity to resist drought due to higher phenolic content, glycinebetaine and proline is *Melissa officinalis*.

1473

ANLAYSIS OF SOME PRIMARY AND SECONDARY METABOLITES IN MEDICINAL PLANT OF *GLYCYRRHIZA GLABRA* AND URTICA *DIOICA*

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Primary metabolites such as carbohydrates, amino acids, fatty acids, chlorophylls and etc. were found in all plants. Unlike primary compounds, secondary metabolites are present in some plants only. Secondary metabolites are not directly involved in the normal growth, development or reproduction of an organism. An experiment was undertaken to estimate some primary and secondary compounds if present in two medicinal species of *Glycyrrhiza glabra* and *U*rtica *dioica* by standard phytochemicals methods in botany laboratory of Gonbad Kavous University in 2014. The quantitative estimation of carbohydrates in studied medicinal plants showed that *G. glabra* sample (328/54 mg/g) had highest carbohydrates over *U. dioica* sample (194/30 mg/g). In case of starch, *G. glabra* sample showed highest quantity about 240/13 mg/g while the lowest quantity of reducing sugar was obtained in *G. glabra* (12/160 mg/g). The average amount of phenols in *G. glabra* and *U. dioica* indicated that *U. dioica* (13/860 mg/g) had higher quantity of phenols than *G. glabra* (12/187 mg/g). In the analysis of proline was observed that *U. dioica* sample (4/667 mg/g) exhibited higher content of above said compound as comparison to *G. glabra* about 3/833 mg/g.

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1476

GEOGRAPHICAL DIRECTION EFFECT OF TREE CROWN ON SOME SECONDARY METABOLITES OF SOUR ORANGE LEAF IN GOLESTAN PROVINCE (KALALEH CITY)

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Sour orange (Citrus aurantium)is an evergreen plant belongs to Rutaceae family and its leavescontain many compounds such asphenol, antioxidant, flavonoid, essential oils and aromatic compounds.The purpose of this researchwas study of some secondary metabolites of sour orange leaves(total phenol, total flavonoid and antioxidant) in four geographic locations (North, South, East, West) in kalaleh city.The study was done in Completely Randomized Design with three replications.Antioxidant features, the amount of phenol and flavonoid were measured by using DPPH, folinsiucaltue reagent, chloridaluminium and potassium acetat reagent respectively with spectrophotometer. The result showed that geographical direction had significant effect on total phenol, total flavonoid and antioxidant features. The most amount of total phenol (0.332mg/g $_{DW}$) was related to the eastern direction that there was no significant difference with northern direction,Although the lowest amount (0.268 mg/g $_{DW}$) was observed in southern direction. Also the highest content of total flavonoid (0.258 mg/g $_{DW}$) was seen in southern direction and the lowest (0.114 mg/g $_{DW}$) was extracted from eastern direction. The maximum amount of antioxidant features (97/55%) was observed in northern direction and the minimum amount (37.19%) was in eastern direction.

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Salehi Surmaq, M H. medicinal plants and heral.

1480

QUANTITATIVE ESTIMATION OF PHYTOCHEMICAL CONSTITUTE IN TWO MEDICINAL PLANTS OF *P*ORTULACA *OLERACEA* AND *ACANTHE PHYLLUM BRACTEATUM*

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Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defence mechanism and protect from various diseases. Phytochemicals are primary and secondary compounds. Chlorophyll, proteins and common sugars are included in primary constituents and secondary compounds including terpenoid, alkaloids, phenolic compounds And etc. An experiment was performed to estimate some phytochemical constitute content such as carbohydrate, starch, reducing sugar, proline and phenols in medicinal plants of. *P*ortulaca *oleracea* and *Acanthe phyllum bracteatum* using standard phytochemical procedure in botany laboratory of Gonbad Kavous University in 2014. In the quantitative estimation of phenols, *A. phyllum bracteatum* (42/513 mg/g) had a higher content as comparison to *P. oleracea* (33/583 mg/g). It was also recorded that content of starch (109/75 mg/g) and reducing sugar (32/037 mg/g) were higher in *A. phyllum bracteatum* over other treatment about 89/91 and 64/843 mg/g repectively. Whereas minimum content of carbohydrate was observed in *P. oleracea* (457/53 mg/g). Result of quantitative estimation analysis of proline revealed that the sample of *P. oleracea* (60/370 mg/g) had a maximum quantity of proline as compared to *A. phyllum bracteatum* about 11/94 mg/g.

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1484

SURVIVAL OF *LACTOBACILLI* AND *SALMONELLA TYPHIMURIUM IN* SIMULATED GASTRIC OR INTESTINAL JUICES WITH OR WITHOUT *CHAVIL* EXTRACT

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This study investigates the effects of *Chavill* extract (0, 1, and 3 %) on survival of three probiotic (*Lactobacillus acidophilus*, *Lactobacillus casei* and *Lactobacillus Plantarum*) bacteria and one harmful bacteria (*Salmonella typhimurium*) in simulated stomach and intestine juices with three replicates (12 treatments). A total of 10^7CFU/ml bacteria from four species were added to the medium and incubated at 37 °C for 2h and 4h, respectively and counted after culturing. The results of the experiment on synthetic stomach juice show that the numbers of *Lactobacillus acidophilus* and *Lactobacillus plantarum* bacteria were increased but had not significant effect on numbers of *Lactobacillus casei* and *Salmonella typhimurium*. Also, findings of bacterial survival on synthetic intestine juice show that there is no significant difference in bacterial survival on *Lactobacillus acidophilus*, *Lactobacillus plantarum* and *Salmonella typhimurium* bacteria. Also the counts of *Lactobacillus casei* bacteria (treatments 4, 5, and 6) was decreased following increasing of *chavill* extract concentration.

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1488

MORPHOPHYSIOLOCAL AND AGRONOMIC CHARACTERISTICS OF *PLANTAGO MAJOR* AND *PLANTAGO LANCELOATA*

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Plantago major and *P. Lanceolata* are of the most abundant and widely distributed medicinal perennial crops in the world [1, 3, 4]. The variability and information for economically important traits of these species was poorly studied[3]. The aim of this study was to determine the difference between this two similar species and to investigate their agronomic potential. Seeds of the widespread *P. major* and *P. lanceolata* were collected from 5 regions of Iran (ecotype) and planted in 5 kg pods in a greenhouse in the College of Agriculture, Shiraz University. Biomass production, day to flowering, day to maturity, leaf to root ratio, seed yield and yield component of genotypes were recorded. Results showed that the seed yield and biomass of early mature *P. Lanceolata* ecotype was significantly lower than *P. major*. Day to maturity and day to flowering of *P. major* were significantly shorter than *P. lanceolata*. Seed yield and its component in *P. major* ecotypes didn't show significant different. However, seed yield and its component were significantly different in *P. lanceolata* ecotypes. The hierarchical clustering analysis indicated that *P. lanceolata* ecotypes were divided into 2 distinct groups (early mature and late mature) while *P. major* assigned to a single distinct group. The results showed that *P. major* is an early mature species compare with *P. Lancelolata*.

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1490

EFFECT OF PRE - TREATMENT OF SALICYLIC ACID ON GERMINATION TRAITS OF MEDICINAL PLANT OF *TRIGONELLA FOENUM* GRAECUM UNDER SALT STRESS

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In the most plant, salinity cause decrease of germination parameter and plant growth in the various phonological stages. All the average first stage of plant growth is critical stage of plant under salinity stress. Seed priming is one of the common strategy on increasing germination percent, germination speed and seed germination uniformity in unsuitable environment. An experiment was conducted to survey pre priming effect of salicylic acid concentrations (0, 0/5, 1 and 1/5 mmol/ L) in various concentrations of salinity stress (0, 40, 80 and 160 mmol/L) to form of factorial experiment based on the completely randomized design in three replications on traits of germination percent, germination index, germination speed index, vigor index, mean germination time, radicle length, shoot length, radicle dry weight, shoot dry weight of *Trigonella foenum graecum* seed. In this experiment, the salt of Nacl was used. The result of analysis of variance showed that main effect of various Nacl concentrations on all studied traits was significant at 1% confidence level. It was also observed that main of various concentrations of salicylic acid on all studied traits except germination speed index, vigor index, shoot length and radicle dry weight was significant. Interaction effect of various concentrations of Nacl and salicylic acid on traits of germination percent, germination index, vigor index and radicle length were significant only. Mean comparison of various concentrations effect of Nacl on various measured traits of Trigonella *foenum graecum* showed that studied traits were decreased with increasing Nacl concentration. It was also found that some traits of germination were increased with increasing concentrations of salicylic acid. The concentration of 1/5 mmol/L had a highest stimulation effect.

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1501

EFFECT OF MEDICINAL PLANTS OF PEPPER (CAPSICUM ANNUUM) AND GINGER (*ZINGIBER OFFICINALE*) ON TRAITS OF BLOOD AND BIOCHEMICAL OF BLOOD SERUM OF COMMON CARP (*CYPRINUS CAPRIO)*

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Fish nutrition has an important impact on several parameters directly influencing the quality of fish. An experiment was conducted to evaluate various treatments effect of ration from medicinal plant of Capsicum annuumand, *Zingiber officinale* and mixed of them on hematology traits (number of white globule, red globule, hemoglobin, hematocryte, mean volume of cell, molecular hemoglobin, molecular hemoglobin concentration, monocyte, lanphocyte and eozinpphyll) and biochemical of blood serum like glucose, triglyceride, total protein and albumin of *Cyprinus caprio* based on the completely randomized design in three replications for 50 days in 2014. The result of one way variance analysis of traits like blood white globule, molecular hemoglobin, notrophyll percent, total protein content, triglyceride content and albumin content of *Cyprinus caprio* in end of experiment showed that some treatments of ration from medicine plant of Capsicum annuumand, *Zingiber officinale* and mixed of them had a significant effect on these traits (P<0/05). While there were no significant effect on the other traits. Mean comparison of data of blood total protein showed that the lowest amount of protein was obtained in both treatments of Capsicum annuuman and, *Zingiber officinale* about 4.03 and 4.20 g/dl over control (6.02 g/dl). Triglycride content in treatment of pepper 229.33 mg/dl as compared to control (261.67 mg/dl). The highest amount of triglycrid was found in the treatment of mixed *Capsicum* annuuman and, *Zingiber officinale*. In this study, maximum and minimum albumin content of *Cyprinus caprio* was obtained in the treatment of control and mixing *Capsicum* annuuman and, *Zingiber officinale*. Mean comparison of data from number of blood white globule showed that the ration of pepper significantly increased this trait. The number of blood white globule in ration of pepper was about 28.25 thousand cell per ml^3. Treatments of Capsicum annuuman and, *Zingiber officinale* and mixing them increased blood molecular hemoglobin over control. Mean comparison of hetrophyll showed that ration of pepper significantly decreased this trait only. Amount of blood hetrophyll in ration of pepper was 21%.

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1502

STUDY OF SEED GERMINATION ANDSEEDLING GROWTH OF *PORTULACA OLERACEAE* AFFECTED BY AQUEOUS EXTRACT OF MEDICINAL PLANT *TANACETUM VULGARE*

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Allelopathic compounds play important role on biological diversity and productivity of ecosystems (1). The allelochemicals or secondary plant metabolites when are released to environment, influence the germination and seedling growth of neighbors' weeds(2). In this study, allopathic effect of aqueous extract of different parts of *Tanacetumvulgare* on seed germination and seedling growth of *Portulacaoleraceae* investigated. A factorial arrangement based on completely randomized design with three replications was used. The treatments were as follows: plant organs at three levels (roots, stems and leaves) and the aqueous extract at five levels (0, 1, 5, 10 and 15 %). The results showed that application of the aqueous extract medicinal plant *Tanacetumvulgare* from 0 to 15 % reducedgerminationand seedling growth of *Portulacaoleraceae* significantly.The highest and the lowest percentage and rate of seed germination, length of radicle and hypocotyle, dry weight of radicle and hypocotyle were obtained in treatments of control and 15% concentration, respectively. Plant roots had the greatest effect on reducing all measured traits.

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1503
EVALUATION OF ANTIOXIDANT ACTIVITY, ESSENTIAL OIL AND PHENOLIC CONTENT OF ZATARIA MULTIFLORA COLLECTED FROM NEYRIZ CITY (FARS PROVINCE)

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Shirazian thyme *(Zataria multiflora*) is an herbaceous perennial plant belongs to Lamiaceae family. Essential oil is the main secondary metabolite in this plant which has antioxidant activity as well as high amount of phenolic compounds. Plants were collected from Siahkol mountains located in Neyriz city (Fars province). The essential oil was extracted by hydro distillation of dried aerial parts in Clevenger-type apparatus. Antioxidant properties and total phenolic content of Essential oil were evaluated by DPPH and Follin-Ciocalteu method respectively. The essential oil yield was 1.47% (w/w) based on dry weight. Total phenolic contents and IC50 of essential oil were 122.63 mg gallic acid equivalents/g and 1.161mg/ml respectively.

1505
EFFECT OF GIBBERELLIC ACID (GA) AND METHANOL SPRAYING ON SILYBIN YIELD IN *SILYBUM MARIANUM* (L.) GAERTN

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Silybin is the most important flavonolignan derived from milk thistle seeds, has been shown to have antioxidative and anti-inflammatory properties [1]. This experiment was conductedon randomized complete blocks design with 5 treatments and3 replications. The treatments were consist of control (distilled water application),giberrellic acid (50 ppm) with methanol 20 and 40% (v/v) and giberrellic acid (100 ppm) with methanol 20 and 40% (v/v). Result indicate that treatment 0f GA3 (100 ppm) with methanol 20% (v/v) caused an increase in the yield of silybin.Also, results showed that maximum silybin percent obtained in control treatment.

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1507

THE EFFECT OF DIFFERENT PHENOLOGICAL STAGES ON TOTAL PHENOLIC COMPOUNDS OF *ACHILLEA MILLEFOLIUM AND A. PACHYCEPHALLA*

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Active compounds such as phenolics have benefits and physiological characteristics such as anti-allergic, anti-inflammatory and antioxidant activity [1]. Secondary metabolites can highly influenced by the phonological stage of plant.*A.millefoilum* is one of the valuable medicinal plantswith different applications.The goal of the present study was to compare the total phenolic compounds of *Achillea millefolium* (Kandovan) and *A. pachycephalla* (Golestan) at four phonological stages including five leaves appearance, sprouting, 50% and 100% flowering. An experimentwas performed at Isfahan University of Technology in spilit plot design with three replicates.Total phenolics were determined colorimetrically using Folin-Ciocalteu reagent as described by Pinelo et al [2]. The amount of phenolic compounds in four phenological stages were compared. Accumulation of phenolic compounds increased as the plant growth elevated until 50% of flowering, while it decreasedin the maturity stage.Both species revealed the highest phenolic content at 50% flowering stage in which *A. pachycephalla*possessed higher amount(101.24mg TAE/gdw) compared with *A. millefolium* (75.47mg TAE/gdw). The lowest phenolic content was observed in *Achillea millefolium* (45.83mg TAE/gdw) at five leaves appearance. Generally, the rate of accumulation of phenolic compounds in plants depends on several factors, one of which is the stage of plant growth. The rate of accumulation of these substances in the plants vegetative phase gradually increased and it get to the highest amount in 50% flowering stage. Then, at the end of the flowering stage, the amount of these compounds dramatically decreased .*A. pachycephalla* is an endemic species of Iran that possessed the maximum amount of phenolic compounds. So, among the studied species ***A. pachycephalla*** at 50% flowering produced the highest amount of phenolic that were suitable for use in pharmaceutical and treatment of disease.

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1508

FLORA, LIFE FORMS AND CHROTYPE OF SOME AROMATIC PLANTS IN KHALKHAL COUNTY

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This study was conducted to identify the aromatic plants in Khalkhal County. According to the identified species, 56 aromatic plant species were identified, which ere belonged to 34 genera and 12 families. The most identified species are belonged to Lamiaceae (29 species), Asteraceae (8 species) and Apiaceae (7 species)families. From the genera, *Salvia* (11 species),*Nepeta*(6 species)and*Achillea*(3 species) respectively, have the most frequent identified species. Hemichryptophytes (62.07%) and Therophytes (15.52%) are the most important life forms. Species belonged to Irano-Turanian (62.5%) and Irano-Turanian/Mediterranean (12.7) regions are the most important chrotypes.

1509

THE EFFECTS OF IRRIGATION INTERVALS AND MICRONUTRIENTS FOLIAR APPLICATION ON SEED YIELD, OIL CONTENT AND OILYIELD OF CASTOR BEAN (*RICINUS COMMUNIS* L)

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In order to survey the effects of Irrigation and foliar application of micronutrients on, seed yield, oil content and oil yield of Castor bean (*Ricinus communis* L.), an experimental design was conducted in research farm of Islamic Azad university of Birjand branch during 2012. Experimental design was a split plot based on randomized complete block design with three replications. In study, three levels of irrigation including irrigation periods 6,12, and 18 days as the main plot and micro-nutrient spraying elements (Fe & Zn) in four levels (no spraying , spraying with zinc-Iron, and Zinc-Iron in equal quantity) were considered as secondary factors.The plant characteristics were studied in terms of number of capsule per plant, number of capsule per main inflorescence, number of seed per capsule, 1000 – seed weight, biological yield per plant , harvest index, grain yield, oil percentage and oil yield. Results showed that different irrigation treatment had significant effects on all characters at one percent probability level. In other hand increasing irrigation intervals significantly decreased,1000 – seed weight, biological yield, yield, and yield component, oil percentage and oil yield. Micronutrient spraying on the majority of the characteristics had significant effect. but they had no significant effect on harvest index. Also the interation between the tested factor on number of seed per plant, 1000 – seed weight, grain yield, biological yield per plant were significant ,but they had no significant effect on other characters. Between all treatments , 6 day irrigation interval and foliar spray with Zn-Fe produced highest grain yield (1732.84 kg/ha) and oil yield (823.45 kg/ha) In general , the results recommended that , 6 day irrigation interval and foliar spray with Zn-Fe in equal amount the most grain in Birjand regions .

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1512
FACTOR ANALYSIS FOR MORPHOLOGICAL TRAITS, YIELD AND ITS COMPONENT CHARACTER IN SYNTHETIC CULTIVARS AND THEIR ELITE PARENTS (*FOENICULUM VULGAER MILL*)

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Fennel (*Foeniculum vulgare* Mill.) belongs to the Apiaceae family, is native to Mediterranean regions, is a biennial or perennial herb, and has feathery leaves and golden yellow flowers. Fennel is used for various purposes in the food, cosmetic, and medical industries. Synthetic cultivar in open pollination plants like alfalfa, sunflower and fennel is a good way to better cultivar. Factor analysis is mainly applied as structure detection method in plant breeding. in this study, morphological traits and yield of 3 synthetic cultivars (syn1) and their 7 elite parents of Iranian fennel including short, medium and long term plant. based on randomized complete block design.The results of analysis of variance indicated significant genetic variation among the genotypes. On the basis of minimum eigenvalue, four factors were detected for these traits. The eigenvalues for factors from one to four were 9.02, 6.58, 2.19, and 1.28, respectively. The cumulative variation related to these factors was 0.96. The results of factor analysis exhibited four factors including sink factor, morphological factor , TKW factor, and metric factor.therefore the studied genotypes had more variation for yield components.

1517
MORPHOLOGICAL AND AGRONOMICAL DIVERSITY OF *ANDROGRAPHIS PANICULATA* ACCESSIONS USING CLUSTER ANALYSIS

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Naein-e Havandi *Andrographis paniculata* is a medicinal herb in the family Acanthaceae. The leaves of the plant contain abundant diterpinoids of medicinal properties [1]. Knowledge of morphological and agronomical diversity improves the efficiency of germplasm conservation and development. The objective of present study was to evaluate 32 accessions of *A. paniculata* from different states of Malaysia in terms of morphological and agronomical traits. The results showed highly significant differences among the accessions in terms of most of the studied traits, while there were no significant differences among the accessions in terms of number of leaf and root fresh weight. Analysis of variance based on seven states showed that there were no significant differences among the accessions in terms of most of the studied morphological and agronomical traits inside the each state. The highest total dry weight (TDW) (0.41 g) was belonged to accession No. 11340 from Kelantan, while the lowest TDW (0.12 g) was belonged to accession No. 11314 from Terengganu. The correlation between of most of the studied morphological and agronomical traits was high significant and positive. The cluster analysis based on the studied morphological and agronomical traits of 32 accessions produced three groups. The first group comprised of 5 accessions, the second group consisted of 10 accessions and the third group contains 17 accessions. Overall, the outcomes of the present study were indicated the presence of high genetic variability among the *A. paniculata* accessions. Our findings suggest that the plants belong to different clusters can be used for hybridization to generate useful recombinants in the segregating generations, the genetics and breeding programs for improvement of *A. paniculata*.

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1519

PECTINASE PRODUCTION BY THYME ENDOPHYTIC FUNGI

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In this research pectinase activity of endophytic fungi, isolated from thyme, was investigated qualitatively. Fungal isolates were inoculated on Pectin agar medium and incubated at 28°Cfor 5 days.After incubation period the plates were flooded with iodine potassium iodide. A clear zone formed around the fungal colony indicated pectinase activity [1]. Diameter of halo zone was measured and data were analyzed using SAS. Out of 78 fungal isolates, 14 isolates showed higher enzyme activity and there was no significant difference among themthereforethese isolates were used for further investigation. Modified Czapek medium in which Sucrose replaced with pectin used for this purpose. Strains inoculated and incubated at28°C and 80 rpm for 5 days. Culture filtrate was obtained by filtration through Whatman No.1 filter paper and the culture filtrate served as the enzyme solution. Pectinase activity of this solution was determined using agar diffusion method [2]. Isolate M42, *Phoma* sp., with higher enzyme activity ($p \leq 0.01$) was selected for further studies and quantitative assay of pectinase is performing on this isolate.

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1521

EFFECT OF VARIOUS COMBINED DRYING METHODS ON DRYING TIME AND BIOCHEMICAL PROPERTIES OF *MENTHA PIPERITA*

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Mentha piperita L. is one of the most important medicinal plants in the family of Labiatae with high nutrient value and medicinal properties [1]. To investigate the effect of different drying methods on drying time, essential oil content and some biochemical characteristics of peppermint including polyphenolic compound, total flavonoids, flavone and flavonoles and total carbohydrate, an experiment based on completely randomized design with 10 drying treatments and three replicates was conducted. The treatments were shade drying, combined drying of shade+ microwave 100W, shade+180W, shade+300W, shade+450W, 100W+shade, 180W+shade, 300 W+ shade, 450W+shade and fresh samples as a control. The end of experiment each treatment was determined on the basis of moisture content equal to 0.10 on the basis of dry weight. The results showed a significant differences among various drying methods on the studied traits. The highest drying time (520 minutes) associated with shade dried samples and the lowest drying time (94.5 minutes) associated with combined drying microwave 450W+ shade samples. The maximum essential oil content (2.42%) obtained from shade dried sample. The highest amount of polyphenolic compound, total flavonoids, flavone and flavonoles reached at combined drying shade+ microwave 450W samples. Our findings suggested that a combined drying shade+ microwave 450W samples could be an effective method to obtain biochemical properties in *Mentha piperita.*

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1525
FUMIGANT TOXICITY OF THREE PLANT ESSENTIAL OILS AGAINSTEGG STAGE OF *EPHESTIA KUEHNIELLA* ZELLER. (LEPIDOPTERA: PYRALIDAE)

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Flour moth,*Ephestiakuehniella* Zeller (Lepidoptera: pyralidae)is an important pest of stored products that causes economic damages especially tocereals.Considering disadvantages and limitations of synthetic pesticides application,ecologically safe compounds of plant origins are needed for pest control. In the present research, fumigant toxicity ofessential oils from cumin (*Cuminum cyminum* L.), oregano *(Mentha pulegium* L.) and peppermint (*Mentha piperita* L.) on egg stage of the pest were evaluated. The experiments were conducted at 27±2˚c, 60±5% relative humidity and in constant darkness. According to the results, the essential oil of peppermint with LC_{50}=67.05 μlit/L air,was the most potent compound. The $LC_{50}$of oregano and cumin essential oils were, LC50= 155.04 μlit/L and LC_{50} =191.08µlit/L, respectively.

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1527

STUDY OF *ECHINACEA PURPUREA* HERBAL EXTRACT IN HONEY BEE (*APIS MELLIFERA*) NUTRITION AND ITS EFFECTS ON THE IMMUNE SYSTEM

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In order to study the effect of *Echinacea purpurea* herbal extract in nutrition and immune system of honey bee (*Apis mellifera*), a factorial experiment based on completely randomized design with seven riplications was conducted is research Farm of and laboratory University of Tehran-Karaj during spring and summer in 2014. 28 colonies were randomly divided into 4 treatments including: 1- control (sugar syrup), 2- sugar syrup enriched with 10 cc extract 3- sugar syrup enriched with 20 cc extract and 4- sugar syrup enriched with 30 cc extract. Criteria such as total heamocyte counts and phenoloxidase enzyme were measured. The results showed that treatments had a significant effect on the activity of the phenol oxidase enzyme in which the highest and lowest levels of enzyme were observed in sugar syrup enriched with 30 cc extract and control, respectively. The treatments had not significant effect on total heamocyte counts in short time immune system, while total haemocyte counts in long time immune system affected significantly by treatments. Application of sugar syrup enriched with 30 cc extract and sugar syrup enriched with 10 cc extract resulted in the highest and lowest levels of enzyme in long time immune system, respectively. In general it seems that *Echinacea purpurea* herbal extract can be a positive effect on the immune system of bee.

1531
EFFECTS OF SILVER NANOPARTICLE AND SILVER NITRATE ON ANTIOXIDANT ENZYMES ACTIVITY OF GARLIC EXPLANTS UNDER IN VITRO CONDITION

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The aim of this study was to evaluate the effects of silver nanoparticles (AgNPs) and silver nitrate ($AgNO_3$) on root and shoot fresh weights and some biochemical parameters such as, total protein concentration and three antioxidant enzymes activity (catalase, guaiacol peroxidase and ascorbate peroxidase) of garlic explants under in vitro culture conditions. This study was conducted in a factorial experiment with completely randomized design with four replications. The stem disc-derived explants were isolated and introduced into MS basal medium for one month. The grown explants on MS medium were subjected to MS medium containing 0, 25 and 50 ppm concentrations of $AgNO_3$ and AgNPs for one week. Application of different concentrations of $AgNO_3$ and AgNPs had significant effects on all parameters in shoot and root samples. Fresh weight of roots was reduced but in the case of shoots it was elevated, dose dependently. In both treatments, total protein content in 50 ppm concentration was decreased in comparison to control, but in 25 ppm was increased. Also some changes in antioxidant enzymes activity were observed. Among these enzymes, silver nanoparticles treatment induced noticeable changes on CAT activity. It seems that the AgNPs is the best treatment for induction of antioxidant response in garlic explants under in vitro condition.

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1534

THE EFFECT OF SOME MACRO AND MICRO NUTRIENTS AND PHOSPHATE BIOFERTILIZER ON QUALITY AND QUANTITY YIELD OF *NEPETA POGONESPERMA*

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The *Nepeta pogonosperma* species is related to Nepeta genus, Labiatae or Laminaceae family. This genus has about 250 species; 39 of them are endemic in Iran. Because the various species of this genus have the highest effect on anti Epileptic, anti Seizure, , anti Asthma diseases and also anti Septic and Diuretic characteristics, so they have been used in traditional medicinal treatments from many years ago. This investigation was conducted in Alborz Research Station, Research Institute of Forests and Rangelands, Karaj, Iran. This research was conducted as a split factorial in the form of randomized complete block design with three replications. The treatments included (A): Macro elements N.P.K in 3 levels [$N_0.P_0.K_0$, $N_{50}.P_{40}.K_{40}$ & $N_{150}.P_{120}.K_{120}$] (kg/ha) and (B): Micro elements Fe.Zn in 3 levels [$Fe_0.Zn_0$ (no spraying), $Fe_1.Zn_1$ (once spraying) & $Fe_2.Zn_2$ (Twice spraying)] and also (C): Bio Phosphate Fertilizer in 2 levels (inoculation & not inoculation). Results indicated that triple treatments with the following levels most affected on plant morphologic characters. Mean comparison showed the highest quantity of total shoot yield with 2341.7 kg/ha and maximal amount of essential oil yield with 97.49 kg/ha achieved in triple treatments ($A_2B_3C_2$) and the highest rate of essential oil percentage (%1.75) with triple treatment ($A_2B_3C_1$). Thereby, it seems usage of triple treatments ($A_2B_3C_2$) with $N_{50}.P_{40}.K_{40}$, $Fe_2.Zn_2$ (Twice spraying) and Bio Phosphate Fertilizer (inoculation) on quantity of total shoot yield, amount of essential oil yield and rate of essential oil percentage will be multiplied.

1545
THE EFFECT OF SOME MACRO AND MICRO NUTRIENTS AND PHOSPHATE BIOFERTILIZER ON OIL ESSENTIAL COMPOUNDS YIELD OF *NEPETA POGONESPERMA*

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Fertilizer Management is the important factor in Medicinal plants cultivation. Bio fertilizers usage in this kind of plants production is the special and serious idea. Therefore, remarkable reducing or omitting chemical fertilizers is the most important goal in these plants's production. The *Nepeta.pogonosperma* species is related to Nepeta genus, Labiatae or Laminaceae family, which is studied in this research. Fertile 2 Phosphate bio fertilizer was used in this search. This fertilizer includes some bacteria such as *Pseudomonas & Bacillus* which are helpful on growth of plants. This investigation was conducted in Alborz Research Station, Research Institute of Forests and Rangelands, Karaj, Iran. This research was conducted as a split factorial in the form of randomized complete block design with three replications. The treatments included (A): Macro elements N.P.K in 3 levels [$N_0.P_0.K_0$, $N_{50}.P_{40}.K_{40}$ & $N_{150}.P_{120}.K_{120}$] (kg/ha) and (B): Micro elements Fe.Zn in 3 levels [$Fe_0.Zn_0$ (no spraying), $Fe_1.Zn_1$ (once spraying) & $Fe_2.Zn_2$ (Twice spraying) and also (C): Bio Phosphate Fertilizer in 2 levels (inoculation & not inoculation). Results indicated that triple treatments most affected on the plant physiologic characters such as oil essential compounds. Mean comparison showed the maximal quantity of 4aα,7α,7aβ-nepetalactone yield with 222.40 g/ha was achieved in triple treatments ($A_2B_3C_2$) and the highest rate of 4aα,7β,7aα-nepetalactone yield with 8.80 g/ha was gained with triple treatments of ($A_2B_3C_2$) and utmost measure of 4aα,7α,7aα-nepetalactone yield with 16.16 g/ha be found out in triple treatments ($A_2B_3C_2$). The results indicated that usage of triple treatments (combination of bio fertilizer with chemical fertilizers,($A_2B_3C_2$)[$N_{50}.P_{40}.K_{40}$, $Fe_2.Zn_2$ (Twice spraying) and Bio Phosphate Fertilizer (inoculation)] on rate of oil essential compounds such as Nepetalactone isomers yield will be productive.

1549

EFFCTS OF MYCORRHIZAE, VERMICOMPOST AND HUMIC ACID ON VEGETATIVE GROWTH AND ESSENTIAL OIL OF PEPPERMINT (*MENTHA PIPERITA* L.)

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In present research the effect of mycorrhizae, vermincompost and humic acid application on some physicochemical properties of Peppermint (*Mentha piperita* L.) was studied. This experiment carried out in factorial experiment based on a randomized complete Block Design with 3 replication in researching field of shahrood university in 2012. The fectors studied were included on 2 levels of use of mycorrhizae and control and also subfactors were vermicompost on 3 levels (0, 5 and 10 ton/ha) and humic acid on 2 levels (0, 5 kg/ha). The mycorrhizae and vermicompost applied with planting. Humic acid applied with planting. the first foliar application of humic acid was performed in 60 days after planting. And then repeated after 2 week. Results showed dry weight of leaf and dry weight of sub branch increased by apply vermicompost. Essence yield by application mycorrhizae was 0.43 L/Ha more than control. Essence yield increased by apply 10 ton/ha of vermicompost.

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1552

INVESTIGATION OF SOME HABITAT CHARACTERISTIC OF MEDICINAL SPECIES SMYRNIUM CORDIFOLIUM BOISS. IN BOYER AHMAD REGION

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smyrnium cordifolium boiss. Is belongs to Apiacea. The purpose of this study was to investigate some habitat characteristic of *Smyrnium cordifolium* species in Boyer Ahmad region. In the study area, 6 transects were established randomly. For every 10 meters along each transect were established plots with a size of 2 x 2 m. Canopy cover percentage and the number of *smyrnium* along with total canopy cover of other accompanying plant species were estimated in each plot. The location of each plot was recorded using hand held GPS. in the some number of Plats soil parameters such as soil texture, organic carbon content, electrical conductivity and pH were determined. the results showed that, in general, in this study, 41 species of 20 families and 38 genera were collected and identified. Astaraceae families with 14% (6 species), Apiaceae family with 12% (5 species), family Poaceae with 10% (4 species) and 10% of the Rosaceae family (4 species) were the most important families in the area. The results showed that the density of *Smyrnium* Is /87 basis in square meters. The results showed that this plants often growth in semi humid cold climate, elevation range of 1500 to 2700 m above sea level, soils with C= 2/57, PH= 7/12. Flowering plants started from early June and continue to early July.

1554

THE COMPARISON OF SOME OF POT MARIGOLD VARIETIES FOR SOME PHYSIOMORPHOLOGICAL CHARACTERISTICS

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In order to The comparison of some of Pot marigold (*Calendula officinalis* L.) varieties for some physiomorphological characteristics, a pot experiment was conducted based on completely randomized block design with four replication in Torbat-Heydariyeh during 2012-2013. seven varieties were low petals and many petals of Tehran and Esfahan as Iranian varieties and Faron, Golden yellow, Dandy as Netherland varieties. Measured traits included total, leaf, stem, flower and root dry weight and flower's extract and essential oil. The result indicated that different varieties were different for root to shoot dry weight ratio and harvest index. The highest flower dry weight was obtained in Golden yellow variety that it had n't significant difference with many petals of Esfahan and Tehran. The highest essential oil percentage was observed in low petals and many petals of Esfahan, many petals of Tehran and Golden yellow. The highest and the lowest extract content were obtained in many petals of Esfahan and Tehran.

1556

EFFECT OF SALICYLIC ACID AND METHYL JASMONATE ON BIOMASS AND ESSENTIAL OIL CONCENTRATION AND CONTENT OF ROSE-SCENT GERANIUM

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This experiment was conducted to evaluate the effects of salicylic acid (SA) and methyl jasmonate (MJ) as chemical elicitors on biomass, essential oil concentration and content *Pelargoniumgraveolens* L. in a completely randomized design with three replications. Weekly foliar application of different levels of SA (0.75 and 1.5 mM) and MJ (150 and 300 µM) were applied under greenhouse conditions with average day/night temperatures about 28/19 ºC and 65% relative humidity in spring and summer seasons.The results showed thatsignificant effects of treatments on all parameters (P<0.05). Therefore foliar application of MJ at 300 µM and control showed the highest and the lowest biomass and essential oil concentration and content, respectively. Also, in compared with control, SA at 0.75 mM concentration led to 20, 16 and 40%, higher biomass, essential oil concentration and oil content, respectively.Based on the results, elicitors and promoters application is a proper strategy for increasing of secondary metabolites and as a consequence odor compounds of rose-scent geranium. Therefore, analysis of odor compounds under these treatment could be recommended.

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1558
ASSESSMENT OF QUALITY AND ORGANOLIPTIC ATTRIBUTES OF DRESSING SALAD PRODUCED FROM OLIVE PASTE AND BASIL SEED GUM

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Salad dressings involve a wide range of oil-in-water emulsion products, which are different in fat content and viscosity [1]. Use of hydrocolloids in food industry has been significantly increased. Basil is a natural hydrocolloids which its mucilage contains components such as pectin and lignin. Basil gum can form a strong and significant gelatinous matrix. It cans also have a considerable influence on texture, viscosity and sensory properties [2]. Olive oil contains triglycerides and fatty acids. Availability of phenolic components in olive oil resulted to a strong antioxidant properties. The aim of this research is assessment of the quality and organoliptic properties of salad dressing produced with olive paste and basil seed gum. Various concentrations of olive paste were examined for selecting the best formula. The formula with 20% of olive paste, 14% of soy bean oil was chosen as an optimum formula. For evaluating of the better operation of basil gum, xanthan (0.3%), guar (0.3%) and basil (0.5%) gum with various ratios was applied. The used ratios are: T1 (100% xanthan+0% guar+0% basil), T2 (0% xantan+100% guar+0% basil), T3 (0% xanthan+0% guar+100% basil), T4 (50% xanthan+50% guar+0% basil), T5 (0% xanthan+50% guar+50% basil) and T6 (50% xanthan+0% guar+50% basil). Acidity, pH, stability, texture, TBA, viscosity, flow behavior, frequency sweep and sensory measurements at time duration of 0 (production day), 15, 30, 45 and 60 days after production were investigated. At the 15th day of storage, there was no significant difference on stability of samples except of T1 and T2. At all period of time, the sample of T4 showed the highest stability. The samples with combined hydrocolloids (T4, T5 andT6) depicted the higher viscosity. The results also showed that xanthan and guar had more effect on pseudoplasticity behavior of salad dressing. The highest consistency coefficient (k) was achieved for (T4) contained the equal ratio of xanthan and guar gum. At the sensory experiments with respect to taste and also at the texture experiments, T3 sample obtained the highest score. Moreover, regarding the apparent and texture, the samples achieved the same scores. In conclusion, with respect to the obtained results using basil gum mixed with xanthan or guar gum in salad dressing is recommended.

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1561
EVALUATION OF THE SHELF LIFE OF MUSHROOM USING EDIBLE COATING BASED ON ALOE VERA AND XANTHAN

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Mushroom, one of the agricultural products, is mainly cultivated in the greenhouses. They are the excellent source of some essential amino acids, vitamins, minerals antioxidants [1, 2]. This product has a low shelf-life less than 3 days at ambient temperature [3]. Covering the mushroom with edible coating is one of the ways to prevent mushroom from premature decay. This research studied the effect of Xanthan and Aloe vera- based edible coating on the quality of mushrooms during storage. Immersion method was used to cover the mushrooms. Three types of edible coating based on Xanthan, Aloe Vera (1%, 1.5% and 2% w/v) and combined Aloe Vera and Xanthan with concentration of (50-50) w/v were performed for mushrooms coating. Weight loss, pH and acidity mesearments, color measurements, total solid measurements and sensory properties (color, adore, texture and overall acceptability) were evaluated during storage. Mushrooms were stored at 4℃ and results were reported after 1, 7 and 14 days of coverage. In general, all used coating was effective to maintain the mushroom quality. Coating of combined Aloe Vera and Xanthan with concentration of 2% w/v had the highest effectiveness in mushroom weight loss. pH variation was not significant during storage. According to the obtained results from TSS test, in the first-seven days storage, all coating prevent similarity from an increase in TSS amount. However, seven to fourteen-days storage, only the combined coating of Aloe Vera and Xanthan with 1% w/v was useful. In addition, sensory evaluation considering the color, texture, odor overall acceptability showed that the best results was achieved by combined coatings. In overall, in the present research using combined coating of Aloe vera and Xanthan with (50-50) w/v was introduced as the best coating for maintaining the mushroom properties during 14 days of storage.

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1566
GENETIC VARIATION ASSESSMENT IN OLIVE (*OLEA EUROPAEA* L.) USING PROTEIN ANALYSIS

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Protein electrophoresis is one of the most known methods in determination of genetic variation in plants. The present study aimed to assess the genetic variation of 32 different olive genotypes collected from six wide-ranging geographical locations of Kermanshah, Iran. The extracted seed storage proteins were separated on SDS-PAGE in 12% and 6% resolving and stacking gels, respectively. Olive genotypes were classified into three groups according to protein pattern and based on jaccard's similarity coefficient. The results suggest that specific proteins could be an index to address the variety of the olive derived from. Indeed, a databank including protein profiles obtained from the aforementioned analyses is a reliable reference to recognize genetic variation among olive genotypes.

1570

GENETIC DIVERSITY OF TRAITS RELATED TO SEED MASS AND WEIGHT IN 2 POPULATIONS OF MOLDAVIAN BALM (*DRACOCEPHALUM MOLDAVICA* L.)

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Moldavian balm medicinal plants that contains active ingredients are abundant. This plant has several properties, including its impact on the treatment of cardiovascular disease. Medicinal plants are great importance because of secondary metabolites. Genetic diversity in primary population is very important for having a successful breeding program. The present study was designed to investigate the genetic diversity of traits related to seed in populations of Moldavian balm. In this study the physical properties of seeds including seed mass, seed size, seed density and seed hectoliter weight were analyzed in 2 populations Iranians *Moldavian balm* by completely randomized design with three replications. The results of data showed differences among populations are for traits under study. Highest seed mass (1.59 g), density and hectoliter weight of seeds was obtained in Neishaboor population., and highest seed size (2 cubic centimeter) were found in the Mashhad population. The results show the density of 1,000 seeds of Neishaboor (2.27 cubic centimeter) and Mashhad (1.57 cubic centimeter). As a result of Neishaboor in Moldavian Balm were suitable for breeding programs.

1575
RATE AND HOMOGENITY OF LEMON BALM (*MELLISSA OFFICINALIS* L.) GRAIN GERMINATION UNDER TREATMENT OF GENETIC DIVERSITY

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Lemon Balm (*Mellissa officina*lis L), is one of the world's most important medicinal plants with many application, due to certain aromatic compounds present in the oil, pharmaceutical industry, health and nutrition [1]. Medicinal plants are great importance because of secondary metabolites. genetic diversity in primary population is very important for having a successful breeding program. The present study was designed to investigate the effect of genetic diversity on growth characteristics of the initial seed herb lemon balm. In this study germination rate and germination homogeneity were investigated in 5 Iranian populations of *Mellissa officina*lis. The layout of experiment was arranged by completely randomized design with four replications. The results of variance analysis showed significant differences among populations for traits under study. Correlation between germination rate with germination homogeneity was negative significant at 5% probability level. Highest germination rate and germination homogeneity was obtained in Shiraz population. As a result, Shiraz in Lemon balm were suitable for breeding programs.

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1577
EFFECT OF MOIST-PRE CHILLING AND 24-EPIBRASSINOLIDE ON BREAKING SEED DORMANCY IN *ECHINACEAPALLIDA*(NUTT.) NUTT

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Echinacea pallida (Nutt.) is a species of herbaceous perennial plant in the family Asteraceae. *Echinacea pallida* is also known as the Pale Purple Coneflower is one of the more rare members of the Echinacea family, well known for their medicinal use in boosting the immune system, anti-allergy, antibiotic, healing wounds and prevention of catching cold. That is why propagation of this plant has main importance. Since propagation of seeds is one of the main methods of propagation plants and with attention to variety of genetic and seed dormancy of *Echinaceapallida*, this research is trying to find a proper method forbreakingseed dormancy of *Echinaceapallida*. In order to reach this purpose two experiments is conducted in a completely of randomized design with 3 replicates and two treatments. Treatments contain moist-pre chilling at 5, 10 and 15 ˚C for 2 weeks and 24-epibrassinolidewith concentrations of0, 0.5, 1 and 2 ppm.The maximum percent of germination (95%) is observed in moist-pre chilling treatment in two weeks at 10˚C temperature. According to the results, seed dormancy in*Echinacea pallida* is physiological.Factors involved in seed dormancy is premature plant or deterrent factor in seed or both.The maximum percent of germination is obtained in 24-epibrassinolide treatment in 1 and 2 ppm concentrations [1, 2].

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1582
THE EFFECT OF DIFFERENT AMUNIOM SULPHATE ON YIELD CHARACTERISTICTS OF TWO CICORIUM SPECIES

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In this research, the effect of different amount of Amuniom sulphate on growth and yeild traits of two *Cichorium* species were studied. The experience was conducted on factorial (include two factors) based on randomized complete block design (RCBD) with 10 treatments and 3 replications in Jahrom climate conditions. The first factor, Amuniom sulphate concentration includes 5 levels: 50, 100, 150, and 200 kg/h and control (common soil without fertilizer) and the second factor, two *Cichorium* species including *Cichorium intybus* and *Cichorium pumilum*. At the end of experiment, before flowering stage (at September) the plant were harvested and leaf number, leaf length and width, plant fresh weight, yield dry matter, tuber root length and diameter, fresh and dry weight of tuber root were determined. The results showed significant effect on some measured factors. In most cases the maximum content in *Cichorium pumilum* related to 150 kg/h Amuniom sulphate treatment while in *Cichorium intybus* were observed in 100 kg/h Amuniom sulphate treatment and the lowest amount was observed to control treatment. In totally, application of 100-150 kg/h Amuniom sulphate fertilizer for *Cichorium* species recommends.

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1590
EFFECT OF STORAGE CONDITIONS ON THE LEVEL OF AFLATOXIN B1 AND OCHRATOXIN A IN RED PEPPER SPICE

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Many spices are raw material for the growth of mold, and are one of the major food groups vulnerable to contamination with mycotoxins particularly aflatoxin and ochratoxin (the strongest and most dangerous mycotoxins). Commercial Spices are increasingly used in a wide variety of meals prepared by consumers to enhance the flavor and taste in the kitchen which can be a source of Mycotoxin infection to humans Because they are usually eaten raw or added to ready to eat foods. The purpose of this research is to study the effects of environmental conditions such as humidity and temperature maintenance, and their interactions on the level of aflatoxin B1 and ochratoxin A in dried red pepper spice to provide the best storage conditions. Results showed that although fungal growth increase by increasing the temperature to 30-35 $^{\circ}C$ but the toxin production decreases in this temperature . On the other hand, the results showed that at low temperatures, toxin is not produse unless the ambient relative humidity and storage time increased. In other words, ochratoxin A and aflatoxin B1 production depends on relative humidity because if the relative humidity is high, toxins will also produce at the low temperature (15 $^{\circ}C$). The results also showed that, storage time at the 80% humidity and lower has no significant effect in the production of aflatoxin B1 and ochratoxin A. Overall, the results showed that the dried red peppers can be contaminated with aflatoxin B1 and ochratoxin A in storage time. Effect of temperature and humidity in during storage time showed that 25 $^{\circ}C$ and relative humidity of 95% is the best condition for the production of aflatoxin B1 and ochratoxin A . Whit reduction of relative humidity and the temperature to below 75% and 10 $^{\circ}C$, it is possible to prevent the production of toxins and contamination of product.

1594

MORPHOLOGICAL CHANGE AND YEILD FACTORS OF *SECURIGERA SECURIDACA* AFFECTED BY PHOSPHORUS AND ZINC APPLICATION

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Securigera securidaca L., is one of the medicinal plants belonging to Fabaceae family that in tradition medicine were used. The seeds of this plant are used as medicine. In this research, in order to, study the effect of Phosphorus (as soil application) and Zinc (as foliar application) fertilizer on morphological and yield characteristics of *Securigera securidaca* L., the experience in Jahrom climate conditions was conducted. The experiment was factorial randomized complete block design (RCBD) with two factors and 12 treatments and 3 replications. The first factor includes 4 concentration of phosphor fertilizer (0, 50, 100 and 150 kg/h triple super phosphate) and the second factor including 3 zinc levels (0 as control, 4 mg/1000 cc as once a week and 4 mg/1000 cc as once each two weeks) as foliar application. At the end of experiment, at seed ripening stage, the most factors including main shoot number and length, pod number in main shoot, total pod number, seed number in each pod, pod length and seed yield were determined. The results showed significant effect on some measured factors. As relation to important factors the highest content was belonged to 4 mg/1000 cc Zn in once a week treatment while the lowest amount attained to control. At the other hand, in association with phosphor application, in most factors the maximum content were observed in 50 kg/h triple super phosphate treatment. Also, interaction effects of Zn and P on some factors was substantial.

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1618

COMPARISON THE EFFECTS OF ANTIBIOTIC AND MEDICINAL PLANTS, ON IMMUNE SYSTEM, BLOOD BIOCHEMICAL PARAMETERS, MICROBIAL POPULATION AND PERFORMANCE OF BROILERS

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Using antibiotics in poultry industry as growth promoter or treatment proposes have been concerned bacterial resistance in humans. This study was conducted to investigate the effects of antibiotic and herbal medicines on immune system, blood biochemical parameters, microbial population and performance of broilers. A total of 300 one-day old male broilers (Ross 308) were randomly allocated to 5 treatments, 6 replicates with 10 birds in each pen, with a completely randomized design. Treatments were contained basal diet (control), two commercial herbal medicines, Echinacea and antibiotic (1 to 1000 ratio). The highest body weight gain obtained by antibiotic treatment ($P<0.05$). The lowest and the highest feed conversation ratio obtained by control and antibiotic treatments, receptivity ($P<0.05$). Moreover, herbal antibiotic alternatives caused to increase the good bacterial population of intestine like lactic acid bacteria and reduced number of bad bacteria such as *E. coli* and aerobic bacteria. The commercial herbal medicines showed highest immune response, and lowest cholesterol and triglycerides compared to the other treatments ($P<0.05$). According to result of this experiment the above mentioned medicinal plants can be used as antibiotic alternatives in poultry production.

1622

INVESTIGATION THE LOCATION OF PLANT GROWTH ON AMOUNT OF ESSENTIAL OIL IN THE BRAZMBLE PLANT LEAVES AND FLOWERS (*PEROVKIA ABROTANOIDES* KAREL.) IN SEMNAN PROVINCE

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Medicinal plant brazmble with the scientific name *Perovskia abrotanoides* Karel. is of the family of *Lamiaceae* as cooling and antibacterial Medicinal herb due to its essential oil. The research studies on the quantity of essential oil and height of Brazmbl, flower stem length, fresh and dry weight of flowers and leaves in natural habitats in Semnan province (Syahpareh Height of 1790 meters and Dibaj Height of 1950 meters) was done in a completely randomized design with three replications. The essential oil extracted was done by Clevenger apparatus and calculated as weight.The results showed that the type of figure and Location of plant growth have been a significant difference at 5% level on the measuring characteristics.With the increasingthe height of Location of plant, plant height,Flower stem length and weight of wet and dried flowers and leaves was reduced.As well as the amount of essential oil produced in flowers has been0.4% in Syahpareh and 0.6% in Dibaj areas. The amount of essential oils in the leaves in two area were no significant differences with each other.

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1628
TO SCREEN THE ALLELOPATHIC POTENTIAL OF MEDICINE PLANT OF *GLYCYRRHIZA GLABRA*

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Allelopathic compounds are secondary plant products released into environment through volatilization, leaching, root exudation and decomposition of plant residues in soil. These metabolites, such as phenolics, flavonoids, alkaloids, terpenoids and cyanogenic glycosides have often attracted scientists to elucidate their structure and biological function. An experiment was conducted to assess allelopathic potential of various concentrations (0, 20, 40, 60, 80 and 100 percent) of *Glycyrrhiza glabra* on traits of germination and seedling growth of lettuce and cress by standard procedure of bioassay in weed science laboratory of Gonbad Kavous University in 2014. The result of variance analysis showed that the main effect of *Glycyrrhiza glabra* and various concentrations on studied test plants were significant in 1% confidence level. It was also observed that interaction effect of medicinal plant and various concentrations extract was significant in 1% confidence level. The mean comparison of data showed that the plant of lettuce was more sensitive to allelopathic compounds of treated medicine species. In this study seedling growth and vigor index of test plants decreased with increasing concentrations of studied species. The highest inhibitory effect was obtained in the concentrations of 100% about 20/24 and 34/83% over control respectively. The result of germination percent and speed of germination resembled with the result of above said traits but there were no significant differences among various concentrations when were applied.

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1633
KARYOLOGICAL VARIATION IN IRANIAN ENDEMIC THYMUS SPECIES

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Essential oil of Thymus has turned it to a valuable medicinal plant. The objective of this research was to study the karyotype of five ecotypes of Iranian endemic Thymus species including *T.daenansis, T. kotschyanus and T.lancifolius*. Appropriate metaphase root-tip cells of germinated seeds were chromosomally assessed via squash technique with 1% α-bromonaphthalene and 2% (w/v) aceto-orcein staining method. Two ploidy levels were observed in Iranian Thymus species. Three ecotypes of *T. daenansis* appeared to be diploid with 30 chromosomes while *T. kotschyanus* and *T. lancifolius* were tetraploid with 58 and 60 chromosomes, respectively. The findings of this research regarding ploidy level and chromosome number might be useful in inter-specific and intra-specific hybridization in Thymus[1,2].

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1634
SALICYLIC ACID, THE MAIN FACTOR REDUCING THE EFFECTS OF DROUGHT STRESS BY AFFECTING ON ANTIOXIDANT ENZYMES ACTIVITY IN FENUGREEK (*TRIGONELLA FOENUM GRAECU* L)

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A considerable fraction of the decline in crop production in the arable land attributed to drought stress. salicylic acid and its derivatives could have a fundamental role in the adaptation of plants to environmental stresses. In this pot experiment, effect of two concentration of salicylic acid (4 and 7 mM) under three different drought stress, low drought (35% soil saturation capacity), moderate drought (25% soil saturation capacity) and intense drought (15% soil saturation capacity) on levels of antioxidant enzymes activities include Catalase (CAT), Ascorbat Peroxidase (APX), Superoxide Dismutase (SOD), Peroxid Hidrogen (H_2O_2), Malondialdehyde (MDA) in leaf of Fenugreek were evaluated. Result showed that drought stress caused a remarkable increase of H_2O_2 content which is a clear indication of oxidative stress. Environmental stresses, such as drought stress, may lead to an imbalance between antioxidant defenses and Reactive oxygen species (ROS) levels, resulting in oxidative stress (1). A sharp increase in malondialdehyde was observed in all levels of stresses treatments without salicylic acid using due to increased peroxid hidrogen. Spraying with Salicylic acid on the other hand, prevented the accumulation of H_2O_2 in drought stressed plants which was due to the up regulation of H_2O_2 scavenging enzymes such as CAT, SOD, APX and This result is well agreed with Kadioglu *et al*. (2011). Salicylic acid is a growth regulator that promotes growth of plants under stress and nonstress conditions(4). Spray of 4mM salicylic acid in all levels of drought stress caused increasing of antioxidant enzymes activity in moderate and intense drought levels ($p<0.001$). Spray of salicylic acid in different concentration caused decreasing of peroxid hidrogen and malondialdehyde in drought stress ($p<0.001$). Among Reactive oxygen species, superoxide radicals are most damaging to cellular structures(3). According to the results, Increasing enzymes activity under drought stress conditions with using salicylic acid spraying improved. We therefore conclude that Salicylic acid could be used as a potential growth regulator for improving plant growth under drought stress

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1636
MAIN WATER-SOLUBLE POLYSACCHARIDE FROM EREMURUS SPECTABILIS ROOTS: EXTRACTION, PURIFICATION AND YIELD DETERMINATION

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The *Eremurus* plant, popularly called "serish" in Iran, belongs to the Liliaceae family. *Eremurus spectabilis* is one of the most important species from this genus. It grows very well in South and Central Asia, including Iran, West Pakistan, Afghanistan, Iraq, Turkey, Palestine, Lebanon, Syria and Caucasus [1]. The people locally use the hypogeal organs (roots) of this plant to cure jaundice, liver disorders, stomach irritation, pimples and bone fractures and even as a glue for industrial application [2]. Roots of medical plants are important resources of interesting bioactive polysaccharide, many of which have been reported to possess various biological functions [3]. In current study a water-soluble crude polysaccharide (CESP) was obtained from the roots of *E. spectabilis* by warm-water extraction (60 °C), ethanol precipitation and deproteinization. CESP was purified with DEAE-cellulose A52 column and the procedure was monitored by phenol-sulfuric acid method. The main fraction was collected, vacuum-dried and named as ESPS-1. The total yield of ESPS-1 was 4.1% of the dried material.

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1638
EFFECTS OF SOIL AND SOILLESS CULTURES ON MORPHO-PHYSIOLOGICAL PARAMETERS, ESSENTIAL OIL CONCENTRATION AND CONTENT OF ROSE-SCENT GERANIUM

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Recently, production of horticultural crops (flowers, fruits and vegetables) under controlled environment conditions such as soil and soilless systems is increasing significantly. While, there is insufficient scientific information about production of medicinal plants in greenhouse conditions especially under different soil and hydroponic cultural systems. The aim of this study was to compare the effects of soil and hydroponic (soilless) growing systems on morphological traits, essential oil concentration and yield of *Pelargoniumgraveolens* L. in a completely randomized design with three replications. Despitenon-significant effects of cultural systems on essential oil concentration; biomass, plant height, number of leaves and essential oil yield were significantly affected by planting method ($P<0.01$). So that, soilless system showed higher performance compared to the soil system. Accordingly, in compared with soil system, biomass and essential oil content (yield) were 39% and 70% higher in soilless or hydroponic system, respectively. Based on the results, soilless or hydroponic system had higher essential oil yield than soil system; although evaluation of essential oil compounds and quality under open field and controlled conditions as well as soil and soilless cultures, could be recommend in later and supplement experiments.

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1639
A BIOASSAY TECHNIQUE TO EVALUTE ALLELOPATHIC POTENTIAL OF *PORTULACA OLERACEA*

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Allelopathy is defined as the direct influence from a chemical released from one plant on the development and growth of another. It is known that allelopathic substances are induced by environmental stresses. An experiment was undertaken to evaluate allelopathic potential of *Portulaca oleracea* on seedling growth, germination percent, germination speed and vigor index of two sensitive plant i.e. lettuce and cress. For this experiment, 5% suspension (5 g powder: 100 ml distilled water) was prepared initially. Then various concentrations of the studied medicine plant (0, 20, 40, 60, 80 and 100) were made with help of distilled water. The analysis of variance showed that the main effect *Portulaca oleracea* and various concentrations and interaction effect of plant and various concentrations were significant on studied traits of two test plants in 1% confidence level. The result of mean comparison showed that various concentrations of *Portulaca oleracea* had most significant inhibitory effect on the studied traits. It was also found that studied traits were decreased with increasing concentrations. In this study, the concentration of 100% had a most inhibitory effect on studied traits. In the concentration of 100% no germination was observed.

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1640
INHIBITORY ACTIVITY OF THREE MEDICINAL PLANTS EXTRACTS AGAINST *ASPERGILLUS FLAVUS* GROWTH AND AFLATOXIN B1 PRODUCTION

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Today, the use of medicinal plants in food and pharmaceutical industries as well as feed additives is growing because of their medicinal, antifungal, antibacterial and antioxidant properties. In this way, the effect of ethanol extractions of *nerium oleander* (nerium), origanum majorana (marjoram) and foeniculum vulgare (fennel) were studied at three concentrations (2, 5 and 10 mg/ml) to inhibit mycelial growth and aflatoxin B1 production of *Aspergillus flavus* in liquid medium PDB. Aflatoxin B1 content was evaluated by High Performance Thin Layer Chromatography (HPTLC) method. The results indicated that there was significant difference between extractions on mycelial growth inhibition and AFB1 production. Fennel extract at concentrations of 5 and 10 mg/ml caused to inhibit mycelial growth (by 77.08 and 80.17 % respectivelly) and decrease AFB1 production (by 97.64 and 100% respectivelly). The ethanol extract of marjoram at 10 mg/ml decressed mycelial growth by 70.67% and could completely inhibit AFB1 production. In addiotion, There was no signifant difference between fennel and marjoram extracts. The ethanol extract of nerium didn't showe considerable effect in mycelial growth and AFB1 production. So, the etahnol extracts of fennel and marjoram are promising candidate to reduce AFB1- contamination in agriculture crops as food and feed additives [1,2].

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1641

EFFECT OF SALICYLIC ACID AND METHYL JASMONATE ON BIOMASS AND ESSENTIAL OIL CONCENTRATION AND CONTENT OF ROSE-SCENT GERANIUM

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This experiment was conducted to evaluate the effects of salicylic acid (SA) and methyl jasmonate (MJ) as chemical elicitors on biomass, essential oil concentration and content *Pelargoniumgraveolens* L. in a completely randomized design with three replications. Weekly foliar application of different levels of SA (0.75 and 1.5 mM) and MJ (150 and 300 µM) were applied under greenhouse conditions with average day/night temperatures about 28/19 ºC and 65% relative humidity in spring and summer seasons. The results showed thatsignificant effects of treatments on all parameters (P<0.05). Therefore foliar application of MJ at 300 µM and control showed the highest and the lowest biomass and essential oil concentration and content, respectively. Also, in compared with control, SA at 0.75 mM concentration led to 20, 16 and 40%, higher biomass, essential oil concentration and oil content, respectively. Based on the results, elicitors and promoters application is a proper strategy for increasing of secondary metabolites and as a consequence odor compounds of rose-scent geranium. Therefore, analysis of odor compounds under these treatment could be recommended.

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1642

BIOCHEMICAL RESPONSE OF VALERIAN LEAVES TO WATER DEFICIT AT VEGETATIVE STAGE

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Valerianaofficinalis (L) which belongs to the family Valerianaceae, is a perennial plant with high water requirement[1]. The roots and rhizomes of Valerian possess the active medicinal properties in the plant, the leaves and flowers are of no medical benefit[2].Water deficit is a great challenge to agricultural production worldwide and is a major limitation to crop productivity[3]. Leaf is one of the most important above ground organs that early affected by water stress;so, for determination the effect of water stress on valerian, a pot experiment was conducted using randomized complete block design with 3 replications. Plants were treated with different levels of water deficit: control (100 % FC), moderate water deficit (75% FC) and severe water deficit (50% FC). The pots were weighed daily and water was added to maintain soil moisture content. Results revealed that leaf relative water content decreased with increasing the water deficit levels, however there were no significant difference between control and moderate water deficit. Water stress had deleterious effect on leaf cell membranes, and increased their permeability, so,the maximum electrolyte leakage was achieved in50% FC. chlorophyll content was negatively affected by severe deficits; but, difference between control and moderate water stress was not significant.The increase in water stress resulted in higher catalase (CAT) and ascorbate peroxidase (APX) activity.The maximum increase in the CAT and APX was observed in the severe water deficit. Although guaiacol peroxidase activity increased with the impact of stress, this was not statistically significant. According to the results, the impact of stress increased with the increase of water stress and valerian can be tolerating the moderatewater stress at vegetative stage, but further investigations must be conducted on its morphological traits.

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1643
INFLUENCE OF BORON APPLICATION ON GERMINATION, FLOWERING AND CORM PRODUCTION OF *CROCUS SATIVUS* L.

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Crocus sativus L., known as saffron, is a perennial herbaceous medicinal plant from Iridaceae family which is used not only in cooking, but also in curing many important illnesses including cancer, abnormal blood pressure and neurological diseases. Corms which are means of this plant's regeneration are planted in late summer or early fall. Flower initiation occurs in November following by leaf growth. Vegetative stage then continues till April, a period during which the mother corms disappear and cormels grow. At the end of growing season, leaves get dry and new corms enter dormancy stage. Increasing the number of flowers, especially in the first year, and also big corms are the main goals in production enhancement of this plant. Boron is one of the elements influencing flowering and cell division in plants. Results of various researches concluded thatboron is mainly involved in carbohydrate metabolismand cell division.The main form of boron in soil is boric acid which is the most likely form of its absorption by plants. This element is not mobile in plants which brings the necessity of its continuous supply from planting media and the only way to have sufficient amount of boron is its external application. In this study, in order to investigate the influence of boron on germination, flowering and corm production of *Crocus sativus* L.,various concentrations of boric acid were applied to its corms by soaking them in boron solutions for 24 hours. In addition to the control treatment, six levels of concentration were used including distilled water, with no boron in the solution. Soaked corms were then planted in pots after being disinfected by benomyl fungicide. Statistical design was randomized complete block in three replications. Number of flowers were counted during the flowering season. Number of corms and cormels in addition to their fresh and dry weight were recorded at the end of growth season. Results demonstrated boron treatment had positive effect on all measured traits except germination percentage for which the highest amount was observed in the control which was followed by 50 mg/lit of boron treatment. Among different levels of boron concentration, the most desirable influence on all characteristics was seen from 50 mg/lit of boric acid solution, whereas all traits were affected negatively by the concentration of 5 mg/lit. Furthermore, 1 gr/littreatment decreased fresh and dry weight of corms as well as flowering percentage.

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1645
ALLEVIATION OF WATER STRESS EFFECTS ON VALERIAN (*VALERIANAOFFICINALIS* L) GROWTH BY SPERMINE FOLIAR APPLICATION

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Drought is considered the single most devastating environmental stress, which decreases crop productivity more than any other environmental stress [1]. In order to tolerate the adverse effect of stress, plants increase biosynthesis of polyamines[2, 3]. Spermine (Spm) may be involved in the regulation of plant adaptation to drought stress. The objectives of study were to identify the physiological effect and elucidate the possible mechanism caused by exogenous Spm (0.5 mM) in valerian under water stress.For this reason, an experiment based on randomized complete block design with three replications was conducted at research greenhouse of MaraghehUniversity. 20 days-old valerian seedlingstransplanted intoplastic potswith normal irrigation. Plants were treated with different levels of water deficit: control (100 % FC), moderate water deficit (75% FC) and severe water deficit (50% FC).Spermine (0.5 mM)was sprayed at 45 days after stress initiating. Water stress induced a marked increase in membrane permeability. Plants treated with Spmshowed a significant reduction of the stress-induced electrolyte leakage in comparison with the non-treated ones. Maximum leaf osmotic potential, relative water content and chlorophyll content index were observed in well-watered plants, although water stress reduced these characteristics. Exogenous Spm application slightly improved the leaf water status and chlorophyll content of water-stressed plants.The average leaf area was significantly decreased with increasing drought severity, however Spm did not improved its growth. Results showed that Spm effectively alleviated the damage effect from water stress, especially biochemical traits.

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1646
INHIBITORY ACTIVITY OF FOUR MEDICINAL PLANTS EXTRACTS AGAINST *ASPERGILLUS FLAVUS* GROWTH AND AFLATOXIN B1 PRODUCTION

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The use ofnatural products such as essential oils (EOs) and extracts, as well ascombinations of their active substances with different mechanismsof action is one of optional approaches[1].Therefore, a search was made to find natural products that couldsafely be used to inhibit the growth of fungi and their mycotoxinsproduction. Therefore, a search was made to find natural products that couldsafely be used to inhibit the growth of fungi and their mycotoxinsproduction[3]. In this study, inhibitory effects of ethanol extractions of four medicinal plants such as garlic *(Allium sativum)*, ginger *(Zingiber officinalis)*, cinnamon(*Cinnamomum verum)* and thyme (*Thymus daenensis*)were examinated on mycelial growth and aflatoxin B1 production of*Aspergillus flavus.*The concentrations of 2,5 and 10 mgof ethanol extracts per ml PDB liquid mediumwere tested. AflatoxinB1-content was estimated by high performance thin layer chromatography (HPTLC) method. The results exhibited that there were significant difference beetween plants extracts on supress the growth and AFB1-production of *A. flavus*. Thyme extract at concentration of 10 mg/ml showed strongest antifungal activity against *A. flavus*by 92.95% decrease in dry mass (weight) of mycelia where as cinnamon extract coused to decresae 86.41% in dry mass. The lowes antifungal activity was achived by garlic extract (12.34% decease in dry wight of mycelia). In addition thyme extract at 1 mg/ml also showed strongest inhibitory activity against AFB1 production and caused to reduce 96.97% AFB1-content. The cinnamon extract at 1 mg/ml could decrease 68.30 of AFB1-content. Surprisingly, garlic extract coused to increse of AFB1 production (38.46%)by*A. flavus.*

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1650

IN VITRO WITHAFERIN A PRODUCTION BY WITHANIA SOMNIFERA SUSPENSION CULTURE

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Withaferin A, is a steroidal lactone belonging to withanolide group present in roots and leaves of *Withania somnifera* Dunal (Fam. Solanaceae) that have been demonstrated to possess significant and specific therapeutic action in cancer, Parkinson and Alzheimer's disease. The present study was, therefore, undertaken to make an assessment of different elicitors effect on *in vitro* withaferin A production from *W.somnifera* suspension cultures. The cell suspension cultures were initialized from leaf explants derived callus on Murashige and Skoog (MS) medium supplemented with 30 gL^{-1} sucrose (w/v), 2.0 mg/l 2, 4-D and 0.5 mg/l kinetin (Kin). Fungi Fusarium *Aspergillus niger* (PTCC5012), *Alternaria alternata* (PTCC5224), *Fusarium solani* (PTCC5284) that were obtained from Iranian Research Organization for Science and Technology (IROST) were used as biotic elicitors (5% w/v). The results of *in vitro* study showed Withaferin A accumulation in cell suspension culture of *W. Somnifera*. Also, the use of fungi elicitors have shown significant increase in bioproduction of withaferin A. Among the various biotic elicitors used *A. niger* shown high increase in the bioproduction of withaferin A (242 µg/g D.W) in comparession with *Alternaria alternata* (183.4 µg/g D.W) and *Fusarium solani* (196.7µg/g D.W). Nearly, cell suspension cultures that eliciated with *A. niger* possessed 2.9-fold higher Withaferin A content when compared with the control (80.8 µg/g D.W). Thus, our study demonstrates the *in vitro* cell suspension cultures potential for large scale production of Withaferin A.

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1653
EFFECT OF DIFFERENT LEVEL OF HUMIC-ACID AND VERMICOMPOST TEA ON PHYTOCHEMICAL PROPERTIEC OF *SATUREJA KHUZESTANICA*

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Satureja Khuzistanica Jamzad is an endemic species of the genus *Satureja* in Iran. It is a valuable medicinal plant because of high concentration carvacrol in the Eessntial oil and rosmarinic acid in the extract[1]. In order to study the effect of different levels of humic acid and vermicompost tea on phytochemical characters of *Satureja khuzistanican*, a factorial experiment base on a randomized complete block design with three replications was conducted in 2013. Factors included of three levels of humic acid (1.5, 2.5 and 3.5 liter per ha.) and vermicompost tea in concentrations of 5% (5:1, water: vermicompost) 10% and 20% which were sprayed on aerial parts of the plants. The maximum content of phenolic and flavonoids compounds were observed in treatments of 2.5 l/ha humic acid +5% of vermicompost (46.56 µg gallic acid/ mg dry extract) and 3.5 L/ha humic acid + 5% of vermicompost (749.13 µg routin/ mg dry extract), respectively on first years. Interaction of humic acid and vermicompost tea on content of phenolic and flavonoids compounds in second years were not significant. The maximum content of rosmarinic acid were observed in treatments 3.5 l/ha humic acid +20% of vermicompost (815/4 µg/ mg dry extract) and 1.5 L/ha humic acid + 5% of vermicompost (475/76 µg/ µg dry extract) in the first and the second years, respectively.

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1654

THE EFFECT OF DROUGHT STRESS ON GROWTH PARAMETERS AND CHLOROPHYLL CONTENT OF FENUGREEK (*TRIGONELLA FOENUM GRAECU* L)

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Water availability is an important factor affecting plant growth and yield, mainly in arid and semi-arid regions where plants are frequently subjected to periods of drought. Salicylic acid and its derivatives could have a fundamental role in the adaptation of plants to environmental stresses. In this pot experiment, effect of two concentration of salicylic acid (4 and 7 mM) under three different drought stress, low drought (35% soil saturation capacity), moderate drought (25% soil saturation capacity) and intense drought (15% soil saturation capacity) on growth parameters, essential oil percent, prolin and , chlorophyll a, b were evaluated. The results showed that drought stress significantly affected Stem length, root length, shoot wet weight, root wet weight and shoot dry weight, root dry weight, Internodes length, biomass and Essential oil percent, prolin and , chlorophyll a, b in $P < 0.05$. An increase in the drought stress, lead to reduce in length of stem and root, fresh weight of stem and root, dry weight of stem and root, internodes length, total biomass, essential oil percent and chlorophyll a, b, in contrast, enhance the amount of prolin. The highest values of growth parameters and essential oil percent were observed under 4mM salicylic acid spraying and low drought condition. Also, proline were increased with the Enhancing drought tolerance ($P<0.01$). Singh and Usha (2003) reported that the foliar application of salicylic acid increased chlorophyll content possibly causing higher fresh and dry weight. It was reported that salicylic acid regulate cell extension and division. In fact between growth and senescence create a balance (5). The highest chlorophyll a and b content were observed under 4mM salicylic acid spraying and low drought condition and the lowest amount of that were observed in non- salicylic acid spraying and intense drought condition. Finally, growth parameters, essential oil percent and chlorophyll a, b were reduced under drought and salicylic acid application had significant effect on plant growth and improved the condition of the plant. It was reported that treatment by salicylic acid increase cell division on apical meristem of plants, and reduced of plant growth improve under condition drought stress (3). Rajasekaran et al., (2002) reported that between salicylic acid and absysic acid signal there are correlation on germination (1). According to the results, Increasing chlorophyll a and b under drought stress conditions with using salicylic acid spraying improved and have positive impact on growth parameters.

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1674

THE EFFECT OF DROUGHT STRESS AND SALICYLIC ACID ON MORPHOLOGIC TRAITS AND YIELD OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.)

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Increased world population along with the reduction in fresh water reservoir and salinization of croplands necessitate the study on plants with tolerance to adverse environmental conditions. In arid and semiarid regions, drought stress is one of the most important stresses that affectplant production. In order to investigate the effect of drought stress and salicylic acid on morphological traitsyield ofRosemary (*Rosmarinusofficinalis* L.), an experiment was conducted under field conditions in 2014, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in split plot in the form of a randomized complete block design with three replications. The main factor was drought stress in three levels (including 30%, 60% and 90% field capacity) and the sub factor was foliar application of salicylicacid in 4 levels (including 0, 1, 2, and 3mMol).The results of analysis variance indicated that drought stress significantly affected on plant height,main stem diameter,canopy area, small and large canopy diameter, leaf long, leaf width, number of lateral stem, number of sub lateral stem, leaf yield, stem yield, shoot yield ($P \leq 0.01$). The results indicated that salicylic acid significantly affected onleaf yield ($P \leq 0.01$), and total shoot yield at $P \leq 0.05$. Mean comparison of drought stress indicated highest leaf yield (4147.5 kg/ha) belong to normal irrigation (90% FC) and lowest leaf yield (4147.5 kg/ha) belong to sever drought stress (30% FC).

1675

THE EFFECT OF DROUGHT STRESS AND SALICYLIC ACID ON ESSENTIAL OIL PERCENTAGE, ESSENTIAL OIL YIELD AND HARVEST INDICES OF ESSENTIAL OIL OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.) .

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Drought stress is especially important in countries where crop agriculture is essentially rain-fed (Muchow, 1990). Drought stress causes an increase in solute concentration in theEnvironment, leading to an osmotic flow of water out of plant cells.In order to investigate the effect of drought stress and salicylic acid on essential oil percentage, essential oil yield and harvest indices of essential oil ofRosemary (*Rosmarinusofficinalis* L.), an experiment was conducted under field conditions in 2014, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in split plot in the form of a randomized complete block design with three replications. The main factor was drought stress in three levels (including 30%, 60% and 90% field capacity) and the sub factor was foliar application of salicylicacid in 4 levels (including 0, 1, 2, and 3mMol).The results of analysis variance indicated that drought stress significantly affected on essential oil percentage, harvest indices of essential oil($P\leq0.01$) and essential oil yield at $P\leq0.05$. The results indicated that salicylic acid significantly affected onessential oil yield ($P\leq0.01$), and essential oil percentage at $P\leq0.05$. Mean comparison of drought stress indicated highest essential oil percentage (2.26%) belong to sever drought stress (30% FC)and lowest (1.03%) belong to normal irrigation (90% FC). So highest essential oil yield with 45.48 kg/ha belong to moderate drought stress (60% FC). Mean comparison of salicylic acid indicated highest essential oil percentage with 1.78% and 1.97% belong to control and foliar application 1mMol of salicylic acid, respectively. So highest essential oil yield with 50.26 kg/ha belong to foliar application 1mMol of salicylic acid.

1681

EFFECT OF PRUNING AND ROW DISTANCE ON SOME CHARACTERISTICS IN KARELA

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Medicinal plant is defined as any substance with one or more of its organ containing properties that can be used for therapeutic purposes or which can be used as precursors for the synthesis of various drugs.Momordica charantia (MC), also known as karela, bitter melon or balsam pear, is one of the plants commonly used for its glucose-lowering effects. Momordica charantia, commonly known as “Karela” (Family Cucurbitaceae), is a tropical household vegetable used as daily food and also as folk medicine especially for diabetes.Optimum plant population is the prerequisite for obtaining maximum yield. Plant density is invariably linked with yield, the more plant stands there are up to a certain limit, the higher the expected yield.The field experiment was laid out in randomized complete block design with facrorial design with three replications. Treatments consisted of row distance in four level (50, 75, 100 and 125 cm) and pruning in three level (no pruning, pruning of main stem and pruning of sub stem).Analysis of variance showed that the effect of row distance on all characteristics was significant.

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1682

IN VITRO MULTIPLICATION OF HYSSOPUS OFFICINALIS

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Hyssopus officinalis is a fast growing species with medicinal and economic value. For clonal propagation of superior genotypes of the species, apical and axillary buds were collected in different seasons. Application of 20 % mercuric chloride solution for 5 minutes was the best treatment for surface sterilization of the samples in summer. Different compositions of hormones were evaluated for regeneration. The best shoot multiplication was obtained using a modified MS medium containing half strength Nitrate containing BA, Kin, ۲ip and GA3 with concentration of ۰/۱۵, 0/۱, 0/۰۱ and 0/۲ mgl^{-1}, respectively. Shoots from the multiplication medium were transferred in MS medium (half strength Nitrate) containing ۰/۱۵ mgl^{-1} BA and 0/1 mgl^{-1} Kin fo shoot elongation. Rooting of shoots were achieved in MS with ¼ strength of macroelemants and 0/3 mgl^{-1} IBA. The plantlets were successfully established in greenhouse and field conditions.

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1685
IN VITRO MULTIPLICATION OF CRATAEGUS ARONIA

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Crataegus aroniais a fast growing species with medicinal and economic value. For clonal propagation of superior genotypes of the species, apical and axillary buds were collected in different seasons. Application of 20 % mercuric chloride solution for 5 minutes was the best treatment for surface sterilization of the samples in summer. Different compositions of hormones were evaluated for regeneration. The best shoot multiplication was obtained using a modified MS medium containing half strength Nitrate containing BA, Kin, ۲ip and GA3 with concentration of ۰/۱۵, 0/۱, 0/۰۱ and 0/۲ mgl^{-1}, respectively. Shoots from the multiplication medium were transferred in MS medium (half strength Nitrate) containing ۰/۱۵ mgl^{-1} BA and 0/1 mgl^{-1} Kin fo shoot elongation. Rooting of shoots were achieved in MS with ¼ strength of macroelemants and 0/3 mgl^{-1} IBA. The plantlets were successfully established in greenhouse and field conditions.

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1695
IN VITRO MULTIPLICATION OF CRATAEGUS ARONIA

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Crataegus aronia L., is a deciduous shruband with medicinal and economic value. it is distributed mainly on dry hillsides and the mountainous regions. In the past few decades, populations of *C. aronia* are subjected to genetic erosion and classified as endangered species as many other wild plants due to severe habitat fragmentation, over-exploitation, extensive agricultural and human activities, overgrazing, and premature harvest by local people. All these factors lead to the rarity of many wild plants and accelerated their extinction in many areas. *aronia* plant, efforts to propagate hawthorn by conventional horticultural techniques are problematic. Seed show slow and low germination percentage and mature tree cuttings are difficult to root. Therefore, plant tissue culture may offer a good alternative technique to propagate and conserve the endangered plant species. For clonal propagation of superior genotypes of the species, apical and axillary buds were collected in different seasons. Application of 20 % mercuric chloride solution for 10 minutes was the best treatment for surface sterilization of the samples in Winter. Different compositions of hormones were evaluated for regeneration. The best shoot multiplication was obtained using a modified MS medium containing half strength Nitrate containing BA, Kin, ۲ip and GA3 with concentration of ۰/۵, 0/3, 0/1 and 0/3 mgl^{1} , respectively. Shoots from the multiplication medium were transferred in MS medium (half strength Nitrate) containing ۰/3 mgl^{1} BA and 0/2 mgl^{1} Kin fo shoot elongation. Rooting of shoots were achieved in MS with ¼ strength of macroelemants and 0/3 mgl^{1} IBA. The plantlets were successfully established in greenhouse and field conditions.

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1699
GENETIC DIVERSITY OF RATE AND HOMOGENEITY OF GRAIN GERMINATION IN LEMON BALM (*MELLISSA OFFICINALIS* L.)

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Lemon Balm (*Mellissa officina*lis L), is one of the world's most important medicinal plants with many application, due to certain aromatic compounds present in the oil, pharmaceutical industry, health and nutrition [1]. Medicinal plants are great importance because of secondary metabolites. Genetic diversity in primary population is very important for having a successful breeding program. The present study was designed to investigate the effect of genetic diversity on growth characteristics of the seed herb lemon balm. In this study germination rate and germination homogeneity were investigated in 5 Iranian populations of *Mellissa officina*lis. The layout of experiment was arranged by completely randomized design with four replications. The results of variance analysis showed significant differences among populations for traits under study. Correlation between germination rate with germination homogeneity was negatively significant at 5% level of probability. Highest germination rate and germination homogeneity was obtained in Shiraz population. As a result, Shiraz genotype Lemon balm was suggested to use in breeding programs.

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1712
THE EFFECT OF MULTI-WALLED CARBON NANOTUBES ON ANTIOXIDANT PARAMETERSOF *SATUREJARECHINGERI* CALLUSES

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Satureja rechingeri was described as a new species from Iran, and its relationship to *S. khuzistanica*, *S.edmondi* and *S. macrantha* has previously been reported [1].The plantbelongs to the Lamiaceae family and is native to Iran. These plant calluses produce large amounts of phenolic compounds especially rosmarinic acid. We evaluated the effect of multi-walled carbon nanotubes with a carboxyl functional group (MWCNT-COOH) on rosmarinic and caffeic acid content, total phenol, total flavonoid and antioxidant activity of *Satureja rechingeri* calluses. MWCNT-COOH was able to increase the amount of fresh and dry weight compared to control in a wide range (25-500 µg/ml). The maximum amount of rosmarinic acid was observed in concentrations of 100 µg/ml MWCNT-COOH. In this study, a positive correlation between antioxidant activity and total phenol content was observed. Also a stronger positive correlation between the antioxidant activity and rosmarinic acid content was found. These data underline the role of rosmarinic acid as a potent antioxidant in plants.

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1715
SALINITY EFFECTS ON GERMINATION OF GERMAN CHAMOMILE (*MATRICARIARECUTITA*L.)

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German chamomile (*Matricariarecutita*Syn. *Matricariachamomilla*) belongs to Asteraceae family, is one of the most important medicinal plants, used as a remedy for many years.Pharmaceutical characters of this plant are related to active constituents including essential oils and flavonoids.temperatureis an important environmental factor regulating seed dormancy and germination, and Salinity is a major constraint in agricultural production, causing a delay in occurrence and speed of germination. Thereforeevaluating the impact of these factors on seed germination is particularly important.In order to evaluate the effects of temperature and salinity on germination traits of German chamomile, this laboratory experiment was conducted as a randomized complete block with three replications at the agronomy laboratory, faculty of agriculture, university of Guilan during 2014. Treatments were arranged as a factorial with seven constant temperature condition of 5, 10,15, 20, 25, 30 and 35 C, and five salinity stress including 0 (control), 4, 8, 12 and 16 µs. cm^{-1}. 50 German chamomile seeds were placed in petri dishes containing 2 ml of the solution or deionized water (control). Germinated seeds were counted for a period of 14 d. The results indicated that temperature and salinity significantly ($P<0.01$) affected seed germination characteristics; however germination responses to temperature was depended on the salinity levels.Increasing temperature from 5 to 20C, caused germination characteristics to improve; While such an effect did not observed at higher temperatures (up to 35 C). Salinity showed negative effect on germination.This effect was further in high levels of stress, in which germination characteristics were more decreased by super- and sub-optimal temperatures. At non-salinity condition of 20 C, maximum germination Percentage (86%), germination rate (19.98 $no.d^{-1}$), Mean Germination Rate (0.43 $no.d^{-1}$), Germination Rate Index (0.41 $no.d^{-1}$), Mean Germination Time (2.35 d^{-1}), Coefficient of Uniformity of Germination (2.58 $1.d^{-1}$) was observed.

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1716

MICROPROPAGATION OF *ZHUMERIA MAJDAEA* (LAMIACEAE)-AN ENDANGERED MEDICINAL PLANT FROM IRAN

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The monotypic Iranian *Zhumeriamajdae*Rech.f&Wendelbo(Lamiaceae), known locally bythe name of “Mohrekhosh”, is growing wild in a limited geographical range in Bandarabbas,Hormozgan province in southeastern of Iran[1]. The plant contains essential oil (5.3-11.1 %w/w) and its leaves have been used for many years as a curative for stomachaches, antiseptic, carminative especially in infants and for the treatment of painful menstruation[2,3].The hugeamounts of the aerial parts of this species are harvested from the wild every year and aresold on the inner markets or exported, especially to southern countries of the PersianGulf.*Z. majdae* is now almost extinct and is listed as an extremely vulnerable species in Iran [1]. As the plant has also a low propagation rate in nature, a suitable method for *in vitro*-regeneration is needed. The present study is the first attempt for an efficient regeneration protocol through *in vitro*axillary shoot proliferation from *in vitroZ. majdae*seedlingsusing single nodal segments.MS medium with various concentrations (2.22, 4.44, 8.88, 17.76, 31.08 &71.04µM) of BAP and (2.32, 4.65, 9.3 & 18.6 µM) KN was tested.Normal shoots were exposed to the medium containing 2.22µM BA for elongation. The highest shoot formation (3.3±0.9) was obtained with a medium fortified 71.1 µM BAP after four weeks. Regenerated shoots were rooted on the different tested media, with the maximum percentage(68.8) roots obtained on half-strength MS medium withoutauxins. The rooted plantlets were successfully acclimatized (80.0%) in a greenhouse before transference to natural conditions.

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1720

CARDINAL TEMPERATURES OF GERMAN CHAMOMILE (*MATRICARIARECUTITA* L.) IN SALINITY CONDITION

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Temperature is the major determinant of germination when other environmental factors are not limiting. Temperature and germination percentage relationship can be illustrated by a “bell shaped” plot, in which three temperatures are considered as cardinal temperature, including optimum temperature, where maximum germination occurs, maximum, as upper and minimum, as lower temperatures allowing germination. Water or soil salinity is one of the factors affecting the germination behavior of species as well as their cardinal temperatures. This laboratory experiment was conducted at the faculty of agricultural sciences, university of Guilan during 2014, to examine the effect of different salinity levels (0 (control), 4, 8, 12 and 16 µs. cm^{-1}) on cardinal temperatures of german chamomile (*Matricariarecutita* L.), an annual herb that its medicinal importance is on the rise. Since establishing of germination rate enables calculating of cardinal temperatures, germination rate was estimated for each temperature of 5, 10, 15, 20, 25, 30, and 35 C at different concentrations of NaCl. The germination rate was assessedas the inverse of time to 50% germination by fitting a three-parameter sigmoidal model to cumulative germination against time. Nonlinear regression methods (segmented and quadratic models) were used to describe cardinaltemperatures, and linear regression analysis was applied toevaluate the influence of salinity on cardinal temperatures.Germination counts of experimental units each consisted of 50 chamomile seed, were taken daily for 14 days. Radicle protrusion was the criterion for germination.The results indicated that,in non-salinity condition minimum, optimum and maximum germination temperatures were 2.23, 20.12 and 36.70 C for segmented, and 3.56, 19.74 and 35.91 Cfor quadratic models,respectively. Germination does not occur over these extremes. The range of adequate temperatures decreasedassalinity level increased; rising in minimum temperature and reducing in maximum temperature was observed. The slope of the regressed line respectively for cardinal temperatures of segmented and quadratic models, was +0.21 (r^2=0.91) and +0.13 (r^2=0.93) for minimum, and -0.20 (r^2=0.74) and -0.13 (r^2=0.82) for Maximum temperature. These results suggest that salinity can limit the temperature range of germination in German chamomile.

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1721
COMPARATIVE ANALYSIS OF ANTIBIOFILM ACTIVITY OF ESSENTIAL OILS AND PLANT EXTRACTS AGAINST *STAPHYLOCOCCUS AUREUS* AND *ESCHERICHIA COLI* BIOFILMS

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In the present study, in vitro antibiofilm activities of essential oils and several plant extracts obtained from peppermint (*Mentha × piperita*), coriander (*Coriandrum sativum*), and anise (*Pimpinella anisum*) were investigated. Plant materials were sequentially extracted by hexane, dichloromethane (DCM) and methanol. Hydrodistillation was used to extract essential oil. Minimum inhibitory concentration assay (MIC) was carried out using two-fold serial dilution method and MTT assay against gram-positive *(Staphylococcus aureus*) and gram-negative (*Escherichia coli*) bacteria. The growth and development of the biofilm were assessed using the crystal violet (CV) and the 2, 3-bis [2-methyloxy-4-nitro-5-sulfophenyl]-2H-tetrazolium-5-carboxanilide (XTT) reduction assays. Antibacterial activity was observed for almost all solvent fractions and all essential oils against both bacterial strains with stronger effect against *S. aureus*. All essential oils and 8 out of 14 plant extracts inhibited bacteria cell attachment of both bacteria with inhibition of *S. aureus* by at least 50%. CV and XTT reduction assay demonstrated that essential oil from coriander had the highest antibiofilm activity against biofilm formed by both tested bacteria at lowest MIC value (0.08% v/v) and (0.16% v/v) against *S.aureus* and *E.coli*, respectively. The ability of essential oil to inhibit biofilm biomass growth was illustrated by coriander oil, and its high antibiofilm activity potential as biofilm prevention agent might be further investigated.

1732

THE EFFECT OF BIO FERTILIZER AND VERMICOMPOST ON SOME PHYSIOLOGICAL TRAITS AND ELEMENTS OF *MELISSA OFFICINALIS* L.

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The results of some research indicated that Mycorrhizal symbiosis increases Chlorophyll concentration [1]. Mycorrhizal fungi increasing magnesium absorption and it could be increase chlorophyll synthesis [2]. This experiment was conducted in Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran, in 2012. The experiment was conducted in factorial in the form of a randomized complete block design with three replications. Factors were vermicompost in three levels (0, 5 and 10 t/ha), inoculation with biofertilizers in four levels (no inoculation, inoculation with *Glomus mosseae* + *G. intraradices*, *Piriformospora indica*, and *Glomus mosseae* + *G. intraradices* + *Piriformospora indica*). Results indicated non-significant effect of vermicompost and biofertilizer and interaction vermicompost * biofertilizer on chlorophyll a, b, a+b. but inoculation with biofertilizers significantly affected carotenoid ($P<0.05$). Vermicompost and biofertilizer and interaction of vermicompost and fertilizer on carotenoid non-significantly affected. The results indicated that vermicompost and biofertilizer significantly affected content of potassium, phosphorus, calcium, magnesium, iron, zinc, manganese and cupper ($P<0.01$). Moreover, vermicompost application significantly affected nitrogen content at $P<0.01$. Results indicated that interaction of vermicompost and biofertilizer significantly affected content of phosphorus, calcium, magnesium, iron, zinc, manganese and cupper ($P<0.01$). Mean comparison indicated that application of 10 t/ha vermicompost resulted in the highest content of nitrogen (2.83%) and potassium (1.66%). the highest content of phosphorus (0.53%) belong use of mycorrhiza (*Glomus mosseae* + *G. intraradices*). Mean comparison indicated that application of 10 t/ha vermicompost * mycorrhiza (*Glomus mosseae* + *G. intraradices*) resulted in the highest content of phosphorus. The highest content of calcium (0.77%) resulted use of 5ton/ha vermicompost * non inoculation the highest content of magnesium (0.6%) resulted in nonuse of vermicompost * mycorrhiza (*Glomus mosseae* + *G. intraradices*) and 10 t/ha vermicompost * mycorrhiza (*Glomus mosseae* + *G. intraradices*). Application of 5 t/ha vermicompost * mycorrhiza (*Glomus mosseae* + *G. intraradices*) had the highest iron (925.6ppm). Results indicated significant effect of vermicompost and biofertilizer on uptake some of elements.

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1736

THE EFFECT OF DROUGHT STRESS AND POUTRECINE ON FLOWERING STAGE TRAITS OF *SALVIA SCLAREA* UNDER FIELD CONDITION.

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In order to evaluate the effect of drought stress and poutrecine on the *Salvia sclarea*, an experiment was conducted under field conditions in 2014, at Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. The experiment was conducted in the form of a randomized complete block design with three replications. Drought stress was in three levels (30, 60 and 90% of field capacity). The seeds planted at field in autumn 2013. The treatment (drought stress) was started in spring. The treatment was done by TDR and measured of humidity weight of soil. The plant harvested at the end of growing season (September 2014). The results of analysis variance indicated a the effect of combination treatments (drought stress and poutricne) at full flowering stage was significant on characteristics such as number of tillering, inflourcence long, plant heghit, stem heghit, number of main inflourcence, large and small canopy diameter, leaf length, leaf width, number of leaves, Inflourcence yield, stem yield, leaf yield, petiole yield, essential oil percentage, essential oil yield ($P \leq 0.01$), number of inflourcence on tillering, essential oil percentage flowering ($P \leq 0.05$). The comparison of means showed that the highest leaf width (11.9 cm), large and small canopy diameter (94.7 and 80.3 cm, respectively), and number of inflourcence on tillering (66.3 number), petiole weight (108g/plant), essential oil percentage of leaf (0.12%) and essential oil yield of (50.33kg/ha) achieved in 90%FC*300 mg/L poutricene. The comparison of means showed that petiol yield (1062.3 kg/ha), stem yield (2855.9 kg/ha), essential oil yied of inflorcence (36.176 kg/ha) were belong to 30% FC *200mg/L. poutricene.

1740

INVESTIGATING THE OPTIMUM MAINTENANCE METHODS FOR IRANIAN QUERCUS BRANTTII

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Rejuvenescence of forests in western regions of country has been subjected to substantial problems due to frequent occupancy and abundant utilization of land. Hence, Quercus branttii, as one of the valuable medical plants which grow in the mentioned forests, must be thoroughly studied. Because the most common method, generally used for the reclamation of forests, may be considered to be dibber, it is necessary to pay special attention to the seed maintenance condition prior to planting. Therefore, the present research was conducted to evaluate the effects of seed maintenance condition as well as its time duration on the germination rate of Iranian Quercus branttii. This experiment was performed in a factorial design based on randomized complete blocks with four replications. In addition, seven different treatments were considered: the control treatment (seed planting right after the harvest), seed maintenance in moist sand at 2°C for 40, 60, and 90 days, as well as seed maintenance inside the pocket at 2°C for 40, 60, and 90 days. The results showed no statistically significant differences among the germination rates obtained under the three cases of seed maintenance in moist sand. However, the germination rates determined under the treatments of seed maintenance in moist sand were found to be statistically different from those obtained under the treatments of seed maintenance inside the pocket only for 60 and 90 days; while the difference for 40 days was resulted to be statistically insignificant.

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1742

ESSENTIAL OIL COMPOSITION OF *DRACOCEPHALUM OLIGADENIUM FROM IRAN*

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Dracocephalum is a genus of ca. 60 species of flowering plants in the family Lamiaceae and has eight annual and perennial species in flora of Iran [1-2]. The hydrodistilled essential oils obtained from aerial flowering parts of two populations of *Dracocephalum oligadenium* were collected from Siahbisheh and Baladeh and analysed by capillary GC-FID and GC-MS and then identified.The essential oil analysis led to the identification of 63 compounds that represented 89.1% and 87.1% of the total oil compositions. Oxygenated monoterpens comprised 46.7 and 57.6 % of compounds as the main group in the essential oils of Siahbisheh and Baladeh samples, respectively. Monoterpene hydrocarbons constituted 16.7 and 19.9 % of the main compounds in the essential oils of Siahbisheh and Baladeh samples, respectively. Major components identified from Siahbisheh sample were *p*-mentha-1,5-dien-8-ol (9.3%), limonene (8.0%), β-bourbonene (7.4%), α-pinene (6.8%), *trans*–sabinol (5.1%), terpinene-4-ol (5.1%), spathulenol (5.1%), methyl geranate (4.2%), *p*- menth-1-en-7-al (3.4%), α-copaene (3.4%), carvone (3.7%) and cryptone (3.3%). Main compounds identified from Baladeh sample were methyl geranate (14.9%), α-pinene (6.5%), limonene (10.1%), α-campholenal (4.8%), *trans*-verbenol (7.1%), geranial (4.3%), pinocarvone (3.1%), terpinene-4-ol (3.0%), neral (3.8%) and β-bourbonene (3.3%). Chemotaxonomically, the essential oil composition of *D. oligadenium* could be used in differentiating it from closely related species, i.e., *D. kotschyi.*

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1743
ESSENTIAL OIL CONSTITUENTS OF THE AERIAL PARTS AND ROOT OF *CYMBOCARPUM ANETHOIDES* (APIACEAE) FROM IRAN

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Cymbocarpum anethoides is locally called "*Shevidak*" and its leaves were collected in spring as a seasonal aromatic vegetable in Khoy, West Azarbaijan Province of Iran. Fresh or dried leaves of this plant are used as a flavoring in soups and foods in the collection site. Essential oils of the members of this genus have already been investigated in Turkey and Iran. The objective of this study was to investigate chemical composition of the essential oils obtained from aerial parts at different growing stages and root of *Cymbocarpum anethoides* DC., growing wild in the northwestern of Iran. Crushed aerial parts in vegetative, flowering and fruit stages and root of the plant were separately subjected to hydro-distillation. The oils were analyzed by a combination of capillary GC and GC – MS. 45, 52, 40 and 36 components were identified in the essential oils of aerial parts (vegetative, flowering and fruit) and root representing of the 99.2, 99.0, 99.8 and 99.6% of the total oils, respectively. The essential oil of the aerial parts of the plant in vegetative stage was dominated by n-decanal (36.5%) and n-dodecanal (25.3%). n-Decanal (35.8%) and (2E)-dodecenal (25.1%) were the main constituents of oil in flowering stage whereas (2E)-decenal (32.1%) and (2E)-dodecenal (21.5%) were characterized as the main components of the oil in fruit stage. In the essential oil of root, the major identified components were 2-decenoic acid (29.8%) and (2E)-dodecenol (12.7%).

1744
ESSENTIAL OIL COMPOSITION AND ANTIBACTERIAL ACTIVITY OF *ARTEMISIA PARADOXA (BORNM.)SONBOLI FROM IRAN*

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The endemic *Artemisia paradoxa* (Bornm.)Sonboli belongs to the family Asteraceae and tribe Anthemideae. This species grows in south of Iran, Fars Province. Aerial flowering parts of plant were collected from Sarvestan, Mianjangal protected area of Fars. The air dried parts were subjected to hydrodistillation using Clevenger type apparatus and analyzed by GC-FID and GC-MS. 1,8-Cineole (27.2%), camphor (25.5%), lavandulyl acetate (8.3%), bornyl acetate (8.1%), terpinen-4-ol (6.8%) and camphene (5.2%) was found as the main compounds. The antibacterial activity of the oil was tested against five bacteria (*Staphylococcus aureus*, *Bacillus cereus*, *Klebsiella pneumonia*, *Pseudomonas aeruginosa* and *Escherichia coli*) by disk diffusion and determination of MIC and MBC values. The essential oil exhibited moderate antibacterial activity. The highly inhibited strains were Gram-positive *Bacillus cereus* with MIC value of 0.25 mg/mL followed by *Staphylococcus aureus* with MIC value of 8.0 mg/mL. The Gram-negative *Pseudomonas aeruginosa* appeared as the most resistant strain with inhibition zone of 7 mm.

1746
ISOLATION AND STRUCTURE ELUCIDATION OF THE CHEMICAL CONSTITUENTS FROM THE AERIAL PARTS OF PROVSKIA ABROTANOIDES

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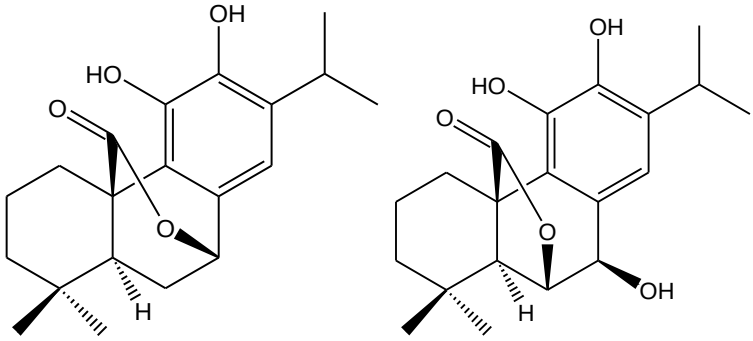
Perovskia is a small genus in the family Lamiaceae and represent in an area from northeast Iran to northwest Indian. The genus is represented in Iran by only three species [1]. *Perovskia abrotanoides* Karel. is an aromatic erect herb which is used in Iranian folk medicine as an analgesic and anti-fever, and also for treatment of leishmaniasis. In recent years, other biological properties, including antibacterial [2], anticanser and antiparasitic [3] of this plant is reported to be highly regarded. In the present work, a phytochemichal investigation on hexane extract of the aerial parts of *P. abrotanoides* led to the isolation and identification of five compounds, including: two abietane diterpenoides (carnosol **1** and epi- rosmanol **2**), one ursane triterpenoid (ursolic acid), one glucosidal steroid (daucostrol) and one flavonoid **(**salvigenin). Their structures were established by extensive spectroscopic methods, including 1D (^{1}H NMR, ^{13}C NMR) and 2D-NMR (COSY, HMQC, HMBC, NOESY).



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1747
RARE CARBON SCAFFOLD TRITERPENOIDS WITH ANTI-PROTOZOAL ACTIVITY FROM HEXANE EXTRACT OF *SALVIA HYDRANGEA*

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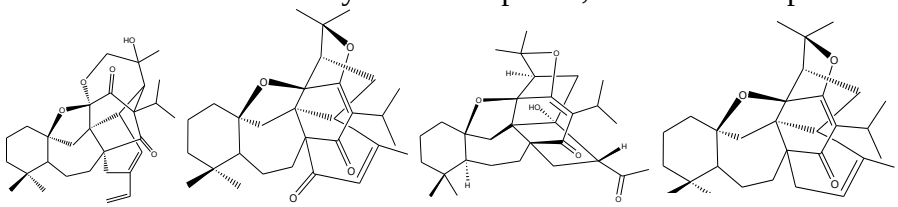
Plants are an important source for drug discovery- particulary for parasites because of the long association between the coexistence of parasites, humans and herbal remedies. The emergence of parasites resistant to current chemotherapies highlights the importance of plant extracts and essential oils as novel antiparastic agents. In our previous work, *n*-hexane extract of the aerial parts of *Salvia hydrangea* was found active against *Plasmodium falciparum* and *Trypansoma brucei rhodesiense* with IC_{50} values of 3.2 and 18 μg/mL, respectively [1]. Salvadione C (**1**), perovskone B (**2**) and hydrangenone (**3**) - three triterpenoids with rare carbon skeletons- showed fairly potent *in vitro* antiplasmodial activity with IC_{50} values of 1.43±0.18, 0.18±0.002 , 1.4 μM and good selectivity indices (SI) of 86.2, 69.6, 6 respectively .IC_{50} and SI values for **1** and **2** against *T.brucei rhodesiense* were found to be 4.33±0.24, 15.92±0.72 and 4.33, 0.78 respectively[1,2]. They exhibited moderate potency against *T. b. rhodesiense*. In the present work, further phytochemical investigation on this extract led to the isolation of perovskone (**4**), another triterpeniod with the same carbon scaffold. Perovskone was tested for *in vitro* antiparastic activity against several parasites such as *T. b. rhodesiense*, *P. falciparum*, *Trypanosoma cruzi*, *Leishmania donovani axenic* and cytotoxicity in rat myoblast (L6). IC_{50} values against these parasites were 14.32±0.056, 0.18±0.42, 10.17±0.016, 18.50±0.00 μM, respectively and the cytotoxicity value was 30.63 μM. This results showed that perovskone has a potent activity against *P. falciparum* with IC_{50} value of 0.18 μM, and SI value of 170.2. *In vivo* examination was also performed, but due to the low solubility of the compound, it was not acceptable.



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1748

NEW PIMARANE DITERPENOIDS FROM *THE HEXANE EXTRACT OF HYMENOCRATER ELEGANS*

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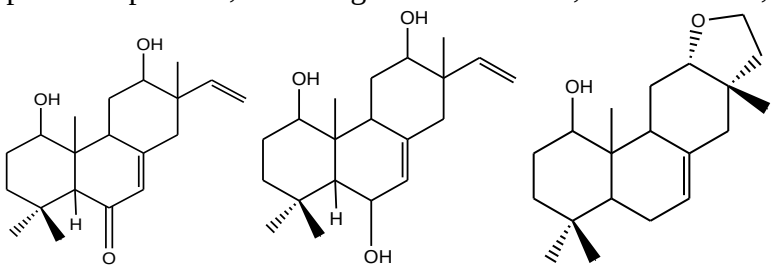
lamiaceae**,** also called Labiatae, with 236 genera and more than 7,000 species is the largest family of the order Lamiales. It is important to humans for flavour, fragrance, or medicinal and many other properties. Many studies on the members of this family are conducting however some genera have a great number of species and are used locally by indigenous people in different parts of Iran, but there are either no or few records and documented references of the investigation of these genera[1]. For example, *hymenocrater* has 9 species in Iran, with a wide range of distribution and usages in traditional and folk medicine such as anti-inflamatory, antispasm, sedative and anti-emphysema[2] but we found no record on the investigation of the extract of this genus although there are few studies on the essential oil of *hymenocrater* species[3] which showed anti-bacterial and antimicrobial properties[4]. Therefore all these above-mentioned prompted us to undertake a systematic phytochemical investigation of extract of this genus.In our continuing research we started the phytochemical analysis of the hexane extract of *hymenocrater elegance,* Our studies led to the isolation of three new pimarane diterpenoids (**1-3**). Their structures were established on the basis of extensive spectroscopic data, including ^{1}H & ^{13}C NMR, ^{1}H-^{1}H COSY, HMQC and HMBC.



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1749
CHEMICAL CONSTITUENTS FROM THE ACETONE EXTRACT OF SALVIA LACNOCALYX HEDGE

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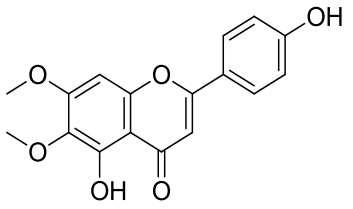
Salvia is the largest genus in the family Lamiaceae. The *Salvia* species are important medicinal and culinary plants, and they have been the subject of numerous chemical and biological studies [1]. From a phytochemical point of view, the main constituents in the aerial parts of *Salvia* species are terpenoids and flavonoids which exhibited a wide range of biological properties. *Salvia lachnocalyx* Hedge is an endemic and range restricted species which grows in the Fars province of Iran. In the present study, we have undertaken a phytochemical investigation on the acetone extract of the aerial parts of the plant [2]. We report herein the isolation and structure elucidation of a flavonoid named as Cirsimaritin (**1**) and a labdane diterpenoid named as Sclareol (**2**) from the acetone extract of the aerial parts of *Salvia lachnocalyx* Hedge. These compounds are described here for the first time from this species. Their structures were established on the basis of extensive spectroscopic data, including ^{1}H-NMR, ^{1}H-^{1}H COSY, APT, HMQC-DEPT and HMBC.



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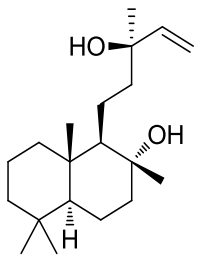

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25

EFFECT OF DIFFERENT SALINITY LEVELS ON PHYSIOLOGICAL CHARACTERISTICS OF FOUR CULTIVAR *FABA BEAN* (*VICIA FABA* L.) AND ANTIOXIDANT ENZYME QUANTITY IN LEAFS

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To study the effect of salinity levels on physiological characteristics and antioxidant enzyme activity in *Vicia faba* leaf,during the years 2012 and 2013 an experiment was conducted at research green house ofKhuzestan Agricultural Research Center. A factorial design based on completely randomized design with three replications was used. The treatments comprised of five salinity levels, , 4.5, 6.5, 8.5 and 10.5 dS/m and four *Faba bean* cultivars, Saraziri, Araqi, Barekat and Gavi. The effect of salinity stress on stomatal conductivity, respirationand relative water content was significant and increasing salt density caused a decreas in above mentioned parameters. The effect of salinity stress on quantitative antioxidant enzyme, Super oxid dismutase, Catalase and Glutation reductase in *Faba bean* leaves was significant. There was a significant difference among *Faba bean* mass on active enzyme value. The active enzyme value increaseddf on flowering stage but there had decreasing on ripening stage. Saraziri had highest SOD activate enzyme. SOD value of saraziri had significant compared to Gavi and Barkat,GR value of Araqi and Barkat, and CAT value of Gavi that had significant compared to othersdifference at 5% level. Correlation between SOD activity and relative water content shows that Saraziri with least Fluctuations of relative water content and highest enzyme value is the most resistant and Gavi is the most sensitive on salinity stress.

45

EFFECT OF PLANT GROWTH REGULATORS ON EMBRYOGENIC CALLUS INDUCTION OF *RUMEX TUBEROSUS* L. SUBSP. *HORIZENTALIS*

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The family polygonaceae consists of 30 genera and 600 species that 100 of them belong to the genus *Rumex*. The species of *R. tuberosus* L. is one of the most important medicinal plants studied in the world. Callus culture of this plant has been considered as a tool to increase production of secondary metabolites. For evaluating growth regulator effects on different tissues and embryogenic callus regeneration, MS medium supplemented with several combination of 2,4-D and Kin, and several different concentration of IAA and BAP, with 6%(w/v) Sucrose and 1 gr/l charcoal was used. This research in the form of a factorial experiment with two factors, explants in three levels and combination hormonal factor in nine levels in a randomized complete block design with 5 replications was conducted. Analysis of variance showed that there is a significant difference at 1% between the interactions of three explant with nine different hormone combinations. Duncan mean comparison test showed that the exvitro hypocotyl explants in MS medium which was supplemented by 5mg/l 2,4-D + 0.5 mg/l Kin with mean 53.4 percent was the best, and exvitro cotyledone explants with the average of 42.2 percent was ranked second.Also epicotyl explants with a minimum amount of embryogenic callus were in the last group.Regarding type of hormone combination of IAA and BAP, the considerable percent was abouthypocotyl explants and the compound 1 mg/l BAP + 0.25 mg/l IAA with 7.99 percent was selected as the best combination hormone for induction of embryogenic calli.

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47

CELL STRUCTURE AND ANATOMICAL STUDY OF THE LEAVES OF TWO CULTIVARS OF RAPESEED MEDICINAL PLANTS IN DIFFERENT CONCENTRATIONS OF NACL

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Rapeseed (*Brassica napus*) is one of the most important oil seeds in word which its oil contents exceeds 40% the nutritional and economical values of rape.this search is diwn to study the effect of salinity (Nacl) in five levels as o, 75, 100, 150 and 200 multimode of nacl as a salt in two figures of kolza which one them was resistance as 420) and the other one was sensitive as rinjet this search was done in a model of factoryl ompletely based on leaf in two figures of kolza.finding resulted from anatomical studies in salinities stress caused to chang structural cellular, leaf each two var.The results are the, indicators of this case that leaf are more rcactive , than root and stem.We observed that length mcasurment, width, longth leaf diameter by gratigolar, we witnessed length and width if incrcase of leaf and decreese of root and stem diameter. Recent findingsin two Var. 420 and Rinjet hasn,t yet reported.Tall in totally, wecan report from the conducted quality and quantity tests in research on That tow Var. of Colza, and 420 Var. in tested parameters in more resistive salinities tension and more sensitive Rinjet

49

ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY OF ESSENTIAL OIL OF THE *HERACLEUM RAWIANUM*

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In the present work, the*in vitro* antibacterial and antioxidant activity of the essential oil (EsO) of *Heracleumrawianum*, a widely used medicinal plant in Iran, as well as the composition of its essential oil were studied [1]. A total of Fourty-three compounds representing 97.7% of the oil has been identified. Butanoic acid hexyl ester (54.28%), acetic acid octyl ester (17.73%) and 3-octenyl acetate (5.12%) were characterized as the main components. Antibacterial activity of the essential oil was studied against three Gram-positive and one Gram-negative bacteria (*Staphylococcus aureus*ATCC 25923, *Enterococcus faecium*TX100, *Enterococcus faecalis*ATCC 29212, *Escherichia coli* ATCC 25922) using micro broth dilution method for determination of minimum inhibitory concentration (MIC). The results of the bioassays showed that the oil exhibited moderate antimicrobial activity against *Enterococcus faecium*(MIC value of 8mg/ml). Also, antioxidant capacities of this plantEsOwas evaluated by determiniation of its ability for scavengering of DPPH radicals comparing to butylatedhydroxyltuloene (BHT) as standard antioxidant. Result showed IC50 of 32.11mg/ml and 56µg/ml for the assessed EsO and BHT respectively.

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89

STUDY THE EFFECT OF AQUEOUS EXTRACT OF LEMON VERBENA ON THE PAIN, ANXIETY AND MEMORY IN RAT

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Lemon verbena (*Lippia citroiodora*) is a perennial shrub belonging to the family of *Verbenaceae*. Lemon verbena leaves are used to make herbal teas that are traditionally used as folk remedy in treatment of asthma, spasms, cold, fever, indigestion, insomnia, headache, anxiety and memory-enhancing properties [1], but still no scientific study has been done on its effects. In this study, the effect of lemon verbena aqueous extract on the pain, anxiety and memory in rat was evaluated.Dried leaves Lemon verbena chopped leaves were soaked in to 2 L of distilled water for 12 hours at room temperature. Then aqueous was filtered, dried by hot air ovens (50 ċ) and turned in to powder. For each of the tests, Wistar male rats (180-250 gr) were used (n=8).Extract (10, 100, 500, 1000 mg/kg) were injected intraperitoneally, (ip). To evaluate the analgesic effect, the tail-flick latency before and 20 min after treatment was measured. Also the number of writhing induced by ip acetic acid during 60 minutes was counted [5]. The effect of extract on memory was investigated in rats by using the passive avoidance task (PAT). The level of anxiety was asserted by elevated plus-maze (EPM).Results obtained for different groups were analyzed by one- way analysis of variance (ANOVA) and Tukey post-hoc test if applicable. The results are expressed as mean ± S.E.M. The differences were considered significant at $p< 0.05$.The aqueous extract of lemon verbena at the doses of 500, 1000 mg/kg caused a significant increase in the tail flick latency compared to the control group and before the treatment ($p<0.001$). The number of writhing in the lemon verbena (100,500 and 1000 mg/kg) treated groups was less than control one ($p<0.001$). Analysis of memory test data showed the treatment of the rats with the extract (≥100 mg/kg), decreased the step through latency ($p<0.001$). In addition, analysis of EPM data showed that treatment with extract (≥10 mg/kg) decreased the numbers of entrance in to the open arms and time spent in the open arms in compare to the control group ($p<0.001$).Results indicate that acute administration of aqueous extract of lemon verbena dose dependently exert analgesic effects, but injection of these mentioned doses increases the anxiety-like behaviours in EPM. Chronic administration of this extract with doses more than 100 mg/kg decrease memory performance in PAT.

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97

TRITERPENOID ISOLATED FROM HEXANE EXTRAACT OF *SALVIA LERIIFOLIIA*

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The genus Salvia belongs to the Lamiaceae family and comprises numerous species that have been used since ancient times for the treatment of several disorders [1]. Diterpenoids, triterpenoids and polyphenols are very common in plants of this genus. Most Salvia species have been extensively investigated for their potential biological properties [2]. S. leriifolia Benth., that was introduced in the Iranian Flora in 1982, geographically grows in the southern and tropical regions of the Khorassan and Semnan provinces, Iran. Different pharmacological activities of this plant, such as the attenuation of morphine dependence, hypoglycemic, analgesic, and anti-inflammatory activities, and anticonvulsant, antiulcer, and antibacterial effects, were evaluated [3].Fractionation of hexane extract of *S.leriifolia* led to the isolation of a triterpenoid(1).Its structure has been established by (1HNMR, 13CNMR and HMQC), as well as HRESIMS.

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123

INTRODUCTION AND IDENTIFICATION OF MEDICINAL PLANTS OF SOUTH OF CENTRAL SECTION IN FARS PROVINCE

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The earth is a locality of different plant species which their values are not hidden to anybody. Human has been benefited from the plants in his life according to experience, science, thought and his circumstances. Plants are basic organisms in food chains. They have been the center of attention of human since the beginning of history. Dependence of human to the plants had persuaded him to identify useful and harmful plants. Nowadays, due to high rates of population growth, the needs of regenerating natural resources by human have highly increased. Nowadays, there is research interest in medicinal plants in the world especially in our country because many people prefer them to the chemical drugs.Today medicinal plants have a special position in the pharmaceutical researches in the world. Medical community pharmacists and specialists have increased the use of medicinal plants and its products because of disadvantages and side effects of chemical drugs. Climate variation in Iran has been caused a high variation in vegetation. Collection and identification of medicinal plants will help improvement of non-chemical pharmacy and can easily lead to environmental protection.Medicinal plants in south of central section of Fars province were studied by a surveying method. Afterwards, all of the selected plants were pressed over the standard cardboard. By the help of key characteristics, the families of plants were recognized and by the help of other characteristics their genus and species were identified. In this study Latin and Persian references were used [1,2,3,4,5]. Totally 70 species of medicinal plants were identified which classified in 30 families. The most prevalent species were belonged to Asteraceae, Fabaceae, Lamiaceae, Ranunculaceae and Rosaceae .Some genera such as *Salvia* and *Ranunculus* were the most frequent medicinal plants in the region. Moreover, dicotyledonous plants were identified as dominant species in this study.

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124

INTRODUCTION AND IDENTIFICATION OF MEDICINAL PLANTS OF SOUTH OF CENTRAL SECTION IN FARS PROVINCE

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The earth is a locality of different plant species which their valuesare not hidden to anybody. Human has been benefited from the plants in his life according to experience, science, thought and his circumstances. Plants are basic organisms in food chains. They have been the center of attention of human since the beginning of history. Dependence of human to the plants had persuaded him to identify useful and harmful plants. Nowadays, due to high rates of population growth, the needs of regenerating natural resources by human have highlyincreased.Nowadays, there is research interest in medicinal plants in the world especially in our country because many people prefer them to the chemical drugs.Today medicinal plants have a special position in the pharmaceutical researches in the world. Medical community pharmacists and specialists have increased the use of medicinal plants and its products because of disadvantages and side effects of chemical drugs. Climate variation in Iran has been caused a high variation in vegetation. Collection and identification of medicinal plants will help improvement of non-chemical pharmacy and can easily lead to environmental protection.Medicinal plants in south of central section of Fars province were studied by a surveying method. Afterwards, all of the selected plants were pressed over the standard cardboard. By the help of key characteristics, the families of plants were recognized and by the help of other characteristics their genus and species were identified. In this study Latin and Persian references were used [1,2,3,4,5]. Totally 70 species of medicinal plants were identified which classified in 30 families. The most prevalent species were belonged to Asteraceae, ,Fabaceae, Lamiaceae, Ranunculaceae and Rosaceae .Some genera such as *Salvia* and *Ranunculus* were the most frequent medicinal plants in the region. Moreover, dicotyledonous plants were identified as dominant species in this study.

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133

INVESTIGATING THE EFFECT OF JASMONIC ACID ON ESSENTIAL OIL YIELD AND CHEMICAL COMPOSITIONS OF VIOLET LANDRACE OF BASIL (*OCIMUM BASILICUM*) UNDER REDUCED IRRIGATION

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Sweet basil (*Ocimum basilicum)*, a plant that is extensively cultivated in some countries, is used to enhance the flavour of salads,sauces, pasta, confectioneries and other products as both a fresh and dried herb [1,2].The effect of foliar application of Jasmonic acid and reduced irrigation on essential oil yield and chemical components of *Ocimum basilicum* (violet landrace) were investigated. The pot experiment was done at a greenhouse in Shahrekord, Iran in 2014. Treatments comprised 0.0 (JA_0) as a control, 200 (JA_1) and 400 (JA_2) µL under normal irrigation and stressed conditions.The essential oils obtained by hydro-distillation and were analyzed by Gas Chromatography-Mass Spectrometry. The highest values of oil content (2.8 % v/w) were obtained from application of 400 µL JA. Percentage of some chemical constituents in the essential oil extracted from the plants under stress was higher than non-stressed plants. Methyl chavicol content was significantly reduced under stressed conditions. Foliar application of JA significantly improved linalool, neral and β-ocimen in the oils, but reduced methyl chavicol and gernial amounts. Our results showed that foliar application of JA reduced the negative effect of water deficit in the essential oil of *O. basilicum*.

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144
THE EFFECT OF SALINITY STRESS IN GROWTH STAGE ON PHENOL AND ANTHOCYANIN CONTENT IN *HYSSOPUS OFFICINALIS*

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Salinity has adverse effects on plant development and ultimately reduces plant production. The ability of plants to grow under high salinityis known as salt tolerance. Although *Hyssopus officinalis* is one of the valuable medicinal plants and its cultivation is continuously being extended in the world, no information is available on the responses of this plant to salinity.Hyssop (*Hyssopus officinalis* L.) is an important medicinal plant that affected by different environmental stresses. In this study, the effects of salinity stress on phenol and anthocyanin contents in hyssop plants were studied. The treatments were six levels (0, 2, 4, 6, 8 and 10 dSm^{-1}) of saline water (hoze-Sultan). In relation with phenolic compound content was observed that with increasing EC, phenolic compound content was significantly ($P<0.001$) increased. Also results expressed increasing of leaves anthocyanin content that was synchronized with increasing of salinity. This result showed that *Hyssopus officinalis*plants could be tolerated salinity conditions with increasing phenol content in the root and leaves and anthocyanin concentration in the leaves [1, 8].

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172
DETERMINATION OF ARTEMISININ CONTENT IN 17 *ARTEMISIA* SPECIES OF IRAN

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Artemisia species are frequently utilized for the treatment of diseases such as malaria, hepatitis, cancer, inflammation and infections by fungi, bacteria and viruses [3]. Artemisinin is an effective anti-malarial drug. Furthermore, it is also active against cancer, hepatitis and schistosomiasis [2].Since chemical synthesis of artemisinin is impossible for a reasonable of price, *Artemisia annua* is the only commercial source [1].Artemisinin concentration was analyzed of *A.annua* and 16 other *Artemisia* species of Iran using high performance liquid chromatography (HPLC). The highest artemisinin concentration was detected in *A.incana* (48.72 mg g^{-1} DW), followed by *A.marschelliana* (31.52 mg g^{-1} DW) and *A.annua* (18.9 mg g^{-1} DW). This study identified two novel plant sources of artemisinin that performed superior than *A.annua* and 11 plant sources of artemisinin which may be helpful for the pharmaceutical production of artemisinin.

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183
EXTRACTION AND IDENTIFICATION OF THE ACTIVEINGREDIENTS OF THE PLANT RHUBARB (RHEUM RIBES)

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Rheum ribes L. is one of the wid rhubarb species belonging to polygonaceae . R. ribes is locally known as, usgun or, ucgun and grown mostly in eastern turkey, lebanon and azerbaijani region of Iran. Young shoots and petioles of R. ribes are used against diarrhea as well as stomachic and antiemetic while juice of some parts of the plant is used against hemorrhoids, measles, smallpox and cholagogue Its fresh stems and petioles are consumed as vegetable, and stems are also eaten fresh, which are used as digestive and appetizer in bitlis, eastern turkey, while the roots are used to treat diabetes, hypertension , obesity, ulcer, diarrhea antihelmintic and expectorant. The air dried powdered stems and flowers of rheum ribes were sequentially extracted at room temperature with hexane ,chloroform and methanol. Separation by thin-layer chromatography was performed on silica gel 60 F_{254} plates. The extracts were separately evaporated under vacuo to dryness . Hexane extract of stems of rheum was isolated by acetone / pet-ether solvent system to 11 fractions was isolated . chloroform extract of stems by chloroform / methanol / ethyl acetate/ to 8 fractions was isolated and methanol extract by methanol/ ethyl acetate/ H_2O/ acid acetic to 7 fractions was isolated. Hexane extract of flower by acetone / pet-ether to 10 fractions was isolated . chloroform extract of flowers by acetone/pet-ether to 6 fractions was isolated .Methanol extract of flower by acetone / pet-ether to 6 fractions was isolated and fraction 1 of methanol extract by ethyl acetate /acid acetic / water/methanol was isolated. Identification tests for tannin , terpenoids, flavonoids, anthraquinone, saponin, alkaloid, steroid compounds of flowers and stem Rheum ribes L extracts were .Showed stronger effects than flower extracts of the stem extract. Purified compounds were identified by means of IR spectroscopy and ^{1}HNMR and ^{13}CNMR were detected.

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195
THE ANTIBACTERIAL EFFECTS OF *ACHILLEAMILLEFOLIUM*AND*ALLIUMURSINUM* EXTRACTSON SOME BACTERIA ISOLATED FROM PATIENTSWITH URINARY TRACTINFECTION IN ILAM

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Urinary tract infection is the most common clinical problems in the world. Despite of treatment with various antibiotics; there is possibility of infection recurrent and bacterial resistance rate to antibiotics during treatment. The situation of medicinal plants used in traditional medicine in our country and plant sources available on the one hand and difficulties in treatment of infections caused by antimicrobial-resistant strain of herbal medicines is another factor for closer examination. This study was conducted to evaluation of antibacterial activity of *Achillea millefolium* and *Allium ursinum* extracts against some bacteria isolated from patient with urinary tract infection in Ilam. The leaves and flowers of plants was collected from natural habitats and then dried from dark room. The aqueous and ethanolic extract of plants was carried using succulate apparatus and their antibacterial effects were detected using disk diffusion method. The methods were repeated three times for each test, the mean diameter of inhibition zone was measured. Broth micro dilution method was performed to determination of minimum inhibitory concentration (MIC). The results showed that ethanolic extracts gave the widest zone of inhibition against the tested organisms. *Staphylococcus saprophyticus* was more sensitive to the extracts to *Achillea millefolium* and *Allium ursinum* incompare to other organisms. Both plants had antibacterial activities on the gram positive organisms, but have had little effective on the gram negative organisms. Ethanolic extract of *Achillea millefolium* exhibited inhibitory effects on *S. aureus*, *S. saprophyticus* and *E. coli*. The minimal MIC was belong to *Staphylococcus saprophyticus* in contrast to other bacteria to alcoholic extract of *Achillea*, and it's rate was 6/25 mg/ml. *Achillea millefolium* and *Allium ursinum* extracts inhibited growth of pathogenic bacteria especially gram positive bacteria. Clinical applications of these materials needed further investigations.

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196
THEANTIBACTERIALEFFECTS AF*PEGANUM HARMALA*AND*VERBASCUM THAPSUS* EXTRACTS ON PATHOGENICBACTERIAIN VITRO

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Concurrent with the development of newchemical drugs and antibiotics, their harmful effects are gradually emerged. Due to lack of harmful effects, herbal medicines have been used in the pharmaceutical industry. The aim of this study was the evaluation of *Peganumharmala* and *Verbascumthapsus* extracts as an herbal medicine for the replacement of antibiotics and chemicals drugs. The leaves and flowers of plants was collected from natural habitats and then dried from dark room. The aqueous and ethanolic extract of plants was carried using succulate apparatus and their antibacterial effects were performed using disk diffusion method. The methods were repeated three times for each test, the mean diameter of inhibition zone was measured.Broth micro dilution method was performed to determination of minimum inhibitory concentration (MIC). The results showed that *Peganumharmala* and *Verbascumthapsus* extractsinhibited growth of pathogenic bacteria especially gram positive bacteria.*Peganumharmala* extractexhibited inhibitory effects on *S. saprophyticus* and theMIC was50mg/ml.extracts of *Verbascumthapsus*exhibited inhibitory effects on *S. aureus, S. saprophyticus, E. coli* and *B.cereus*with a range of MIC values extended from 12.5 to 50 mg/ml.*Peganumharmala* and *Verbascumthapsus* extractsinhibited growth of pathogenic bacteria. Clinical applications of these materials needed further investigations.

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198

THE JUJUBE (*ZIZIPHUS JUJUBA* MILL.) FRUITS OF IRAN: A SCREEN OF FRUIT COMPOSITION AND MORPHOLOGY

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Zizyphus jujuba,which belongs to the family Rhamnaceae, is widely distributed in Europe and Southeastern Asia. This plant is one of the most valuable medicinal plants which grow in south-Khorasan province. This plant is widely used as a folkmedicine for the treatment of anti-fertility, analgesic, and anti-diabetes. However, there are few scientific studies about the composition and morphological differences of Iranian *Z. jujuba* fruits.Therefore, the fruits of 29 *Z. jujuba*genotypes were harvested from sarbisheh collection in September 2013. Fruit diameter, length, average fresh weight of ten fruits and soluble and non soluble carbohydrate content of fruits were measured. The results showed that, the highest fresh weight was detected in ghahbandan arabkhaneh, khanghahe bardeskan and kalkatane noghab (6.52, 6.25 and 6.15 g, respectively). The lowest fresh weights were observed in kazerune shiraz, maghame sari, koshuke birjand, juibar and Esfahan shahreza (2.26, 3, 3.11, 3.13 and 3.18g, respectively). The results indicated that, ghahbandan arabkhaneh had the highest fruit diameter (2.17 cm) and length (2.72 cm). Based on the results obtained, the highest soluble carbohydrate content was in kiuke birjand, ghom and ghahbandan arabkhaneh (35.91, 35.61 and 35.47 mg g^{-1} DW),respectively. Further analysis showed that, the highest non soluble carbohydrate content were in ardestan Esfahan, ghahbandan arabkhaneh and khanghahe bardeskan (9.17, 8.43 and 8.75 mg g^{-1} DW),respectively. The further analysis of Iranian *Z. jujuba*genotypes in this project willlead to more profound informationon composition of valuable food or medicinal materials of *Z. jujuba*fruits. The present results showed that there are a great variety in composition and morphological characteristics in Iranian *Z. jujuba*fruits and it is possible to enhance quality parameter in an agricultural breeding program.

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201
EVALUATION OF FREE RADICAL SCAVENGING OF PLAMT EXTRACTS OF *HYSSOPUS OFFICINALIS* L. IN DIFFERENT IRRIGATION CONDITIONS

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Essential oils and extracts from medicinal plants are regarded as natural food preservatives and health promoting drugs [1]. The present study was aimed to evaluate the antioxidant capacity of water extractsof *Hyssopus officinalis* L. cultivated in three different levels of water deficit (A_1: 80% field capacity: control, A_2: 60% field capacity, A_3:40% field capacity) of via DPPH free radical scavenging activity[2].The 50% inhibition (IC_{50}) values ofA_1 (control), A_2 andA_3were 0.083, 0.12 and 0.15 μg ml−1 respectively.Results show that IC_{50}values of the water extracts of the 3 environments (no stress, mild stress and extreme stress) are much lower that BHT as the positive control and this demonstrates the fact that theantioxidant potency of the water extracts of this plant in any irrigation conditions is very high. Also the antioxidant potency of the extract of this plant decreases by increasing the stress. It is worth noting that even the most IC_{50} values of the water extract that were observed, show remarkable antioxidative activity in this plant that can introduce it as a natural source for antioxidants to food and pharmaceutical industries.

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203
GENETIC STRUCTURE AND OIL CONTENT EVALUATION OFFLAXSEED(*LINUM USITATISSIMUM*) BY USINGMICROSATELLITE MARKERS

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Today, omega 3 fatty acids are an object of considerable medical and nutritional research for a wide range of human health conditions and disorders, including infammation, joint and bone health, menopause, aging, obesity and cardiovascular disease [1]. Flaxseed is regarded as a functional food or nutraceutical because it contains the omega 3 fatty acid, alpha-linolenic acid (ALA) [2,3]. Omega 3 fatty acids in flaxseed have been shown to inhibit the growth in vitro of colon, breast and prostate cancers [4]. A diet rich in both omega 3 fatty acids and dietary fiber appears to offer significant protection against lymphoma [5].Development and characterization of flax genetic resources and assessment of genetic variability are essential for germplasm conservation and breeding.In present study, genetic diversity as well as oil contentwereevaluated in 3 geographical populationsof *Linum usitatissimum* using microsatellite markers and Mass spectrophotometer respectively.STRUCTURE analysis and K-Means clustering revealed some degree of genetic admixture among the studied populations.AMOVA testalso showedpopulation difference in allele composition and frequency. The amount ofomega-3fatty acids by GC analysis techniq ues were evaluated inflax populations and differences were observed about them.

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204
GENETIC DIVERSITY IN MEDICINAL HERB, *POLYGONUMAVICULARE* L. IN IRAN

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Polygonum aviculare L. or common knotgrass (Polygonaceae) is a medicinal plant widely distributed in North hemisphere. This herbaceous plant has long been used in folk medicine for diseases of the liver, kidneys, and bladder and for tuberculosis and various tumors, and in modern medicine as an astringent, tonic, and diuretic agent. Recently, anti cancer properties and anti obesity of this plant have been reported [1, 2].
In order to know the genetic diversity of this valuable plant, this study was done for the first time in Iran. Genetic variability and populations' structure were studied in 109 plant specimens from 12 geographical populations of this plant distributed in the eastern and western parts of Iran. ISSR molecular markers were used for genetic study. Genomic DNA was extracted using CTAB activated charcoal protocol [3].10 primers commercialized by UBC were used. AMOVA and Gst [4] analyses revealed the presence of extensive genetic variability within and among studied populations. Mantel test showed positive significant correlation between genetic distance and geographical distance of the studied populations. STRUCTURE [5] and K-Means clustering [6] revealed populations' genetic stratification. Moreover some degrees of gene exchange were seen among populations. These results may be of use for future conservation and breeding of this medicinally important plant species.

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209
ANTIOXIDANT PROPERTIES OF STEMS ESSENTIAL OIL AND HYDROALCHOLICEXTRACT *ECHINOPHORA CINEREA*

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Antioxidants are compounds that protect the body against damagecaused by oxidative stress that induce by free radicals. The aim of this study is to compare the antioxidative activities ofstems hydroalcholic extract and essential oil of *Echinophora Cinerea*. This experimental study, which carried out in 1390 in Lorestan MedicalUniversity.Stems hydroalcholic extract and essential oil of *Echinophora Cinerea* were prepared and then antioxidant properties of samples were assessed. The power of destroying the free radicals was measured usingDiphenylpicrylhydrazyl (DPPH), Total antioxidant capacity samples was measured by Phosphomolybdate and the amount oftotal phenol and flavonoid of samples was measured by Folin-Ciocalteu and Zhishen.It was demonstrated that total antioxidant capacity of Stems hydroalcholic extract and essential oil of *Echinophora Cinerea* is (0.92±0.07; 2.13±0.56), phenol content of Stems hydroalcholic extract and essential oil of *Echinophora Cinerea* is (74.25±3.93; 76.25±3.73), and flavonoid content of Stems hydroalcholic extract and essential oil of *Echinophora Cinerea* is (7.33±0.28; 0.5±0.25). In the DPPH assay, the IC_{50} value of stems hydroalcholic extract and essential oil and Butylated hydroxytoluene (BHT) as a positive control were (1678.6±5.00, 540.12±5.00, 133.00±3 μg/ml).This study showed that *Echinophora Cinerea* extract is a source of natural of antioxidants that is easily accessible and it may be suitable for using in foods, pharmaceutical and industries [1][2].

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214

EFFECT OF HEAVY METALS ON SEED GERMINATION AND SEEDLING GROWTH IN SOME MEDICINAL PLANTS

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This study were conducted to test the effect of heavy metals (Pb, Ni, Cd and Zn) on seed germination and seedling growth in *Amaranthus retroflexus* L., *Cardaria draba* L., *Foeniculum vulgare*Mill.Three replicates of Petri dishes, each containing 50 seeds, were used for each test. For each heavy metal, test solutions were prepared at two concentrations including: the critical concentration in the soil andapproximately two times the critical concentration. Distilled water was used as a control.The aim of this research work was to screen studied species for tolerance of heavy metal. The results showed that seedling growth was more affected by different concentration of the heavy metals than seed germination. According to the results, seed germination of *Amaranthus retroflexus* L. was stimulated under zinc (500 and 700 mg/l) and Pb (200 and 500 mg/l) treatmentsby more than 40 percent in compared with the control. Also the results showed that seedling growth of *Cardaria draba* L. was stimulated under lower concentration of pb (50 mg/l) and Ni (8 mg/l) by more than 20 percent in compared with the control. *Cardaria draba* L.exhibited tolerance to leadandnickel.

224

EFFECT OF HYDRO-ALCOHOLIC EXTRACT OF PEEL OF *PUNICA GRANATUM* L. ON GROWTH OF *CANDIDA ALBICANS* IN ALLOXAN-INDUCED DIABETIC RATS

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Biological synthesis of noble metal nanoparticles is a greatly developing area of research. Metallic nanoparticles have received enormous attention from physicists, biologists, engineers and chemists who wish to use them for the development of a new-generation of nano devices. The exploitation of different plant materials for the nanoparticles biosynthesis is considered a green technology because it does not include any harmful chemicals. The aim of this study was to evaluate the influences of aqueous extracts of plant parts (stem, leaves and root) of *Pulicariavulgaris* L., a medical plant,on silver nanoparticles (AgNPs) bioformation. Silver nanoparticles synthesis by various plant part extracts of *Pulicaria vulgaris* L. was performed and nanoparticles formation were confirmed and evaluated using atomic force microscopy (AFM), transmission electron microscopy (TEM) and UV-Visible spectroscopy. The different plant extracts exposed with silver nitrate exhibited gradual change in the extract color from yellow to dark brown. Different of the silver nanoparticles were formed using various plant parts extracts. The ultraviolet-visible spectrum of the aqueous medium containing silver nanoparticles showed a peak of absorption at around 415 nm. Transmission electron microscopy exhibited that mean diameter for the silver nanoparticles formation was 30-40 nm. The synthesized nanoparticles through this biosynthesis method can potentially useful in different applications. The most needed outcome of this research will be the value-added products development from *Pulicaria vulgaris* for biomedical and nanotechnology-based industries. Moreover, the AgNPs antimicrobial potential was investigated. The results showed that the biosynthesized AgNPs could inhibit various pathogenic organisms such as fungi and bacteria. The present study opens a new avenue for the nanomaterial green synthesis.

226

THE EFFECTS OF SOLVENT TYPE AND EXTRACTION METHOD ON PHENOLICS CONTENT, ANTIOXIDANT AND ANTIBACTERIAL PROPERTIES OF PENNYROYAL (*MENTHA PULEGIUM* L.) EXTRACT

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The pennyroyal (*Menthe pulegium* L.) is a member of Lamiaceae which has been used widely in traditional medicine and food industries. Two of the major factors that should be considered in essential oil extraction are the solvent type and extraction method. In current study, the effects of two solvents (Ethanol and Methanol) and two extraction methods (soaking and suxhlet) on phenolics and flavonoid contents, antibacterial and antiradical properties of extracts were investigated in a factorial experiment based on completely randomized block design. The analysis variance of results showed, although extraction method had no significant effects on flavonoids but the solvent type and the interaction of solvent and extraction method had significant effects on flavonoids ($p \leq 0.01$). According to our results the solvent type has significant effect on phenolics ($p \leq 0.05$), but the extraction method and their interaction had no significant effects. The effects of pennyroyal extract on free radical scavenging indicated that the solvent type and extraction method affected antiradical properties of extract significantly ($p \leq 0.05$), but their interaction had no effects on it. The MIC and MBC experiments on gram positive (*Staphylococcus aureus* and *Bacillus cereus*) and gram negative (*Escherichia coli* and *Pseudomonas aeruginosa*) bacteria, indicated that all extracts showed antibacterial properties and the highest sensitivity observed in *Bacillus cereus*. Also, the means comparison of results showed that the highest phenolics and flavonoid contents, antiradical and antibacterial properties were observed in methanolic extract obtained by soaking method.

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231
SIMUTANEOUS DETERMINATION OF PROTOCATECHUIC ALDEHYDE AND PROTOCATECHUIC ACID USING LOCALIZED SURFASE PLASMON RESONANCE PEAK OF SILVER NANOPARTICLES AND CHEMOMETRIC METHODS

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Protocatechuic acid (PAC) and protocatechuic aldehyde (PAH) are the most effective active ingredients in some of the Chinese conventional herbal drugs such as Salivia miltorrhrza [1], Fufang-Pugongying-Mixture [2], Shuangdan granule [3], and Zaoren-an-shen capsules [4]. In order to study the clinical effects, it is significant to develop an easy, sensitive and fast method for the simultaneous determination of PAC and PAH in pharmaceutical preparations. So far, the commonly used techniques for simultaneous determination of PAH and PAC in pharmaceutical preparations are chromatography (TLC and RP-HPLC) [2,5] and capillary electrophoresis with electrochemical, UV-visible absorbance and chemiluminescence detectors [6-8].A simple and sensitive spectrophotometric method is proposed for the simultaneous determination of protocatechuic acid and protocatechuic aldehyde. The method is based on the difference in the kinetic rates of the reactions of analytes with $[Ag(NH_3)_2]^+$ in the presence of polyvinylpyrrolidone to produce silver nanoparticles. The obtained data were processed by chemometric methods of principal component analysis artificial neural network and partial least squares. Excellent linearity was obtained in the concentration ranges of 1.23-58.56 μg $mL^{-1}$and 0.08-30.39 μg mL^{-1} for PAC and PAH, respectively. The detection limits for PAC and PAH were 0.039 and 0.025 μg mL^{-1}, respectively.

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236
INDUCTION OFDIOSGENIN PRODUCTION IN HAIRY ROOT CULTURES OF *TRIBULUS TERRESTRIS* L. VIA AGROBACTERIUM – MEDIATED GENETIC TRANSFORMATION

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In this study, we have selected *Tribulusterrestris* L, a herb of zygophyllaceae, due to its high medicinal value. *T.terrestris* is a source of pharmacologically active compounds such as saponins, flavonoids, β-carboline alkaloids, phytosteroids and other nutrients [1].Transgenic hairy roots were induced from leaf explants of *in vivoT. terrestris* plant after cocultivation with *Agrobacterium rhizogenes* AR15834 and GMI9534. The transfer of *rol B* gene into the *T. terrestris* was confirmed by PCR analysis. The most active strain, the AR15834 was examined for its growth and secondary metabolite content.Extraction and measurement of diosgenin of the samples were determined by Drapeau *et al*[2] methods.In our research, transgenic hairy roots showed vigorous growth and produced equal amounts diosgenin in compared with non-transformed rootsbut the production of secondary metabolite may have increased due to rapid accumulation of a considerable root mass by continuous and active growth of roots in*invitro* condition. In recent years, many investigations have been reported on the important pharmacological attributes of diosgeninand its derivatives such as anti-diabetic, anticancer, antagonistic effects on rheumatoid arthritis, cardiovascularaction, and antimalarial action [3].

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238
THE EFFECT OF COMPOUND DRUG ON BLOOD GLUCOSEIN STREPTOZOCIN-INDUCED DIABETIC RAT

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Diabetes is one of the most common diseases of endocrine glands system in body and its symptoms are: rising blood glucose, carbohydrate, lipid and protein metabolism disorders.In this study the effect of steamed compound drug for blood glucose (urtica dioica leaf, morus alba leaf, allium sativum powder, trigonella foenum-graecum powder, juglans regia leaf, cinnamomum zeylanicum bark) on level of glucose in experimentally induced diabetic rats by STZ, was investigated. 32 male adult Wistar rats were divided in to 4 groups:
1.Healthy rats without intervention (control group).
2.Healthy rats group recipient compound drug.
3.Diabetic rats group without intervention.
4.Diabetic rats group + compound drug, diabetes was induced to this group by STZ injection and daily 6/0 cc dose of compound drug (Ghandkhon capsule made in booAlidarooGhom company) was taken to rats through gavage, during two weeks.Levels of blood glucose in these animals were investigated on third, seventh and thirteenth days (in 12 hours fasting condition). Results showed that level of blood glucose in diabetic rats decreased in comparison with other groups.($P < 0/0001$). But this drug doesn't have remarkable effect on blood glucose decrease in healthy rats.Conclusion: Due to the notable decrease in level of blood glucose in rats, this drug can be useful for diabetic treatment in human patients. It is recommended that clinical examination carried out on this production.

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248

THE EFFECT OF CAMELTHORN EXTRACT ON HISTOLOGIC CHANGES IN CCL4-INDUCED HEPATIC LESIONS IN RATS

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In folk medicine, plants play a very important role in human life since the ancient time, not only as a source of food, but also in treatment of various diseases [1].Camelthorn (*Alhagi maurorum* L) was used in folk medicine as a remedy forrheumatic pains, bilharziasis, urinary tract infection and for various types of gastrointestinal discomfort [2]. The aim of the present study is to evaluate the protective effect of camelthorn aerial parts extract against carbon tetrachloride (CCl4)-induced liver damage in male Wistar rats. In an experimental study, adult male rats received daily oral administrations of different doses camelthorn extracts (0.05, 0.1, 0.2 and 0.4 g/kg bw) along with intrapertioneal CCl4 (50% CCl4 in olive oil, 1 ml/kg bw) twice a week for 28 consecutive days. Histopathological examinations in CCl4-treated rats showed extensive liver injuries characterized by extensive hepatocellular degeneration and necrosis, fat degeneration, and inflammatory cell infiltration while histopathological changes induced by CCl4 were significantly attenuated by camelthorn extract treatment. The results of this study suggest thatcamelthorn extract acts as a potent hepatoprotective agent against CCl4 induced hepatotoxicity in rats.

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250
TOXICITY ACTIVITY OF ESSENTIAL OILS ON BARNACLE'S LARVAE

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Barnacles are typical macrofouling organisms found in marine environment, because their settlement involves the attachment of larvae on immersed solid surface, research has focused on processes necessary to their settlement *Amphibalanus Amphitrite* [1].Essential oil is a concentrated hydrophobic liquid containing volatile aroma compounds from plants Essential oils are generally extracted by distillation, often by using steam. Other processes include expression or solvent extraction [2]. Barnacles *(Balanus Amphitr)* used for this study was harvested in the intertidal zone and collected from Bandar Abbas, Hormozgan province, Persian Gulf. Brood sacs containing mature nauplii were dissected from the animals and nauplli were released by removing the enveloping membrane in filtered sea water [3].Although *balanus Amphitrite* has been used toxicity in bioassays, no comparison has been made of the sensitivity of the different larvae stage to essential oils. Result showed that at 24h LC_{50} for three types of essential oils such as *Zataria multiflora*, *Satureja rechingeri*, *Satureja Khuzistanica* was 362, 187, 101 µg/ml, respectively. The result indicates that the earlier naupliar stages (nauplius II and IV) are more susceptible to essential oils stress than the last naupliar stage. In other words , In the high concentration of essential oils the rate of mortality increased and the nauplii may become more tolerant to essential oils stress as they develop through successive larval stages [4].

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251
ANTIFERTILITY ACTIVITY OF CELERY (*APIUM GRAVEOLENS* L.) EXTRACT IN MALE RATS

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Causes of infertility in men are includedoligozoospermia, immaturity of sperm, sperm deformity, and sperm non-motility[1]. Some of the plants due to the presence of specific active ingredients can be effective in reducing or preventing fertilization[2].In this study the possible effects of celery on sperm viability in male Sprague- Dawley rats were investigated. The represent study was aimed at evaluating the effect of 3 level of celery extract (200, 400 and 600 mg / kg / cc) on forty male Sprague- Dawley rats. The treated rats(approximately eight-week old) were gavaged with extracts daily for fifty-four consecutive days. The results showed that celery extract have significant effect on sperm count (including normal-alive, abnormal-alive and dead sperm count) and sperm motility. The number of alive-normal sperm count decrease and dead sperm count increase with increasing concentration of celery extract. The maximum alive-normal sperm count (92±1.3) and the lowest dead sperm count (7.5±0.9) were observed in rats which treated with 200 mg / kg /cc of celery extract. sperm motility was significantly lower (12.5%) in the rats which treated with 600 mg / kg /cc of celery extract as compared to them which gavaged with higher dosages. It seems that celery can affect on sperm viability and motility, and thus caused the decline in the reproductive system of rats.

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261

ANTIMICROBIAL AND PHYTOCHEMICAL PROPERTY OF *ZIZIPHU SPINCHRISTIA* ON ISOLATED VIBRIO SPP. FROM SHRIMP AQUACULTURE IN BUSHEHR PROVINCE

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Vibriosis is one of the most prevalent bacterial fish diseases worldwide. In deed different species of Vibrio are responsible for vibriosis in shrimp,which can occur at all developmental stages. On the other hand, use of antimicrobial agents in aquacultures may could alter the dynamics of bacterial communities and induce antibiotic resistance.Therefore, in the present study totally 315water, sediment and shrimp(*Litopenaeus vannamei*) samples were collected from three aquaculture in Delvar,Helle and mond in bushehr province during May– August 2014. The samples were cultivated on TCBS agar medium and incubated at 37^0C for 24 hrs. Then the pure isolates were identified using ApiKit 20E. Furthermore, effect of methanol, acetone and aqueous extract of *Ziziphu spinchristia* leaves were evaluated on the isolates using well diffusion agar technique and MIC of the herbal plant for each organism were calculated. Finally, presence of phytochemical compounds of the plant was determined using different biochemical tests. The results of PCR obtained from this study indicated that out of 252 isolates the species were belonging to *V.corallilyticus* strain *ATCC BAA-450* (48.41%), *V.alginolyticus*strain *l67* (11.11%), *V.alginolyticus*strain *CIFRI V-TSB1*(7.54%),*V.harveyi* (3.57%), *V.hepatarius* strain *CIBAAG5* (3.57%) and others (25.75%) were belong to *Aeromonas* species. Among the three solvents, aqueous extract of *Ziziphu spinchristia* pro showed Minimum inhibitory zone ofinhibition against *V.alginolyticus strain l67* and*V.corallilyticus* strain *ATCC BAA-450*.The Minimum inhibitory concentration (MIC) of aqueous extract against the test pathogens was calculated as 0.1267±0.0023,0.0413±0.0103,0.1267±0.0233,0.0104±0.0026µg/ml, respectively. Aqueous extractof *Ziziphu spinchristia* no effect against the*V.alginolyticus*strain *CIFRI V-TSB1*. In addition the phytochemical compounds were identified as: Alkaloids,Saponins and Glycosids.Consequently it could beconcludedthat *Ziziphu spinchristia* with different phytochemical compounds could be use for remedy of vibriosis in shrimp aquacultures.

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268

STUDIES ON MORPHOLOGY OF SOME MEDICINAL PLANTS *CAPPARIS SPINOSA L.* (CAPPARACEAE) SPECIES IN IRAN

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Capparis (Capparaceae) as a medicinal plant is native to Mediterranean region of the world[1]. This plants are of ecological and medicinal importance with more than 250 species in the world [3] and 5 species in Iran. This plants are found in the region with almost 350 mm annual rain fall and these are adapted to the place with more than 40˚C summer temperature. These plants are distributed in different habitats of Iran as old walls, crevices of hard rock outcrops and foothillsof Alborz chainmountains, Baloochestan, Ardebil, Shiraz, Bandarabas, Khoozestan, Ghazvin Provinces, etc.Its medicinal effects are anti-rheumatic, amenorrheaic, anti-inflammatory, antimicrobial and antifungal activities, flatulence reducer, hepatic stimulant, improving liver function, treat of coronary heart disease andanemia [1, 2]. The main aim of present study is to evaluate the morphological variation of *Capparis spinosa* in different localities of Iran. For this purpose we used 13 accessions of different localities of Iran and we studied 18 qualitative and 18 quantitative morphological features from vegetative and reproductive parts. We used multivariate statistical methods including ordination factor and cluster analysis to study the data. Results show that most variation is shown in leaf shape and size and petiole size. Intraspecific variation in this species is evaluated.

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269

SECONDARY METABOLITES IN GLANDULAR TRICHOMES OF FENUGREEK (*TRIGONELLA FOENUM-GRAECUM*)

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A great variety of important chemical compounds areproduced by specialized secretory cells, on many plants in theform of glandular trichomes, which are involved in an array of functions[1].Furthermore, the locality of secondary metabolites important in medicinal applications needed to be ascertained. This information would be useful in deciding the protocol required for isolation of such compounds.Fenugreek (Fabaceae) an aromatic plant, with medicinal application,potentially has economic value. The chemical content was studied by applying various chemical reagents and fluorescence microscopy. Two types of glandular trichomes were distinguished on the leaves and stem of fenugreek. Both of the trichomes containing alkaloid compounds are probably the main site of their accumulation. Fluorescent stain indicated the possible presence of phenoliccompounds. Other secondary metabolites included lipids, mucilaginous polysaccharides and amino acids. The glandular cells not exhibit of cell actively involved in the secretion of terpenoids. This study linking the chemical content of the glandular trichomes of T. foenum-graecum has contributed to the knowledge and understanding of secretory structures of trigonella spp. in general.

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272

PALYNOLOGICAL STUDY OF MEDICINAL PLANT OF THE GENUS *ACHILLEA*

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Achillea as an important medicinal plant with more than100 species in the world is one of the youngest genera of the Asteraceae from the evolutionary point of view[3]. Its main centers of origin are Europe, Asia and north of America[1]. This genus comprises 19 perennial and often aromatic species (seven of which are endemic)[1, 3]. These species are grouped in four sections. Main application of this medicinal plant are stopping bleeding, stimulate growth, treatment of gastrointestinal disorders,antibiotics,fever reducer, insomnia treatment,sedating,strengthen the liver,treatment of liver cirrhosis,treatment of arthritis,mouthwash,cold treatment, reducer of urea and bladder secretions[2].The main of present study is to evaluate pollen morphology of some *Achillea* species which are distributed in different habitats of Iran. Totally 20 accessions of 9 species of this genus were studied by light and scanning electron microscope. Qualitative and quantitative features of pollen grains were studied multivariate statistical methods as cluster, factor and ordination analyses. Pollen grains were tricolporate and also tetracolporate with oblate-sphroidal, spheroidal, prolate-sphroidal and subprolate shape. Exine sculpture was echinate-microperforate and echinate-rugulate-microperforate. Results of present study revealed that many morphological features of pollen grains especially exine sculpture pattern is of diagnostic value. Species relationship is discussed.

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279

EFFECTS OF EXOGENOUS SALICYLIC ACID ON ANTIOXIDANT ACTIVITY, TOTAL PHENOLIC CONTENT AND ROSMARINIC ACID CONTENT IN *ROSMARINUS OFFICINALIS L.*

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Rosemary (*Rosmarinus officinalis L.)* is a member of lamiaceae. This family is one of the major sources of culinary,vegetable and medicinal plants all over the world. Rosemary is a rich source of natural antioxidants [1,2]. In this study treatment by 150 ppm and 300 ppm salicylic acid solution were used to investigate elicitor effects on Rosemary plant .The antioxidant activity, total phenolic content, rosmarinic acid content were evaluated. There was a correlation between phenolic content and antioxidant activity. In plants treated with 150 ppm SA, phenolic content was higher than other treatment.On the other hand treatment by 300 ppm SA solution was more effective on rosmarinic acid content. concentration of other compounds and synergistic or antagonistic effects, making it difficult to obtain correlation between SA doses and antioxidant capacity of shoot extract. Further investigations are needs to clarify the underlying mechanisms.

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284
THE EFFECTS OF DROUGHT STRESS ON THE CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *HYSSOPUS OFFICINALIS* L.

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Hyssopus officinalis L. is one of the most important plants producing essential oil.The essential oil of *Hyssop* is widely used in food, pharmaceutical and cosmetic industries throughout the world [1].Since medicinal plants react differently to drought stress in terms of function and the produced effective materials, in this study, we decided to analyze the effects of drought stress on the chemical composition of the essential oil of *Hyssop* [2].Three levels of water deficit stress including A_1 (80% field capacity: control, no stress), A_2 (60% field capacity, mild stress), A3 (40% field capacity, intense stress) were induced to the pots under controlled conditions.The essential oils obtained from the aerial parts of *H. officinalis* were extracted by the hydrodistillation method. The chemical composition of the oils were determined by gas chromatography-mass spectrometry (GC-MS).The analyses revealed the presence of 31 compounds in the 80% field capacity oil, 27 compounds in the 60% field capacity oil and 42 compounds in the essential oil from 40% field capacity.Results indicated that at all three levels of irrigation, the main components of *H. officinalis* L. oil were as follows: cis-pinocamphone(45.32%-25.67%) trans-pinocamphone (33.08%-15.31%)and β-pinene (11.44%-6.09%).Comparison of the essential oils obtained from the three drought stresses showed that composition and quantity of the components of the essential oils from 80 and 40% field capacities are not much different, however when the mild stress (60% field capacity) was produced, the quantity of the main components of the essential oil showed a lot of changes. For instance, in the environment free from stress the main components were cis-pinocamphone (45.32%) and β-pinene (10.24%); but these components in the environment of extreme stress were respectively 36.79% and 11.44%. These same

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303

THE IDENTIFICATION OF MEDICINAL PLANTS IN PASTURE AREAS OF GUILAN PROVINCE

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The use of medicinal plants has always been importantsince the birth of mankind.thus,The first step for accurate using of therapeutic effects is the appropriate identify and accurate gathering of plants species.Guilan Province, due to the diversity and inrichment of appropriate species is full of medicinal plants.The survey was conducted by using the navigation field and documentary studies.Then identify, categorize and identify the plants were in the pasture range of Guilan.Results showed that 192 plant species among 50 family are known as the medicinal plants.The most widely used herbal family are include of 6family.Respectively, the maximum variation in the plant family, Compositae with 34 species of medicinal plants, Labiatae with 26 species of medicinal plants and umbellifera with 15 species of medicinal plants, Papilionaceae with 12 species of medicinal plants,Cruciferae and Rosaceae each one with 11species of medicinal plants are contains most species of medicinal plants in the forest range of guilan province.

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308

GENETIC DIVERSITY OF FLAXSEED (*LINUM USITATISSIMUM* L.) ASSESSED USING MOLECULAR MARKER AND OIL CONTENT

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Linum is the main genus of the flax family widely distributed across the word with about 300 species [1].Flaxseed (*linum usitatissimum* L.) is an important nutraceutical and is added in functional food for health benefits.The nutritional significance of flax seed oil is due to the presence of higher levels of α-linolenic acid (ALA) of omega-3 fatty acid(O3FA) family[2].In present study, we found presence of five major fatty acids with predominance of 18 carbon species,α-linolenic acid(ALA 18:3),linoleic acid (LA 18:2),oleic asid (OA 18:1),stearic acid(SA 18:0)and palmitic acid(PA 16:0) by using Mass spectrophotometry. Geneticdiversity of ecotypes of*Linum usitatissimum*(Shiraz) was estimated by using inter-simple sequence repeat markers (ISSR). The results showed 100 % polymorphism within Shiraz population flaxseeds with Number of effective allele=1.158, Shanoon index= 0.250 and He= 0.131. PCA ordination revealed high genetic variation among individuals of Shiraz population.

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312
STUDYING FLORISTIC AND INVESTIGATING MEDICINAL PLANTS OF SAVERZ MOUNTAIN IN KOHGILOYEH AND BOYERAHMAD PROVINCE

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The height difference and also the existence of ups and downs in Kohgiloyeh and Boyerahmad province have caused that in a not very vast domain, a vast range of climatic variety and vegetation be observed. Medical plants are valuable resources which nowadays are considered as important by the countries of the world.In this research, the identification and determination of medical plants of Saverz Mountain in Kohgiloyeh and Boyerahmad province are investigated. For two continuous years, the plants of Saverz region were collected and after preparing herbarium specimens, the collected plants were identified. The objective of the present research was to identify the plant species of the region and introduce endangered, rare and endemic species in order to protect the fluorine of the region and also identify and introduce medicinal toxic waste species in order to provide the ground of scientific management and exploit plants economically. From the identified total 248 species, the number of 55 medical species were identified, which belonged to 53 genera and 28 plant families, were identified. The family Labiatae with 9 medical species, Papillionaceae with 6 species, Compositae with 5 species,Cruciferae،Lilliaceae،Ranunculaceae and Rosaceae each with 3 species, Geraniaceae and Umbelliferae with 2 species are the greatest families and the rest of families have 1 medical species. Among Genus, Adonis and Allium have two species and the rest of genera have one medical species. The number of 21 species equals 38.1 percent of medical plants of the region were identified as toxic and 32 species equals 58.1 percent were identified as waste. Regarding the biological evaluation (Raunkiaer classification), 24 species were Hemicryptophyta, 16 species Therophyta, 6 species Phanerophyta, 4 species Geophyta, 3 species Chamephyta, 1 species Hydrophyta and 1 species was parasite. The number of 2 species among 55 medical species are Endemic of Iran and 7 species are rare, which 6 species LR (with less danger) and 1 species VU (vulnerable). In terms of chorology, most medical plants of Saverz are related to Irano-Turanian region.

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313
INVESTIGATING MEDICINALWEEDSINIRAN

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Medical plants play significant and important roles in protecting health and alsotreating diseases. Regarding ever-increasing welcoming of the world of today from herbal drugs and traditional medicine, and the favorable grounds of growing medicinal plants in Iran, we are to take a little step in line with introducing resources and reservoir of medical plants of Iran which are wasted under the name of weeds every year.In the present study, a list if weeds in Iran was collected by the help of valid resources available in Iran and using valuable medical resources, their medical plants were identified.The obtained results indicate that weeds of Iran includes 771 species belonging to 263 genera and 70 families. Families of Poaceae with 131 species, Compositae with 93, Fabacea with 77, Crusiferae with 50, Cyperaceae with 31, Chenopodiaceae with 25, Umbelliferae with 23, Euphorbiaceae with 20, Labiatae with 19 and Caryophyllaceae with 18 species are the greatest families of weeds in Iran, which in sum they are 487 species, i.e. 63 percent of weeds in Iran belong to the first 10 families. Among 771 species in Iran, 252 species belong to 154 genera and 54 herbal medical families. 19 families have one medical species. Families of Compositae with 43 species, Fabacea with 21, Crusiferae with 16, Poaceae with 14, Malvaceae with 13, Labiatae with 10, Euphorbiaceae with 8, Chenopodiaceae, Papaveraceae, Polygonaceae every one with 7 medical species are the greatest families of medical plants, which in sum includes 146 species or 57.9 percent of medical weeds. Artemisia with 7 species, Euphorbia and Papaver with 6 species, Chenopodium and Hibiscus with 5 species Cuscuta،Cyperus،Malva،Plantago and Ranunculus each with 4 medical species are the greatest medical Genus. In addition, the number of 106 species of 252 of identified medical species (42.06%) are toxic, 3 endemic species of Iran and 10 species are related to rare plants of Iran, which are 8 species LR (less danger), one species DD (lack of data) and one species VU (vulnerable). Regarding biological evaluation, most of species of medical weeds are Chamaephytes and Therophytes.

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317
EXTRACT OF *GLYCYRRHIZA GLABRA* DECREASES STRESS-INDUCED DOPAMINE RELATED BEHAVIORS IN RAT

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*Glycyrrhiza glabra*is a medicinal plant which has been has various used in traditional medicine. Traditionally, this medicinal plant has been used to cure different diseases such as asthma, ulcer, cardiovascular, inflammation, etc. Dopamine-related behaviors are among the stereotype behaviors which their changes can be occurred in the mesolimbic dopamine system over activity. These behaviors are present during and after stress induction which may indicate a possible link between stress and the mesolimbic dopamine system. Therefore, in this studythe effect of the extract of *Glycyrrhiza glabra* on the dopamine-related behaviors induced by food deprivation stress in male Wistar rats has been investigated. Male Wistar rats (230-280 g)received intraperitoneal injection of the extract (1, 3, 9 mg/kg) before food deprivation. Control groups received saline instead of the extract. Stress was induced by a 24 or 48 hours deprivation of food. Animals' behavior (copping, sniffing and locomotion) was recorded by a video camera. The results revealed that 24 or 48 hours food deprivation resulted in the decrease of locomotion but the increase of copping and sniffing. Intraperitoneal administrations of *Glycyrrhiza glabra* extractincreased locomotion and decreased sniffing and copping with respect to control group. Our findings showed that *Glycyrrhiza glabra*extract decreased the effects of food deprivation stress on the dopamine-related behaviorsand it can interact with the effects of food deprivation stress on dopamine-related behaviors as measured by locomotion, copping and sniffing.

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320
ANTIBACTERIAL EFFECT OF *GLYCYRRHIZA GLABRA*ON ESCHERICHIA COLI

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Escherichia coli (E. coli) is a Gram-negative bacteria that can cause different diseases such as dysentery, food poisoning and urinary trace infect. In addition, *Glycyrrhiza glabra*is a medicinal plant which had been has various used in traditional medicine. Traditionally, this medicinal plant has been used to cure different diseases such as asthma, ulcer, cardiovascular, inflammation, etc. In the current study, the antibacterial effect of *Glycyrrhiza glabra*on Escherichia coli was investigated. After preparation of the extract, the minimum inhibitory concentration and minimal bactericidal concentration (MIC / MBC) were determined. In disc diffusion method, the mean diameter of growth inhibition zones on agar media were determined by preparing discs from different concentrations (400, 600 and800 ppm). In order tocompare theantibacterialeffect of*Glycyrrhiza glabra*extract with antibiotics, antibiogram kits for gentamicin, ampicillin, ciprofloxacin, and cefotaximewas usedasa positive control groups. The results revealed that certain concentrations of the extracts showed significant antibacterial effect on the strains. Extracts with 400, 600 and 800 ppm concentration showed defined growth inhibitory effect and 600 and 800 ppm concentration showed both inhibitory and bacteriocidal effects on the bacteria. The results of used antibiogramkits indicated that the effect of extract on Escherichia coli was similar to the effects of gentamicinand ciprofloxacin antibiotics. Findings fromthisstudyshowed that*Glycyrrhiza glabra*extractinhibitsthe growth ofGram-negative bacteriaEscherichia coli. This plantcan beconsidered as amedicinal plantusedfor treatinginfections caused byEscherichia coli.

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324
DETERMINATION OF FATTY ACID COMPOSITIONSOF SALVIA HYDRANGEA

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*Salvia*is one of the genuses in *Lamiaceae* or *Labiatea*family. This genus has 58 annual and perennial species, and also 17 species are endemic in Iran [1]. *Salvia hydrangea* has several effects such as anti-inflammatory, antispasmodic, carminative and sedative effects [2]. Traditionally, the brew of the flowers of this plant has been used for common cold, especially in the Fars province of Iran for several years [3].In this study, plant material was collected on 23 June 2013 in Khalkhal area (Ardabil province) at an altitude of 1900m, in Iran.The leave of plant was air- dried at ambient temperature in the shade and the extract was obtained byn-hexane as solvent, using a Soxhlet apparatus for 2h. The available fatty acid was methylated to related methyl esters by transesterification method and then analyzed by GC and GC/MS. The main components of the oil were behnic acid (7.27%), 11, 14 -octa decadinoic acid (6.26%), octa cosanoic acid (4.34%), 8-octa decnoic acid (4.11%), hexa decanoic acid (3.35%) and icozanoic acid (3.34%).

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328
INTERACTION OF AQUEOUS ALCOHOLIC EXTRACT OF GINGER AND MUSCIMOL ON PAIN SENSITIVITY

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Zingibar offcinalehave anti nocieptive effect, in formalin test and hot plate test[1]. A lack of inhibition, particularly that mediated by gamma-amino butyric acid (GABA), the main inhibitory transmitter of the central nervous system (CNS), is responsible for many pain states[2]. So, the aim of present study was to investigate the interaction of aqueous alcoholic extract of ginger and muscimol on pain sensitivity in formalin test.Twenty adult male rat in standard conditions with tempreture 21-24°C and 12 h light-dark cycle in four groups were used. 1- Control (intact rats); 2- sham (recived 0.5 ul ACSF); 3- experimental1 (recived 0.5 ul muscimol 250ng/rat .after 15 days oral administration of ginger 50 mg/kg/day) and 4- experimental2 (recived 0.5 ul muscimol 500ng/rat .after 15 days oral administration of ginger 50 mg/kg/day). Pain sensitivity test were done in all group by formalin test. Lateral ventricle was canulated unilaterally by stereotaxic procedure. Data were analyzed by one way ANOVA and ANOVA measuring, post-hoc test was tuckey test. P value were considered as $P<0.05$.Our data showed that muscimol in two doses in rat that received ginger 50mg/kg/day does not show significant effect on pain sensitivity in first phase of formalin test, but in dose of 250ng/rat significantly ($P<0.05$) decrease pain sensitivity in second phase of formalin test.The present results indicated that ginger can modulate the GABAergic system in control of pain sensitivity in formalin test.

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329
INTERACTION OF AQUEOUS ALCOHOLIC EXTRACT OF GINGER AND PICROTOXIN ON PAIN SENSITIVITY

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Zingibar offcinale increase the hot plate and tail flick latencies by 79% and 83% respectively. A great deal of effort has been expended in attempting to define the role of GABA in mediating the transmission and perception of pain[2]. So, the aim of present study was to investigate the interaction of aqueous alcoholic extract of ginger and picrotoxin on pain sensitivity in formalin test.Twenty adult male rat in standard conditions with tempreture 21-24°C and 12 h light-dark cycle in four groups were used. 1- Control (intact rats); 2- sham (recived 0.5 ul ACSF); 3- experimental1 (recived 0.5 ul picrotoxin 250ng/rat .after 15 days oral administration of ginger 50 mg/kg/day) and 4- experimental2 (recived 0.5 ul picrotoxin 500ng/rat .after 15 days oral administration of ginger 50 mg/kg/day). Pain sensitivity test were done in all group by formalin test. Lateral ventricle was canulated unilaterally by stereotaxic procedure. Data were analyzed by one way ANOVA and ANOVA measuring, post-hoc test was tuckey test. P value were considered as $P<0.05$.Our data showed that picrotoxin 250ng/rat in rat that received ginger 50mg/kg/day significantly ($P<0.05$) decrease pain sensitivity in firstand second phase of formalin test, but in dose of 500ng/rat significantly ($P<0.05$) decrease pain sensitivity in second phase of formalin test.The present results indicated that ginger can modulate the GABAergic system in control of pain sensitivity in formalin test.

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331

EFFECTS OF DATURA STRAMONIUM PLANT ON PTZ-INDUCED SEIZURE IN MICE

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Epilepsy is characterized by recurrent unprovoked seizures and affects 0.5-1% of the population. More than 30% of the epilepsy patients have uncontrolled seizures or unacceptable medication-related side effects despite adequate pharmacological treatment [1]. The use of plant extracts to treat diseases is proposed as a therapeutic modality. Datura plant has been used for a long time in traditional medicine for some of nervous disorders like epilepsy [2, 3]. The aim of this investigation was to provide a scientific basis for traditional use of Datura in epilepsy. In this experimental study, 16 mice were randomly allocated into 4 equal groups including: a normal group, control group and 2 treatment groups. Doses of 50 and 100 mg/kg of aqueous extract of Datura Stramonium seed were gavaged to treatment groups for 4 weeks. Distilled water was gavaged to control group. After 30 minutes of treatment, control and experimental groups were injected with pentylenetetrazol (PTZ 35 mg/kg, i.p) to induced seizure. Then the seizure onset and the duration of the seizure phases were measured and recorded in the experimental and control groups.Our data indicated that the extract had a significant effect on threshold seizure in doses of 50 and 100 mg/kg. The results obtained from the present study showed that extract of this herb could have markedly alleviated PTZ-induced seizure phases in male adult mice.

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332
THE EFFECT OF HPOS PLANT ON SEIZURES IN PTZ-INDUCED KINDLING MODEL IN MICE

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Epilepsy is one of the most common diseases of the brain, affecting at least 50 million persons worldwide [1]. Despite a variety of current antiepileptic drugs, research for discovering new drugs with more efficacy and less unsuitable adverse effects has been continued. Herbal medicine has various natural substances and proper context for this type of research [2]. The aim of this study was to survey the effect of Humulus Lupulus (Hops) extract in the treatment of seizure. 16 male mice have been chosen randomly and divided into 4 groups including 4 mice in each group as follows: a normal groups, control group receiving distilled water and 2 experimental groups receiving aqueous extract of Humulus lupulus flowers in doses of 100 and 200 mg/kg for 4 weeks. 30 minutes after gavage with different doses of the extract or distilled water, Pentylenetetrazol (PTZ 35mg/kg, i.p) was injected to experimental and control groups. Animals immediately transferred to a special cage and the seizure behaviors and parameters were recorded by a camera during the 30 minutes. Then the different phases of seizure were evaluated. Data analysis showed that the seizures were significantly reduced in the groups that received extract compared to control group. The attained results showed that Hops extract can be used in seizure treatmeant.

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340

GREEN SYNTHESIS OF SILVER NANOPARTICLES USING LEAF EXTRACT OF *MALVA SYLVESTRIS* AS A MEDICINAL PLANT

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The synthesis of nanoparticles, because of the widespread use of them is an important area in researches. Nanoparticles can be synthesized by different methods, among them green synthesis of nanoparticles withplant extraction is the most useful, because it is environmentally benign and economically efficient. In this study silver nanoparticles, which are the most useful nanoparticles in medical and industrial areas were synthesized using leaf extract of*Malva sylvestris*as a medicinal plant, which is full of phenolic antioxidants that act as both reducer and stabilizer. Two different extraction methods were used: the extraction with alcohol and water. The properties of silver nanoparticles such as structure, type, size, production were investigated respectively by SEM (Scanning Electron Microscopy), EDX (Energy Dispersive X-ray spectrometry), DLS (Dynamic Light Scattering) and UU-visible spectroscopy. The water extraction produced smaller nanoparticles with a peak at about 430nm in absorbance spectrumthat proved the production of silver nanoparticles. According to SEM images, the silver nanoparticles were spherical and the results of DLS have confirmed well – dispersed silver nanoparticles with thediameter of about 50nm.

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344
ANTICANCER AND ANTIMICROBIAL EFFECT OF METHANOL EXTRACT OF *EUPHORBIA CONDYLOCARPA*

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Spurge family is a large family of plants that contain more than 300 genera and 800 species, of which five genera and 72 species are native to Iran. This important family of plants can be used in various diseases treatment such as cancer, arthritis, asthma, bacterial infections, and neuralgia. This study was assessed anticancer/antimicrobial effects of alcoholic extract of Euphorbia Condylocarpa, native Iranian Kurdish name "*Shoalehkoleh*". In this study, the cytotoxicity of methanol extracts of *Euphorbia* was performed on cancer cell lines AGS Gastric cancer using the MTT assay and also its antibacterial effect on gram positive bacteria with different dilutions. Minimum inhibition concentrations (MIC) of extract against these bacteria strain were determined. The obtained data showed that the greatest anticancer effect on gastric cancer cell line was related to the dilution of 200mg/ml. In the present study, the antibacterial activity effect of methanolic root extract of Euphorbia Condylocarpa was assessed against five Gram positive bacteria. Antibacterial activity was determined by agar disk diffusion method. The most susceptible bacteria to Euphorbia Condylocarpa root extract was Bacillus subtillis, B. pumilisand Staphylococcus epidermidis. The lowest MIC values were obtained with B. pumilis, B. subtillisand S. epidermidis (1.87mg/mL), followed by Staphylococcus aureus (7.50mg/mL). The findings suggest that potentially suggested anticancer effect of methanolic Euphorbia Condylocarpa root extract, and also antibacterial effect (G^+). Of course it can be further assessed to discover bioactive natural component(s) involved in its activity [1,2].

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347

THE EFFECT OF THE *TEUCRIUM POLIUM* AQUEOUS EXTRACT ON THE BLOOD CELL PARAMETERS IN ANIMAL MODEL INFECTED WITH *CANDIDA ALBICANS*

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Teucrium polium known popularly as felty germander is a sub-shrub and herb native to the western Mediterranean region belongs to a family of flowering plants *Lamiaceae* or *Labiatae*(the mint or deadnettle family). It is important to humans for herb plants useful for flavor, fragrance, or medicinal properties including antimicrobial, antispasmodic and anti-tumor properties. Currently the use of herbal medicines has noticeably increased especially in treating opportunistic fungal diseases and in particular the infection due to *Candida albicans*.The current study aimed to investigate the effect of aqueous extracts of *Teucrium polium* on thr blood factors of 72 female mice infected with *Candida albicans.* The samples were randomly divided into six groups (three treatment groups, control (+/-) and Placebo. They were kept under identical conditions.The aqueous extract in doses of 50, 100 and 200 mg/kg were injected intraperitoneally (IP) every other day within 20 days. The suspension of *C. albicans*.. 1×10^6 cfu/ml (0.5 McFarland) injected only once in a 20-day period to the control positive group. The Placebo group was injected using physiological saline serum. The blood cell parameters included WBC, RBC , platelet counts, hemoglobin, hematocrit, MCHC, MCH, MCV, neutrophil, monocyte and lymphocyte. They were compared with the control groups.The data was analyzed using Duncan's test and SPSS software. The findings showed that the blood factors affected by the extract. However, the factors such as WBC, platelets counts and hematocrit were same in negative control. The RBC, hemoglobin, MCHC and monocyte declined in all days with the dose of 50. MCV, MCH in doses of 100 and 200 remained the same while it increased in negative control. The lymphocyte count in the positive control group and the other groups was higher than in negative control. The neutrophil count in all groups increased compared with the positive control.The results of this research showed that the effect of *Teucrium polium* aqueous extract on blood factors reduced the chance of *Candida albicans* infection.

348

EFFECT OF *MALVASYLVESTRISL*. AQUEOUS EXTRACT ON BLOOD CELL PARAMETERS IN MICE WITH *CANDIDA ALBICANS* INFECTION

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Malvasylvestris L. is a used to treat such microbial diseases. In this research, the effect of *M.sylvestris* on blood factors in mice with *Candidaalbicans*.*C. albicans* is a commensally and pathogenic organism in human. This study was performed on 60 mice. The samples were randomly divided into six groups (three treatment groups, control (+/-), placebo group) and were kept under identical conditions. Aqueous extract of *M.sylvestris* in doses of 50, 100, 200 mg/kg were injected by intra peritoneal (IP) within 20 day every other day. *Conidial* suspension of *C.albicans* 1×10^6 cfu/ml (0.5 McFarland) injection only once in 20- day period to the control positive group. Physiological serum was injected control negative group. The main parameters included the WBC and RBC count, hemoglobin, hematocrit, platelet count, MCHC, MCH, MCV, neutrophil, monocyte and lymphocyte compared with control groups. Showed that WBC decreased at all doses and hemogolobin, hematocrit decreased in 200mg/kg and lymphocyte decreased in 50 and 100 mg/kg doses but platelet increased in 200mg/kg dose and neutrophil increased in 50 and 100 mg/kg dosesthan control positive. Also that platelet and lymphocyte increased in 200 mg/kg dose and hematocrit increased in 50 and 100 mg/kg but neutrophil increased in 200 mg/kg dose than control negative. No, significant changes were observed in MCH, MCHC, RBC, monocyte and MCV. Findings of this research show that theaqueous extract of *M.sylvestris* could possibly increase in the number of white blood cells stimulate the innate immune system.

351

THE EFFECT OF INHIBITION OF PISTACIA LENTISCUS'S ETHANOLIC EXCTRACT ON ACETYLCHOLINESTERASE ACTIVITY

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Dementia is a progressive reduction in perceptional abilities, which some mental disease or damages cause it. Initial signs of Dementia are change in character and manner, short time memory, abilities of understanding and language. There is difference kind of Dementia but Alzheimer is the most prevalent Dementia disorders. Reductions in memory, unusual behavior, exposition decrease and change in character have been seen in this disease. Accession of this disorder is 5-1 percent after 65 years of age and 20-40 percent after 85-100 years of age[1].There aren't any definite methods to treatment this disease but there are some ways to decrease the signs and control of disorders. In this way antioxidant agents, acetylcholinesterase inhibitors and anti-inflammation drugs such as physostigmine could be used [2].The most important effect of Alzheimer disease is the reduction in memory, in the traditional medicine of Iran pistacia Lentiscus was used to support memory. In this study for the first time the quality of pistacia Lentiscus extract to improve Alzheimer disease and comparison between inhibitory effects of this extract and physostigmine into acetylcholinesterase was investigated. It was showed that pistacia Lentiscus extract could improve Alzheimer disease sings and this positive was achieved via comparative inhibition of acetylcholinesterase such as physostigmine. However, the inhibitory effect of pistacia Lentiscus was half of this effect in comparison with physostigmine [3].

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356

TEUCRIUMPOLIUM: AS AN USEFUL HERBAL PLANT FOR REMEDY OF UTI

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Urinary tract infections are one of the most common infections amongst women. Due to the anatomy of their body, sexual intercourses and familial backgrounds, this infection is mostly seen in women. Although antibiotic resistance has seen in isolated bacteria from UTI, the present study started to evaluate effect of *Teucriumpolium* on isolated bacteria from women with UTI. For this purpose hundred urine samples were collected from patients and cultivated on Blood agar as well as EMB agar medium. Then they were identified using Api 20 E identification kit. Furthermore, the sensitivity pattern of the isolates was evaluated using six major antibiotics by disk diffusion method. Afterward the aqueous, ethanol and acetone extracts from the airborne sections of *Teucriumpolium* were prepared and the extracts were added to the cultivated isolates on Muller Hinton agar using well diffusion agar technique. Finally, the phytochemical compounds were evaluated using different chemical test. The results obtained from this study indicated, totally 9 diverse bacterial group isolated from the samples and all of them were belong to gram negative bacteria. In addition aqueous and ethanol extracts had antibacterial activity against the isolates with minimum average zone of inhibition (8 mm) for *E coli* and maximum zone (31/33 mm) for *klebsiella oxytoca*. Besides, glycosides, quinones, alkaloids, flavonoid and saponin were identified for the herbal plant. According to the obtained results, *Teucriumpolium* may be used as an effective material against urinary tract infections in women but further research needed for completing and introducing the exact compound of *Teucriumpolium*as an antibacterial agent.

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357

PHYTOCHEMICAL INVESTIGATION OF *ALLIUM PARADOXUM*

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Plants of the genus *Allium* have been recognized as rich sources of secondary metabolites endowed with interesting biological activities [1]. These plants have been used since ancient times both as food and medicine. In fact, *Allium*s are rich sources of phytonutrients, considered an important element of the daily diet because of interesting pharmacological properties such as cholesterol lowering, anti-hypertensive, antispasmodic, antibacterial, antiviral and anticancer [2]. Many of the biological effects of these plants are related to the thiosulfinates, volatile sulfur compounds typical of the *Allium* plants, which are also responsible of their characteristic pungent aroma and taste. However, these compounds are unstable and give rise to transformation products. For this reason, recent attention has been focused on polar compounds in *Allium*s that are more stable to cooking and to the storage. Among these compounds, sapogenins, saponins, and flavonoids are the main classes found [3]. *Allium paradoxum* (M.Bieb.) G. Don is known as a wild edible vegetable in northern Iran. It is locally called “Alezi” and is used for preparation of several local foods, especially in Mazandaran province [4]. Protective effects against gentamicin-induced nephrotoxicity [4], hepatoprotective, antihemolytic and antioxidant activities are pharmacological effects of this plant, recognized in recent researches. However, since there is no comprehensive phytochemical study on this plant and as a part of our research project on the isolation of bioactive compounds from *Allium* species [2], we decide to plan the phytochemical study of *Allium paradoxum.*The air-dried bulbs of the plant were extracted in a four step extraction method with the following solvents at increasing polarity: hexane, chloroform, chloroform–methanol (9:1) and methanol. The methanolic extract was finally partitioned between butanol and water. Chloroform–methanol and butanolic extracts were fractionated by MPLC using a linear gradient of H_2O to MeOH, selected fractions were subjected to HPLC and interesting compounds were purified. Chemical structure of the compounds was elucidated by comprehensive spectroscopic analyses including 1D- and 2D-NMR and MS spectroscopy [2].

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362
EVALUATION OF MEDICAL METABOLITES IN BORAGINACEAE FAMILY

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Boraginaceae family is known as a medicinal plant classified in dicotyledons. It is originated from Asia (Middle East). The aim of this study was to evaluate ingredient between 4 species of Boraginaceae family based on physiological & phytochemical traits as well as seed fatty acid contents. 4 species (E. *russicum, E. italicum, E. amoenum, B. officinalis*) were evaluated carefully. All seeds cultivated in an identical conditions in a greenhouse in Tehran to assessing parameters such as tannins, phenols, anthocyanin, total protein, seed oil contents, Superoxide Dismutase (SOD) and Catalase (CAT) activity. Analysis of oil from seeds of *Echium* L. determined 7 different fatty acids include Linolenic acid (35.1%), Linoleic acid (16.8%), Oleic acid (16.6%) and Arachidonic acid (15.5%) as major fatty acids, while stearic acid (4.42%), Palmitic acid (6.22%), Gama-Linolenic acid (6.04%) were the minor fatty acids extracted from seeds. Low protein content observes in *E. russicum* (70 mg/g) and maximum level of protein was in *B. officinalis*(91mg/g). *E. amoenum* had maximum phenols (38mg/g) whereas *E. russicum* had minimum (26 mg/g). For total phenol, *B. officinalis*had maxium phenols (8.1mg/g) whereas *E. italicum*hadminimum (3.9mg/g). Anthocyanins: *E. russicum* had maximum anthocyanins (65 mg/g) whereas *B. officinalis*had minimum (41 mg/g). In conclusion it can be said that different species have different amounts of secondary metabolites so that no regular relation would be detected among plant species that we studied.

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376

COMPARISON OF MICROWAVE-ASSISTED AND CONVENTIONAL HYDRODISTILLATION IN THE EXTRACTION OF ESSENTIAL OILS FROM *HYSSOPUS OFFICINALIS* L.

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Extraction is the first main stage in research on medicinal plants. Different methods of extraction have widely been investigated to obtain such valuable compounds [1]. This study was aimed to compare the chemical composition of the essential oils obtained by two different methods of hydrodistillation: conventional hydrodistillation (CHD) and microwave-assisted hydrodistillation (MAHD).The optimum conditions for MAHD were: microwave delivered power 800 W, microwave radiation time 30 min and the temperature of 93ºC.The obtained essential oils were analyzed using GC-Mass and their components were identified by comparing their mass spectra and kovats indices with Wiley library and published books, data bases available and credible websites [2].
The main components of the oil obtained by MAHD were cis-Pinocamphone (63.48%), Elemol (6.67%), ortho-Menthatriene (5.55%) and Bicyclogermacrene (4.43%). While the most abundant constituents identified in the oil obtained using CHD were cis-Pinocamphone (45.32%), trans-Pinocamphone (18.00%), β-Pinene (10.24%) and Elemol (3.87%).Comparison of these twomethods showed that not only the MAHD is faster and saves energy, also the essential oil yield is higher as the essential oil yield for the MAHD was 1.5 times the CHD.

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393
APPLICATION OF ETHANOLIC EXTRACT OF *CROCUS SATIVUS L.*PETALS AS PH INDICATOR

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Crocus sativus L. commonly known as saffron, belonging to Iridaceae family, is a perennial plant widely cultivated in different parts of the world, particularly in Iran [1]. Saffron, which is obtained from the dried stigmas of *C. sativus* is the most expensive spice used in industry with a wide range of uses from medicine, to textile dye and to culinary adjunct.Around 350 kg of flowers are needed to obtain one kg of saffron [2]. Thus a high amount of tepals, mainly composed of petals indistinguishable from sepals, is generated which is wasted as useless material. However, the phytochemical content of sepals, petals and flowers of *C. sativus* showed their wealth in flavonoids and anthocyanins [3,4]. Anthocyanins are water-soluble vacuolar pigments that may appear red, purple, or blue according to PH. Anthocyanins represent one of the most widely distributed classes of flavonoids in plants. The difference in chemical structure that occurs in response to changes in pH is the reason that anthocyanins are often used as pH indicator, as they change from red in acids to blue in bases [5]. In this study, The Anthocyanin extract was accurately measured as 3 ml and was taken in different, clean test tubes. The pH of solution in each test tube was adjusted by 1N HCl and 1N NaOH sequentially from 1 to 13 using the acid and base and pH meter for accurate pH adjustments. Results showed the colour of Anthocyanin pigments changes drastically with change in pH value. The color of anthocyanins depends on the acidity of the medium. At acidic PH= 1-3, anthocyanidins exist.

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394

EXTRACTION AND COMPARATIVE IDENTIFICATION OF CHEMICAL COMPONENTS OF THE ESSENTIAL OILS FROM LEAF AND STEM OF *MENTHA MOZAFFARIANII* JAMZAD

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Since *Mentha* genus was used in ancient medicine and its application in culinary, flavor cosmetics, food and drinking industries is important, investigated the composition of the essential oil of *M. mozaffaranii*[1]. The aerial parts (leaf and stem) of this species were collected from Sarchahan moumtain in Hormozgan province and isolated by water distillation. Then the essential oils were analyzed by GC and GC/MS. Twenty one compounds were identified in the essential oil of leaf of *M. mozaffaranii*[2]. The major components of leaf oil were piperitone(45.2%), linalool(17.3%), 1,8-cineole(13.4%) and mentone(6.7%). At the essential oil of stem, 13 compounds were identified, and the major components were similar with major components of leaf.

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395
GREEN SYNTHESIS OF SILVER NANOPARTICLES USING EXTRACT OF SAFFRON'S WASTAGE

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Metal nanoparticles (NPs) have attracted considerable attention for their unusual chemical and physical properties such that they show great potential applications in biotechnology, catalysis, medical imaging, novel electronics and optics [1]. The biological methods of Ag nanoparticle synthesis using biological entities like bacteria, fungi and plants were reported to be clean, nontoxic, costeffective and environmentally acceptable when compared to chemical methods [2-4]. The aim of the present study was to evaluate the effect of plant synthesized silver nanoparticles (AgNPs) using aquatic petal and stamen extract of saffron. The synthesized AgNPs were characterized by UV–vis spectrum, high resolution transmission electron microscopy (HRTEM), X-ray diffraction (XRD) and FTIR analysis. The UV–vis spectrum of the aqueous medium containing silver nanostructures showed a peak a round 430 nm corresponding to the surface plasmon resonance band of AgNPs. XRD and TEM analysis revealed that AgNPs are cubic structure being spherical in shape with an average particle size of 15 nm.

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396
EVALUATION OF PRELIMINARY PHYTOCHEMICALS, DETERMINATION OF MINERAL ELEMENTS IN *AJUGA CHAMAECISTU* AND ITS BIOLOGICAL EFFECTS ON LOWERING BLOOD PRESSURE

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The genus *Ajuga*. (Lamiaceae) comprises about 300 species in the World. In Iran, *Ajuga* genus is represented by 5 species, which *Ajuga chamaecistus* Ging. subsp. *tomentella* Rech. f. is an endemic species [1,2]. Some *Ajuga* species are used in folk medicine for the treatment of rheumatism, gout, asthma, diabetes, malaria, ulcers and diarrhea [3].The present study is focused to investigate mineral elements amount like K, Fe, Ca, Mn, Mg, Na, Znand evaluate the preliminary phytochemicals in stem and leaves. Atomic absorbtion analysis showed us that the highest level was K in stem sample (919.35 ppm) so it can be appropriate to treat high blood pressure. Phytochemical characterization revealed the presence of carbohydrates, tannins, saponins, alkaloids, phenols andPhytosterols in both ethanolic and methanolic extracts of stem and leaves.

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397
IN VITRO REGENERATION OF MEDICINAL PLANT *SATUREA AVROMANICA*

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Satureja is a genus of aromatic plants of the family Lamiaceae, related to rosemary and thyme.*Satureja avromanicais* a new perennial, evergreen and non-aromatic species which collected and introduced from West of Iran (Belbar village, Marivan – Paveh strand) recentlyIt can be used as a newly source of medicinal bioactive compounds of human health benefits. The aim of this study was develop a protocol for *S. avromanica* plantlet regeneration from young spikes, to identify the mediums which have favorable response in tissue culture. The sterilized seeds were cultured on Murashige and Skoog medium and then The cultures were incubated at 25±1 °C under an illumination of 1200 lux during a 16/8 h photoperiod obtained from Gro-Lux fluorescent lamps. Thenthe explants were cultured from seedling and transferred to a MS medium supplemented with different concentration of BAP and IBA growth regulator hormones. The highest percentage of generation of samples hypocotylat a concentration of 1mg/l BA and IBA produced the highest frequency of shoot regeneration (87.3%) in hypocotyl- derived callus. The described method can be successfully employed for the large-scale multiplication and conservation of threatened this medicinal plant [1, 2].

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405

IN HIS NAME EFFECTS OF *HYDRO ALCOHOLIC EXTRACT OF FERULA ASSA-FOETIDA* ON PAIN & CUTANEOUS INFLAMMATION DUE TO FORMALIN INJECTION IN MALE WISTAR RATS

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The present research was conducted to evaluate, analgesic and anti–inflammation effects of ferula assa foetida (fafo) hydroalcoholic extract on experimental pain and inflammation induced in male rats. 60 male wistar rats, weighing 200± 20g, selected and divided into 2 main groups (pain test group and inflammation test group, n = 30 in each).Then, each group divided into 5 subgroups (n=6, in each): 2 negative control groups received normal saline, one positive control group received morphine (10 mg/kg)(Pain test).One positive control group received dexamethasone (dex.) (15 mg/kg) (Inflammation test).3 fafo extract pre-treated groups (50, 100 and 200 mg/kg)(Pain test)3 fafo extract pre-treated groups (50, 100 and 200 mg/kg)(Inflammation test)All injections was intraperitonealy (ip).For pain test, 30 minuts after ip injections of fafo. Extract, 20 μL 2.5% formaline injected into hind paw, sub-cutaneously, and absorved for acute (5 min) and chronic (30 min) pain signs and sympoms (Licking and bitting).For inflammation test, 30 min. after fafo. Extract injections, 0.03 ml of Xylene injected into right ear. 2 hour later, these rats killed, ears excised, and weighed, the weight differences between 2 sections of the left and right ears considered as inflammation response. Data analysis done by SPSS and $P < 0.05$ considered as level of significance. The results of pain test showed dose – dependent analgesic effects of fafo extract on both phases of pain and in 200mg/kg dose. The most analgesic effect obtained, comparable with morphine. The results of inflammation test showed similar dose-dependent anti-inflammatory effects. Possible mechanism involved may be inhibition of phospholipase-Az by fafo. Extract, comparable with dex. And central inhibition of pain, probably by alkaloids and flavonoids and other bioactive chemical compounds present in fafo extract.

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408

EFFECT OF AQUEOUS FRACTION OF NIGELLA SATIVA ON MORPHOLOGY AND APOPTOSIS IN HUMAN RENAL CARCINOMA CELL LINE (ACHN) AND NORMAL HUMAN RENAL EPITHELIAL CELLS (GP-293)

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Renalcell carcinoma(RCC)isthe most lethalform of urinary system cancer. Smokingandobesityarethe main causes ofthisdisease [1]. The therapeutic methods of RCC are surgery, immunotherapy, chemotherapy and biologic response modulators [2]. Medicinal plants such as Nigella sativa (N. sativa) also are used for the treatment of cancer [3]. Obiective: in this study the effect of Aqueous fraction of *N. sativa* was investigated on morphology and apoptosis in human renal carcinoma cell line (ACHN) and normal human renal epithelial cells (GP-293).After obtained 70% hydro-alcoholic extract, N-hexane, dichloromethane, ethylacetate, N-butanol andaqueousfractionswere extracted [4]. In this study two cell lines including ACHN cell line and GP-293cell line were used. Cells were treated with various concentrations of Aqueous fraction of N. sativa′ hydro-alcoholic extract. Morphological status of the cells in the vicinity of the Aqueous fraction was determined by using an inverted light microscope at 24, 48 and 72 hrs.Also rate of apoptosiswas determined by using of PIandAnnexin Vapoptosiskit and flow cytometry after48h. Results are presented as Mean ± SEM statistical analysis. One-way ANOVA test was applied for the statistical analysis of the data.Aqueous fraction only in the 2000µg/ml concentration inducedMorphological changes in GP-293 atalltimes but in ACHN Morphological changes such as reduced cell congestion, increased intercellular distance and non-uniform distribution of cells was revealed in a dose and time dependent .Also theresults offlow cytometryshowed a greater induction of apoptosisby Aqueous fraction on the ACHNcell lineincomparison with control groupandGP-293 cell line.The results were concluded that Aqueous fraction has Apoptotic effects and causes morphological changes on ACHN cell line compared with GP-293 cell line.

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411
WOUND HEALING POTENTIAL OF ALCOHOLIC EXTRACT OF CAPER BUSH (*CAPPARIS SPINOSA*) ON WISTAR RAT'S SKIN

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The skin is the largest organ of the animal's body and one of the most important. Throughout an animal's lifetime the skin is subjected to a large number and variety of internal and external damages. In healthy individuals skin is strong, resilient and will repair itself in response to the most severe insults. In spite of this natural potential, traditionally people use many different remedies to speed up the recovering process. A large number of plant extracts or pastes are used by different societies worldwide for treatment of cuts, wounds and burns. This study was designated to investigate the healing potential of Caper bush, *Capparis spinosa* alcoholic extracts on open wounds of rat skin. Twenty five healthy female Wistar rats were chosen for this research. After anesthetizing the animals with ether, on their depilated backs a Para vertebral wound of 6mm in diameter was made using a punch biopsy. The animals were then divided into three groups; control (untreated), sham (daily treated with a vegetal butter) and experimental (daily treated with a vegetal butter having 5% extract of the Caper bush). All groups were housed in standard conditions and monitored or treated daily. The wound area was removed on the 3rd, 6th, 9th, 12th and 15th day post wounding and processed for histological examinations. Microscopic observations showed that the mean period of epithelization in the experimental group was significantly ($P<0.001$) reduced when compared to both control and sham groups. Moreover, the length and diameter of regenerated hair follicle significantly increased in the wounds treated with the plant extract. In conclusion, this survey showed that the alcoholic extract of *Capparis spinosa* improve wound healing activities in rat's skin. However, further study is required to know the compounds responsible for its wound healing property and to understand the mechanism of action. Parallel in conjunction with.

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413

STUDY OF PROTECTIVE EFFECTS OF PELARGONIUM GRAVEOLENS HYDROETHANOLIC LEAF EXTRACT ON SPERMATOGENESIS IN MALE RAT INDUCED WITH LEAD ACETATE

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The compounds which have lead are widely used in industries in the world. The toxic effects of this material were studied in many of organs. Medicinal plants have protective effects in body tissues. The aim of this study is to evaluate the protective effect of Pelargonium graveolens leaf extract (PLE) on spermatogenesis in male rat were induced with lead acetate. The 42 male rats with 220-250 gr body weight were divided randomly in 6 groups(n=7): control (taking normal saline,0.5ml/day, gavage), positive control (taking lead acetate, 500 ppm in tap water), treated groups: (1, 250mg/Kg PLE and 2, 500mg/Kg PLE, gavage), and groups which induced with lead acetate(500 ppm in tap water) and treated by MLP (250mg/Kg and 500mg/Kg). After the examination the blood samples were collected from heart directly and testosterone, FSH, LH, sperm count, sperm motility and GSI were analyzed and the microscopic studies of testes tissue were done. All data were expressed as mean±SEM. and statistical significance differences were accepted at $P<0.05$. Our results showed that the lead acetate has necrotic effect in testes tissue. The testosterone,FSH and LH hormones increased in treated groups compared with group induced with lead acetate significantly ($P<0.001$). The number of sperm and motility were increased and microscopic study of testes tissue showed decreased significantly in inflammation and necrosis in testes compared with lead acetate induced group ($P<0.001$).The Pelargonium graveolens hydroethanolic extract has antioxidant and flavonoids compounds which can to protect the testes tissues from toxic chemical agents. Also this extract has stimulation effects on hypothalamic-pituitary axis.

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417
MOLECULAR SYSTEMATICS OF SPINY *ASTRAGALUS* WITH SPECIAL FOCUS ON SECTION *ANTHYLLOIDEI*

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Astragalus L. (Fabaceae), as the largest genus of vascular plants on earth, contains an estimated number 2500-3000 annual and perennial species and 245 taxonomic sections. The greatest number of species is found in southwest and central Asia and the Sino-Himalayan region. *Astragalus* contains 800 species (400 endemics) in Iran. Spiny *Astragalus*, a large group in the genus, characterized with thorny cushion forming plants, existence of gum ducts, reduced pods and inflorescence size and unilocular fruits with 1-2 seeds.Most of these characters are found in some sections of traditional subgenera of *Astragalus* including *Tragacantha*, *Calycophysa*, *Astragalus*and *Cercidothrix*. Previous phylogenetic analyses based upon nrDNA ITS revealed that the spiny sections of these subgenera are intermixed with each others. But their relationships were not well resolved. Also section *Anthylloidei*as one of the most complicated groups of spiny *Astragalus*, has been revised several times but its species relationships remained unresolved. In this study nrDNA ITS and chloroplast DNA*rpl*32-*trn*L_{UAG} and *ndh*F-*rpl*32, were used to investigate the phylogenetic relationships of spiny *Astragalus* with focus on the section *Anthylloidei*, delimitation of sections and given a correct classification for them. Our findings revealed that cushion forming spiny *Astragalus* evolved independently three times. All of the multi-species spiny sections including sect. *Anthylloidei* and its relatives are non-monophyletic. The members of sect. *Anthylloidei* scattered across the phylograms among other spiny sections of *Astragalus*. Our results suggested that a new taxonomic treatments for spiny *Astragalus* sections, more taxon sampling and using of other genes with high evolutionary rates, is required.

420
STUDY OF CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *PELARGONIUM QUERCETORUM* AGNEW. OF IRAN

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Pelargonium genus that is relevant to the Geraniaceae family has over 220 species in the World [1]. *Pelargonium quercetorum* Agnew. was reported from Ghasemlu valley in the west Azerbaijan province of Iranin 1992. It is utilized as a medicinal herb in local and traditional medicine (in Kurdistan). The plant materials of this study were collected from west of Iran (Marivan-Kurdistan province) at the end of May 2012. The volatile constituents in the essential oil of *P.quercetorum*, growing wild in Kurdistan, Iran were investigated through GC and GC/MS technique. Twenty-six compounds, representing 21 (80.77%) of the total oil were identified. The main components were: α-pinene (25.28%), α-fenchyl acetate (20.63%), limonene (9.94%), β-caryophyllene (8.20%), camphene (4.31%), δ-cadinene (3.32%), *β*-pinene (3.21%), α-amorphene (2.80%), valencene (2.73%), ledene (2.25%) and p-cymene (1.63%). α-Pinene is also applied as solvent for protective coatings, polishes and waxes, lubricating oil additives, and flavoringodorant. α -Fenchyl acetate (20.63%) is mainly applied in herbal-pine fragrances. It is used in combination or as a support for bornyl acetate and iso-bornyl acetate. This compound in alcohol form is used as solvent, organic intermediate, odorant, and in flavoring. Perhaps, the high densities of the main compounds give some biological activitiesto the essential oil or to this herb [2]. Although no records of toxicity have been found for this plant, it belongs to a family that includes many poisonous plants so some caution is advised.

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432
INVESTIGATING THE ANTIOXIDATIVE PROPERTIES OF THE WATER EXTRACT OF *THYMUS LANCIFOLIUS* IN DROUGHT STRESS

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Water is one of the most important environmental factors that has major effects on the growth of effective substances in medicinal plants. Water deficit in the process of producing plants can damage the process and the effective substances of medicinal plants heavily [1].*Thymuslancifolius*Celak (*T. lancifolius*)species which is a thyme and from the mint family, is indigenous to southern Iran [2].This study was conducted in order to investigate the antioxidative effects of the water extract of *T. lancifolius* in drought stress conditions. The seeds of this plant were obtained from Fereydunshahr of Isfahan province and cultured by the method "completely random design (CRD)" in 3 replicates (pots) and 3 irrigation conditions including (1) 80% field capacity (control), (2) 60% field capacity (mild stress) and (3) 40% field capacity (drought stress) in Qom Agricultural Research Station of Medicinal Plants. In this study the act of extraction of the aerial parts for every 3 samples of the plant was done by the reflux method using water as solvent. The antioxidant activity of the extracts of this plant in different stresses were analyzed by the DPPH free radical scavenging test.In the DPPH system IC_{50} values for antioxidant activity of the extracts of this plant in different stresses were respectively 0.0079 µg/ml in 80% stress, 0.056 µg/ml in 60% stress and 0.199 µg/ml in 40% stress; however the standard BHT (Butylhydroxytoluene) showed that the IC_{50} value was 19.72.The results of the study showed that these water extracts in different stress conditions, especially in full irrigation, possess noticeable antioxidant activity and by increasing the intensity of drought stress, the antioxidative effect of them will slightly reduce. So as a result these extracts can be used in medical sciences and related industries as a source for antioxidants even at the condition of water deficit.

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438
ESTIMATION OF *EBENUS* SPECIES DIVERGENCE TIME BASED ON NRDNA ITS AND *MAT*K CPDNA SEQUENCES

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The genus *Ebenus*(Hedysareae- Fabaceae) comprises ca. 19 species, of which 14 species are endemic to Turkey[1,2], and only one species (*Ebenus stellata*) is distributed in Iran, Afghanistan and Pakistan[3], and the two species is endemic to Southern Europe (*E. sibthorpii* and *E. cretica*) and the two other (*E.armitagei* and*E.pinnata*) are also distributed in North Africa[4].In this study,for estimation of divergence time among the genus,18 species belonging to *Ebenus*pluse one species of*Sulla aculeolata*as an outgroup was included in a phylogenetic analysis. The analysis using nrDNA ITS and *mat*K sequenceswere amplified with appropriate primers by PCR and purifed PCR products were sequenced on an automated DNA sequencer. Sequences were aligned with Muscle program and adjusted manually. Using BEAST v1.1.6[5]to estimate divergence time of the genus *Ebenus*. We used penalized likelihood estimates of ages for *Caragana arborescens–Hedysarum boreale* from fossil evidence[6] and divergence time between *sulla* and *Ebenus*(19.8 Ma) for calibration it. According to phylogenetic dating results of BEAST software we infer that*Ebenus* date 9 Ma and *E. Stellata,E.pinnata, E.armitagei* and *E.cretica*(from different geographic areas and placed in basal branches) date from pliocene. It seems that these groups generally are older than the others in turkey that it is the result of a very young diversification within *Ebenus*. It suggests a history of high and rapid diversificationduring the Quaternary.

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440

ANCESTRAL AREA RECONSTRUCTION AND ESTIMATING GEOGRAPHIC PATTERNS OF DIVERSIFICATION WITHIN *EBENUS*(HEDYSAREAE–FABACEAE)

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The genus Ebenus is distributed in southwest Asia, the east Mediterranean and North Africa. It comprises ca. 19 species, of which 14 species are endemic to Turkey[1,2], and only one species (*Ebenusstellata*) is distributed in Iran, Afghanistan and Pakistan[3], and the two species is endemic to Southern Europe (*E. sibthorpii* and *E. cretica*) and the two other (*E.armitagei* and*E.pinnata*) are also distributed in North Africa[4]. Statistical Dispersal-Vicariance Analysis(S-DIVA), Bayesian Binary MCMC(BBM) Analysis and Dispersal-Extinction-Cladogenesis(DEC) model implemented in RASP 2.1(Beta) to reconstruct ancestral states in phylogeny[5]. *Sulla* was used as an outgroup. Input file for RASP consisted of 9000 trees from MCMC output based on combined nrDNA ITS, *trn* L-F and *mat*K sequences.The number of maximum areas was kept as 2. In BBM analysis, the MCMC chains were run simultaneously for 5000000 generations. The state was sampled every 100 generations and Fixed JC +G (Jukes-Cantor + Gamma). S-DIVA(similar to DEC) suggests a complex biogeographical history. Based on S-DIVA and BBM analyses, dispersal and vicariance have pivotal rules in the shaping of the current distribution pattern in *Ebenus* that the greatest numbers of this events occurred in basal nodes. With relying on S-DIVA, Mediteranian region is possible ancestral region of *Ebenus*andbased on BBM North Africa is the most possible ancestral range which later dispersed to the other parts.

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442
α-GLUCOSIDASE AND α-AMYLASE INHIBITORY EFFECT AND ESSENTIAL OIL COMPOSITION OF *SALVIA SANTOLINIFOLIA*

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The genus *Salvia* comprises over 1000 species.*Salvia* species are used as traditional medicines all around the world, possessing antibacterial, antioxidant, antidiabetic and antitumor properties [1,2]. In the present study, *Salvia santolinifolia* which is a native species of Iran was collected from Zabol and investigated for its essential oil constituents. The essential oil of the plant was extracted by hydrodistillation method using a Clevenger apparatus. The components were identified by GC and GC-MS. 16 compounds which comprised 98.9% of the total oil were identified. The main constituents were α-Pinene (49.3%), β-Eudesmol (20%) and Camphene (7.8%). Furthermore *n*-hexane, dichloromethane and methanol extracts and the essential oil of the plant were examined for α-glucosidase and α-amylase inhibition using an in vitro model [3, 4] with IC_{50} values ranging from 3 to 40 µg/ml.

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444

GLANDULAR TRICHOMES AND ESSENTIAL OIL CONSTITUENTS *PEROVSKIAABROTONOIDES*KAREL. &*PEROVSKIAATRIPLICIFOLIA*BENTH. IN IRAN

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Most of the aromatic species of Lamiaceae families have the best medicinal performance. Perovskia, which is one of the important genus of Lamiaceae, is used as an analgesic in rheumatic pains, a cooling medicine in the treatment of fevers, antiplasmodial and antiseptic. The structure and micromorphology of the glandular trichomes and the chemical composition of the secreted essential oil of PerovskiaabrotonoidesKarel. and Perovskia atriplicifolia Benth. were studied. The leaves present numerous glandular trichomes of two morphological distinct types, 1) capitate hairs and 2) peltate hairs.These features are to be highly conserved in their structure.Qualitative and quantitative GC-MS analyses of the essential oils revealed. The main compounents of P. abrotonoides are 1,8-Cineole (14.41%), δ-3-Carene (8.63%), β-Caryophyllene (8.18%) and α-Humulene (8.33%) and the major constituents oil of *P. atriplicifolia* are 1,8-Cineole (18.65%), δ-3-Carene (11.23%), α-Pinene (9.98%) and Viridiflora (8.45%) were found. The ethnopharmcological and chemotaxanomic importance of the genus *Perovskia* prompted us to re-investigate the chemical constituents of *P. abrotanoides* and *P. atriplicifolia* [1, 2, 3, 4].

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460

BIOLOGICAL EVALUATION OFTHE ESSENTIAL OIL OF *THYMUS LANCIFOLIUS* CELAK IN THE CONDITION OF DROUGHT STRESS

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Medicinal plants respond differently to drought stress in terms of performance and production of effective materials [1]. *Thymus lancifolius* celak (*T.lancifolius*) is a plant from the genus of *thymus* that belongs to the Labiatae family which is indigenous to Iran [2]. This research was conducted in order to study the antimicrobial properties of the essential oil of *T.lancifolius* in the condition of drought stress. The seeds of this plant were obtained from the city of Fereydunshahr of Isfahan province and cultured inQom Agricultural Research Station of Medicinal Plants, in three irrigation conditions including **1:** 80% field capacity (Control), **2:** 60% field capacity (mild stress) and 3:40% field capacity (drought stress) in 3 repetitions by means of the completely random design (CRD) method. Essential oils of this plant were obtained using the hydrodistillation method.Antibacterial activity of the samples was investigated against two Gram-positive bacteria (*Staphylococcus aureus* ATCC 25923 and *Bacillus subtilis* PTCC 1715) as well as one Gram-negative bacteria (*Escherichia coli* ATCC 25922). The fungi used in this study were*Shigella dysenteriae*RI366 and *Candida albicans* ATCC 10231. The activities were assessed by measuring the growth inhibition zone diameter in the agar disc diffusion method.Results showed that the essential oils obtained in different stresses specially, the one from full irrigation, were completely active against all 3 bacteria and 2 fungi. However the amount of their activity dropped slightly by increasing the drought stress. As a result these essential oils can be used in medicine and relative industries as an important antimicrobial source.

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462
FATTY ACIDS PROFILE OF *LALLEMANTIACANESCENS*NUTLETS

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Lallemantia canescens (L.) Fisch & C.A.Mey. genus comprises herbaceous perennial belongs to the Nepetoideae subfamily of the family Lamiaceae [1]. The family has been charactrized by occurrence of Linolenic, Linoleic and Oleic in the whole plant [2]. For the first time the oil content and fatty acid composition of the nutlets of *L.canescens* (Lamiaceae) at two localities (East Azarbaijan and Qazvin Provinces) was examined by GC and GC/MS. The major fatty acids were Linolenic (58.3%) and Linoleic (18.9%). The total SFA (saturated fatty acid) composition of studied species is between 5.5-6.1%, while the UFA (unsaturated fatty acid) composition is between 93.6-94.5%. Plants with a high ratio UFA/SFA is desirable for human nutrition [3] and this is characteristics of nutlet oils of the Lamiaceae [2]. In this study, this ratio was found to be between 15.3-17.2%. According the our result, it is clear that the composition of *L. canescens* nutlet fatty acids from two localities is similar, Therefore, the conservation nature of the nutlet fatty acids profile can be used as chemotaxonomic markers.

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463
EVALUATIONARTEMISININPRODUCTIONCULTURE(IN VIVO)OF THE PLANTANDCALLUS(*ARTEMISIA AUCHERI BOISS*)TOLIGHTSTIMULUSANDUV RAY

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Artemisinin is the most important anti malaria medicine and its chemical synthesis is complex and costly. Due to the presence of gene manufacturer Artemisinin in plant *Artemisia aucher* Boiss. and disable thisgene and the abundance this plant in Iran, this experiment was designed with aim probability of producing artemisinin in cultured tissue in the presence of light stimuli.For culture, was used of solid culture, Murashing and Skoog without growth regulators. Culture medium was placed in the culture room under sterile conditions, the temperature of 2 ± 25 and different light conditions with different treatments. Lighting conditions was used of optical radiation 1000.2000 and 3000 lux. In addition, it was assumed, radiation treatments UV and treatment of Darkness. For analyzing data and drawing diagrams of software SPSS version 20 and Excel programs were used. During the experiment, the resulting data, the average of three replicates ± SD and results based on one-way ANOVA test, Tukey test and a significant difference on the 0.05 P ≤, were investigated. For detection of artemisinin, the dichloromethanolic extract was analyzed by TLC. Measure phenolic compounds and flavonoids were done into spectrophotometric method. Seedlings in treatments under light 1000 and 3000 lux were produced artemisinin. Mean while, radiation-UV both the callus and the seedlings have affected and produced Artemisinin. Effects of light stimulion the chemical plant and its morphological characteristics, too,were confirmed. this study showed that increased exposure as well as the use of radiation UV, forcing *Artemisia aucheri*plant to produce artemisinin. In addition to the chemicalplant and the shape of the lights timulus takes effect.

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464
EFFECT OF LIGHT ON GROWTH AND MORPHOLOGICAL CHARACTERISTICS OF THE PLANT ARTEMISIA AUCHERI APPARENT IN VITRO CULTURE (IN VIVO)

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Different climatic factors have an impact on growth and morphological characteristics of plants. Light is one of the most important climate factors. Usually light influences on morphological characteristics, linear growth of plants, which will vary according to light intensity and type of plant.Our goalwasinvestigate the effectof lightwithdifferent frequenciesongrowthof the plantArtemisia aucheri. For culture, was used of solid culture, Murashing and Skoog without growth regulators. Culture medium was placed in the culture room under sterile conditions, the temperature of 2 ± 25 and different light conditions with different treatments. Lighting conditions was used of optical radiation 1000.2000 and 3000 lux. In addition, it was assumed, radiation treatments, UV, and treatment of Darkness. For analyzing data and drawing diagrams of software SPSS version 20 and Excel programs were used. During the experiment, the resulting data, the average of three replicates ± SD and results based on one-way ANOVA test, Tukey test and a significant difference on the 0.05 P ≤, were investigated. According tostatistical analysis results between wet and dry weightsof allsamples, there was a directrelationship. However,the largest amount offresh and dry weightof the seedlings was observedintreatment 3, the irradiationof 3000lux. 3treatmentswithall treatments and control treatments showed significant differences. Morphological changes were observed by UVtreatment and with compared to the dry weight, except fortreatment 1 and5, showed significant differencewithother treatments. It was concluded after comparison, the best lighting conditions in this experiment is 300 lux, the longitudinal growth and transverse growth of the plant, the better, and even, on root growth, the impact a lot. With increasing light intensity decreased, the time to reach maximum density. Ray of UV, the shape plant and root growth, and stem of the plant, was effective.

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475

STUDY OF PROTECTIVE EFFECT OF AVICENNIA MARINA HYDROETHANOLIC LEAF EXTRACT ON KIDNEY FUNCTION IN MALE RAT INDUCED WITH CARBON TETRACHLORIDE

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Drugs and chemical agents may infect on kidney tissue and caused renal toxicity. Carbon tetrachloride which is used in hygiene industries caused renal disorders. Medicinal plants are able to protect body organs. In this study the protective effect of Avicennia marina leaf extract (MLE) on renal function in male rat were induced with ccl_4 investigating. The 42 male rats with 220-250 gr body weight were divided randomly in 6 groups (n=7). control (taking normal saline,0.5ml/day, i,p), sham(taking olive oil, 0.5ml/day, i,p single dose), group induced by ccl_4 (carbon tetrachloride 1:1 with olive oil,0.5ml single dose, i,p), treated groups: (1,2 and3 by carbon tetrachloride 1:1 with olive oil,0.5ml single dose and 200mg/Kg, 400mg/Kg and 800mg/kg MLE /day for 96 hrs, i,p). After the examination the blood samples were collected from heart directly and BUN, serum creatinine, LDH , ALT,AST and ALP enzymes were analyzed and the microscopic studies of renal tissue were done. All data were expressed as mean±SEM. and statistical significance differences were accepted at $P<0.05$. Our results showed that the carbon tetrachloride has necrotic effect on kidney. The BUN,LDH and liver enzymes increased in group which induced with ccl_4 compared with control group and treated groups by MLE have decreased liver enzymes compared with ccl_4 induced group significantly ($P<0.001$). The microscopic study of kidney tissue showed that the necrosis and inflammation in glumerolus and renal tubules ($P<0.001$) and treated groups were no changed.The Avicennia marina hydroethanolic extract has antioxidant and flavonoids. compounds which can protect the kidney tissues against toxic chemical agents .[1, 2, 3, 4]

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476

STUDY OF PROTECTIVE EFFECT OF AVICENNIA MARINA HYDROETHANOLIC LEAF EXTRACT ON SPERMATOGENESIS IN MALE RAT INDUCED WITH CARBON TETRACHLORIDE

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The toxic chemical compounds are widelyused in the world. Carbon tetrachloride which is used in hygiene industries caused tissue disorders. Medicinal plants have protective effects in body tissues. In this study the protective effect of Avicennia marina leaf extract (MLE) on spermatogenesis in male rat were induced with ccl_4 investigating.The 42 male rats with 220-250 gr body weight were divided randomly in 6 groups(n=7): control (taking normal saline,0.5ml/day, i,p), sham(taking olive oil, 0.5ml/day, i,p single dose),group induced by ccl_4(carbon tetrachloride 1:1 with olive oil,0.5ml single dose, i,p), treated groups: (1,2 and3 by carbon tetrachloride 1:1 with olive oil,0.5ml single dose and 200mg/Kg, 400mg/Kg and 800mg/kg MLE /day for 96 hrs, i,p). After the examination the blood samples were collected from heart directly and testosterone , FSH, LH , sperm count, sperm motility and GSI were analyzed and the microscopic studies of testes tissue were done. All data were expressed as mean±SEM. and statistical significance differences were accepted at $P<0.05$.Our results showed that the carbon tetrachloride has necrotic effect in testes. The testosterone, FSH and LH hormones increased in treated groups compared with ccl4 induced only group significantly ($P<0.001$). The number of sperm and motility were increased and microscopic study of testes tissue showed the necrosis and inflammation with decrease in spermatogonia and spermatocytes comparedwith ccl_4 induced only group significantly ($P<0.001$) and treated groups were no changed. The Avicennia marina hydroethanolic extract has antioxidant and flavonoids compounds which can protect the testes tissues from toxic chemical agents.[1, 2, 3, 4].

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478
STUDYOFPROTECTIVEEFFECTSOF AVICENNIAMARINAHYDROETHANOLICLEAFEXTRACTOF HEMATOPOESISAND BLOODPARAMETERSIN MALE RATINDUCEDWITHCARBON TETRACHLORIDE

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The chemical toxins caused hematopoiesis disorders and changed blood parameters. Medicinal plants have hematopoietic effects and can inhibit the toxicity progress in blood tissue. In this study the protective effect of Avicennia marina leaf extract (MLE) on hematopesis in male rat were induced with carbon tetrachloride investigating.The 42 male rats with 220-250 gr body weight were divided randomly in 6 groups(n=7): control (taking normal saline,0.5ml/day, i,p), sham(taking olive oil, 0.5ml/day, i,p single dose),group induced by ccl_4 (carbon tetrachloride 1:1 with olive oil,0.5ml single dose, i,p), treated groups: (1,2 and3 by carbon tetrachloride 1:1 with olive oil,0.5ml single dose and 200mg/Kg, 400mg/Kg and 800mg/kg MLE /day for 96 hrs, i,p). After the examination the blood samples were collected from heart directly and RBC,WBC,PL,Hb,MCV,MCH,MCHC, total protein and Albumin were analyzed and the microscopic studies of bone marrow tissue were done. All data were expressed as mean±SEM. and statistical significance differences were accepted at $P<0.05$.Our results showed that the carbon tetrachloride has necrotic effect in bone marrow. The RBC, MCV,Hb and Hct has no changed compared with control group ($P>0.05$). The WBC, PL, total protein and albumin were increased significantly compare to ccl_4 induced group ($P<0.001$). The serum total bilirubin level decreased significantly in treatment groups ($P<0.05$). The Avicennia marina hydroethanolic extract has antioxidant and flavonoids compounds which can protect the hematopoietic tissues from toxic agents such as ccl_4.[1, 2, 3].

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481
ASSESSMENT OF CYTOTOXICITY OF *TRIBULUS LONGIPETALUS*USINGBRINE SHRIMP (*ARTEMIA SALINA*) LETHALITY ASSAY

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Medicinal plants constitutea significant part of the flora and are extensively distributed in Iran.Therefore, identifying and expansion of information toward biological activity of these plants which can be appropriate foundation for the development of pharmaceuticals substances, is indispensable.In this direction, *Tribulus longipetalus*(Zygophyllaceaefamily)were selected and collected.*T. longipetalus* is an annual or biennial prostrate herb,found in dry sandy soils in warm temperate areasof Egypt, Afghanistan, India, Pakistan and Iran.According to the ethnopharmacological literature, this plant is usedfor the treatment of urinary disorders, cough, sexual dysfunction, painful frequent urination, Heart diseases and inflammation of the joints. An oldphytochemical study on the *Tribulus* speciesevidenced the presenceofsteroidal saponins, ligninamides, alkaloidsand flavonoids. In the present study, methanol extract of whole plantextracted by soxhlet apparatus were screened for its cytotoxicity using brine shrimp lethality test. The brine shrimp lethality assay is considered a useful tool for preliminary assessment of cytotoxicity. It has also been suggested for screening pharmacological activities in plant extracts.Total extract exhibited potent brine shrimp lethality with LC_{50} valueequal to 70µg/ml. Thecurrent study with the support by brine shrimp bioassay clearly showed bioactivity toward secondary metabolites of *T. longipetalus*and more encourage for its use in phytochemical and pharmaceutical researches, especially in the field of anticancer[1, 2].

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500

THE EFFECTS OF NATURAL HONEY ON LIPID- PEROXIDATION AND TOTAL ANTIOXIDANT POWER IN STREPTOZOCIN-INDUCED DIABETIC RATS

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Diabetes mellitus is a metabolic disorder that characterizes by hyperglycemia and associated with oxidative stress. Diabetes is a disease with increased inflammation, oxidation, and glycation, therefore agents with strong antioxidant properties may have potential for limiting the progression of diabetes and its related complications. Honey is a naturally occuring product with many medicinal effects such as hypoglycemic and antioxidant effects that indicates honey is a good candidate for diabetes research. The purpose of the present study was to assess the hypoglycemic effects and antioxidant activity of honey in STZ-induced diabetic and control rats. To this, natural honey in two doses (1 and 2 g/kg body mass) were used orally for 21 days. At the end of treatment period, total antioxidant power evaluated with FRAP assay. The levels of lipid peroxidation were measured with malondialdehyde (MDA) assay.Our findings showed total antioxidant capacity was decreased and MDA levels were increased in the diabetic control group. Honey could increase total antioxidant capacity and reduced blood MDA levels in a dose dependent manner (pvalue ≤ 0.05). Treatment with honey also could treat hyperglycemia. The current study demonstrated that natural honey could ameliorate oxidative stress in diabetic rats via a decrease in malondialdehyde and an increase in total antioxidant capacity. It seems honey could be a good candidate for treatment of diabetes and amelioration of diabetic complication. However, further studies are required to determine the molecular mechanism of honey's therapeutic action on diabetes mellitus.

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501
QUERCETIN: A GOOD CANDIDATE FOR TREATMENT OF DIABETES?

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Imbalance in oxidative stress and antioxidant defense plays key role in pathogenesis of diabetes. Agents with hypoglycemic, lipid-lowering, and antioxidant activity can be useful for ameliorating progression and development of diabetes and its related complications. Quarcetin, a major flavonoid derived from plant source, demonstrated with many pharmacological effects includindg anti-inflammatory, anti tumor and antioxidant activity.The present study investigated the hypoglycemic effects and antioxidant activity of quercetin in experimental diabetes divided in three groups (n= 7) including healthy control, diabetic control and quercetin-treated diabetic rats. The levels of malondialdehyde as a marker of lipid peroxidation were measured by malondialdehyde (MDA) assay. Total antioxidant power evaluated using FRAP assay.
Our findings showed MDA levels were increased and total antioxidant capacity was decreased in STZ-induced diabetic rats. Quercetin treatment (15mg/kg) showed significant increase in total antioxidant capacity (pvalue $\leq$ 0.05). In applied dose, quercetin could treat hyperglycemia and amelorate MDA levels.The present study demonstrated benefical effects of quercetin including hypoglycemic and antioxidant activity via decrease in malondialdehyde and fasting blood glucose and increase in total antioxidant capacity in diabetic rats. Our results suggested quarcetin is a good case for study to determine its therapeutic function on diabetes mellitus.

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503

COMPARATIVE ECOLOGICAL STUDIES OF FOUR LALLEMANTIA (LAMIACEAE) SPECIES GROWING WILD IN IRAN

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Lallemantia Fisch & C.A.Mey. is a small genus belonging to Lamiaceae family. The genus *Lallemantia* is distributed in Afghanistan, Iraq, Turky, Caucasia, Afghanistan, Pakistan and Europe. All species (*L. royleana*, *L. iberica*, *L. peltata* and *L. canescens*) grow naturally in Iran [1]. The only *L. canescens* is perenial. Several species (*L. royleana* and *L. iberica*)are used in folk medicine as antiseptics, astringents and spasmolytics [2]. Detail information on ecological properties of *Lallemantia* species has not been studied. Ecological investigation included altitudinal and soil properties (texture and pH) analysis of habitat. The results obtained from ecological studies are showing that L. canescens has been determined to grow in higher altitude (2400- 3000) on sand soil with pH 6.9-7.1 and EC with 300-500 µs. *L. peltata* is characterized by loamy sand habitat with 7.0-7.2 and EC 450-500 µs in lower altitude than the L. canescens (Average 2400). L. iberica and L. royleana are growing on loam-sandy loam with more alkaline (7.7-7.8) and saline (700-900 µs) than the others. Finally, PCA analysis show that EC, Sand and Clay as First component and Altitude as Second components are main ecological factors that are responsible to *Lallemantia* habitat differentiation.

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510

CHEMICAL COMPOSITION OF ESSENTIAL OIL FROM *TEUCRIUM POLIUM* GROWING IN IRAN

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Teucrium polium is a member of the Lamiaceae family with thegenus including more than 300 species.[1] For thousands of years, *T.polium* species have used for flavoring foods and for medicinalpurposes.[2] *Teucrium* have been used for treatmentofmany pathophysiological conditions, such as gastrointestinal disorders, inflammations,diabetes and rheumatism.[3] Composition of the essential oil obtained from dried flowering aerial parts of *Teucrium polium* wasanalyzed by GC and GC/MS.[4] The results indicate that the *Teucrium polium* is consisted Fivety different components were identified in the essential oils of *T. polium*. The major constituents of the oil were α-Pinene (12.19%),Germacrene D (9.8%), β-caryophellene (9.28%).

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512
MICROMORPHOLOGICAL STUDY OF MEDICINAL *QERCUS* SPECIES OF ZAGRUS REGION

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Oak species are important trees of Iran jungles in Zagrus region. Main diagnostic features are based on their leaves form and shape [1]. There is a great variation in leaf shape of Iranian *Quercus* species. *Quercus* species are of medicinal importance. Different parts of Oak plants, as wood, bark and nut shell and core are used as medicinal material in traditional medicine of Iran [2]. Due to the vast distribution of these species in Iran, their economic and medicinal importance in present study we have considered different micro-morphological features to evaluate the diagnostic ones. Three Zagrus species are considered here as: *Quercus brantii, Q. libani, Q. infectoria. S*hoots were gathered from local habitats in proper season and qualitative and quantitative features were evaluated and, measured. Leaf and shoot indumentums were studied by use of light and scanning electron microscopy. Hair type, shape, abundance and their cellular characters were studied. Species relationship and the value of characters in species separation are discussed.

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516

COMPARISON OF THE COMPONENTS OF THE ESSENTIAL OILS OF *THYMUS LANSIFOLIUS* CELAK COLLECTED FROM TWO ECOTYPES OF IRAN

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Thymus has about 250 species around the world. According to recent resources 18 species of it are distributed in Iran from which 4 species are indigenous [1]. *Thymus lancifolius* Celak (*T. lancifolius*) belongs to the mint family and its essential oil due to having thymol has a strong activity against a wide range of bacteria and fungi [2].This study was performed in order to compare the components of the essential oils of *T. lancifolius* which was collected from two ecotypes of Iran. The seeds of these two ecotypes were obtained from Kurdistan and Isfahan (Fereydunshahr) provinces and cultured in Qom Agricultural Research Station of Medicinal Plants. The obtained essential oils from these two ecotypes by hydrodistillation method, were analyzed using the GC-MS device. Results showed that the difference between them was regarding the percentage and components of the essential oils. The yield of the essential oil from Isfahan province was 0.95%, while it was 1.02% in the Kurdistan ecotype. The most important components of the essential oil obtained from the Isfahan ecotype were: thymol (64.58%), p-cymene (11.62%), γ-Terpinene (6.89%), Octane (2.93%) and carvacrol (4.38%); and the most important components in the Kurdistan ecotype were: thymol (46.95%), p-cymene (25.75%), γ-Terpinene (8.83%), Octane (3.48%) and carvacrol (4.21%).Cis-α-Bisabolene compound (1.18%) was in the Isfahan ecotype however, it was not identified in the Kurdistan ecotype. Also δ-Cadinene (0.4%) was the compound that existed in the Kurdistan ecotype but not in the other. Regarding to the high yield of thymol in the essential oil of the Isfahan ecotype and p-cymene in the essential oil of the Kurdistan ecotype, one can use both ecotypes for various purposes especially medicinal applications.

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519

THE PROTECTIVE EFFECT OF GINGER EXTRACT ON KIDNEY TISSUE AND SOME SERUM BIOCHEMICAL PARAMETERS IN NMRI MICE TREATED WITH BISPHENOL A.

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Bisphenol A (BPA), an endocrine disrupting compound largely used in plastic and paper industry, can induce reactive oxygen species (ROS) by increasing oxidative stress in many organs including kidney [1, 2].The aim of this study was to investigate the protective effect of Ginger extract (GE) onkidney tissue and some serum biochemical parameters against toxicity induced with BPA.Adult male NMRI mice with mean body weight 32±3 g were randomly divided into 4 groups (n=6): Control, BPA (240mg/kg/day), GE (500ml/kg/day) and BPA + GE. Oral treatment was performed till 34 days. At the end of treatments, Body and left kidney weight were recorded. After fixation the tissue, tissue sections were prepared and stained with Haiden Han Azan method and studied stereologically to evaluate the volume of kidney, cortex and medulla, renal tubules, renal corpuscle and its components. Serummalondialdehyde (MDA), creatinine and urea levels were also measured. Data were analyzed with One Way ANOVA test. $P<0.05$ was considered as statistically significant.A significant increase in weight of kidney, volume of kidney, cortex, renal tubules and their epithelium and lumen, glomerolus, taft, renal corpuscle and rare of MDA, creatinine and urea in serum was found in mice treated with BPA compared to the control group ($p<0.05$). In BPA + GE group, Ginger significantly decreased the mentioned parameters compared to the BPA group ($p<0.05$).These findings suggest that Ginger extract by reduction in serum MDA, creatinine and urea, and tissue damage, appears to have a protective role in the Bisphenol A -induced injury in renal tissue.

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521

ANTI-PROLIFERATIVE ACTIVITY OF *FUMARIA VAILLANTII* DIFFERENT EXTRACTS ON MELANOMA

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Plant-derived natural products are known to have cancer chemo-preventive and chemo-therapeutic properties. Plant extracts or their active constituents are used as anti-cancer medicine by 80% of the world population. The advantage of using plants as a medicine is that they contain fewer side effects than their chemical counterparts [1,2]. The aim of the present study is to determine the anti-proliferative and pro-apoptotic potential of *Fumariavaillantii*extracts on malignant melanoma SKMEL-3 and to characterize the underlying mechanisms. Anti-proliferative activity was evaluated by MTT and flow cytometry methods against malignant melanoma cell line.Totalphenolics and flavonoids were determined by Folin-Ciocalteu and aluminum chloride methods [3].Chloroform fraction had the lowest IC_{50} value at 72 h (0.004 mg/ml) in SKMEL-3 cells. Flowcytometry analysis indicated that the fraction induces necrosis in SKMEL-3 cells. In addition, the colorimetric methods showed that the methanolic fraction possess the highest amount of total phenolics (33.03 ± 0.75 mg/g of dry powder) and flavonoids (10.5 ± 2.0 mg/g of dry powder).The collective data indicate that *F. vaillantii* chloroform fraction may contain effective compounds with chemo-therapeutic potential.

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536

EVALUATION OF HEPATO PROTECTIVE EFFECTS OF AQUEOUS EXTRACTS OF *BERBERIS VULGARIS* AND *ZIZIPHUS JUJUBA* MILL

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Berberis vulgaris and *Ziziphus jujuba* are native to South Khorasan. The plants have high sources of flavonoids and therefore are good antioxidant. Based on literature, *B.vulgaris* and *Z.jujuba* could be hepato and cytoprotective [1, 2]. *B. vulgaris* fruit is safe for human consumption and is approved by FDA [3]. Fruits of *Z.jujuba* are edible and different parts of this plant possess multiple medicinal properties such as antifertility, analgesic, and antioxidants [4]. The aim of this study was to investigate hepatoprotective effects of the plants against acetaminophen and rifampin-induced hepatotoxicity. In this study, 60 Wistarrats were used and via intra peritoneal injection of acetaminophen and rifampin, acute liver damage was created and thenhepatoprotective effects of the plants extract was assessed.Hepatotoxic groups were given the extracts by gavage-feeding, at afixed time every day for three days.At the end of experimental period, serum levels of enzymesALT, AST, ALP, Total and direct Bilirubin, Urea, Creatinine, total Protein and Albumin were measured by the photometric method.Treatment of rats with different doses of plant extract (100 and 200 mg/kg) showed significant decrease ($P<0.05$) in liver enzymes and increase in antioxidant capacity.Basedon the results, oral administration of *B.vulgaris* and *Z.jujuba* could prevent hepatotoxicity.

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538

THE EFFECTS OF HYDRO-ALCOHOLIC EXTRACT OF SAGE (*SALVIA OFFICINALIS* L.) ON ESTROGEN SECRETION AND ALKALINE PHOSPHATASE ACTIVITY OF OVARIAN GRANULOSA CELLS OF MOUSE

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Herbal plants, are one of important sources of drug that have used for long times. *Salvia officinalis* (sage) is an important plant of lamiaceae family. Recent research showed the anti bacterial, antispasmodic, anti-anxiety and relaxing, antifungal, anti-toxic, hypoglycemic, anti-sweating and estrogenic properties of this herb [1]. In this study the effectof hydro-alcoholic extract of sage on mice ovarian granulose cells culture were examined. Ovulation of immature 25-35 days mice with 13-18 g weight stimulated by PMSG itraperitoneal injection. Granulosa cells were extracted and cultured in DMEM-F12. After 24 h, the cells treated by concentrations of 0, 10, 50, 100, 500 and 1000 µg/ml of *salvia officinalis* hydro-alcoholic extracts.Bioviability, estrogen concentration and alkaline phosphatase activity of granulosa cells were measured. The results showed that 500 and 1000 µg/ml concentrations of extract were toxic. Estrogen level and alkaline phosphatase activity increased in 500 and 1000 µg/ml. High dose of *salvia officinalis* hydro-alcoholic extract were toxic and inhibited granulosa cells bioviability and proliferationand increased hormone secretion,Therefore,it may be show side effects on fertility.

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542
STUDY OF ANTINOCICEPTIVE EFFECTS OF *HERACLEUM PERSICUM* LEAF HYDROETHANOLIC EXTRACT IN DIABETIC MALE MICE

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Pain is a protective sense in tissue injury time[1]. Diabetes mellitus accompanies with undesirable neuropathic side-effects in long term[2]. The aim of this study is to examine analgesic effects of hydroethanolic*HeracleumPersicum*L.leaf'sextract (HHE) in diabetic and intact male mice.In this study, the 96 male mice were divided into 9 groups: control, treated by morphine, treated by HHE (100,200 and 400mg/kg,i.p.), naloxone + HHE (200mg/kg) and STZ (60mg/kg, i.p) and STZ+ HHE (400mg/kg) randomly. To assess the antinociceptive effects of HHE, the animals were examined by tail-flick and writhing tests. The data were expressed in mean±SEM and analysied by use of ANOVA statistical way.Ourresults showed that 200 and 400 mg/kg of HHEincreased pain threshold compared with control group in writhingand till flick tests ($p<0.001$). Also the effect of administration of 400 mg/kg HHE was moreanalgesic that of morphinealone ($p<0.001$). Diabetic grouphad low threshold to pain compared to control group. Inthis study, HHE has antinociceptive and anti-diabetic effects. We suggeste the analgesic effects of HHE may be due to opioid system and also it effect on prostaglandins synthesis [3].

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546

THE EFFECT OF GAMMA RADIATION ON CELLULAR AND BIOCHEMICAL CHANGES IN TISSUE CULTURE REGENERATED FROM ALOE LITTORALIS PLANTS

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Aloe littoralis is one of the most important medicinal plants belonging to *Liliaceae* family that nowadays is propagated by in vitro culture in high-scale propagation. [1] The effects of gamma radiation on plants that are in constant need of the sun is unavoidable. In present study the nuclear techniques (gamma radiation) were used to modify plants.Gamma rays are electromagnetic waves with an ionization potential of the material that is easy to use, good permeability, and high reproducibility of mutations produced many more used.[2] The results of this study showed that increasing the dose of 30 to 60 Gyof gamma radiation significantly increased the chlorophyll A, B and carotenoids,total protein content, antioxidant enzyme superoxide dismutase and phenolic compounds compared to control plants and reduced the amount of carbohydrates. Therefore it is suggested that the vegetative stage of gamma rays can be used to increase the amount of useful material such as antioxidant enzymes.[3, 4]

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547

INVESTIGATION OF *NIGELLA ARVENSIS* SEEDS EXRACTION TOXICITY EFFECT ON STOMACH CANCER CELL LINE (AGS) WITH REGARED TO THEIR THYMOQUINONE CONTENT

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Thymoquinone (TQ), the predominant bioactive constituent derived from the medical spice *Nigella arvensis* (also known a black cumin), has been applied for medical purposes for more than two thousand years [1, 2]. Recent studies reported anti-inflammatory effect of the alcoholics extract of *N. Sativa* seedsand its callus on mix glial cells of rat with regard to their thymoquinone content [3]. And also thymoquinone has been reported to inhibited cell proliferation, cancer metastasis and cell cycle in zebrafish (Danio rerio) and mouse neuroblastoma cell [1, 2, 4]. This study was performed to investigate the toxicity effect of alcoholic's extraction of N. arvensis seeds on stomach cancer cell line (AGS). In this project seeds juice were extraxted and thymoquinone content was measured by HPLC technique. And then we treated cancer cell line separately with various concentration of thymoquinone and seeds alcoholic extract. Treated cell line incubated about 24 hours. These cells were examined by microscope and morphology changing was reported. For confirmed this result, MTT assay was accomplished and confirmed toxicity effects of thymoquinone. It is considered that we found different consequence of toxicity level in cell linewhich treated by various concentration by thymoquinone and seeds alcoholic extract. Also we found few concentration of thymoquinone that they didn't have any toxicity effect on cancer cell line.

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548

INTRACTION STUDY OF A SECONDARY METABOLITE COLCHICINE WITH METAL IONS BY SPECTROFLUORIMETRY

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Colchicine, is a toxic natural product and secondary metabolite, initially extracted from plants of the genus *Colchicum*. It was utilized originally to treat rheumatic and inflammatory complaints. It was also prescribed for its cathartic and emetic effects, and used in the treatment of acute gouty arthritis and familial mediterranean fever.It has also medicinal applications in the treatment of some auto-immune and dermatologic disorders. It has diverse effects on tubulinsuch as microtubules assembling [1, 4]. Colchicine, like many other cytotoxic drugs, enters the cell through the lipid bilayer by passive diffusion and binds reversibly to P-glycoprotein (Pgp) [5]. At a molecular level, colchicine inherently has too low intrinsic fluorescence intensityand the fluorescent effect of colchicine binding with tubulin is used for tracing of components in the cells.Due to the importance of using Colchicine in pharmacology and its widespread application, to enhance its intrinsic fluorescence for better detection of this compound when it attaches to tubulin proteins, its complexation with some common metal ions (Li, Na, K, Mg, Ca, Sr, Cr, Mn, Fe, Ni, Co, Cu, Ag, Cd, Hg, Al, Pb) was studied by fluorescence spectroscopy. Because the cations offer an effectual means of probing the role of metal cation size in the structural organization of biological membranes. The molar composition of the complex was determined according to the mole-ratio method which corresponding to the formation of a 1:1 complex between Colchicine and silver ions.The experimental results revealed silver cation has an ability to increase the intrinsic fluorescence of Colchicine to quintuple.

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551

COMPARISON OF ANTIOXIDANT ENZYME ACTIVITIES BETWEEN *COLCHICUM CROCIFOLIUM AND COLCHICUM KOTSCHYI*

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Colchicum L., is a very interesting geophyte plant because of its unusual life cycle. The autumnal one followed by the winter season and photosynthetically active one which leads ageing and dormancy. Different researches described *Colchicum* L., as a source of therapeutically active alkaloids called colchicinoids. One of the most plentiful alkaloid- colchicine, is known to have cancerostatic, anti rheumatic, anti inflammatory, anti mitotic, cathartic and emetic effects [1, 5]. The main substrates for colchicines's biosynthesis are dopamine and cinnamic acid. The polyphenol oxidase is expected to participate in dopamine formation from tyrosine. The authors were interested in the comparative study on some antioxidant enzyme activities in different organs of spring- flowering species (*C.crocifolium* Boiss) and autumn- flowering species (*C. kotschyi* Boiss). The results showed that the highest and the lowest polyphenol oxidase activities were noted in the roots and seed of *C. Kotschyi* correspondingly. The peroxidase activity was maximum at the roots of *C. crocifolium*, however the lowest peroxidase activities were observed in the daughter corm in *C. crocifolium*. The Superoxid dismutase activity in all of the organs in *C. crocifolium*and *C. kotschyi* was identical and on the other hand it was negligible in the seed [6].

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553
LEAF ANATOMICAL CHARACTERISTICS OF IRANIAN *JUNIPERUS* L.

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Juniperus L.,is composed of six species with heterogeneous geographical distribution and morphological variations in Iran.Anatomical and morphological investigations of different species of Iranian *Juniperus* are performed in this study [1, 5]. Transverse sectionsof leaves (needle-like or scales) were studied with a light microscope. Great anatomical variation existsbetween the species. The palisade parenchyma and joining fiber were observed in all of the species except *Juniperus excelsa.* In *Juniperus foetidissima* with elliptic outline, stomata are present only in the upper epidermis of scale-like leaves. Stomata arepresent on lateral faces of needle-like leaves in *Juniperus excelsa*, *J. sabina*, *J. communis* and *J. oblonga*. Inthese species, stomata are present only in the abaxial epidermis where there are no fibers underneath the epidermis. The number of secretory cells in *J. excelsa* was 4-5 layers, although *J. Sabina* and *J. foetidissima* have 2 and 3 secretory cells respectively.*Juniperus communis* and *J. oblonga* havestomata that are distributed uniformly in the lower epidermis, except under the midrib of *J. oblonga*,which is covered with fibers instead of stomata. *Juniperus communis*had two numbers of transfusion tracheids whereas there were four transfusion tracheids in *J. oblonga.* The results confirm the taxonomical treatment of Gymnosperms in “Flora of Iran” by Assadi [2].

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554
DETERMINATION OF PROTEIN CONTENTS IN DIFFERENT ORGANS OF *COLCHICUM VARIANS*

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Colchicum L., that has an uncommon life cycle, is a monocot geophyte [1]. Its life cycle containing of two growing phases: autumnal period followed by winter season and photosynthetically active period being expected to result in senescence and latency. After the starch, protein content characterized as the second vital storage compound in corms [2-4]. Soluble and insoluble protein contents of the seed, roots, mother and daughter corms, leaf and stem of spring flowering species of genus *Colchicum* (*C. varians*Freyn & Bornm) in both quantity and quality aspects were studied. Results showed that the seed had the largest soluble protein content since roots had the least amount of soluble protein. Interestingly, the authors determined a lower level of insoluble proteins than soluble proteins in all examined organs except stem and leaf. These results confirm that the function of total protein in any organs depends on the stages of the plant lives. Because of the active phase of plant life and flowering and photosynthesis is ongoing, the amount of total protein in the mother corm and roots is lower than the other organs [5, 6].

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556

THE EFFECTS OF THE HYDROALCOHOL EXTRACT OF *DOREMA GLABRUM* ON ANTIOXIDANT ENZYMES ACTIVITY OF RAT LIVER HOMOGENATE

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Dorema glabrum is a perennial plant that belongs to the apiaceae distributed in Nakhichevan, Autonomous Republic-Azerbaijan, Armenia and North-West of Iran [1, 2]. Dorema genusis well known for its vasodilator, diaphoretic, carminative, emmenagogue, mild diuretic,stimulant, antispasmodic, antifungal,antimicrobial and hepatoprotective effects [3]. It is also traditionally used for the treatment of bronchitis, catarrhand different kinds of cancer [4]. Recent studies indicate that hydro-alcoholic extract from aerial parts of *Dorema glabrum* possess antioxidant activity and anti-lipidemic effects in rats fed with high cholesterol diet [5]. In the present study, we aimed to evaluate the effect of different concentration of the hydro-alcohol extract of *Dorema glabrum* on antioxidant enzymes activity (peroxidase and catalase) of rat liver homogenate. Finely powderedaerial parts of *Dorema glabrum*was submitted to extraction withmethanol and water at a ratio of 1:1 in a Soxhlet apparatus for 5 h. After extraction, the solvent was filtered andthen evaporated via a rotaevaporator at 40 °C.The dried extract was reconstituted toprepare a solution of 10 mg/mL in distilled water justbefore the start of the experiments.Rat liver peroxidase and catalase activity was determined in the present of 0.4-2.5 mg/ml of the extract.The experimental data indicated that *Dorema glabrum*extract possessed partially activatory effect on peroxidase and catalase of rat liver homogenate. These results suggest that probably some part of antioxidant activity of the extract in body of animals may be related to activation of the antioxidant enzymes such as peroxidase and catalase.

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560
GREEN SYNTHESIS AND CHARACTERIZATION OF SILVER NANOPARTICLES USING *DOREMA AUCHERI* LEAF EXTRACT AND THEIR ANTIBACTERIAL PROPERTIES

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Green synthesis is one of the rapid, reliable, and best routes for the synthesis of silver nanoparticles (AgNPs). Furthermore, the improvement of experimental processes for the synthesis of these nanoparticles of different sizes, shapes, and controlled dispersity has many important.These factors strongly affected of the physical and chemical properties and their potential application in optoelectronics, electronic, recording media, sensing devices, catalysis, biomolecular detection and medicine [1,2]. The current study revealed that the aqueous leaf extract of *Dorema aucheri*, which contains steroids, saponins, tannins, phenols, triterpenoids, flavonoids, glycosides, and glycerides, is found to be responsible for bioreduction during the synthesis of spherical Ag nanoparticles. The formed Ag NPs were characterized by ultraviolet-visible (UV-vis), Fourier transform-infrared (FT-IR), X-ray diffraction (XRD), atomic force microscopy (AFM), energy-dispersive X-ray spectroscopy (EDX), and scanning electron microscopy (SEM) analysis. UV-vis spectra of the aqueous medium containing silver nanoparticles showed a surface plasmon resonance peak at 460 nm. FT-IR analysis was performed to analyze the biomolecules responsible for the reduction of Ag NPs. XRD results confirmed the presence of silver nanoparticles with face-centered cubic structure. The EDX analysis showed the completed inorganic composition of the synthesized Ag NPs. AFM analysis exemplified the results of particle sizes (41 nm). The calculated crystallite sizes are in the range of 20 to 50 nm, and the spherical nature of the Ag NPs was ascertained by SEM. The synthesized Ag NPs exhibited good antibacterial potential against gram-positive and gram-negative bacterial strains. The zone of inhibition effect of antibacterial activity depends upon the concentration of Ag NPs.

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563
ANTIBACTERIAL EFFICACY OF SILVER NANOPARTICIES SYNTHESIZED BY A GREEN METHOD USING EXTRACT OF *SISON AMMI* L.

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Silver nanoparticles have a significant role in the pharmaceutical science. Especially, silver nanoparticles synthesized by the plant extracts lead a significant role in biological activities such as antimicrobial, antioxidant and anticancer [1, 2].Antibacterial efficacy of silver nanoparticles developed by a phyto-synthesis method has been investigated and presented in this work. Silver nanoparticles of mean size 30–45 nm having spherical shape and crystalline structure were synthesized at room temperature through bioreduction of silver nitrate solution treated with seed extract of *Sison Ammi*. Formation of nanoparticles was observed by the color change in the reaction medium which was further established with UV-vis spectroscopy. Structural and morphologicalcharacterizations on silver nanoparticles were made by X-ray diffraction (XRD), Transmission electron microscopy (TEM), and Fourier transform infra-red spectroscopy (FTIR) analyses. FTIR spectroscopic analysis has revealed the presence of biomolecules enveloped around the silver nanoparticles. Antibacterial efficacy of these nanoparticles was analyzedagainst *Escherichia coli* and *staphylococcus aureus* by measuring the zones of inhibition on solid growth medium. These silver nanoparticles have shown efficient inhibitory activity against the tested bacterial strains.It is believed that the proposed biocompatible, eco-friendly, and green synthesis method would lead to development of novel biomedical products based on silver nanoparticles.

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564
ON THE CHEMICAL COMPOUNDS AND ANTIOXIDANT ACTIVITY OF *SALVIA NEMOROSA* L'S ESSENCE

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Salvia Nemorosa l is a prototype of Labiataes, the research on which has brought to light its important applications in traditional medicine. The present research, therefore, is an attempt not only to discover the chemical compounds of the plant but also shed light on its antioxidant activities of *Salvia Nemorosa* l which is grown in Kashan, a city in Iran. Using water distillation methodology, the oil essence of the plant is collected from Kashan Mountains–a city in Iranian central region and then analysed using GC/MS. Also, using spectrophotometer method, the antioxidant activity of the plant was evaluated against Di Phenyl Picryl Hydrazyl (DPPH) and β-carotene-linoleic acid tests. They were then contrastively analysed against the standard antioxidant of Trolox. The research findings resulted in the identification of 54 different compounds in the blossoms and 52 different ones in the leaves and peduncles among which Aromadendrene Oxide II, Spathulenol, Caryophyllene Oxide, Caryophyllene 14 Hydroxy-9-epi-(E) and Caryophylla-4 (12),8 (13)-dien-5-alpha-ol formed the principal componentsesults. Also, in comparison with Trolox with 22.72 percent, the blossom's essential and leaves and peduncles' essential more decrease the density of DPPH radicals with 34.04 percent and 40.78 percent respectively. In addition, as other essences, the plant's essential decreased the density of DPPH radicals more than Trolox. Also, in the de-coloration test of Beta-carotene a significant stability of pro-oxidations compounds was obtained with 59.74 and 61.28 percents for blossom's Essential and leaves and peduncles' essential respectively in comparison with 75.2 percent of Trolox. The results of the de-coloration test of Beta-carotene on methanol essences of leaves, blossoms and peduncles in different densities have also shown that the aerial organs of the plant has better anti-oxidant properties than the standard Trolox anti-oxidant.

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565
THE EFFECTS OF DROUGHT STRESS ON CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *THYMUSLANCIFOLIUS* CELAK

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Water deficit stress, permanent or temporary, limits the growth and the distribution of natural vegetation and the performance of cultivated plants more than any other environmental factors [1]. *Thymus lancifolius* Celak (*T. lancifolious*) belongs to the labiatae family and it's used as flavor and also in the treatment of cold and cough [2]. This experiment was conducted to determine the effects of drought stress on chemical composition of the essential oil of *T. lancifolius*. Three levels of water deficit stress including A_1 (80% field capacity-control), A_2 (60% field capacity) and A_3 (40% field capacity) were induced to several pots of the plant under controlled conditions.The essential oils of aerial parts of *T. lancifolious* were extracted by means of hydro-distillation method. The chemical composition of the oils were determined by Gas Chromatography-Mass Spectrometry (GC-MS, GC-FID).The analysis revealed the presence of 15 compounds in 80% field capacity, 22 compounds in 60% field capacity and 17 compounds in 40% field capacity. Results showed that in all the three mentioned irrigation conditions, thymol (66.24%-61.64%) was the main compound and othercompoundslike γ-Terpinene (7.37%-6.58%) and carvacrol (4.97%-4.37%) were also present in all three water deficit stresses as compounds with high percentages. The significant difference that was observed was the existence of p-cymene in full irrigation with 11.62% which in 40% field capacity reduced to 8.3% but in 60% field capacity was not observed at all. Also o-cymene was observed in 60% field capacity with 8.87% while it was not observed in 80 and 40% field capacities. Also it is worth noting that the yield of the essential oils was reduced by increasing the drought stress in all the three mentioned levels (0.95–0.66)

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566

THE PROTECTIVE EFFECT OF SILYMARIN ON THE MARKERS OF OXIDATIVE STRESS IN TESTIS OF MICETREATED WITH CADMIUM CHLORIDE

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Cadmium as an environmental pollutant and heavy metal exerts its effects through oxidative stress on the reproductive system as well as testis [1]. Silymarin which is an effective substance extracted from the seed of *Silybum marianum* has potent antioxidant property [2]. Due to toxic effect of cadmium chloride and silymarin as an antioxidant this study was performed to investigate if silymarin can prevent the adverse effect of cadmium chloride on lipid peroxidation and antioxidant capacity of testis in mices. Adult male NMRI mices are divided into four groups: 1. Control 2. cadmium chloride (5 mg/kg, s.c) 3. Silymarin (100 mg/kg, i.p) and 4. silymarin + cadmium chloride. Treatments period was 24 hours. After treatments mice were dissected and the testes were removed and homogenized in KCl 0.15 M. the testes homogenate were used for the markers of oxidative stress. To evaluate lipid peroxidation malondialdehyde (MDA) was assessed while ferric reducing antioxidant power (FRAP) was used to study antioxidant capacity in the testis tissue. Data were analyzed with one way ANOVA and $P<0.05$ was considered significant. A significant increase was observed in the amount of testis MDA while the amout of testis FRAP was decreasedin cadmium chloride group compared to the control. In silymarin + cadmium chloride group, silymarin could significantly compensate both MDA level and FRAP in the testis tissue compared to cadmium chloride group. cadmium chloride induces toxic effects through lipid peroxidation and decrease of antioxidant capacity and that silymarin is able to compensate the adverse effects of cadmium chloride.

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569

CHEMICAL COMPOSITION ANALYSIS OF THE ESSENTIAL OIL OF *MENTHA PIPERITA* L. FROM KERMANSHAH-IRAN BY KELEVENGER AND HS/SPME METHODS AND CALCULATION OF THE BIOPHYSICOCHEMICAL COEFFICIENTS OF THE COMPONENTS

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The volatile constituents from the aerial parts of *Mentha piperita* L. (Peppermint) which were collected from cultivate growing plants in Kermanshah (Garreban- East of Kermanshah city) Iran were extracted by Kelevenger and headspace/solid-phase micro-extraction (HS/SPME) methods,and were analyzed by gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS). Solid-phase micro-extraction (SPME) is a sampling technique based on the absorption of analysts on or into a polymeric material that coats a silica fiber. SPME fits into a trend of developing analytical techniques for small sample volumes, reduced solvent consumption, and shorter analysis time, while maintaining or improving sensitivity. The results have demonstrated that the SPME sampling resulted in relatively higher amounts of high-volatile monoterpenes and lower detection of less volatile compounds compared to essential oil distillation. Some of the physicochemical properties such as: the logarithm of calculated Octanol-Water partitioning coefficients (logKow), total biodegradation and (TBd in mol/h and gr./h) were calculated for the extracted components of *Mentha piperita* L. It has been reported and accepted that the toxic properties of organic compounds can be predicted on the basis of their logKow. Total biodegradation (TBd) is another useful and important factor in chemical and biochemical studies In this study, have also investigated the thermal changes by Kelevenger method and the predicted mechanism of the reactions under heat process.

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571

STUDY OF THE ANTI-NOCICEPTIVE EFFECT OF *ARCTIUMLAPPA* L. LEAFH HYDROETHANOLIC EXTRACT IN MALE MICE

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Pain is a sign to identify the disease and mostly has a protective effect. Several side effects of chemical drugs caused more likely people are to use herbal treatment. Use of drugs and medicinal plants of the common methods of pain control.The aim of this study was to evaluate the antinociceptive effects of *Arctiumlappa* L. leafh's hydroethanolic extract (AHE) in male mice.In this study, 72 male mice weighing 25±30gr were divided randomly in two sections with 6 groups (n=6) including: Control group, morphine treated groups (1mg/kg), the groups treated with AHE at doses of 100, 200 and 400mg/kg, and group treated with naloxone (2mg/kg) with dose 200mg/kg of extractwere used.For pain assessing in mice the writhing and tail flick tests were used. The data for each test were compared with One-way ANOVA and Tokay *post* testand $P<0.05$ were considered statistically significant.Our results indicated that doses of 200 and 400mg/kg of AHE significantly increased pain threshold compared with the control group in writhing and tail flick tests ($P<0.01$). Also dose 400mg/kg of AHE have been showed mostly analgesic effect especially in writhing test compared with morphine group ($P<0.001$).In this study, analgesic effect of the AHE was observed in the tail flick and writhing tests and this analgesic effect of extract probably related to activation of opioid system.

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581

TOTAL ALKALOIDS EXTRACTION OF LOCAL *SOPHOREA ALOPECUROIDES* DECREASED *ACRA* EXPRESSION IN MULTIDRUG RESISTANT *ESCHERICHIA COLI* MUTANT

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Multidrug resistant (MDR) gram negative bacteria pathogens, such as *E. coli*, are a global public health concern as they weaken the effect of therapeutic options. However, use of synthetic antibiotic, like ciprofloxacin, in combination with alkaloids plant extraction enhances the effect of ciprofloxacin against MDR mutants [1, 2]. The aim of this study was to examine the synergistic effect of alkaloids extracted from local *Sophorea alopecuroides* on ciprofloxacin against MDR *E. coli* mutant with high expression of AcrAB-TolC efflux pump. Quantitative real time PCR was used to determine *acrA* gene, encoding AcrA ingredient of AcrAB-TolC pump, expression. Results showed that treatment of the MDR mutant with subinhibitory concentration of alkaloids extract of above plant species decreased the expression of *acrA* gene expression ($P<0.05$). It is concluded that plant extract can increase the effect of current antibiotics against MDR strains and eliminate the necessity to synthesize new potent antibiotics.

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593
PHYTOCHEMICAL INVESTIGATION ON ACETONE EXTRACT OF *NEPETA GELOMERULOSA*

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Nepeta gelomerulosa from the Labiateae family is one of the endemic plants of Iran. This plant is used in traditional Iranian medicine for cough andsinusitis treatment and also as a sedative. According to the uses of this plant in ethnopharmacology and lack of phytochemical data on its constituents, the plant was selected for investigation to identify the active compounds [1]. *Nepeta gelomerulosa* was collected from Nishabuor, Darrud and Pivejan. The dried aerial parts of the plant were extracted using different solvents such as *n*-hexane and acetone. The acetone extract was selected for further investigations and a number of its active compounds were isolated and purified by column and thin layer chromatographic techniques. Finally, the structures of six pure compounds were characterized by 1D (^{1}H and ^{13}C) and 2D-NMR.The identified compounds were, ß-sitosterol (a sterol), ursolic acid (an ursane typetriterpene), daucostrol (a glucoside sterol), an ursane type triterpene (19a-hydroxyursolicacid), and two fatty alcohols (G 33 and G 42-39). G 33 and 19a-hydroxy-ursolic were isolated and characterized for the first time from the genus *Nepeta.*

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595
INVESTIGATION OF CURCUMIN EFFECT ON HTERTGENE EXPRESION IN HUMAN ADIPOSE-DERIVED MESENCHYMAL STEM CELLS BY QUANTITATIVE REAL-TIME PCR (Q-PCR)

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Curcumin (diferuloylmethane) is found in the rhizomes of the turmeric plant (*Curcuma longa* L.) and has been used for centuries as a dietary spice. Curcumin exhibits potent antioxidant and anti-inflammatory activity, inhibiting the production of free radicals, promoting radical scavenging and suppressing the production and release of inflammatory mediators.Telomeraseis a ribonucleoprotein DNA polymerase complex that maintains telomere length. The complex comprises the protein telomerase reverse transcriptase (TERT, or hTERT in humans) and acatalytic RNA (TERC). The level of telomerase activity is important in determining telomere length in aging cells and tissues.The present study describes the effect of curcumin on hTERT gene expression by Q-PCR.MSCs were isolated from adipose tissue and after curcumin toxicity measurement by MTT assay, cells treated with or without curcumin**.**The phenotype of ADSCs was evaluated by flow cytometry analysis, by using CD45, CD56, CD 90 and CD 105 antibodies.Total RNA from the cells was isolated and cDNA synthesis was done. PCR reactions were performed using the Corbett Rotor-Gene™ 6000 HRM.The thermal cycling conditions were beginning denaturation step 5 min at 95 ºC, followed by40 cycles, each denaturation at 95 ºC for 30 s, annealing at 63 ºC for 30 sand extension at 72 ºC for 30 s. The results indicate that cell prolifferation in treated cells withCurcumin showed significant increase in comparison with the control group ($P<0.05$). There were no significant changes in hTERT gene expression in samples treated with Curcumin compared to controls. In this study no observable effect was seen in hTERT gene expression between treated and control group.

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596
EVALUATION OF TOTAL SECONDARY METABOLITES AND CYTOTOXIC EFFECT OF *HAPLOPHYLLUM TUBERCULATUM* AGAINST 1321N1 CANCER CELL LINE

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Haplophyllum tuberculatum (Rutaceae) as a traditional medicinal plant has pharmaceutical effects such as effect on the cardiovascular and nervous systems [1]. The plant is distributed from central to southeastern parts of Iran with the local name "gahij" [2]. The present study is focused on the total secondary metabolites and anticancer activity of methanolic extract of the dried aerial parts of this species. Aerial parts of *H. tuberculatum* were gathered from Hormozgan province, south of IRAN, which dried at room temperature. Total alkaloids, phenols and flavonoids contents of the methanolic extract were evaluated with spectrophotometer. The results indicate that total alkaloids, phenols and flavonoids contents of the extract were 17.41, 0.147 and 0.508 mg/gr DW, respectively. The cytotoxic properties of the extract was examined against 1321N1 cells (cancer cell lines of glial-like) using MTT assay which showed moderate cytotoxic activity against this cell line with IC_{50} value of 100.48 µg/ml.

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599

CHEMICAL COMPOSITION ANALYSIS OF THE ESSENTIAL OIL OF *JOHRENIOPSIS SCOPARIA (BOISS.) M. PIMEN* FROM KURDISTAN-IRAN BY HS/SPME METHOD AND CALCULATION OF THE BIOPHYSICOCHEMICAL COEFFICIENTS OF THE COMPONENTS

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The volatile constituents from the aerial parts of *Johreniopsis scoparia (Boiss.) M. Pimen* which were collected from wild growing plants in Kurdistan-Iran were were extracted by headspace/solid-phase micro-extraction (HS/SPME) and were analyzed by gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS). Solid-phase micro-extraction (SPME) is a sampling technique based on the absorption of analysts on or into a polymeric material that coats a silica fiber. SPME fits into a trend of developing analytical techniques for small sample volumes, reduced solvent consumption, and shorter analysis time, while maintaining or improving sensitivity.Thirty nine compounds in the essential oil of this herb were identified. The main components were: α-pinene(44.74%), β-pinene (13.42%), β-Thujene (8.65%), bornyl acetate (6.01%),vulgarol B (3.27%), β-myrcene(3.26%) and 1-phellanderene (2.69%). Some of the physicochemical properties like: the logarithm of calculated Octanol-Water partitioning coefficients ($logK_{ow}$), total biodegradation and (TB_d in mol/h and gr./h) were calculated for the extracted components of *Johreniopsis scoparia (Boiss.) M. Pimen*. It has been reported and accepted that the toxic properties of organic compounds can be predicted on the basis of their $logK_{ow}$. Total biodegradation (TB_d) is another useful and important factor in chemical and biochemical studiesIn this study, were investigated the changesand the predicted mechanism of the reactions of the components under heatprocess as well.

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601
EFFECTS OF HYDRO-ALCOHOLIC EXTRACT OF *MELISSA OFFICINALIS* (LEMON BALM) ON MORPHINE STATE–DEPENDENT LEARNING IN MICE

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Melissa officinalis has a variety of effects, including sedation and antioxidant. *M. officinalis* has also terpenoides that is usful in memory and learning. Opioid agonists have destructive effects on memory and These drugs are injected pre-training decrease memory. Moreover morphine can effect on memory and learning by opioid receptors of hippocampus opioidergic system. The present study was conducted the effects of *Melissa officinalis* (MO) extract on SDL in mice.66 male mice were selected and allocated to 8 groups (n=6).To study memory in mice using passiveavoidance method to measure step-down latency. The injection of pre-training of morphine (3mg/kg) Cause memory impairment But injection of pre-testing of morphine (3mg/kg) can improve memory. The obtained results showed that morphine was caused state dependent learning. Injection of pre-training of *Melissa officinalis* extract 25 mg/kgand pre–testing of saline intraperitoneallycan increase memory.injection of pre-training of morphine (3mg/kg) and pre-testing of *Melissa officinalis* extract 25 mg/kgcan decrease memory. Interaction effect of morphine and Varangboo decrease memory .

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604

EFFECTS OF HYDRO-ALCOHOLIC EXTRACT OF *MELISSA OFFICINALIS* (LEMON BALM) ON NICOTINE STATE–DEPENDENT LEARNING IN MICE

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state-dependent learning is the phenomenon through which memory retrieval is most efficient when an individual is in the same state of consciousness as they were when the memory was formed. *M. officinalis* has also terpenoides that is useful in memory and learning. Moreover nicotin can effect on memory and learning by nicotinic receptors of hippocampus colinergic system. The present study was conducted the effects of *Melissa officinalis* (MO) extract on SDL in mice .66 male mice were selected and allocated to 8 groups (n=6).To study memory in mice using passiveavoidance method to measure step-down latency. The obtained results showed that injection of pre- training of nicotin (0.1mg/kg) and pre–testing of *Melissa officinalis* extract 25 mg/kgIntraperitoneally can increase memory and also and pre–testing of nicotine (0.1mg/kg) and pre-training o f extract (25 mg/kg)Intraperitoneally can increase memory. Interaction effect of nicotine and Varangboo increase memory.

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605
INTERACTION OF FALAXSEED OIL AND CHOLINERGIC SYSTEM ON MEMORY RETENTION IN MALE WISTAR RATS

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Flaxseed is emerging as an important functional food ingredient because of its rich contents of α-linolenic acid, lignans, and fiber. Flaxseed oil, fibers and flax lignans have potential health benefits such as in reduction of cardiovascular disease, atherosclerosis, diabetes, cancer, arthritis, osteoporosis, autoimmune and neurological disorders [1-3]. This study concerned effects of flaxseed oil and the cholinergic system on memory retention of passive avoidance learning in rats. Administrations of flaxseed oil (1.5 and 2 ml/kg, i.p.), nicotine (0.1 □g/rat, i.c.v.) the nicotinic receptor agonist increased memory retention, while succinylcholine (0.1 □g/rat, i.c.v.), the nicotinic receptor antagonist decreased memory retention. The combination of flaxseed oil with nicotine showed potentiation. Effects of succinylcholine were attenuated by flaxseed oil. It is concluded that flaxseed oil has a close interaction with nicotinic cholinergic system in memory retention process.

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619

THE EFFECT OF THYME OIL ON GROWTH PERFORMANCE AND IMMUNITY OF BROILER CHICKENS

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Food additives are substances or compounds that can improve the production efficiency and help to maintain the health of poultry [1]. Among these, antibiotics have been widely used as growth promoters and performance improvements in the poultry industry for several decades [2]. Today, the use of additives like antibiotics as growth promoters has been banned due to development of microbial resistance and their residues in animal tissues. Therefore, the objective of this research was to study the effects of thyme oil as alternative to antibiotic on growth performance and immune system in broiler chickens.One hundred and thirty-two chickens with one-day-old were weighed and randomly allocated between 12 battery pens with two diets. Two iso-nitrogenous and iso-caloric diets include: basal diet (control) and basal diet with 200mg/kg essential oil of thyme. Each diet was fed to birds in six pens (replicate) with 11 chickens per pen. Birds were fed in starting (1-21 days), growing (22-42 days) and finishing (43-49 days) periods. At 17 and 26 days of age, all chickens were vaccinated against Newcastle disease (ND). Body weight of chickens per each pen were cumulatively measured at the end of 21, 42 and 49 days. Food intake andfeed conversion ratiowere also calculated. Blood samples were withdrawn from the wing vein at days 17, 26, 34, 41 and 47 of age. The number of white blood cells and heterophil to lymphocyte ratio was measured. The sera were applied to HI test to determine Antibody (Ab) titer to ND. The data was analyzed based on completely randomized design by GLM procedure of SAS.Body weight gain (BWG), food intake (FI) and feed conversion ratio (FCR) were not affected by dietary treatment, except for FCR during the 22-42 days of age. Chickens fed with diet containing thyme oil showed improved FCR comparing to chickens of control group during the growing period ($p<0.05$). Inthe group receiving essentialoil was observed 9% increasein the number of lymphocytes ($p<0.05$) and 66% decrease in heterophil to lymphocyte ratio ($p<0.05$). Maximum Ab titer was related to the control group that was significantly higher than Ab titer in the group receiving thyme oil ($p<0.05$). From the results obtained in this study, it can be concluded that usage of thyme oil in diet of broiler chickens could have the beneficial effects on growth performance by decreasing FCR.

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620

THE EFFECT OF *WITHANIA SOMNIFERA* L. ALCOHOLIC EXTRACT ON LEARNING AND MEMORY IN KAINITE ACID-INDUCED EXPERIMENTAL MODEL OF TEMPORAL LOBE EPILEPSY

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Frequent epileptic seizures can cause learning and memory impairment. There are some research evidence that Withania somnifera L. alcoholic extract has neuroprotective and anticonvulsant effect with beneficial effect on learning and memory. Therefore, this study was conducted to evaluate its effect on learning and memory deficit in kainite-epileptic rats. In this study, 32 rats were divided into 4 groups, i.e. sham, epileptic, treated with Withania somnifera L. alcoholic extract (positive control) and epileptic were treated with Withania somnifera L. alcoholic extract. For induction of epilepsy, unilateral hippocampal injection of 1 micrograms of kainic acid was used. Rats received Withania somnifera L. alcoholic extract at doses of 100 mg/kg intraperitoneally daily for three days prior to surgery. At the end of 4 weeks, to assess learning and memory, initial latency and step through delay using passive avoidance test and the percentage of alternation behavior in the Y maze test were determined. Pre-treatment with *Withania somnifera* L. alcoholic extract at a dose of 100 mg/kg dose not decreased epileptic seizure as compared with epileptic group (p=0.1). Regarding initial latency, there was no significant difference between the groups. Step through latency was not significantly higher in epileptic group treated with 100mg/kg of *Withania somnifera* L. alcoholic extract versus epileptic group (p=0.19). Meanwhile, alternation percentage was significantly higher in Withania somnifera L. alcoholic extract pre-treated group as compared to epileptic group (p=0.03). Administration of *Withania somnifera* L. alcoholic extract at a dose of 100 mg/kg in rats with kainite-induced epilepsy could not increase ability to store information and its recall in passive avoidance test, but could improve spatial memory in such rats.

632
PHYTOCHEMICAL AND PHYSICOCHEMICAL STUDIES OF *SCROPHULARIA STRIATA*

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Scrophularia striata (Scrophulariaceae) is an herbaceous plant that is traditionally used for treatment of microbial infections. The dried aerial parts of *Scrophularia striata* was collected on June 2014 from sirjan (kerman Province, Iran) and subjected to extraction by macerationmethod with water, methanol and acetone [1]. The phytochemical screening in three crude extracts showed the presence of Steroids, Alkaloids, Tannins, Coumarins, Proteins, Flavonoids, Terpeniods, Phenols and Carbohydrates. And also, total Phenolic, total Flavonoidsand Tannins contents were determined in three different extracts with spectrophotometer [2]. In addition, determination of mineral elements amount like K, Fe, Ca, Mn, Mg, Na, Zn were investigated. Among the three selected solvents, methanol was the best for total Flavonoids and total Phenolic contents extraction. The total ash value was found to be 3.97% w/w indicating the considerable presence of inorganic radicals [3]. The results showed that the leaves of plantare rich in Fe and K [4].

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637

THE EFFECT OF HYDROALCOHOLIC GINGER EXTRACT ON THE MEMORY AND LEARNING IN THE OFFSPRING MALE RATS

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memory is the ability of one person to store information, and subsequently remember them. Growth of human and passing through third decade of life, the learning outcomes and memory parameters will follow a downward trend and it is obvious that implementing tools and effective and precautionary actions are endeavors in order to improve memory's condition and learning ability and in the meantime, the role of embryonic period role in enhancing brain function, including children's memory is undeniable. Since some mothers during pregnancy consume ginger in order to relieve nausea and vomiting and since no research has been conducted yet about consuming ginger during pregnancy and its relation to memory, so the purpose of this study was to investigate the effect of embryonic ginger on the amount of memory and learning in mature male rats.in this research 30 male and female rats were used as samples. First, we put rats into special cages for mating, zero day of pregnancy determined by vaginal plug vision. We separate 30 pregnant female rats and during days 16-18 3 group of them received dozens of ginger's hydroalcoholic extract, with concentration of low doses (200 mg/kg bw), medium (400 mg/kg bw), high (800 mg/kg bw) via intraperitoneal and control group did not receive injection and sham group received normal saline. Then, male offspring in each group at day 50 were tested for learning and memory tests using the shuttle box set and data analyzed by SPSS and using ONE WAY ANOVA and then by Tukey test. $p<0.05$ considered as significance level.investigating results of data above, it can be concluded that ginger extract containing compounds such as gingerols, shogaols and zingerone have been effected memory and learning ability of tested rats positively by affecting embryonic acetylcholine content and place cells, and having antioxidant property.

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642
STUDY OF ELETTARIA CARDOMOMUM FRUIT'S HYDROETHANOLIC EXTRACT ON SPERMATOGENESIS IN HYPOTHYROID MALE MICE

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The thyroid gland has forcible effect on spermatogenesis. The thyroid disorders caused by different factors. Elettaria cardomomum is a herbal plant which widely used in traditional medicine. In this study the Eletaria cardomomum extract(ECE) effects on spermatogenesis in hypothyroid mice have been investigated.In this study 42 male mice, weighing 25-35 gr were randomly divided in 6 groups: control group (taking saline normal,0.5ml/day, i.p), levothyroxine treated group (15mg/kg/day, gavaged), hypothyroid group (taking 0.1% propylthiouracil in drinking water for 2 weeks), and hypothyroid groups treated by ECE 100, 200 and 400 mg/kg/day, i.p). After the end of experiments the mice were anesthetized and blood samples were collected from heart directly and testosterone ,FSH and LH hormones were analyzed by ELISA method. The sperm count and motility and microscopic studies of testes were done. All values are expressed as mean±SEM .The differences were compared using ANOVA followed by Tukey's multiple comparison test and $P<0.05$ were considered statistically significant. Our results showed that the testosterone hormone levels and spermatogenesis in hypothyroid animals decreased compared with control group. In hypothyroid group which treated by ECE the testosterone and spermatogenesis increased significantly ($P< 0.001$). Our findings suggest that the ECE has stimulatory effect on thyroid gland function and increased spermatogenesis and raises plasma testosterone hormone levels.

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646

STUDY OF *ELETTARIA CARDOMOMUM* FRUIT'S HYDROETHANOLIC EXTRACT ON SERUM THYROID HORMONE LEVELS IN HYPOTHYROID MALE MICE

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Endocrine glands have important effects in body function and metabolism. The thyroid disorders caused by different factors. Elettaria cardomomum is a herbal plant which widely used in traditional medicine. In this study the Eletaria cardomomum extract (ECE) effects on thyroid hormones and TSH in hypothyroid mice have been investigated.In this study 42 male mice, weighing 25-35 gr were randomly divided in 6 groups: control group (taking saline normal,0.5ml/day, i.p), levothyroxine treated group (15mg/kg/day, gavaged), hypothyroid group (taking 0.1% propylthiouracil in drinking water for 2 weeks), and hypothyroid groups treated by ECE(100, 200 and 400 mg/kg/day, i.p). After the end of experiments the mice were anesthetized and blood samples were collected from heart directly and T3 & T4 and TSH hormones were analyzed by ELISA method. All values are expressed as mean±SEM .The differences were compared using ANOVA followed by Tukey's multiple comparison test and $P<0.05$ were considered statistically significant. Our results showed that the T3 &T4 plasma levels in hypothyroid animals treated by ECE had significant differences ($P< 0.001$) compared with control and hypothyroid alone and hypothyroid treated by levothyroxine groups. Our findings suggest that the ECE has stimulatory effect on thyroid gland function and raises plasma thyroid hormone levels.mice

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647
MEASURMENT OF ANTIOXIDANT LEVELS OF GREEN AND ROSELLE TEA

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Oxidative stress is defined as an imbalance between free radical production and antioxidant defenses. Phenolic compounds are important secondary metabolites in plants and are present in herbs such as green and roselle tea. Since tea is a good drinking and is commonly used among Iranians people as food habit and might have a prominent role in the prevention of many diseases like cancer. Therefore the study was aimed to determine antioxidant capacities of two types of tea (green and roselle) which in our previously showed that within 18 minutes of brewing holds the most polyphone levels [1].FRAP (Ferric Reducing Antioxidant Power) method was used to determine the antioxidant capacity of two types of tea by applying the reagent TPTZ (2, 4, 6 - Tris (2-pyridyl)-s-triazine) [2]. Absorbance of the reaction solution was read by spectrophotometer at a wavelength 593 nm. Vit-C was used as standard for comparison of their antioxidant levels. The results showed that the highest antioxidant capacity green tea was 1348.70 ± 48.22 μM at 1562.50 ppm concentration and the lowest antioxidant capacity was found to be 150.92 ± 10.37 μM at 195.31 ppm concentration. Whilst the highest antioxidant capacity of roselle tea was 831.60 ±36.40 μM at 6250 ppm concentration and its lowest antioxidant capacity was 158.70 ± 14.64 μM at 390.625 ppm concentration. There were significant differences between antioxidant levels of both kinds of tea in comparison with Vit-C antioxidant value ($P<0.001$). Considering these results it can be concluded that green tea has the highest antioxidant activity which is consistent with the results obtained by previous research in which showed that green tea has the highest phenol compound and may be used as a good in-vitro terminator of free radicals formed in chemical reactions [3] and due to its high antioxidant levels it might have a free radical hindering action in living systems.

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666

PROTECTIVE EFFECT OF SILYMARIN ON LIPID PEROXIDATION AND ANTIOXIDANT CAPACITY OF SERUM IN MICE TREATED WITH CADMIUM

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Cadmium is a heavy metal and environmental pollutants wich its compounds are toxic even at very low levels and can store in the body and the environment. This toxicant with the reduction of antioxidant defense system and increase of free radicals production induces oxidative stress. Silymarin, an effective substance extracted from seed or fruit of medicinal plant, *Silybium marianum*, is a polyphenolic flavonoid with powerful antioxidant properties. The aim of present study was to investigate the effect of silymarin on lipid peroxidation and antioxidant capacity of serum in mice treated with cadmium chloride. Adult male NMRI mice were divided into four group: 1. Control, 2. Cadmium (5mg/kg, sc), 3. Silymarin (100mg/kg, ip), 4. Silymarin+Cadmium. The treatment period was 24 hours. After treatment, blood samples were obtained from the different groups and their serum were prepared. To investigate lipid peroxidation in the serum, the amount of malondialdehyde (MDA) was measured while antioxidant capacity of the serum was evaluated using Ferric Reducing/Antioxidant Power (FRAP) method. In cadmium group the level of MDA significantly ($P<0.001$) increased as compared to the control. In silymarin+cadmium group, silymarin significantly ($P<0.001$) compensated the level of MDA compared to cadmium group. In addition, cadmium caused a significant reduction ($P<0.001$) in antioxidant capacity compared to the control and in silymarin+cadmium group, silymarin could significantly ($P<0.001$) ameliorate antioxidant capacity compared to cadmium group. Silymarin as a potent antioxidant can reverse the adverse effect of cadmium on serum lipid peroxidation and antioxidant capacity.

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676

IN-VIVO STUDY OF HEPATO PROTECTIVE EFFECT OF *SAFFRON* STIGMAS AND PETALS EXTRACT AGAINST RIFAMPIN TOXICITY

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The medicinal plants, for instance saffron, have high sources of antioxidant components including carotenoids and flavonoids. Saffron growing in different regions especially in South Khorasan, Iran [1, 2]. On the other hand, anti-tuberculous drug rifampin is a potent hepatotoxicant. This study aims to evaluate the protective effect of aqueous extract of saffron stigmas and petals in comparison with standard drug silymarin against rifampin-induced hepatotoxicity in the wistar albino rats by measuring the serumbiochemical parameters. 25 rats were randomly divided to five groups (n=5) including: 1) healthy (control), receiving normal saline; 2) Intoxicated, receiving only rifampin (450 mg/kg); 3) treated with dose of saffron petals (200 mg /kg) and receiving rifampin (450 mg/kg); 4) treated with dose of saffron stigmas (80mg/kg) and receiving rifampin (450 mg/kg) and 5) treated with dose of silymarin (100 mg /kg) and receiving rifampin (450 mg/kg). The rifampin treatment resulted in higher levels of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and bilirubin, along with lower total protein and albumin concentration than the control group. The administration both stigmas and petals of saffron like silymarin significantly decreased the levels of serum AST, ALT and total bilirubin and elevated the levels of albumin and total proteins. In conclusion our results indicated that these herbal extracts equals with silymarin ameliorate rifampin-induced liver injury in rats.

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681
ENHANCING MEDICINAL ALKALOIEDS PRODUCTION BY FEEDING OF PHENYLALANIN IN *ATROPA BELLADONNA IN VITRO* CULTURES

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The *Solanaceae* plants produce a range of biologically active alkaloids including nicotine and tropane alkaloids, such as hyoscyamine and scopolamine [1]. These alkaloids have been used for their medicinal properties. *Atropa belladonna* is a medicinally important herbaceous plant that synthesize high amount of these alkaloids in its arial and root parts [2]. In this research, *A. belladonna* explants were obtained from sterilized seeds in the modified Murashige and Skoog (MS) solid medium. The seeds were collected from Vaz and Garmestan regions of Iran (N: 52˚ 7´, E: 36˚ 20´; N: 53˚ 9´, E: 36˚ 14´ respectively). Formed explants were cultured four weeks on a modified MS solid medium, under different concentrations of phenylalanine precursor (0, 0.5, 1 and 2 mM). Then the production of two tropane alkaloids, atropine (racemic isomer of hyoscyamine) and scopolamine, in aerial and root parts of new plantlets were assayed byhigh performance liquid chromatography (HPLC). The results showed scopolamine content significantly was enhanced by increasing the phenylalanine concentrations in roots of Vaz accession. However, there was no significant difference in the amount of atropine this accession. Moreover, in arial parts of Garmestan accession, atropine content was enhanced by increasing of phenylalanine concentration. In conclusion, the feeding experiment to plantlet cultures of *A. Belladonna* have established that the extra-cellular phenylalanine is a good precursor for tropan alkaloids production. But there is a significant difference for alkaloids content in different parts of two the accessions. Although the root growth of Garmestan accession was less than of Vaz, but in its roots was observed highest level of atropine and scopolamine content (respectively; 60 and 70 µg g^{-1} FW). So, Garmestan plantlets was selected for further study.

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690
SALINITY EFFECTS ON ANT OXIDATIVE PROPERTIES OF SENSITIVE AND TOLERANT GRAPE (*VITIS* L.) GENOTYPES

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Salinity is a major environmental stress that restricts plants growth and production. Grapes are classified as moderately sensitive to salinity [1]. Soil salinity affected viticulture as a strategic agricultural product in the fields around Urmia Salt Lake. In primary screening experiments among 18 grape genotypes, hybrid H_6 (*V. vinifera* cv. GharaUzum × *V. riparia* cv. Kober 5BB) and hybrid H_4 (*V. vinifera cv. Jighjigha* × *V. riparia cv. Gloire*) genotypes that showed a higher ability to restrict Cl^- and Na^+ transport to the shoot were selected as tolerant and GhezelUzum and Shirazi genotypes were selected as sensitive genotypes. In this study the effects of NaCl salinity on phenolic compounds and anti-oxidative enzymes activities of sensitive and tolerant grape (*Vitis* L.) genotypes were studied. Own-rooted vines were grown in aerated Hoagland solutions and then salinity was applied as nutrient solutions containing 0, 25, 50 and 100 mM NaCl during a two week period. Protective enzymes activities in roots and leaves of four genotypes increased significantly ($P<0.05$) under salinity. That increase in roots was higher than leaves. It seems that because of roots conditions, they were in salt solutions and couldn't escape from salinity. The increase in anti-oxidative enzymes activities in tolerant genotypes was higher than sensitive ones. Many evidences had indicated that phenylalanine ammonia-lyase (PAL; EC 4.3.1.5), a key enzyme in the phenylpropanoid pathway, could perform defense-related functions [2]. Salinity had an obvious effect on the accumulation of total phenolics content and induced phenylalanine ammonia-lyase enzyme activity in all genotypes. Phenylalanine ammonia-lyase and total phenolics increased in leaves of four genotypes under salinity. That increase in tolerant genotypes was higher than sensitive, especially in H_6. There were significant positive correlations ($P<0.01$, $r^2>0.9$) between anti-oxidative enzyme activities, total phenolics content and phenylalanine ammonia-lyase activity in the leaves of all genotype. H_6 genotype can tolerate salinity significantly higher compare to others, because it had higher phenolic compounds and antioxidant system during salinity.Shirazi showed better status between sensitive genotypes.

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692

ANTIMICROBIAL EFFECT OF METHANOL EXTRACT THREE LICHEN SPECIES (*ACAROSPORA CERVINA, CALOPLACA AURANTI, DIPLOSCHISLES CUVPSRIS*) ON *ESCHERICHIA COLI* ISOLATED FROM URINARY TRACT INFECTIONS IN CITY ILAM

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The use ofl ichensin the traditional medicine of it was customary in many countries and inthe treating of diseases such as yellow fever, gout, convulsions, bacterial infections. Escherichia coliurinary tract infection i soneof the most common cause are widespread antibiotic consumption increased antibiotic resistance in this bacterium [1]. The purpose of the Antimicrobial effect of methanol extract 3 lichen species on *Escherichia coli* isolated from urinary tract infections in City Ilam. Lichens collected from different parts of Ilam Province methanol extract which were prepared using the Soxhlet device. *Escherichia coliurinary* tract infection was isolated in hospitals ilam. After preparing various concentrations of extracts the methodagar diffusion and disk diffusion effecton *E. coli*. MIC and MBC determined For them Gentamicin and Amoxilin seen as a positive control were compared. 10% of dimethyl sulfoxide (DMSO) was used as a negative Control. Disk diffusion test results show. Average Diagonal zone of growth inhibition dilution to 100mg/ml, 200mg/ml, 400mg/ml and 800mg/ml for lichens Acarospora cervina respectively 11±0/57mm, 13/33±0/57mm, 14/66±0/57, 17/66±0/57 mm and for lichen Caloplacaauranti respectively 19±0/57mm, 20/13±0/57mm، 23/46±0/57mm، 24±0/57mm and for lichen Diploschislescuvpsris respectively. 7±0/57mm, 10±0/57mm, 11/33±0/57mm 14/66±0/57 mm،.and antibiotic Gentamicin 13±0/57mm. and Amoxilin 11±0/57mm. The results showed an increased concentration, the Diagonal zone of growth inhibition increased. Themethanol extract was observed between 3 Lichens Lichen Caloplaca aurantiinhibition zone diameter 24±0/57 mm have the greatest impact on *E. coli* and lichens Diploschisles cuvpsris had the least impact on *E. coli*. 25922 ATCC strains and was used to control. determine the MIC and MBC of dilution series were used in Mueller Hinton Broth The results showed MIC for lichens Acarospora cervina100mg/ml MIC for lichens Caloplaca auranti 100mg/ml for lichens) Diploschisles cuvpsris 200mg/ml and MBC for lichens Acarospora cervina 800 mg/ml MBC for lichens Caloplaca auranti 400mg/ml and MBC for lichens Diploschisles cuvpsris 800mg/ml. extract the lichens used in the treatment of infections caused by *Escherichia coli.*

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717
STUDIES OF MESPILUS GERMANICA LEAF FLAVONOIDS

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Medlar (*Mespilus germanica* L.) from Rosaceae family is a spiny shrub with 2-3m height in wild and 4-6 m when cultivated [1,2]. Medlar fruit and leaves are extremely rich sources of vitamin C and minerals (Potassium, Sodium, Calcium, Magnesium, Iron), antioxidants and flavonoids[2,3]. Many flavonoids are active principles of medicinal plants, exhibit pharmacological effects and contribute to human health [4]. Contents of sugars (fructose, glucose and sucrose), the main fatty acids (linoleic and palmitic acid), organic acids such as malic and citric acid, aspartate, glutamate and amino acids were determined in high levels in the mature medlar fruits [2]. Main flavonoid in Medlar leaf and fruitis Quercetin, maximum flavonoid content was recorded in their methanolic and aqueous extracts [1]. In this study leaf flavonoids of *Mespilus germanica*are reported using 2-dimentional paper (2-DPC) and thin layer chromatography (TLC). Results showed *M. germanica* leaf contain flavonoid sulphates, flavones *C* and *C-/O* glycosides. Aglycones was not found. Chrysin, Kaempferol, Myercetin, Quercetin and Rutin were found in the species leaf.

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718
COMPARATIVE STUDIES OF ARTICHOKE AND GUNDELIA EDIBLE PARTS FLAVONOIDS

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Artichoke (*Cynara scolymus* L.) and gundelia (*Gundeliatournefortii* L.) from Asteraceae (Compositae) are two of the world's oldest edible and medicinal plants [1, 2]. Pandino et al (2011) showed that the phenolic acids and flavonoids in normally uneaten parts of wild and cultivated artichoke could be exploited as sources of natural antioxidants [3]. Flavonoid study of artichoke leaf flavonoids showed existing apigenin-7-*O*-glucoside, luteolin, Luteolin-4-glucoside, cynaroside (luteolin-7-glucoside), scolymoside, (luteolin-7-rutionoside) and cynarotrioside (a flavonodial compound) in the species leaf using chromatographical methods [4, 5]. In traditional medicine, *G. tournefortii* has been prescribed in many disorders. Compounds found in the species proved to have several pharmacological effects [2]. It is recorded that the water extracts of *G. tournefortii* roots were containingphenols, glycosides, tannins, flavonoids, carbohydrates,proteins, alkaloids and nitrate [6, 7], and saponins. Tabibian et al (2013) showed antioxidant effects of *G. tournefortii* by having phenolic compounds such as Quercetin. In this study edible parts of artichoke and gundeliaflavonoids are reported using 2-dimentional paper (2-DPC) and thin layer chromatography (TLC).Results showed that *G. tournefortii* has more flavonoids comparing to *C. scolymus*. Both species had flavonoid sulphates, flavones *C* and *C-/O* glycosides and aglycones. Naringenin, Quercetin and Rutin were found in both species but Apigenin and Luteolin were just found in artichoke.

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719
ENHANCEMENT OF ROSMARINIC ACID ACCUMULATION IN *SALVIA VIRGATA* JACQ. SHOOT CULTURES USING YEAST EXTRACT AND METHYL JASMONATE

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Rosmarinic acid (RA), an ester of caffeic acid and 3, 4-dihydroxyphenyllactic acid, is mainly found in the plant species belonging to Boraginaceae and Lamiaceae. Because of potent antioxidant and antimicrobial activities, natural phenolic compounds such as RA are valuable natural products for food and pharmaceutical industries and can be used against different diseases like cancers [1]. *Salvia virgata* (belongs to Lamiaceae family), is a perennial medicinal plant native to Asia and southeastern Europe which used to be traditionally applied against skin diseases and wounds and blood cancer (leukemia) in some parts of the world [2]. Due to interesting biomedical activities of RA, its low content in the intact plants and a high demand for RA production, alternative strategies were imposed to improve the RA yield, among them biotic and abiotic elicitors have higher impact. Towards higher RA production, its accumulation was studied in regenerated shoots of *S. virgata* in response to yeast extract (YE) and methyl jasmonate (MJ). Photochemical analysis by HPLC and spectrophotometer showed higher accumulation of RA as well as total phenolic and flavonoid contents in response to YE and MJ, but MJ elicitation was more effective. The effect of elicitors on RA accumulation in shoot cultures was dependent to elicitor type, dosage and the period of exposure. A considerable 2-fold RA accumulation (about 25 mg g^{-1} dry weight) was obtained with 50 or 100 µM MJ after five days of elicitation compared with control. By overall YE and particularly MJ were able to elicited higher phenoilc compounds with antioxidant properties such as RA in *S. Virgata* shoot cultures [3].

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721
HAIRY ROOTS INDUCTION QUALITY ON LEAF EXPLANTS OF *SALVIA VIRGATA* JACQ. BY VARIOUS STRAINS OF *AGROBACTERIUM RHIZOGENES*

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Salvia virgata Jacq. a valuable medicinal plant belongs to the Lamiaceae family has tremendous beneficial properties [1]. Hairy roots culture is considered a prominent technique for development of *in vitro* production of secondary metabolites in this species. To improve our protocols for manipulating hairy roots induction in *S. virgata* and to obtain more qualified hairy roots, leaf explants from one-month old seedlings were inoculated with five *Agrobacterium rhizogenes* strains (A4, ATCC15834, R1000, GM1534, and C58C1). Results showed that all strains of *A. rhizogenes* were capable to produce hairy roots on leaf segments, but the induction rate and the quality was significantly different. The highest (55%) and the lowest (20%) infection rate were obtained by strains of ATCC 15834 and C58C1, respectively. By overall hairy root induction was developed and improved in *S. virgata* in this study as an alternative and potent method for future plant-based studies [2, 3].

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725

STUDY THE PROTECTIVE EFFECT OF *NASTURTIUM OFFICINALE* HYDROALCOHOLIC EXTRACTON LIVER TISSUE DUE TOSODIUM VALPROVATE EXPOSURE IN MALE RAT

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Valproate is one of the medicines that are used for epilepsy treatment and recent days it has been used widely.Nasturtium officinal is a kind of plants that has anti-cancer, antioxidant and protecting liver so it has been considered for treating chronic diseases. The aim of the present study was to investigate the protective effect of Nasturtium officinal hydro-alcoholic extract against the liver tissue injury due to the presence of sodium Valproate in male rats[1,2].In this study 30 male Wistar rats were randomly divided into 5 groups, control, receiver sodium Valproate (sham) and three groups which received low, medium or high dose of Nasturtium officinal and sodium valproate by gavage respectively. After one week, the rats were anesthetized and at first the blood samples was takenand then their livers were removed for histological study. Finally the data was analyzed by one-way ANOVA and Turkey post-test. $p<0.05$ was considered as significance level.The present study indicated that the hydro-alcoholic extract of Nasturtium officinal in different doses during 7 days led to significant changes in rats weight, liver volume and weight comparison to control and sodium Valproate groups.Histological results indicated changes in hepatocytes. The present study that Nasturtium officinal extract with different doses can lead to significant changes on volume and weight level comparison to control group. It seems that the effect of Nasturtium officinalon liver is due to its component likeFlavonoids, Lutein, Quercetin.

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728

EFFECTS OFHYDROALCOHOLIC EXTRACT OFCHICORY(CICHORIUM INTYBUS L.)ONFORMALIN-INDUCED PAININMALE MICE

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Painis unpleasant sensoryexperience ThatWhentissues damage it was created. Humanalwaystrying to discoverwaysto combat with it.Most of availablechemicaldrugs have sideeffects. Therefore increasedreplacementof this compoundwithnatural materialssuch asherbalextracts. In this study, the analgesic effects ofhydroalcoholic extract ofchicory (Cichorium intybus l.) were investigated that alsointraditional medicine theanti-inflammatory and analgesic effects were referred. Experimental study onmale NMRImice with average weight of20 to25 gr (6 micein each experiment)was performed.Mice were divided to 3 groups: the negativecontrolgroup (formalin 2.5%),the positive control group (Saline +formalin) andexperimental group **(**extractwith dose of10and25 mg / kg +formalin).Extraction *was done* throughsoxhletmethodandextractsorsaline were injected30 minbeforeformalin administrationin dueintraperitoneal.After Injection offormalin 2.5% to themetatarsus,response of mice for 30 min and every5 minutesonce pain score was calculated.Datawas analyzed by the SPSS softwarewith statistical tests and one way variance and tukey test($p < 0.05$). The results showed thatthesignificant differencethere is not between negativeand positivecontrol groups. Chicoryextractin the dose of25mg / kgreducedacute and chronic of paindue formalin in the positive control group *significantly* ($p < 0.001$). Hydroalcoholic extract ofchicoryhasananalgesic effect.

730

EFFECT OFHYDROALCOHOLIC EXTRACT OFCHICORY (CICHORIUM INTYBUS L.)AND ITS INTERACTIONWITH THEOPIOID SYSTEMONFORMALIN-INDUCED ACUTE PAIN INMALE MICE

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Painisanunpleasantsensory experience that isassociatedwithtissue damage.The role of the opioid system in an inhibition of pain is very important.Morphine (endogenousopioids) as the strongestanalgesicknownbut becouse of addictivepropertiesandtolerance,researchers are searchingand exploringcombinationsofplant that having analgesic properties with fewer side effects. Effect ofhydroalcoholic extract ofchicory (Cichorium intybus l.)and its interactionwith theopioid systemonformalin-induced acute Pain inmale mice are Considered.Experimental studies onMale NMRImice with average weight of20 to25 gr (6 micein each experiment)was performed.In order to induced-pain in all groups,2.5% formalin was injected to the mice metatarsus.Intraperitoneally treatments wereperformed half an hourbefore formalinWithin 5minutes from each other.Saline-Saline controlgroup andexperimental groupshavereceived saline-extract 25 mg/kg,saline-morphine 5 mg / kg,saline-naloxone 5mg/kg,extract25 mg/kg-morphine5mg/kg and extract25 mg / kg-naloxone5mg/kg.After injection of2.5% formalin to the metatarsus,mices responsewas checked for 5 minutesand pain scorewas calculated. Datawas analyzed by the SPSS softwarewith statistical tests and one way variance and tukey test($p < 0.05$). The results show the chicoryextractata dose of25mg/kghavesignificantlyreduced acutepain ($p < 0.001$)induced byformalin than the positive control group.Morphine5mg/kgInhibitsacute Painandnaloxone5mg/kghadnoteffecton acute pain. Injectionofextract-morphineincreasedanalgesic effect ofmorphineand injection of extract–naloxone decreased the pain of formalin-inducedsignificantly. Thisstudy show thatthe part ofanalgesicproperties of thechicoryplantis supportedby opioidergicmechanisms.

733

EFFECT OF SYLIMARIN ON SPERM NUMBER, VIABILITY, MOTILITY AND CHOROMATINE MATURITY IN CADMIUM-TREATED MICE

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The heavy metal cadmium as an inviromental pollutant is able to have numerous undesirable effects on human health by induceing oxidative stress[1].Silymarin, a polyphenolic flavonoid extracted from the seeds and fruits of *Silybum marianum* or milk thistle indicates effective antioxidant properties[2].Due to the antioxidant role of silymarin this study was performed to investigate if silymarin can prevent the adverse effect of cadmium on sperm number, viability, motility and chromatin maturity.Adult NMRI mice were divided into four groups: 1. control 2. cadmium chloride(5mg/kg,sc) 3. Silymarin(100mg/kg,ip)+ cadmium and 4. sylimarin. Treatment period was 24 hours. After treatment mice were disected and their epididymis were cut into small pieces in HTF medium, in order to swim out spermatozoa. Spermatozoa from different groups were used to evaluate sperm parameters.Sperm count and sperm motility were done according to World Health Organization (WHO) guidelines. Sperm viability and chromatin maturity assessed by Eozin-Negrosin and aniline blue (AB) staining respectively. Data were analyzed with one way ANOVA and $p<0.05$ was considered significant.In cadmium-treated mices, the percentage of number, viability and motility of the spermatozoa were significantly decreased compared to the control group. In silymarin+ cadmium group, silymarin could significantly compensate sperm number, viability and motility compared to cadmium-treated group. No significant difference was observed in chromatin maturity in cadmium-treated group as compared with the control. In concolusion, cadmium, as a heavy metal can induce toxic effects on mice sperm number, viability and motility and silymarin is able to compensate the adverse effect of cadmium on these sperm parameters.

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742

PHENYLALANINE IMPROVES ACTEOSIDE PRODUCTION, AN ANTICANCER AGENT, IN CELL SUSPENSION CULTURE OF SCROPHULARIA STRIATA

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Scrophularia striata Boiss., One of Iran's native plants, has been used since ancient times as folk remedies. The major bioactive constituents in *Scrophularia* are phenylethanoid glycosides (PhGs). Acteoside is a typical phenylethanoid glycoside which has extensive biological activities including antioxidant [2], cell apoptosis regulation [3] and cytotoxicity against various tumor cells [1]. In this research, effect of feeding precursors L-phenylalanine on growth, viability and production of acteoside in *S. striata* cell suspension cultures was investigated. Samples were extracted using methanol %90 as a solvent. The isolated acteoside was analyzed by HPLC. Quantitative estimation of acteoside was done based on the peak area of specific concentrations of the sample and the standard. 1 mM phenylalanine induced the highest increase of acteoside (13.26±0.76 µg g^{-1} cell fresh weight) which was 2.3-times greater than the untreated control at 7th day after treatment.Then, 1 Mm Phenylalanine is effective to acteoside production and biosynthesis pathway.

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746

EFFECT OF SEED PRETREATMENT BY GAMMA RADIATION ON THE AMOUNT OF PHENOLIC AND FLAVONOID CONTENTS AND ANTIOXIDANT PROPERTIES OF MARIGOLD EXTRACT

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Marigold (*Calendula officinalis*) is gramineous plant with one year of life from the Asteraceae family. It is also one of the most popular and widely used medicinal plants. Marigold extract has several pharmaceutical effects such as wound healing, anti-inflammatory, anti-bacterial, anti-tumor, anti-AIDS and etc. But the most important function of this plant is its usage in treatment of inflammatory skin diseases. Color materials of Marigold are widely used in food industry. Marigold contains phenolic compounds and flavonoids, which are antioxidants and protect the body against free radicals. Antioxidants are vital to protect the body against oxidative stress and different types of cancer. Antioxidant compounds that prevent from prevalence of chronic diseases and destruction of food can be derived from flowers of this plant [1].The aim of this study was to compare the effect of different doses of gamma radiation (10, 15, 20, 25 and zero as a control) on phenolic, flavonoid and antioxidant properties of marigold.To evaluate the phenolic, flavonoid and antioxidant properties of marigold flower from its pretreated seeds by gamma radiation, an experiment was performed based on randomized complete block design with 3 replications in greenhouse of Imam Khomeini International University. After preparing and collecting Marigold flowers, they are dried in an oven at 40 °C for 48 hours and extract of ethanol (80% ethanol) was prepared by using Maceration Method. The antioxidant activity of the extract at different concentrations was measured by using DPPH free radical inhibition method. Data analysis was performed using SPSS software and ANOVA test.

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760

NATURAL DYE EXTRACTED FROM SAMBUCUS NIGRA AS A SUBSTITUTE TO HISTOLOGICAL TISSUE DYE EOSIN

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Some plant extracts can be used in histological technique to reveal cellular components and tissues [1, 2].The objective of this study was to investigate the effects of time on staining of histological sections of sheep mammary gland by an extract of *Sambucus nigra*.The mammary gland tissues were processed for paraffin embedding technique and sectioned at 7 µm thicknesses. The sections were stained with haematoxylin and the dye extracted of *Sambucus nigra* as secondary stain. The extract was used to stain sections attimesof 12, 15 and 18 min.The results showed that the natural extract from *Sambucus nigra* stained the cytoplasm of tissues with pink to red coloration. This finding suggests that *Sambucus nigra* can be used as an alternative dye for histological staining.

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770
EFFECT OF DRY YEAST ON GROWTH AND HYPERCIN PRODUCTION OF HYPERICUM PERFORATUM UNDER DROUGHT STRESS

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The great challenge for the coming decades will be the task of increasing food production with less water, particularly in countries with limited water. Improving tolerance of plants could be happened by different ways such using bio-stimulants. dry Yeast as a bio-stimulant is considered as a natural source of cytokinins that stimulates cell division and enlargement as well as the synthesis of protein, nucleic acid and chlorophyll. In this research the effect of various concentration of dry yeast on growth of *Hypericum perforatum* plants was studied. In a field experiment hypericum plants, were subject to irrigation regimes with interval of 7 (control), 11 (moderate stress), and 14 (high stress) days and were sprayed at the initiation of flowering with various concentration (0, 3, 6) gr/lit of dry yeas. The results pointed out that drought stress significantly decreased plant height, fresh and dry weight of aerial parts, Adding dry yeast was effective on growth parameters. The yeast application caused also progressive increase in hypercin content.

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772
EFFECT OF CHITOSAN ON GROWTH AND ANTIOXIDANT CAPACITY OF HYPERICUM PERFORATUM UNDER DROUGHT STRESS

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Chitosan is a polysaccharide biopolymer derived from chitin. It not only stimulates growth and increases the crop yields but also alleviates the harmful effect of abiotic stress on plant growth. The objective of this study was to investigate the effects of chitosan on growth and antioxidant capacity of hypericum perforatum under dry stress. In this research the effect of various concentration of chitosan on growth of *Hypericum perforatum* plants was studied. In a field experiment hypericum plants, were subject to irrigation regimes with interval of 7 (control), 11 (moderate stress), and 14 (high stress) days and were sprayed at the initiation of flowering with various concentration (0, 100, 200 ,400) mg/lit of chitosan. Results indicated that all of chitosan increased growth and antioxidant capacity of hypericum perforatum under normal condition and dry stress compared to control. and concentration of 0.2% chitosan was more effective than other treatments.It is suggested that chitosan could be a promising material used to reduce the harmful effect of water stress on the growth and antioxidant capacity ofmidicinal plants[1, 2].

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787

EVALUATION OF TOTAL PHENOL, FLAVONOID CONTENTS OF ETHANOLIC EXTRACT OF SEEDS OF POLYLOPHIUM INVOLUCRATUM (PALL.) BOISS.

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Polyphenols are aromatic compounds from the plant kingdom. They are important due to positive correlation with antioxidant activity. They are responsible for the medicinal worth of plants. Phenolic components show antioxidant potential basically due to their reduction potential. Flavonoids are most important polyphenols. They have the ability to trap free radicals which are responsible for a number of diseases [1].The phenolics and Flavonoids content of *Polylophium involucratum* (Pall.) Boiss.was determined in the present study.The phenolic content was determined using Folin-Ciocalteu assay. The total flavonoids was measured spectrophotometrically using the aluminum chloride colorimetric assay. The resultsshowed that the ethanolic extract of *Polylophium involucratum* (Pall.) Boiss.contain significant amount phenolics andflavonoids. The phenolic content was showed by seeds of *Polylophium involucratum* (Pall.) Boiss.(8.16±0/5 mg GAE). In the case of flavonoids,was obtained for seeds of *Polylophium involucratum* (Pall.) Boiss. **(**2.18±0.6 mg QE). The *Polylophium involucratum* (Pall.) Boiss.can be regarded as promising plant species for natural plant sources of antioxidants with high potential value for drug preparation.

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791
NOVELMICROWAVE IRRADIATION ASSISTED GREEN SYNTHESIS OF SILVER NANOPARTICLES USING *POLYLOPHIUM INVOLUCRATUM* (PALL.) BOISS. SEEDS EXTRACT

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Recently, biosynthetic methods employing plants extract have emerged as a simple and viable alternative to more complex chemical synthetic procedures to obtain nanomaterials. Different types of nanomaterials like copper, zinc, titanium, magnesium, gold, alginate and silver have come up but silver nanoparticles have proved to be most effective as it has good antimicrobial efficacy against bacteria, viruses and other eukaryotic microorganisms. Of these, silver nanoparticles are playing a major role in the field of nanotechnology and nano medicine [1,2].In this study silver nanoparticle was synthesized using *Polylophium involucratum* (Pall.) Boiss.seeds extract as a reducing agent by microwave irradiation method. The advantage of using microwave irradiation is it takes less time to reduce the silver ions. The biosynthsised nanoparticle was characterized by FT-IR, UV-Vis, XRD, TEM and FESEM analysis. The surface plasmon resonance(SPR) band was observed at 430 nm for synthesized silver nanoparticles. FESEM image shows uniformly distributed spherical shape nanoparticles. The carboxylic and amine groups capped the silver nanoparticles and protect from aggregation.However, future studies are needed to investigate the other hidden effects exhibited by the plant in order to make the plant as a proficient herbal drug therapy.

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799

DETERMINATION OF ANTIOXIDANT PROPERTY AND AMOUNT OF TOTAL PHENOL OF ROOT EXTRACTS OF *MARRUBIUM VULGARE*

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of horehound are medicinal materials that are used mainly as spasmolytic, hypotensive, cholagogic and sedative agents The therapeutic effect is due to the presence in these plants of essential oils, terpenoids (marrubiin, peregrinol, marrubiol, peregrinin, tetrahydroperegrinin, dihydroperegrinin, phytol), flavonoids, phenolic acids, alkaloids (stachydrine), phenols, coumarins, amino acids, carbohydrates, tanning agents and saponins [1].The present study was carried out to measurement of the amount of total phenoland investigate the antioxidant activity for both extracts (Aqueous and methanolic) of*Marrubium vulgare. L* measurements have been done in different concentrations but some of them were disregarded due to following the Beer-Lambert's rule. The methanolic extract was showed higher antioxidant activity than the aqueous extract according to both 2,2-diphenyl-1-picryl hydrazyl (DPPH) [2]and Ferric Reducing Antioxidant Power (FRAP) [3] tests. In DPPH and FRAP tests for methanolic extract the antioxidant activity was IC_{50}= 58.856 ppm and 42.94 mMFe^{2+}/mg sample respectively. Ascorbic acid was used as standard. The amount of phenolic compounds in *M.vulgare L.* was found to be 2.127 mgphenol/g D.w and Gallic acid was used as standard.As a result of the study it is suggested that the use of*M.vulgare L.*because of its high antioxidant property and also high amount of total phenol is usefulfor treatment of the deseases wich are due to various oxidative stresses.

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803

EFFECTS OF SALT STRESS ON THE PIGMENT CONTENT OF MEDICINAL PLANT LEMON BALM (*MELISSA OFFICINALIS* L.)

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Melissa officinalis L. belongs to the family Lamiaceae and is one of the important medicinal plant species in central and southern Europe and in Asia. Due to the essential oil components of lemon balm, it is used in the Iranian traditional medicine for treatment of many diseases [1]. Essential oils are currently used as pharmaceuticals in medicine and pharmacology as anti-tumor, anti-bacterial, antimicrobial, antihistaminic, antispasmodic and antioxidant agents [2]. Salinity causes adverse effects in all biochemical and physiological processes of plants [3]. Chlorophyll *a*, chlorophyll *b* and carotenoid are main photosynthetic pigments and they play important role in photosynthesis. The present study aimed to investigate the effects of salinity on the photosynthetic pigments in *M. officinalis* plants. In this regard, an experiment was carried out based on randomized complete block design with four salinity levels (0, 3, 6, 9 dSm^{-1}) and three replicates. The results indicated that increasing the salinity level led to decrease in the chlorophyll *a* content with the highest decrease at 9 dSm^{-1} salinity level. With increasing salinity level to 9 dSm^{-1}, a decrease of 19.53% was observed in chlorophyll *a* content, as compared to control. At 3 and 6 dSm^{-1} salinity levels, the chlorophyll *b* and carotenoid contents were increased. The highest increases in chlorophyll *b* (28.59%) and carotenoid (13.77%) contents were recorded at 3dSm^{-1},as compared to control. With increasing in salinity level from 6 to 9 dSm^{-1}, chlorophyll and carotenoid contents decreased with the values of 13.03% and 24.04%, respectively, as compared to control. As compared to the control group, a 7.23% increase and a 24.68% decrease was obtained in totalchlorophyllcontent of the treated plants with3 and9 dSm^{-1}salinitylevels, respectively. Chlorophyll a/bratio reducedindifferent salinity levelsandthe greatestdecrease (22.09%)was observedin plants treated by 3 dSm^{-1} levels of salinity, as compared to control. In agreement with the report of Khorshidi et al., the findings of this study supported the suggestion that salinity causes significant decrease in the chlorophylls and carotenoids contents of the M. officinalis plants. Pigments system reduction is attributed to a salt induced weakening of protein-pigment-lipid complex or increased chlorophyllase enzyme activity.

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808

DETERMINATION OF ANTIOXIDANT ACTIVITY AND AMOUNT OF TOTAL PHENOL OF THE STEM EXTRACTS OF THE *DUCROSIA ANETHIFOLIA* BOISS L. FROM SISTAN AND BALUCHESTAN

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Ducrosia anethifolia Boiss L. family apiaceae has a restricted distribution, mainly in Afghanestan, Iran, Iraq and Pakistan. In Iran the plant is used to improve the smell of foods and *Ducrosia* were re-established by Alava. In its native countries the plant drinks. In traditional medicine it is used to treat catarrh, headache and backache; in Karoon the seeds are given to children as an infusion in case of colic [1]. Antioxidant activity of the *D.anethifolia boiss L*. stem in methanol, ethanol and aqueous extracts and the total phenolic content were studied. The total phenol content was determined using FolinCiocalteu method while antioxidant activity were determined using 2,2-diphenyl-1-picryl hydrazine (DPPH) method and Ferric reducing antioxidant power (FRAP) assay [2, 3]. In DPPH and FRAP tests for methanolic, ethanolic and aqueous extracts the antioxidant property were (IC_{50}= 78.35, 15.23), (IC_{50} =74.96,16.20)and (IC_{5o} = 97.34 ppm, 9.25mMFe_{2+}/mg sample) respectively. Ascorbic acid was used as standard. The amount of phenolic compounds in *D.anethifolia* boiss L. was found to be 142.865 mgphenol/g D.w and Gallic acid was used as standard.As a result, due to the high content of amount of phenol component and antioxidant property *D. anethifolia* boiss L. can be considered as a main natural antioxidant source, which can be used for prevention of progress of various oxidative stresses.

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809

CHEMICAL COMPOSITION OF ESSENTIAL OIL OF ROOTS OF *NEPETA BINALUDENSIS* JAMZAD FROM KHORASAN, IRAN

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Aromatics plants such as Some species of *Nepeta* genus have traditionally been used in folk medicine, and provide a multitude of flavours and fragrances which have found their way into everyday life. The genus *Nepeta* belongs to Lamiaceae family, it is a genus of about 280 species of flowering plant and distributed in South and Southwestern Europe, Southwestern of Asia and a few parts of Africa. It has been represented in Iran by sixty seven species including thirty nine endemics [1]. *Nepeta binaludensis* Jamzad (or *Nepeta* bodeana Bunge) is a one of them and used as herbal tea, it has been known as Poone saye Binaloudi in Iran. The composition of the essential oils hydrodistilled from the roots of *Nepeta binaludensis* Jamzad collected from Binaloud mountainous in Neyshabur, Iran, in June 2011, was analyzed both by gas chromatography (GC-FID) and gas chromatography-mass spectrometry (GC-MS). Identification of the components was based on GC retention indices computer matching with Wiley GC-MS library, and by comparison of the fragmentation patterns of the mass spectra with those reported in the literature [2]. Essential oil yield of dried plants obtained by hydrodistillation was 0.13 (w/w %). Five components were identified, representing 99.8% of the total oil composition. The major components in roots oil were δ-3-Carene (15%), 1, 8-cineole (74.4%), Myrcenol (3.6%), iso-3-Thujanol (4.7%), Sabina ketone (2.1%). Amongst them monoterpenes and oxygenated monoterpenes were predominant.

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812

THE ANTIMICROBIAL ACTIVITIES OF SOME PLANT NUTRIENTS *HELIANTHUS TUBEROSUS* L. TUBERS

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Helianthus tuberosus L .native species found in northeastern America and Canada East, and South America to North Dakota and northwestern Florida and Texas. Widely across the temperate regions because of the gland that is used as a vegetable. Meanwhile, Iran has already developed [1]. In this study, after collecting and drying plant growths, using soxhlet extraction was performed and identified five key elements: calcium, phosphorus, potassium, zinc and iron were analyzed by atomic absorption spectrometry which the amount of calcium, phosphorus, potassium, zinc and iron, equal to 0/15%, 0/26%, 1/34%, 1/32%, 38/1% respectively. Antimicrobial effect of the extract with two Disc Diffusion and well method, at concentrations of 25, 50, 100 and 200, with four Staphylococcus aureus, Pseudomonas aeruginosa, Bacillus subtilis and Escherichia coli was investigated.The results showed that the maximum diameter of the bacteria Escherichia coli inhibition disk method with an average of 7/125±1/72and themaximumdiameterofinhibitionofStaphylococcus aureuswell an average of 0/79±3/30 respectively.

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813

ESSENTIAL OIL COMPOSITION OF *FRANCOEURIA UNDULATA* (L.) LACK.GROWING WILD IN IRAN

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The essential oil content in the aerial parts of the native species *Francoeuria undulata* growing wild in the south of Iran was found to be 0.7 % based on the fresh weight. The oil was analyzed by GC and GC–MS. Forty two constituents, representing 96.9 % of the oil were identified. The major components of the oil were α-bisabolol (17.5%), chrysanthenone (12.5%), 1,8-cineol (10.7%), trans-thujone (9.7%) and linalool (6.6%).

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814

INHIBITORY EFFECTS OF ROSMARINIC ACID ON THE FORMATION OF ADVANCED GLYCATION END PRODUCTS

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There has been considerable public and scientific interest in the use of phytochemials derived from dietry components to combat human disease.In this work, we concentrates on the evaluation of the anti-glycation effect of rosmarinic acid, a bioactive substances present in plants.Rosmarinic acid is an ester of caffeic acid and 3,4-dihydroxyphenyllactic acid. It is commonly found in species of the Boraginaceae and the subfamily Nepetoideae of the Lamiaceae[2].Protein glycation and protein modifications are frequently observed in numerous disease states. Albumin, themajor circulating protein in blood, can undergo increased glycoxidation in diabetes [1].In this study,bovine serum albumin wase incubated in the presence of methylglyoxal with or without the addition ofrosmarinic acid.The level of glycation, conformational alterations and protein bindingto RAGE receptors were assessed by specific fluorescence, congo red binding assay, circular dichroism and tnbs assay.

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815

EVALUATION OF SECONDARY METABOLITES CONTENT IN LATEX OF ASAFOTIDA FROM SOME NATURAL LOCALITIES OF KERMAN PROVINCE

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Asafoetida, an oleo-gum-resin obtained from the roots of *Ferula assafoetida*, is used in traditional medicine to treat various diseases including, asthma, epilepsy, gastrointestinal disorders and influenza [1].This plant is almost widespread around India, Pakistan, Iran and Kerman province [2]. In this project,some secondary metabolites content including phenolic compounds, flavonoids, anthocyanins, tannins and Ferulic acid have been compared in latex from plants growing in some natural localities of Kerman province.Latex from Chatroud locality showed the highest total phenolic compounds content while Keshtuiyeh showed the lowest.There was no significant difference between total phenolic content in latex of plants from Sarduieh, Hossein Abad and Joopargrasslands. The content of ferulic acid *in* Chatroud was also the highest and the lowest was belonging to Sarduieh. The maximum amount of Tannin was observed in samples from Sarduieh and the lowest was in Chatroud. UV-absorbingcontent was maximum in latex of Sarduiehsamples (in wavelengths of 270, 300 and 330 nm), and the lowest was observed at 270 and 300 nm wavelength in Hossein Abad, Chatroud and Joopar. At 330 nm, UV-absorbing compounds content were lowest in Chatroud. Sarduieh had the maximum amount of anthocyanins content between all localities and Keshtuiyeh and Joopar showed the lowestanthocyanins content. Based on the results, latex from Chatroud grasslands has the highestcontent of phenolic compounds and *Ferulicacid* but the lowest content of tannins and UV-absorrbing compounds content at 270 and 330 nm.

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819

DETERMINATION OF VOLATILE CONSTITUTION IN AERIAL PARTS OF *STACHYS PILIFERA*

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The essential oil of the aerial parts of *Stachys pilifera* (Lamiaceae) was isolated by hydro-distillation. The chemical composition of volatile oil was analyzed by capillary GC and GC/MS. Fifty three compounds were identified representing 97.51% of the total components detected. The main components were found to be: Bicyclopentadiene (29.84%), Caryolan-8-ol (9.4%), β-selinene (8.63%) and Spathulenol (7.01%).

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822

VOLATILE CONSTITUENTS OF *VITEX AGNUS CASTUS*

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The volatile constituents of *Vitex Agnus Castus* were isolated by HD studied by GC and GC/MS. Forty three components were identified. The main components were α-Fenchene (%27.13), terpinyl acetate (%19.73), Limonene (%13.61) (+) Arromadendrene (%9.31), β – Pinene(%5.48), β–Myrcene (%3.01) and β copaen-4-alpha-ol (%3.50)[1, 2]

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823

COMPARATIVE STUDY OF ANTIOXIDANT COMPOUND CONTENT IN HIBISCUS TEA FLOWERS BASED ON SHRUB DENSITY AND PLANTING DATA

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Hibiscus tea is a great source of vitamins, minerals and bioactive compounds such as organic acids, phytosterolsand polyphenols having antioxidant properties [1].Several studies demonstrated thatplant secondary metabolite would be effected by density and planting date [2]. In this study, the effect of planting date and plant density on the antioxidant compounds content plant was investigated in Hibiscus tea. Sepals collected from plants which were grown in 20 April with 75 cm distance between shrubs showed the highest total antioxidant content among other groups including plants which were showed in 10 May with 75 cm distance and plants cultured in 20 April with 25 cm distance. Plants which were cultivated in 10 May with 25 cm distance between shrubs had the highest content of total flavonoids, phenolic compounds and total anthocyanins content. Based on the results, hibiscus tea which was grown in 10 May with 25 cm plant density hadthe highest amount of antioxidant compounds.

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829

STADY OF *HYPERRICUM PERFORATUM* HYDROETHANOLIC LEAF'S EXTRACT ON BLOOD PARAMETERS IN MALE RATS INDUCED WITH CYCLOPHOSPHAMIDE

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Cyclophosphamide is an anticancer drug which caused alkylation on DNA in cell. The side effect of cyclophosphamide are blood cells decrease and bone marrow damages. *Hypericum perforatum* is a medicinal plant which widely used in traditional medicine. In this study the hemopoeitic effect of Hypericumperforatumleaf extract (HPE) on bone marrow function and blood parameters in male rat were induced with cyclophosphamide was investigated. The 42 male rats with 220-250 gr body weight were divided randomly in 6 groups (n=7). control (taking normal saline,0.5ml/day, i,p), group taking cyclophosphamide (15mg/kg/day, i.p.), group taking HPE (200mg/kg, i.p/day), treated groups: (1,2 and3 by cyclophosphamide ,15mg/kg/day, i.p. and 100mg/Kg, 200mg/Kg and 400mg/kg HPE /day for 10 days, i,p). After the examination the blood samples were collected from heart directly and RBC, WBC, Hct, Hb and PLT were analyzed and the microscopic studies of bone marrow tissue were done. All data were expressed as mean±SEM. and statistical significance differences were accepted at $P<0.05$. Our results showed that the cyclophosphamide has injury effect on bone marrow tissue. The blood cells count decreased in groups induced with cyclophosphamide significantly. The groups treated with HPE were significantly increased in blood cells and parameters compared with group taking cyclophosphamide ($P<0.001$). The microscopic study of stem cells showed that the basophilic erythroblast and band cells in increased cyclophosphamide induced group compared with HPE treated groups ($P<0.01$).The *Hypericum perforatum* hydoethanolic extract has antioxidant and flavonoids compounds which can protect the bone marrow tissues against toxic chemical drugs.

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834

STUDY OF HYPOGLYCEMIA ACTIVITY OF HYDROETHANOLIC EXTRACT OF *ANETHUM GRAVEOLENS* LEAF IN NORMAL AND STREPTOZOTOCIN-INDUCED DIABETIC MALE RATS

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Diabetes mellitus is one of the most common metabolic disorders, which is accompanied by debilitating complications in the long term. This study was conducted to evaluate the effects of intraperitoneal administration of Anethum graveolensleaf hydroethanolic extract (AGE) on the serum glucose levels in diabetic male rats. In this experimental study 35 male rats were divided randomly in 5 groups contain control group, diabetic (STZ 60mg/kg, i.p), diabetic treated with metformine (500mg/kg, gavaged) and diabetic treatment with AGE extract (200mg/kg and 400mg/kg ,i.p). The blood glucose were examined daily by glucometer for one week and data were analyzed using one-way ANOVA and then Tukey post test.All data were expressed as mean±SEM and statistical significance differences were accepted at $P<0.05$. Intraperitoneal Prescription of hydroethanoholic extract of *Anethum graveolens* significantly decreased blood sugar in diabetic rats ($P<0.001$). The rats which treated with 400mg/kg AGE were more significantly decreased glucose serum level compared with control group ($P<0.001$). The metformine administration had decreasing effect on blood glucose level but it effect was moderate compared with AGE treatment in diabetic rats.The AGE has hypoglycemic effects in diabetic rats. It seems that the Anethum graveolenshas some flavonoids and trepenoids composition that can decrease blood glucose level and increase serum insulin.

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840

INVESTIGATING PLANT BIODIVERSITY WITH EMPHASIS ON MEDICINAL PLANTS IN DEHBAR OF TORGHABEH, KHORASAN RAZAVI PROVINCE

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Biodiversity provides important resources for medical researches [2]. Dehbar, situated in southwest of the Torghabeh around Mashhad in Khorasan Razavi province, was investigated to explore the floristic composition and extract the medicinal plants inside. The area is part of the so called "Arghavan forest", dominated by the shrub species *Cercis graffiti*, with an area of 7116 ha. Therefore, the flora of the area were collected by establishing 150 random sample plots of the size 1 sq. m. The number of individuals and percent cover of each species within the plots were evaluatedin May, June, July and November, 2014.The Collected species were identified by valid Flora. Some soil characteristics viz. N, K, P, CaCo3, pH and EC were also determined based on the soil samples established under the canopyof *Cercis graffiti* and in the open space. The results revealed the presence of 164 plant species among which 33 were medicinal ones. In other word, the list of medicinal plants present in the area involved 20.12 percent of the flora. The *Cercis graffiti* hasa potential in growth and natural regeneration in difficult ecological conditionsandlack ofgrowthfactors.The resultsof statistical analysis showed that the amount of N-P-K wassignificantly different ($P<0.05$) in the two and was high in the undercanopy cover of the shrub species. The area may be considered a suitable habitatfor the medicinal plants and biodiversity studies regarding the facilitation provided by *Cercis graffiti*.

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844

STADY OF HYPOGLYCEMIC EFFECT OF *SATUREJA MONTANA* IN DIABETES MALE RATS INDUCED WITH STREPTOZOTOCINE

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Medicinal plants are widely used in treatment of diseases in the world. Diabetes mellitusis one of the common metabolic disease which has variousbody disorders. This study was conducted to evaluate the effects of intraperitoneal administration of Satureja montanaleaf hydroethanolic extract (SME) on the serum glucose levels in diabetic male rats. In this experimental study 42 male rats were divided randomly in 6 groups contain control group, diabetic and diabetic treatment with SME extract (200mg/kg, 400mg/kg and 800mg/kg,i.p) and diabetic treated with metformin (500mg/kg,gavaged). The blood glucose were examined daily by glucometer after induced with STZ and treatment by SME. All data were analyzed using one-way ANOVA and then Tukey post test and all data were expressed as mean±SEM. and statistical significance differences were accepted at $P<0.05$. Intraperitoneal prescription of hydroethanoholic extract of *Satureja montana* significantly caused decrease blood sugar in diabetic rat ($P< 0.05$), but it has not effect on normal rats. The rats which treated with 800mg/kg SME were more significantly decreased glucose serum level compared with control group ($P<0.001$). The metformin administration had decreasing effect on blood glucose level but it effect was moderate compared with SME treatment in diabetic rats.The SME has hypoglycemic effects in diabetic rats. It seems that the Satureja montanahas some natural chemical composition and ant oxidants which can decrease blood glucose level and increase insulin hormone.

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846

COMPARISON OF CHEMICAL PROPERTIES AND FATTY ACID PROFILES OF OIL 2-VARIETIES KERNAL OF DATE IN BUSHEHR

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Date is one of important agricultural product s in Iran. And annually is produced great amount o kernel in date,s proction workrooms. As wastage. From this kernels, we can prepare oil. In this survey, I study the charactristics of oil and 2- varieties fatty acids in Bushehr. In this survey, two kinds of current date (shekar,kabkab) in Bushehr was studied. The measure of oil was determind by sokcelea machine, Aceton and n-Hexan. And measure of fatty acids was studied by GAS choromatography mashine.The measure of oil in kernel was 8.3% (according to dry weight) other charactristics of oil such as peroxid number, Acid Andis and light filure factor were obtained in measures under (10.4-10.6), (1.33-1.79), (1.462-1.462). Profile of produced fatty acids was studied by gas choromatography machine and was found oleic acids by measure of (31.47-37.60), saturated fatty acids and Luric by measures of (25.68-30.50). As saturated fatty acids in kernel \. fatty acids such as miristic (13.27-16.76), Palm itic (11.90-13.08) Estearic (1.85- 2.34), C11(.17- .46)and Linoleic (4.41-6.46) in all 2-varietis was found. I n the both varieties were founded Capric and caprilic Acid afew. yield outcomes shows that there are un saturated fatty acids in date,s kernel thatLinoleic is one of them. Linoleic is one of essential fatty acids for human body. It can be considered as source of feed oil. The kernel ,s oil use in producing toliety, medicine and feed production [1, 2].

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867

POLLEN MORPHOLOGY OF MEDICINAL *ZIZIPHUS* SPECIES IN IRAN

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Rhamnaceae family comprises 900 shrubs, trees and trends distributed in 50 genera. One of the important medicinal plants of this family is *Ziziphus* with persica name as Konar different species of this genus are of medicinal importancein the world. *Ziziphus* species are used as anti-inflamatory and antibacterial agents .These plants extract are used to treat skin disorders,insomnia and fever polyuria.These are distributed mainly on tropical and sobtropical zones of the world. The main aim of the present study is to evaluate the pollen grains morphology of *Z. jujuba*, *Z. nummularia*, *Z.Spina-charisti*,by use of light and scanning electron microscopy (SEM) in different habitats of these species in Iran.Results of pollen studies by multivariate statistical methods as cluster,ordination and factor analysis revealed that exine sculporing of studied species show differences species relationships based on pollen grains featores are discussed.

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874

APPLICATION OF CLUSTERING ANALYSIS TO THE DIAGNOSIS THE EFFECT OF BUTACHLOR HERBICIDE ON THE RICE METABOLITE PROFILING

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A novel approach using GC–MS (Gas Chromatography tandem Mass Spectrometry) coupled with multivariate statistic analysis was established for screening the effect of butachlor herbicide on the rice metabolite profiling. The metabolomic-chemometrics approach used in this study for screening rice metabolite profiling during exposure to butachlor herbicide and gave raise no evidence in metabolic differentiation for this stress in two concentration limit. A novel strategy to screen out the effect of applying recommended dose and ten times more than the amount of recommended dose of butachlor in rice fields for studying the changes of metabolic profiling in control and exposed rice plants. A batch of control and exposed samples was analyzed, and the data sets of tR–m/z pairs, ion intensities and sample codes were subjected to thePrincipal Component Analysis (PCA) and Hierarchical Clusterig Analysis (HCA). Result of two classification model in two concentration level of butachlor (recommended and ten times more) showed not a clear classification between the control and exposed samples in tow levels, it means recommended dose of butachlor (3 Lit/hectare) and ten times more (30 Lit/hectare) cannot effect on rice metabolite profiling. This approach could be valuable to quality assurance of rice and promote the quality control and safety application of butachlor in a rice field [1, 2].

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875

INTEGRATED PATHWAY-BASED AND NETWORK-BASED ANALYSIS OF GC-MS RICE METABOLOMICS DATA UNDER DIAZINON STRESS TO INFER AFFECTED BIOLOGICAL PATHWAYS

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Diazinon insecticide is widely applied throghout rice *(Oryza sativa L.)* fields in Iran. However, concerns are now being raised about its potential adverse impacts on rice fields. In this study, a time-course metabolic change in rice plants was investigated after diazinon treatment using gas chromatography−mass spectrometry (GC−MS) and subsequentely, three different methods, namely metaboanalyst, metabonetwork, and analysis of reporter reactions, were used in order to link changes in metabolite levels to investigate the changes of biological pathways. Metaboanalyst is a web-based tool for data processing, statistical analysis and pathway analysis of metabolomics data. Here, for the first time, we have explored three of the mentioned methods, for the analysis of metabolomics data of rice *(Oryza sativa L.)* plants under diazinon stress.We used three methods to find the underlying changes in metabolism with stronger evidences. Additionally selected methods are such that they have different points of view and their results can be complementary to each other, results clearly showed the similarity AChE of rice plants to that of animals in terms of its inhibitability by Diazinon and emphasizes that subsequent accumulation of Ach mainly affects on the metabolism of osmolites and TCA intermediates Acetylcholinesterase (ACHE), an enzyme occurring in the pre- and postsynaptic membranes, responsible for hydrolysis of ACh to choline and acetic acid residues. The mechanism of enzymatic hydrolysis of ACh in plant cells seems similar to that observed in animal cells. In the active center there are two sites, one an anion site, which attracts the positively charged nitrogen atom of ACh, and one an ester site, at which the substrate is hydrolyzed. Therefore, as AChE of animals, plants AChE also can be inhibited by Diazinon, resulting in accumulation of acetycholin [1, 2].

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900
FUMARIA PARVIFLORA LAM. EFFECT ON SERUM LEVEL OF GLUCOSE AND LIPIDS IN STRPTOZOSIN-INDUCED DIABETIC RATS

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Lowering serum glucose and lipid levels in diabetic patients by using natural materials is of great importance. In this study, the effect of oral consumption of *Fumaria parviflora* Lam was was assessed on serum glucose and lipid levels in streptozocin diabetic rats. In this experimental study, 32 male Wistar rats were divided into four groups of control, control under the treatment of *F. Parviflora* L., diabetic and diabetic under the treatment of *F. parviflora* L. *F. parviflora* L. was administered orally (6.25%) after injection of streptozocin for five weeks. Serum levels of glucose, triglyceride, total cholesterol, HDL and LDL were evaluated before and three and six weeks after the treatment. Regarding glucose level, there was no significant difference between diabetic rats treated with F. Parviflora L. and diabetic rats at third and sixth weeks. However there was a significant decrease in triglyceride level in F. Parviflora L. treated group as compared to diabetic rats at third and sixth weeks. Regarding serum total cholesterol, F. Parviflora L. treated group did not show a significant decrease at third week, but this difference was significant at sixth week. Regarding HDL cholesterol, there was no significant increase in F. Parviflora L. treated group as compared to diabetic group at third week, while this difference was significant at sixth week. Oral administration of *F. Parviflora* L. to streptozocin-induced diabetic rats improved triglyceride, total cholesterol and HDL serum levels, but no significant effect on serum glucose and LDL.

902

PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITIES OF THE CONSTITUENTS ISOLATED FROM GOLDEN RAIN LEAVES

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Golden rain tree (*Koelreuteria paniculata Laxm.*), is a species of flowering plants in the family*Sapindaceae*, native to China, Korea and Japan. It is a small deciduous tree that is also called Pride-of-India, China tree or varnish tree [1]. Local people use the seeds as insecticides and the leaves as antifungal and antibacterial agents [2]. In the follow, researchers found that the crude extracts of this plant possessed anti-tumor and anti-oxidation activities [2]. Phytochemical screening is very important in identifying new source of therapeutically and agricultural valuable compounds having medicinal and agricultural significance, to make the best use of available natural wealth. In recent years, interest for the characterization of organic compounds from plants has been developed. Therefore, an attempt was made to screen and isolate the bioactive compounds, evaluate the bioactive potential and characterize them by GC-MS analysis [3] and in follow evaluate the antibacterial and antifungal effects of fractions obtained from Golden rain leaves plant. Methanolic extract of Golden rain leaves was fractionated by column chromatography on silica gel and 18 frantions were obtained. Antimicrobial activities of frantions were investigated against *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa* as quality control bacteria and fungus *Pyricularia grisea* that causing Blast disease in rice. Fractions showed more antibacterial activity at 0.04 g/ml concentration only on *Bacillus subtilis* and *Staphylococcus aureus* as gram positive bacteria. Also, three fractions indicated excellent antifungal effect on fungus *Pyricularia grisea*. Moreover in present study, fractions that showed very good effect on microorganisms were used for GC-MS analysis and the results are shown the isolated phytochemicals (secondary metabolites).

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904

PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITIES OF THE METHANOL EXTRACT OF *GLEDITSIA CASPICA* SEEDS

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Gleditsia caspica (Caspian Locust or Persian Honeylocust) is a species of Gleditsia native to western Asia, in the Caucasus region of Azerbaijan and northern Iran, close to the Caspian Sea. Gleditsia species have been widely used in folk medicine. Previous reports on Gleditsia species revealed that they contain bioactive compounds as phenolic compounds; phenolic acids, flavonoids, triterpenes and sterols, which have numerous activities including antioxidant, cytotoxic, anti-inflammatory, analgesic, antiallergic, antibacterial, hypocholesterolemic, and hypoglycemic effects [1]. Phytochemical screening is very important in identifying new source of therapeutically and agricultural valuable compounds having medicinal and agricultural significance, to make the best use of available natural wealth. In recent years, interest for the characterization of organic compounds from plants has been developed. Therefore, an attempt was made to screen and isolate the bioactive compounds, evaluate the bioactive potential and characterize them by GC-MS analysis [2] and in follow evaluate the antibacterial and antifungal effects of Gleditsia caspica seeds. The aim of this study was to characterize the methanol extract of *Gleditsia caspica* seeds for the presence of biologically active phytochemicals using GC-MS analysis and then the antibacterial and antifungal activities were evaluated. This extract showed more inhibitory effect at 0.5 g/ml concentration on *Bacillus subtilis*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* bacteria. In follow, antifungal activity ofGleditsia caspica seed was examined and the results indicate that this extract at 0.5 g/ml concentration show excellent antifungal effect on fungus *Pyricularia grisea*.

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909
EFFECT OF SPIRULINA (*ARTHROSPIRA PLANTENSIS*) ON SPERMATOGENESIS IN NMRI MICE

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Spirulina (*Arthrospira plantensis*) is one of the oldest medicinal plants consumed by humans. It contains all essential amino acids, gama-linolenic acid and vitamins needed for spermatogenesis [1, 2]. The aim of this study was to investigate the effect of Spirulina on male reproductive system. 40 adult NMRI mice were divided in 4 groups including one control and three experimental groups. The control group received saline (gavage) and experimental groups received 50, 100, 200 mg/kg spirulina. Treatment was performed for 30 days and histological changes in the testis and level of FSH, LH and testosterone were assessed. Our data showed that treatment with spirulina increased the germinal epithelium, number of spermatid, level of testosterone compared with the control group ($p<0.01$). Spirulina has a multiper effect on the male reproductive system and can be used as a medicinal plant to enhance spermatogenesis.

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922

EXAMINATION OF PLANTS REGION ASSOCIATION MEDICINAL HERBAL OF *ARNEBIA EUCHROMA* (ROYLE) JOHNST. IN THE PROTECTED AREA OF DENA

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The Medical plants of *Arnebia euchroma* (Royle) Johnst. grows in Dena area has been the focus of study for several years in terms of physiognomy and floristic and ecologic. in this study, Andogene settings was determined using physinomic, floristic and ecologic indices. Then in each of the settings the sample releve were randomly selected in each of samples , the mimnium level of type was studied using the level type method. the data of floristic association and herbal samles and ecologic soil of each part were collected and analyzed through softwar of analysis. The results of samples of soils and herbal samples Were examined in terms of systamtic, photochemical properties , Ph Electrical conductivity (EC) tissue and mineral properties The results of this study shwed that the herbal *Arnebiaeuchroma* (Royle) Johnst. grow in five formation of Forest Juniperus excelsa, accessory formation of rock plants, accessory formation of snow plants, alpin herbals formation, subalpines and 8 plants associations exist. Form ecological perspective, this type grows in the areas that are 2975 to 4435 meters form the sea level and in the southern slopes, south east, northeast and east and north grow with 19 to 81% in the soil which are silit, clay, sand, sand-clay and lumi and east and average amount of sand 17.1%, clay 52.2% silit 30.3% and the Ph is between 7.2 to 7.94 and the EC is between 380 to 930 milimous cm, the amount of organic Material is between 1.371% to 3.744% note should be taken that the herbal *Arnebia euchroma* (Royle) Johnst. is one of the most omportant herbals that is used in the tradition medicine of the inhabitance. It is used as an antiseptic for treatment of wounds for time and today it is used as an active herbal to cease the prostate activities, reducing fever, antibacterial, anti locmia, anti-tumor, anti-tumult, anti- cancer and against HIV, anti-diabetes(B), anti-pregnancy, stopping bleeding and treating sexual disorders.

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927

EFFECT OF THE *PEGANUM HARMULA* ASSENTIAL OIL ON WOUND INFECTION CAUSED BY *PSEUDOMONAS AERUGINOSA EXOTOXIN* A-PRODUCING IN LABORATORY MICE

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One of the great problems of infection in burns and is considered the major cause of mortality in these patients.Therefore, the research for effective drugs against *Pseudomonasaeruginosa*, which is the most common bacteria causing these infections seems essential .The aims of this study was to determine antibacterial *peganumharmala* L. effect on burn wound infections caused by *Pseudomonasaeruginosa* and comparison with the effective antibiotics on this infections. The effect of plant essential oils against *Pseudomonas* was evaluated using the agar ditch method. To assess healthiness of burn wound infection with *Pseudomonas aeruginosa*, *Peganum harmala* L. oil used on burn wounds in mice. Wound area and percent recovery was measured on a daily basis. At day 16 after infection to determine the number of neutrophils and lymphocytes from all infected groups the sample of blood obtained. The results of measuring the diameter of inhibition zone showed that *peganum harmala* L. is effective against *Pseudomonas aeruginosa*. The Count number of colonies displaied in treated group with plant and ciprofloxacin significantly different than the control group and the group treated with gentamicin. Count of white blood cells infected mice as control groups and treated with Gentamicin were lower than normal levels in the blood while the number of this cells in treated with herbs and Ciprofloxacin groups were in the normal range. The result of this study showed that the *peganum harmala* L. ointment than the untreated group and gentamaysin and siprofloxacin against *Pseudomonas aeruginosa* productive exotoxin was more effective.

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938

STUDING ON TOTAL PHENOLIC CONTENT AND TOTAL FLOVONOID CONTENT OF *FERULA OVINA* FROM SABZEVAR

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The genus of *Ferula* belongs to the Umbelliferae family and comprises 53 species that grow wild in Iran and popular Persian name of this genus is "Koma". *Ferula ovina* is distributed in different regions of Iran. Previous studies demonstrated anti-spasmodic, anticholinergic and smooth muscle relaxant properties for essential oil of *F. Ovina* [1], which were rich in ±α-pinen (50%) and limonene (11.5%) [2]. In this study the presences of different secondary metabolites in different aerial parts of the plant using some phytochemical tests were evaluated. For this propose, the different parts of *F. Ovina* including stems, leaves, and flower were collected from Sabzevar (May 2014). The samples were dried at room temperature, grounded and then macerated in methanol for 72 h. After filtration, the extracts were concentrated using a rotary vacuum until a crude extract was obtained. The crude extracts were dissolved in MeOH again and then partitioned using various solvents, which differ in polarity, including n-Hexane (H), Chloroform (C) and Ethyl acetate (E) respectively. The TLC profiles of different extracts were analyzed using different phytochemical tests to determine of the existence of flavonoids (reagent: AlCl3 in MeOH5%), phenolic (aqueous FeCl3 5%), and anthraquinone (KOH in EtOH 5%) compounds. The results is tabulated in following table.

Plant / Partition	Leaf	Steam	Flower
n-Hexane	-	-	-
Chloroform	-	-	-
Ethyl Acetate	+	+	+

As shown in the table, uses of these identifiers characterize, that the ethyl acetate partition of stem, leaves and flower contain phenolic and flavonoid compound, and there is not any kind of anthraquinone compounds in the plant parts. Since phenolic and flavonoids compounds have some biological properties such as antioxidant and antimicrobial activities, it should be said, *F. Ovina* should be considered for more investigation.

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939

DETERMINATION OF TOTAL PHENOLIC AND FLAVONOID CONTENT OFAERIAL PART OF *SALVIA LERIIFOLIA* BENTH FROM SABZEVAR-IRAN

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Salvia leriifolia Benthis a species of *Salvia* genus that grows exclusively in Khorasan- Razavi and Semnan. Previous studies reported antibiotical properties, pharmacological, and toxicological effects of essential oils from aerial parts of the plant [1]. Because of there is no report on phytochemical properties of the extracts of *S. Leriifolia* in literature we choose the plant for this study. First of all, in order to study phenolic and flavonoidcompounds of *S. leriifolia*, the aerial parts of plant including leaves and flowers were collected from Sabzevar, second the collected parts were dried, gritted, and steeped in methanol (the best chosen solvent for extraction) for 72 hours at room temperature, and then the liquid was filtered. Since existent compounds in the extract could be separate according to their polarity, the extracted material was washed with n-hexane, chloroform, and ethyl acetate, respectively, and the outcome mother liquors were condensed with rotary. Finally, phytochemical tests have been used as below in determination of phenolic and flavonoid compounds kind. Different identifiers as ethanolic KOH 5%, methanolic $AlCl_3$ 5%, and 5% aqueous $FeCl_3$ have been applied because of each extracted liquid samples have various parts of the compounds with different polarity. According to the previous reports, presence of anthraquinone, flavonoid, and phenolic compounds in vicinity of KOH, $AlCl_3$, and $FeCl_3$ identifiers, resulted in solution or TCL changing color to red, yellow or orange, and blue or green, respectively. Regarding to the mentioned approach, existence of the phenolic and flavonoid compounds in the ethyl acetate phase of leaf and flower of *S. Leriifolia*could be confirmed. Since the phenolic and flavonoids compound possess a variety of biological activities such as antioxidant, antiplatelet, antitumor, and antiviral activities, it should be said *S. Leriifolia* could be nominated as a suitable source to isolate of this compounds and study on the other biological properties of these isolated compounds.

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956

EXAMINING THE ETHNOBOTANY AND ETHNOPHARMACOLOGY IN NOORABAD IN FARS PROINCE

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In all countries in the world there two types of inheritances: the first one is the biological inheritance and the other one is the lofty inheritance of traditional medicine and the local knowledge which are the output of million years of live creatures evolution. This could be the invaluable wealth for future generations in that they can use these sources in diverse aspects of life including economic biology and ascetic and other material and immaterial dimensions. The invaluable inheritance of traditional medicine is the basis of cultural resources and it is the oral and unwritten knowledge, which has been shaped through thousands of years in interaction with biological wealth and biological Biodiversity. The knowledge that should be exploited and used as immeasurable sources of human society. precise recognition of this types of knowledge, the diverse components of biology along with the local knowledge to use this invaluable wealth could considerably help stable development and increasingly growing interaction of biological protection. the ethnobotanical examination and ethnopharmacological studies in Noor Abad has been done in 1390 to 1393 using questionnaires in different parts of this area. the information of ethno botany and ethno pharmacology were gathered from informed people and types of herbal s to be used in the study. in this study, it was attempted to sample the local names and all function and uses of the herbals including medical, edible and other uses. the sample of herbals were recognized and the collected data were analyzed. in this study each scale included 100 item. all uses of these herbals including sacred trees were analyzed in this study. however, the ethno pharmacology is more important than others. therefore, mainly we deal with the ethno pharmacological results. results of this study showed that 80% of the people in this area are using these herbals to treat their diseases. additionally more than 100 species of the plants are used in diverse aspects, forexample *Teucrium polium* L. , *Anchillawilhelmsii* C.Koch, *Anthemi* ssp. , *Cicherium intybus* L. and *Glycyrrhiza glabra* L. var. *glabra* are most frequently used herbals. moreover, more than 50% of the herbals including *Rheum ribes* L., *Quercus Brantii* Lindl., *Amydalus* spp., *Crataegus* spp., *Dromea aucheri* Boiss., *Gundelia turenfortii* L., *Allium stivum* L. are used for eating. In addition, herbals like *Alcea* spp., *Ziziphus nummularia* Burm.f., *Myrtus commnis* L., *Acanthophyllum squarrosum* Boiss. are used wash things. in addition, tanners use *Quercus brantii* Lindl. sand *Salvia sclarae* L. are used to kill the insects. *Ferula gummosa* Boiss., *Ferula assa-foetida* L., Peganum harmala L. are used as powerful disinfectors and finally *Nerium indicum* Miller, *Hyoscymus niger* L., *Hypericum perforatum* L. are percieved to be poisonous for humans and goats and sheep.

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970
LEAF FLAVONOIDS OF *CONVOLVULUS* L. SPECIES IN MARKAZI PROVINCE, IRAN

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Convolvolus L. from *Convolvulea* (Convolvolaceae) has about 250 species in the world [1] and 60 species in Iran [2]. Today, flavonoids are used for making antitumoure, anticancer, antibacterial, antiviral, antifungal drugs and insecticides [3]. Some flavonoid compounds have been reported from the *Convolvolus* genus. Attia et al (2007) isolated two aglycones Kaempferol and Quercetin from *C. fatmensis* Ktz. [4]. Flavonoid patterns of 20 *Convolvolus* taxa from Morocco showed existing flavonols (Quercetin, Kaempferol and Isorhamnetin), flavones Luteolin and hydroxycomarin Cichotin [5]. Phytochemical studies on 4 *Convolvolus* species leaves (*C. commutatus*, *C. arvensis*, *C.pilosellafolius* and *C. lineatus*) from different parts of Markazi Province, Iran area were done using two-dimensional paper chromatography (2-DPC) and thin layer chromatography (TLC). Results showedall of leaves contain flavonoid sulphates and flavones *C* and *C-/O* glycosides but aglycones were not found. Luteolin, Quercetin, Kaempferol and Hesperidin were found in all of the studied species leaves. *C .arvensis* had Myercetin and Morin while the rest lack.

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989

APPLICATION OF RESPONSE SURFACE METHODOLOGY FOR THE OPTIMIZATION OF SUPERCRITICAL CARBON DIOXIDE EXTRACTION OF CURCUMIN FROM THERMURIC

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The most important property of tumeric is a stimulant and digestion. Its compounds are Curcumin, di-methoxy Curcumin and Curcumin bis di- methoxy, which have anti-cancer properties. In this project for the first time using the super critical fluid Curcumin., di-methoxy Curcumin and bis di- methoxy were extracted with high efficiency. In order to optimize the extraction conditions Central composite design, after a screening process was used. The used model predicted extract condition as below: pressure, 355 atmosphere, 35 °C, static and dynamic extraction time respectively 10 and 70 minutes and the modifier volume 150 microliter predicted. The extracted compounds were measured using high performance liquid chromatography coupled with ultra violet detector.

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990

EXTRACTION OF FATTY ACIDS FROM ZUCCHINI SEED USING SUPERCRITICAL CO_2 IN GREEN AND HIGH-TECH SEPARATION PROCESS COMPARE WITH ULTRASOUND-ASSISTED EXTRACTION USING RESPONSE SURFACE METHODOLOGY AND CENTRAL COMPOSITE DESIGN

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Zucchini squash (*Cucurbita pepo*) or courgettes, is a member of the cucumber and melon family which is believed to be originating in the Central America and Mexico. Today zucchini is cultivated in the United States, European countries and Iran. Its feature is smooth with tender skin and flesh with small edible seeds and high moisture content. In the present work the zucchini seeds were extracted using green solvent viz. supercritical CO_2 and ultrasound-assisted extraction techniques. The chemical composition of the oil was determined by GC-MS. The supercritical CO_2 process and ultrasound-assisted extraction selectively extracted the fatty acids from seed. The main fatty acids found in zucchini seed oil are palmitic acid, stearic acid, myristic acid, Linoleic acid and Linolenic acid. The oil extraction with SFE technique seems to be a good alternative because it operates at low temperature with good mass-transfer rates and with no solvent residual in the final product. The experimental parameters of SFE such as pressure, temperature, modifier volume, static and dynamic extraction time and UAE such as solvent volume, extraction time and temperature were optimized using a Central Composite Design. According to the extraction of useful fatty acids from seeds, the plant can be used as supplement for treatment of variety of diseases.

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991
EXTRACTION OF FATTY ACIDS FROM CITRUS LEMON SEED USING SUPERCRITICAL CO_2 IN GREEN AND HIGH-TECH SEPARATION PROCESS USIRESPONSE SURFACE METHODOLOGY AND CENTRAL COMPOSITE DESIGN

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Limeis acitrusspecieswith a globose fruit, which is native to Southeast Asia. Lime oil was extracted using supercritical fluid extraction (SFE) and ultrasound-assisted extraction (UAE) methods; the extracts were analyzed by GC-MS. The experimental parameters such as pressure, temperature, modifier volume and dynamic extraction time were optimized using a central composite design after a screening step. The highest yield for SFE was obtained at a pressure of 310 atm, temperature of 35°c modifier volume of 124.83 µL, dynamic extraction time of 48.71 min. n-hexane was selected as the extracting solvent in UAE method and the parameters solvent volume, solvent ratio, temperature and extraction time were optimized using central composite design. The optimum obtained values are solvent volume of 20 mL, extraction time of 44.71 min and temperature of 50 °c.

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995

ROOT INDUCTION IN THE CALLUS CULTURE OF *STEVIA REBAUDIANAAT* DIFFERENT HORMONAL COMBINATIONS

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Stevia rebaudiana (compositae) is a perennial herb indigenous to South America. The plant contains diterpene glycosides and has been used as non caloric natural in food and pharmaceutical industries for treatment and prevention of diabetes and overweight. Due to various pharmaceutical and biological potential the plant has been cultivated in differentpart of the world. In this investigation the effects of different hormonal compositions root induction in callus were studied. The leaf segment of *S. rebaudiana* were cut into 1 cm^2 square pieces and then aseptic explants were cultured on MS (Murashige and Skoog) medium supplemented with various concentrations of the hormone NAA/Kin , 2,4-D /Kin and IBA/Kin [1]. The results showed that the root induction in callus take place when NAA and kin are combined with concentration more than of 1.5 mg/L and 0/5 mg/L respectively. The similar results can be yielded when IBA/kin are combined with concentration more than 2 mg/L and 0/5 mg/L respectively. However, combination of NAA/Kin compared to IBA/Kin has the maximum effect on the rooting. It is found that when the concentration of NAA is more that of Kin the process rooting is accelerated. On the other hand, 2,4-D/Kin did not promote rooting in callus. It could be concluded,whereas IBA is known as a typical rhizogenic hormone,the root induction in callus of*Stevia* in MS medium containing NAA is better than those ofcontaining IBA.

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998

STEROIDS AND PHENOLIC COMPOUNDS FROM *DESCURAINIA SOPHIA* L.

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Descurainia sophia L. is an annual species belonging to family Brassicaceae (Cruciferae). This species is only species of the genus *Descurainia* in Iran and distributes in all parts of Iran from below sea level up to 3000 m[1].It has traditionally been used as a folk medicine in many countries [2]. Up to now, several studies have identified the presence of different groups of phytochemicals[3-5]. In previous study, we reported chemical compositions of essential oil and fatty acid from different parts of this plant [6]. Herein we communicate results from the first study of the steroids and phenolics composition of *Descurainia sophia* L. collected in the north of Iran. The dried aerial parts (leave and stem) (800 g) of *D. sophia* were ground to small size powder and extracted with methanol (3 × 3 L). After removal of the solvent under reduced pressure, the residue was fractionated with hexane and ethyl acetate. For the isolation of steroids, column chromatography of the hexane fraction was performed on silica gel and eluted with light petroleum to give three fractions. Fraction I was subjected to silica gel column chromatography to give β-sitosterol (12 mg) and lanosterol (15 mg).An activity-guided fractionation and purification process was used to isolate l,l-diphenyl-2-picrylhydrazyl (DPPH) radical-scavenging components from the plant material. Ethyl acetate fraction was chromatographed on silica column using hexane-chloroform (1:1) with increasing polarity to give four fractions. Elutes were monitored by TLC. Fraction I was subject to silica gel column chromatography using petroleum-ethyl acetate to yield kaempferol (8 mg) and quercetin (15 mg). Fraction IV was subject to silica gel column chromatography using chloroform to afford epigallocatechin (23 mg) and syringic acid (19 mg). This study is the first report on isolation and purification of steroids and phenolic compounds of *D. sophia* in Iran.

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1000
COMPARATIVEANTIMICROBIAL ACTIVITYOFROSEMARY (*ROSMARINUSOFFICINALIS* L.) LEAVES IN RELATION TO DEVELOPMENT

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Rosmarinus officinalis L. is well known for its multiple medicinal significance, including antibacterial properties [1,2]. Quantitative and qualitative analyses of Rosemary essential oils are also reported [3], but no such data exist on Rosemary leaf, in relation to its development. Therefore, antimicrobial activity of Rosemary leaves was correlated with their histological aspect and developmental changes in this present study. Leaves were collected at four successive ontogenic phases, from the bud to mature stage, free hand sectioned, stained with carmin-iodine green and observed under the light microscope. Essential oils were isolated at the same developmental stages by hydrodistillation with a Clevenger-type apparatus, and quantified. Antimicrobial activity of the oils was assessed against three bacteria: (*Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853) through the agar disc diffusion and the broth microdillution methods. Microscopic observations revealed the early glandular trichome initiation, in the buds. Secretory trichomes reached their highest density in young leaves emerging from the bud, and decreased in number along with the leaf maturation. All the tested essential oils showed the antibacterial activity, but to a different extent with regard to leaf developmental stages. The highest amount of essential oil (2.1% w/w, based on the dry weight) and antimicrobial activity, against *Staphylococcus aureus* (minimum inhibitory concentration of $0.12 \mu\ell m\ell^{-1}$) were found in the youngest, emerging leaves. Antimicrobial activity of Rosemary oil decreased against *S. aureus* and increased against *E .coli* along with the leaf maturation. *P. aeruginosa* was the most resistant strain to all the investigated oils. Different antibacterial properties of Rosemary oil can be attributed to the change in its chemical composition during leaf developmental stages. Ontogenic survey is therefore proposed as a useful tool for the most efficient and specific antimicrobial use of Rosemary, as well as other medicinal plants.

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1001

ANTI-INFLAMMATORY EFFECTS OF *KELLUSSIA ODORATISSMA* IN MODEL OF RHEUMATOID ARTHRITIS

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Rheumatoid arthritis is an autoimmune disease that causes chronic inflammation of the synovial layer and subsequent deformity and destruction of bone and cartilage. This disease effects the small joints of the hands and feet there are symmetrical. Although rheumatoid arthritis can occur at any age. It usually begins women aged 40 to 60 years. The pathogenesis of this disease is unknown *Kellussia odoratissma* as a traditional medicinal plant has been used as anti-inflammation is some area of Iran. *Kellussia odoratissma* has a higher content of flavonoids. According to studies Bio-inflammatory markers such as CRP, TNF-α, IL-1 and IL_6 increase in the incidence of the disease As the plant flavonoid rebate, inflammation and immune responses through inhibition of regulatory enzymes participating in the metabolism of inflammatory mediators. To study the anti-inflammatory effect *Kellussia odoratissma* on inflammation caused by arthritis induced by adjuvant has been done. Therefore, in the range of 30 rats weighing 180 to 200 g were selected and injected subcutaneously 05/0 ml of complete Freund's adjuvant induced illness.30 female Rats (180–200 gr) divided to 5 groups. Arthritis was induced by intra dermal injection of complete freunds adjuvant (0.5 ml) into the right hind paw of the Rats. Kellussia (100, 200 and 300 mg/kg) were intrapritonealy and ministered for 10 days to 3 groups of Rats. Indometacine were used for positive control. The anti–inflammatory activity was assessed by Measuring Clinical conditions, levels of TNFα, CRP in serum of Rat. The hematoxylin and Eosin was used in the analyses of inflammation, Granuloma, Synovial porliferation, fibrin deposit and Giant cell.By controlling the results of clinical conditions in three receiver extracts Kellussia odoratissma and decreased serum CRP levels and TNF-α in the treatment groups and of course, the level of apparition of histological factors of disease, the ability of *Kellussia odoratissma* to reduce the inflammation and pain caused by rheumatoid arthritis, was determined and the expressed.

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1003
DETERMINATION OF THE ANTIFUNGAL ACTIVITES OF *MENTHA PIPERITA* ESSENTIAL OILS AGAINST *CANDIDA ALBICANS, ASPERGILLUS NIGER* AND *ASPERGILLUS FUMIGATUS*

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Due to the growing problems associated with fungal diseases, and restrictions on the treatment of fungal diseases such as lack of treatment And expensive antifungal drugs, side effects, drug resistance or decreased susceptibility to this class of drugs has been led researchers to search for new antifungal drugs, especially herbal medicines paid.Without a doubt, use of medicinal plants, approach for the treatment of human diseases and in the course of all human close relationship between humans and plants have always existed. Still, many plant species have not been studied and remain unknown and still plenty of time to new and valuable sources of plant discovered. Thus, plants can be a source of potentially useful chemicals is the only part of it is about exploitation.In recent years scientists have been started broadly the study of antibacterial Effects and antifungal activity of aromatic constituents of plants and Extract and essential oil on microorganisms,. today antibacterial and antifungal activity of compounds plants on a large number animal and plant disease-causing agents have been demonstrated.The aim of this study was to Determination Of the Antifungal activites of *Mentha piperita* essential oil against *Aspergillus niger, Candida albicans, Aspergillus fumigatus.*To determine the Antifungal properties, the disk diffusion method against three fungi was performed, and the minimum inhibitory concentration (MIC) and minimum bacteriocidal concentration (MBC) was calculated.The results of this study indicated that the use of peppermint essential oil as an anti-cell growth can be effective and MBC and MIC for each tested three types of fungi are almost equally and Significant differences between them not observed and Increasing concentrations of not effected on MBC and MIC. Generally, peppermint essential oil in all concentrations Greatest effect on the fungus *Candida albicans* and *Aspergillus fumigatus* is two. The smallest diameter inhibition zone in concentration 0/5 and 1 is related to the fungi aspergillus niger. But in 0/4 concentration smallest inhibition zone is related to the fungi *candida albicans.*General, peppermint essential oil significantly on the fungus as an antifungal agent and is effective on inhibiting the growth. Measuring the diameter of inhibition zone on the plates of this fungus is show that the testing fungus is highly sensitive to the essential oil of peppermint meaningful.

1005
MEDICINAL PLANTS FROM ZAR CHESMEH PROTECTED REGION IN ESFAHAN PROVINCE

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Zar cheshmeh protected region is one of the intact zones with 60000 hectares area which is located at north of Esferjan and south-west of Shahreza from 130 km of Esfahan city at 51º 45' longitude and 31 º 33' latitude. The elevation of this region ranges from 2170 to 2610 m. The aim of this study is to investigate the medicinal plants from this regionfor the first time. Consequently, the specimens were collected during 2012-2014 and determined using taxonomic methods. The results of this study showed that the studied species were found to be annual, perennial, herbaceous, fruticose and shrub. A total of 27 families, 62 genera and 78 species are identified as medicinal plants. Noticeably, there are 16 endemic medicinal species which belong to Lamiaceae (*Ajuga chamaecistus* Ging. exBent., *Menta longifalia* (L.) Hudson, *Nepeta glomerulosa* Boiss., *Nepeta oxyodonta* Boiss., *Nepeta persica* Boiss., *Phlomis aucheri* Boiss., *Phlomis olivieri* Benth., *Phlomis persica* Boiss.), Asteraceae, (*Anthemis odontostephana* Boiss.,*Echinops elymaticus* Bornm.), Apiaceae (*Eryngium bungei* Boiss., *Thecocarpus meifolius* Boiss.), Liliaceae (*Eremurus persicus* (Jaub. & Spach.) Boiss.), Polygonaceae (*Rumex crispus* L.), Rosaceae (*Cerasus brachypetala* Boiss.) and Ranunculaceae (*Clematis ispahanica* Boiss.). In this protected region, the highest frequency was observed in dicotyledon families such as Asteraceae, Lamiaceae, Brassicaceae and monocotyledon families such as Poaceaea and Alliaceae [1, 2]. In addition, *Nasturtium officinale* R. Br. is one of the aquatic genera from Brassicaceae which is determined in this region [1]. The presence of considerable number of medicinal plants species detects diversity and valuable genetic resources in this region. In order to viable purposes, collection and proliferation of seeds in medicinal plants can provide valuable advances in pharmaceutical industry in this protected region.

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1035
INVESTIGATION OF ESSENTIAL OILS OF *ECHINOPS ENDOTRICHUS* (ASTERACEAE) FROM FARS PROVINCE

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The genus *Echinops* of Asteraceae comprises 120 species distributed throughout the world, 54 of which occur in Ir.*Echinops* is found in several regions, including Oromieh, Tabriz, Tafresh, Tehran and Fars [1]. In this study we investigated the hydro-distilled essential oil of the aerial parts of *Echinops endotrichus* from Fars province by GC and GC/MS methods for the first time.One hundred and compounds were detected in the oil of *E. endotrichus* representing 87.3% of the total oil. Principal components of the essential oil were hexadecanoic acid (14.6), α-terpineol (7.8%), tetradecanoic acid (6.4%) Linalool (5.6%), dodecanoic acid (5.2%), spathulenol (3.8%), selin-11-en-4-α-ol (3.2%), 2,2':4',2''-terthiophene (3%), eugenol (2.3%), (Z,Z)-9,12-octadecadienoic acid (2.2%) and α-selinene (2.1%).

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1060
EVALUATION OF TWO DIFFERENT PROCEDURE BASE ON FAST PROTEIN LIQUID CHROMATOGRAPHY (FPLC) FOR PURIFICATION OF TAXA DIENE SYNTHASE AS A KEY ENZYME IN TAXOL BIOSYNTHESIS PATHWAY

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The first step in the biosynthesis of Taxol in pacific yew is the cyclization of universal diterpene precursor geranylgernal pyrophosphate to taxa-4 (5), 11 (12)-diene in the presence of taxa diene synthase enzyme. This parent olefin of taxan diterpenoids is then elaborated to taxol and related compound by a complex series of reactions involving oxidations and side- chain acylations[1]. This study is focused on the extraction and purification of Taxadiene synthase enzyme from *Taxus baccata* by ion exchange chromatography (IEX), size exclusion chromatography (SEC), and hydrophobic interaction chromatography (HIC) techniques. Because of the key role of this enzyme in Paclitaxel pathway, it is a criterion for evaluation of the production ability of this valuable compound by other sources, such as entophytic fungi. In the first step, proteomes content was extracted from leafs and stems. Since the solubility of proteins is under affection of parameters such as dielectric constant, pH, and ionic strength, in the second step ammonium sulfate was selected as a suitable reagent for precipitation of proteins. Finally total protein content was fractionated and the ability of two different strategies of chromatographic theniques was evaluated in purification of this target enzyme. In the first strategy, ion exchange chromatography was applied for capturing and then size exclusion chromatography evaluated as polishing step. On account of high slat concentration exist in the medium, hydrophobic interaction chromatography was evaluated as capturing step. Since the pattern of elution in this technique was gradient descent, we selected ion exchange chromatography for polishing in this strategy. All of the fractions were obtained, then preoncetrated, and finally a gel based electrophoresis was done. The fractions contained desirable bands were further analyzed using mass spectrometry techniques. Mass spectrometry results confirmed the existence of two protein with molecular weight of 76 kD and 79kD.

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1062
CENTRAL COMPOSITE DESIGN TECHNIQUE FOR FABRICATION OF PACLITAXEL LOADED HSA NANOPARTICLES

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Paclitaxel (PTX) is a natural hydrophobic diterpenoid product extracted from the bark of the Pacific yew tree (*Taxus brevifolia*). It is one of the most widely used anticancer drugs for treatment of various human malignancies. Pervious formulation of paclitaxel (Taxol®) has been documented for various serious side effects, including acute hypersensitivity reactions, neurotoxicity, cardio toxicity and nephrotoxicity [1]. Therefore, it is necessary to find a biocompatible and efficacious PTX formulation that have minimal side effects and promote specific uptake into tumour cells. Albumin nanoparticles could be an efficient carrier for paclitaxel as an anticancer agent [2]. In this study human serum albumin (HSA) was used as starting material for preparation of paclitaxel formulation. Human serum albumin (HSA) nanoparticles loaded with paclitaxel (PTX) were prepared using a desolation technique [3]. Nanoparticles were characterized for particle size by dynamic light scattering (DLS) and surface morphology and shape by scanning electron microscopy (SEM). Drug encapsulation efficiency and loading were also determined using liquid chromatography technique. Nanoparticle preparation technique was optimized by means of a full factorial design over the influence of four different independent variables including; PTX/20mg, volume of ethanol, rate of ethanol addition and the volume of glutaraldehyde (GA8%) per mg HSA. Analyses of variance (ANOVA) were showed a significant F values, correlating different responses and selected variables. The optimum formulation condition proposed by the software was 4.4 mg PTX, 20mg HSA, 2.9 mL ethanol, 2mL/min rate of ethanol addition and 50µl of GA8% per mg HSA. Predicted and experimented responses for proposed optimum condition expressed in the Table 1;

Table-1. Predicted and experimented responses for proposed optimum condition.

Response	Mean size(nm)	Size distribution(nm)	Loading%	Efficiency%
Predicted	188.5	25.6	5.6	18.4
Experimented	184.0	22.3	8.0	29.0

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1069
HAEMOLYTIC ACTIVITIES OF TOTAL SAPONINS ISOLATED FROM *MARRUBIUM ASTRACANICIUM*

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Recent approaches concerning biological and pharmaceutical activities of saponins are attractive. Thus, hypoglycemic, chemopreventive, antitumor, immunomodulating, antiinflammatory, antihepatotoxic activities and the application of saponin adjuvants for the increase of humoral or cellular immune responses has been approved. Nevertheless, undesirable haemolytic effect has been pointed out as the main restriction to their usage. In this study, the haemolytic activities of *Marrubium astracanicium* saponins were evaluated. Total saponins were isolated by column chromatography from methanolic extract. For this purpose, first clean up unwanted compounds with n-hexane and ethyl acetate then isocratic elution by ethyl acetate:methanol (7:3, v/v). Thin layer chromatography (TLC) of total saponins indicated five spots with R_f of 0.22, 0.39, 0.52, 0.61 and 0.68 in chloroform:methanol (7:3, v/v). In vitro haemolytic activities of seven serial concentrations ranged from 5-500 μg/mL of total saponins were tested. Hemolytic assay used a 0.5% suspension of human red blood cells with distilled water and saline as positive and negative controls, respectively. Total saponins showed weak haemolytic effect, with its haemolytic percents being 5.79 and 6.23% at the concentrations of 250 and 500 μg/ml, respectively. In conclusion, the present findings suggest these saponins could be safely used in future large-scale studies of possible pharmacological applications with low haemolytic effect [1, 2].

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1070
ISOLATION OF THE STRONGEST CYTOTOXICITY AGENT FROM *AJUGA CHAMAECISTUS* SUBSP. *SCOPARIA*

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The pharmacological appraisement of constituents from plants is an established technique for the identification of lead compounds which can leads to the development of novel and secure medicinal agents. We selected *Ajuga chamaecistus* subsp. *scoparia* (Lamiaceae) to explore for its bioactive constituents. The objective of this study was to isolate potential cytotoxicity agent from *A.chamaecistus* subsp. *scoparia* crude methanol extracts from one of the most active organs that are contain flower tops, leaves, stems and roots, using a bioassay-guided strategy. For this purpose, we used brine shrimp lethality test (BST) that is attractive method and very useful tool for the isolation of bioactive compounds from plant extracts because it is very simple, reliable and low toxin amounts are sufficient to perform the test in the microwell scale and also is confirmed by the National Cancer Institute (NCI). The crude extracts of the leaves has the most effect with LC_{50} values of 45 μg/ml. Then, successively fractionation of this extract was performed by liquid-liquid chromatography with n-hexane, ethyl acetate and methanol solvents, respectively. Ethyl acetate fraction with LC_{50} of 25 μg/ml, was determined the most active component. By using thin layer chromatography (TLC), HPLC-UV analytical method, gradient elution of column chromatography with n-hexane and ethyl acetate (and subjected to sequential fractionation) and BST, ultimately the most effective compound was isolated and purified. This compound displays LC_{50} values of 6.33 μg/ml and R_f equal to 0.25 in chloroform:methanol (150:1, v/v). The present study reveals two results; it is clear that the isolation and purification of plant extracts provides bioactive components that not only eliminate ineffective or even harmful substances, but also increases their effectiveness. On the other hand, we are facing with plant that shows great cytotoxicity. These two factors are critical from the perspective of biological activity and medicinal properties, especially in the field of anticancer [1,2].

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1077

EFFECTS OF ESSENTIAL OIL AND EXTRACT FROM *MENTHA PIPERITA* ON THE PROLIFERATION AND SUSTAINABILITY OF *LACTOBACILLUS REUTERI* AND *BIFIDOBACTERIUM*

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The beneficial effects of probiotic foods on human health and nutrition are increasingly known by health professionals. Recent scientific work on the properties and functionality of living micro-organisms in food have proposed that probiotics play an significant role in immunological, respiratory and digestive functions, and that they could have a substantial effect on the alleviation of infectious diseases in children and other high-risk groups. In parallel, the number and type of probiotic foods and drinks that are available to consumers, and marketed as having health benefits, has increased considerably. In this research,the in vitro effects of essential oil and methanol extract from *Mentha piperita* for proliferation and sustainability of probiotics bacteria *Lactobacillus reuteri* and *Bifidobacterium* were evaluated. For this purpose, different concentrations of extracts and essential oils (62/5 - 4000 µg/ml) in MRS medium were prepared and transferred to the 96-well plates. After inoculation probiotics in wells, plates incubated for 72 h at 37 °C and then 28 days at 3 °C. Growth and survival of probiotics in intervals of 0, 1, 3, 10, 17, 24, 31 days was determined by measuring the OD by an ELISA reader. The extract not presented much impact, but the essential oil at concentrations of 500 to 2000 µg/ml, provides a positive impact in order to the optimal conditions for stimulating growth and maintain them. In general, not only the use of Mentha piperita essential oils as prebiotics can cause be synbiotic products development, but also can be used as a natural preservative [1, 2].

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1082

THE EFFECT OF DIFFERENT SOIL PROPERTIES ON *ARBUSCULAR MYCORRHIZAL* COLONIZATION OF *THYMUS KOTSCHYANUS* BOISS. & HOHEN. IN NOUJIAN WATERSHED

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Arbuscular mycorrhizal fungi (AMF) are the most important microorganisms of soil having an important role in soil fertility. Inthisresearch, symbiosis between AMF and *Thymus kotschyanus* Boiss. & Hohen. in Nojian were studied. Noujian Watershed with the area of 34000 hectares is situated between the Eastern latitude of 48° 23́ to 48° 40́ and its Northern longitude ranges from 33° 17́ to 33° 60́ at Lorestan province in watershed of Dez dam.Soil and root samples collected randomly during spring and autumn to find out the interactions between arbuscular mycorrhizal and soil elements. The hairy roots were separated and longitudinal sectionswere stained with lactophenol cotton blue and prepared glass microscope slides for observation and analysis. Spores of fungi separated from soil with sucrose gradient andthe number of spores per gram of soil was calculated.Five species of *Glomus* genus *containG. microcarpum, G. etunicatum, G. macrocarpum, G. constrictum* and *G. geosporum*were identified in the *rhizosphere*of *Thymus kotschyanus*. Significant difference was found between arbuscular mycorrhizal colonization percentage and spore frequency in spring and autumn. The spore density of AMF had a strong positive correlation with soil pH and organic carbon content but negatively correlated with the macro minerals such as phosphorus, calcium and magnesium.

1104
ANALYSIS OF VOLATILECOMPOUNDS OF *MELISSA OFFICINALIS* L. CULTIVATED IN ISFAHAN USING HS-SPME TECHNIQUE

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Lemon balm, *Melissa officinalis* L. (Lamiaceae), a native of the northern Mediterranean region and western Asia, is cultivated as a medicinal herb. Different methods that can be used for the extraction of volatile compounds from herbs. Among them, Headspace SPME enables many possibilities in aroma analysis and it has been successfully used for the chemical analysis of different plant materials. In this study, HS-SPME coupled with gas chromatography–mass spectrometry (GC/MS) has been used for the chemical analysis of *Melissa officinalis* (leaves) cultivated in Isfahan suburb. HS-SPME analysis led to the identification of 22 volatile components accounting for 98.2% of the total identified components.The major components identified in the HS-SPME extract were citronellal (35.4%), geranial (14.4%), neral (9.72%), E-caryophyllene (9.31%), 6-methyI-5-hepten-2-ol (8.18%), 6-methyI-5-hepten-2-one (6.36%) and geraniol (3.96%). Literature reports show that the essential oil of *M. officinalis* is composed of some important compounds like (E)-caryophyllene and caryophyllene oxide in addition to major constituents such as citronellal, neral and geranial. Overall, the results suggest that HS-SPME is a rapid, simple and eco-friendly method for the essential oil screeningof*M. officinalis.*

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1105
COMPARATIVE ANALYSIS OF THE PHTHALIDE COMPONENTS OF *KELUSSIA ODORATISSIMA* MOZAFF. USING HYDRODISTILLATION AND HS-SPME TECHNIQUES

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Headspace solid phase microextraction (HS-SPME) sampling for gas chromatographic analysis which is a rapid, simple, inexpensive and solvent-free technique very stable for the analysis of volatile and semi volatile compounds in different types of samples. It has been successfully utilized for the qualitative analysis of various food substances and flavors. *Kelussia odoratissima* Mozaff. is one of endemic plants with ecological value in high altitude mountain of the Central Zagros of Iran, which belongs to Apiaceae family. Itis used as a folk medicine to treat hypertension, inflammation, ulcer, and cardiovascular diseases. The results of recent studies showed that major compositions of essential oil of *K. odoratissima* are phthalides. These compounds exerts anti-inflammatory, anti-cancer, neuro-protective, anti-hepatotoxic and anti-cardiovascular effects. Aerial parts of *K. odoratissima* were subjected to HS-SPME and hydrodistillation (HD) techniques after drying, and then headspace volatiles and the essential oil were analyzed by GC/MS. Results of GC/MS analysis led to identification four (70.2%) and two (47.3%) phthalides in samples extracted by HS-SPME and HD methods, respectively. The comparative analysis of phthalide components of *K. odoratissima* leaf extract using HS-SPME and hydrodistillation techniques shows both qualitative as well as quantitative differences. The results from this study indicate that HS-SPME technique is not suitable for the analysis of phthalide components.

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1109
CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS OF ROOTS OF KAK KOSH BIABANI

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The genus *Pulicaria* (Compositae) is represented by 5 species found in the Iran [1]. *Pulicaria gnphalodes* (Vent.) Boiss.or *lnulagnphalodes* Vent. is a native plant, it has been known as Kak kosh biabani in Iran, which also has been used as an anxiolytic and sedative in Iranian folk medicine. In this study *P. gnphalodes* were collected from Khrasan Razavi province, Iran. Chemical constituents of essential oil of roots of *P. gnphalodes* were determined. Roots of *P. gnphalodes* were subjected to hydro-distillation in a Clevenger – type apparatus until there was no significant increase in the volume of the oil collected. The yield of the oil was 0.10 (w/w %). The essential oil was analyzed by GC and GC/MS. Identification of the components was based on GC retention indices computer matching with Wiley GC-MS library, and by comparison of the fragmentation patterns of the mass spectra with those reported in the literature. 14 components were identified constituting more than 96.5% of the oil. α-Pinene (17.1%), germacrene D (12.2%), β-pinene (9.1%), bicyclogermacrene (5.3%), palmitic acid (4.5%), , β-borbonene (5.7%) and caryophyllene oxide (5.3%) were major components in oil of roots of *P. gnphalodes*. The oil was tested against six strains of bacteria (gram-positive and gram-negative). *In vitro* antimicrobial activity of essential oil of flower of *P. gnphalodes* were investigated by disc diffusion method and the minimum inhibitory concentration (MIC) and also minimal bactericidal concentration (MBC) determination. The studied sample was active against gram-positive and gram-negative microbial strains.

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1110
IMPROVEMENT OF ATROPINE PRODUCTION BY NANOSILVER AND $AGNO_3$ IN HAIRY ROOTS OF *DATURA METEL*.

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Hairy roots induced by *Agrobacterium rhizogenes* are distinguished by their high growth rate, genetic stability, and lateralbranching. *Datura metel* is an important medicinal plant whose hairy roots are used for the production of atropine, a tropane alkaloidapplied as an anticholinergic and parasympathetic agent.To increase the yield of atropine,abiotic ($AgNO_3$ and nanosilver) elicitors were added to the hairy root cultures of *D. metel* and then analysed through highperformance liquid chromatography. Both of the elicitors influenced biomass accumulation and atropine production. Among the testedelicitors, nanosilver was most effective in enhancing the hairy roots' atropine content. To the authors' knowledge, the application ofnanosilver for increasing tropane alkaloid production is reported for the first time here and could improve the atropine production of pharmaceutical industries [1, 2].

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1111
IMPROVEMENT OF ATROPINE PRODUCTION BY BIOTIC ELICITORS IN HAIRY ROOTS OF *DATURA METEL*.

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Plant-derived drugs are important sources of variouspharmaceuticals. Tropane alkaloids suchas (-)-hyoscyamine, atropine, and scopolamine (hyoscine)are the most well-known alkaloids, extracted from various species of Solanaceae.*Agrobacterium rhizogenes*, whichcarries the Ri T-DNA plasmid, can transform plant rootsto hairy roots.These roots are preferred to parent plants fortheir genetic and biochemical stability, high growth rate,hormone autotrophy, lateral branching, relatively lowcostculture requirements, and multienzyme biosyntheticpotential. To increase the yield of atropine, biotic (*Bacillus cereus* and *Staphylococcus aureus*) elicitors were added to the hairy root cultures of *D. metel* and then analyzed through high performance liquid chromatography. Both of the elicitors influenced biomass accumulation and atropine production [1, 2].

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1113
CALLOGENESIS IN SOLANACEAE SPECIES EXPLANTS AFTER INDUCING BY *AGROBACTERIUM RHIZOGENESIS*

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According to studies on explants that affected by *Agrobacterium rhizogenes*, the creation of callogenesis is possible as well as to induce the hairy roots formation in this tissue. The formation of various callus with different morphological properties are possible. The callus formation can affected on secondary metabolite production and cause to decrease of these compositions in plants. In this study, the root explants of four species of solanaceae family including *Atropa belladonna*, *Hyoscyamus niger*, *Datura stramonium* and *Datura metel* were induced by different strains of *A. rhizogenes* (AR318, AR15834, AR9543, A7, AR9402, and A4). Some of these explants entered into callus phase and formed the various callus with different colors and shapes. These events probably made by conversion of hormonal (auxin and cytokinine) ratio after induced of explants by A. rhizogenes [1, 2].

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1125
ASSESSMENT OF THE BIOLOGICAL PROPERTIES OF HYDROALCOHOLIC EXTRACT AND ESSENTIAL OIL DERIVED FROM *CHELIDONIUM MAJUS*L.

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Chelidonium majus L. belongs to the family Papaveraceae is an herbaceous plant, perennial, dicotyledonous [1], to a height of 45-60 cm, leaves divided into five to seven pieces, flattened and serrated green, blue and crack with anti-tumor, anti-microbial and anti-inflammatory properties [2- 6]. All parts of the plant contain orange latex rich in alkaloids, among which the most present are chelidonine, chelerythrine, sanguinarine, berberin and others. In this study, the composition and biological properties of *Chelidoniummajus L.*hydroalcoholic extract and the essential oils was studied. For this purpose, *Chelidonium majus* was collected through the establishment of plots from one location in Mazandaran province (siahbishe-chalus). Plant samples were dried at room temperature and away from sunlight for one week following transferring to the laboratory. The essential oils extracted using Clevenger apparatus and its compounds were analyzed by GC / MS. Then, the hydroalcoholic extraction was made with distilled water and methanol and following estimation of flavonoid rate with standard solutions. Then, the antioxidant activities of the sample was determined by beta-carotene and DPPH tests. Based on the results of the analysis of GC/MS, 4 compounds were identified inthe essential oil derived from*Chelidoniummajus*. The flavonoid content was determined (56/85 mg Quercetin per gram of extract. Also, essential oil and extract, significantly inhibited the peroxidation of linoleic acid in beta-carotene test. Antioxidant activity of the essential oil and extract were calculated with DPPH test indicating strong antioxidant activity in compared with Trolox reference. According to the results, oil and extracts derived from*Chelidoniummajus* had certain compounds along with significant antioxidantactivities.

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1127
STUDY ON CHEMICAL COMPOSITION OF THE ESSENTIAL OIL, ANTIOXIDANT ACTIVITIES OF *JOHERNIA AROMATICA*

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The aim of this study was to investigate chemical composition of the essential oil and antioxidant activity of alcoholic extract of *Johernia aromatica*. This plant belongs to Umbellifera family. The stem is covered with dry leaves, having long fiber branches [1]. Thirty seven components were identified constituting %80/357 of total oil. Falkarinol (%13/208), alfa-Pharnesene (%12/953) and beta- Phellandrene (%9/696) were the major components [2]. The ethanolic extract was subjected to screened for its possible antioxidant activity, free radical scavenging properties using Diphenylpicryl-hydrazyl (DPPH) radicals and total phenolic componds were used for this purpose. The fair correlation between DPPH and phenolic content was observed among this plant [3, 4].

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1153

ANATOMICAL STUDY IN FOUR SPECIES OF *SONCHUS* AND THREE SPECIES OF *CEPHALORRHYNCHUS* IN IRAN

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The *sonchus* and *cephalorrhynchus* genera belong to asteraceae family. The *sonchus* has five species and *cephalorrhynchus* has nine species in Iran the *sonchus* has wide distribution in Iran and some species of *cephalorrhynchus* as a endemic to iran.in this research, we examine the anatomic properties of stem of these two genera. For this purpose of some species the stem in have stored in 70% alchol. Hand crossed section was observed double staining using methyl green and carmine zaji.were used photograph bx-53 microscope equipped with camera photo micrograph system. Studied showed that the stem of *sonchus* has empty pith. Number of epidermis, collenchyma, sclerenchyma fibre layers and laticifer tube, secretory channels in the species was diagnostic characters. The stem in cephalorrhynchus number epidermis,sclerenchyma, collenchyma layers and laticifer tube, secretory channels were diagnostic characters. Therefore anatomical characters of the stem could useful for distinguishing the species of sonchus and cephalorrhynchus [1, 2].

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1162
STUDY OF O-METHOXYPHENOL SEPARATED OF MEDICINAL SMOKE FORM JENNET FECES EFFECT ON WOUND HEALING OF DIABETIC ADULT MALE RATS

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According to an old iranian tradition, medicinal smoke of jennet feces has a lot of antimicrobial effects. The most commonly detected components in organic phase is o-Methoxyphenol (Guaiacol).In diabetic patients, progression of healing takes longer and thus using new medication to accelerate it is required.Thus, the present study aimed at investigation the effect of Guaiacol extracted form Jennet feceson wound healing in diabetic rats.In this experimental study, 30 wistar male rats were randomly divided into 3 equalgroups: normal, Diabetic- control (Positive control treatment with anji pars as individual cream and negative control treatment with normal saline) and diabetes (induced through intraperitoneally injection of aloxone).A circular full- thickness wound with a diameter of 1.5 cm was created onthe side body of rats. In the test subgroup, the woundswere treated with a daily topical dose of0.25 , 0.5 , 1 mg/mlof Guaiacol during 30 days. The process of wound healing was assessed by macroscopic andmicroscopic studies on days 7, 14, 20, 25 and 30.The macroscopic study, showeddelays in healing of the diabetic group in comparison with the normal group and after the seventhday, wound healing showed considerable change in the test subgroup in both normal and diabeticrats ($p<0.05$). In the diabetic groups microscopic study, granulation tissue organization increasing of neoangiogenesis and re-pithelizationwas observed in the test subgroup. Also, the Guaiacolreceiving subgroup showed impressive improvement compared to the saline subgroup.Conclusion: Topical that extract can accelerate the process healing of diabetic wounds.

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1168
A MOLECULAR DOCKING STUDY USING SESTERTERPENOIDS FROM *SALVIA* SPECIES AS TTL INHIBITORS

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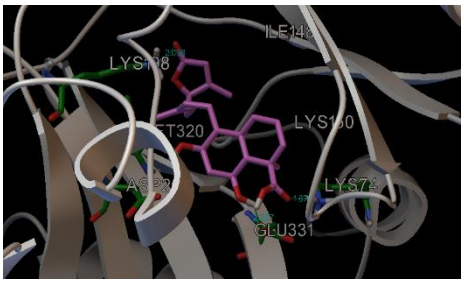
Sesterterpenoids are a branch of natural products, occurring mostly in marine sponges and algae. Among higher plants, the genus *Salvia* has attracted special attention due to biosynthesis of sesterterpene lactones. It has been recently reported that sesterterpene lactones isolated from *Salvia dominica* interact with tubulin-tyrosine ligase (TTL) and inhibit its activity in cancer cells [1]. TTL is a tubulin modifying enzyme that binds a tyrosine residue to the C-terminal of α-tubulin. Although the structural characteristics of this enzyme is known, but there is no information about the potential inhibitors of the enzyme. In order to create a model, simulating the inhibition of TTL by *Salvia dominica* sesterterpenoids and extend the results to those structures isolated from *Salvia lachnocalyx*, in this work a molecular docking study using AutoDock 4.2 software was used. The 3D structure of TTL enzyme provided by homology modeling via swiss-model server [2] and critical residues in the enzyme binding site determined on the basis of crystallographic data presented in Protein Data Bank (PDB) [3]. Analysing the docking results revealed an effective inhibition of TTL enzyme by *Salvia* sesterterpenoids according to their corresponding binding energies, which confirmed by Surface Plasmon Resonance (SPR) studies of *Salvia dominica* sesterterpenoids.



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1179
STUDYING THE INTERACTION OF SOME ANTHRAQUINONE DERIVATIVES WITH DNA IN COMPARISON WITH DOXORUBICIN

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Anthraquinones are an important group of organic compound that most of these substances came from plants and fungi. Anthraquinone compounds are structurally similar to anthracycline antibiotics such as doxorubicin. Doxorubicin is an anticancer drug that commonly used in the treatment of a wide range of cancers including hematological malignancies, many types of carcinoma and soft tissue sarcomas [1]. It interacts with DNA by intercalation and inhibition of DNA replication [2]. As DNA is often the target for majority of antitumor and antibiotic drugs, therefore, investigation of the mechanism of action and identification of drug interaction with DNA in cells at the molecular level to develop potent drugs and exploration isan essential requirement [3].It seems that anthraquinone compounds with structural similarity to doxorubicin can have interaction with DNA. So in the present study two anthraquinone derivatives such as 1, 4-dimethylanthraquinone and 2-methylanthraquinone were analyzed for its possible interaction with chicken liver DNA in Tris-HCl buffer (pH=7.4) by UV-Vis spectroscopy and their interaction was compared with doxorubicin. The results showed that doxorubicin has more effective interaction with DNA than anthraquinone compounds. Spectroscopy studies showed that interaction of anthraquinone compounds with DNA as doxorubicin is dose dependent and the interaction of 1,4-dimethyl anthraquinone with DNA is more than 2-methylanthraquinone.

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1181

STUDYING THE ANTIMICROBIAL ACTIVITY OF METHYLATED ANTHRAQUINONE DERIVATIVES IN COMPARISON WITH DOXORUBICIN

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Anthraquinones are a class of naturally occurring phenolic compounds that most of these substances camefrom plants and fungi [1]. Anthraquinone compounds are structurally similar to anthracycline antibiotics such as doxorubicin. In this study two methylated anthraquinone derivatives such as 1, 4-dimethylanthraquinone and 2-methylanthraquinone were synthesized and evaluated for antimicrobial activity against a set of 12 microorganisms and compared with doxorubicin, in vitro. Following microbial strains were provided and used in this research: *Pseudomonas aeruginosa*, *Escherichia Coli*, *Klebsiella pneumonia*, *Shigella dysenteriae*, *Proteus vulgaris* and *Salmonella paratyphi-A* serotype as examples of Gram negative bacteria, *Bacillus subtilis*, *Staphylococcus aureus* and *Staphylococcus epidermidis* as examples of Gram positive bacteria, *Candida albicans*, *Aspergillus niger* and *Aspergillus brasiliensis* as examples of fungal strains. Agar diffusion technique was used for the determination of preliminary antibacterial and antifungal activities [2]. Bacterial strains sensitive to the compounds in agar diffusion assay were studied for their minimal inhibition concentration (MIC) values using micro-well dilution assay method [3]. Our results indicated that doxorubicin was more active against bacteria than anthraquinone derivatives. 2-methylanthraquinone was active against *Staphylococcus aureus* and *Staphylococcus epidermidis* and 1, 4-dimethylanthraquinone was only active against *Staphylococcus epidermidis*. 1, 4-dimethylanthraquinone and 2-methylanthraquinone had no antifungal activities.

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1182

STUDYING EFFECTS OF HABITATS CHANGE ON THE MORPHOLOGICAL CHARACTERISTICS OF THE (*DITTRICHIA GRAVEOLENS* (L). GREUTER AT SEVERAL DIFFERENT SITES IN HABITATS IN GOLESTAN (GOUNBADKAVUS, AZADSHAHR, DALAND BRANCH AND ALI ABAD-E KATOOL).

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Dittrichia graveolens (L.) Greuter (Asteraceae) with locally known as (Atr Payizi) is one of the most important wild medicinal plant and strongly aromatic, annual plant grown in roadsides, which has been used in medicine. Golestan province with ecological variation has good potential for growth of many wild medicinal plants [1,2]. This plant in his growing part, especially the leaves and branches with sticky glandular hairs abundant and is heavily scented with the smell of camphor oil. That used in the pharmaceutical industry due to the attractant material for producing honey and bee pollen nutrients in other expenditure frequently [3]. In this paper, medicinal plants ofGounbadkavus, azadshahr,dalandBranch andAli Abad-e katool are examined. The results showed that habitats is effectine on the number of branches and plant height, flower, plant size, leaf length and width, leaf number and plant dry weight .And with changing Medicinal plant habitat, plant morphological traits also change.Based on the results obtained in this study it can be concluded that by changing the habitat of growth or cultivation of medicinal plants , performance can be achieved by a variety of plant morphological rank upon rank.Thatdifferent climatic conditions and soil type and altitude above sea level and etc can cause morphological changes in plants.

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1190
TRANSFORMATION OF SESQUITERPENE CYCLASE (SQC) GENE INTO *ARTEMISIA ANNUA* L. VIA *AGROBACTERIUM TUMEFACIENS*

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Since past, using pharmaceutical herbs and plants in treating various diseases has been a common practice. *Artemisia annua L.* from *Asteraceae* family is one of the Iranian pharmaceutical herbs for treating fever and malaria. Discovering the usage of effective ingredients of this plant; that is, Artemisinin, in treating several types of cancer and its anti-bacteria properties, along with the significant role of this plant in treating malaria has increased the demand to this valuable substance considerably [1]; since on one hand, the chemical synthesizing of Artemisinin with our current knowledge is a difficult and costly task, and on the other hand, this substance produces in low quantity per dry weight; thus, its cultivation is not economical. Therefore, many efforts have been already made to increase the production of this substance in the plant. In the present research, it has been tried to transfer the Sesquiterpene cyclase gene which is one of the important enzymes in the inhibition of Artemisinin biosynthesis path [2] to the plant, and to increase the synthesis of this plant. the gene transfer was performed via agrobacterium. After optimization of the transfer conditions, including bacterial suspension concentration, the time for infecting the explants, determining the type of explants and the concentration of antibiotic to remove bacterial contamination in next stages, the explants were contaminated and were transferred to the selective environment in optimized conditions. The selective environment contained 0.5mgl^{-1} BA and 0.05 mgl^{-1} NAA, Cefotaxime in 200 mgl^{-1} concentration and kanamycin in 15 mgl^{-1} concentration. After two to three weeks, some of the leaf explants were infected and in the selected environment, Callus and shoots appeared; however, some of them turned white and died due to unsuccessful transfer of gene and subsequently lack of resistance to kanamycin. The shoots that had been originated from transgenic cells were able to resist kanamycin and by continuation of chlorophyll synthesis and photosynthesis, they survived in the selective environment. To ensure successful transfer of gene, the DNA of leaf tissues of the possible transgenic plant and control plant were extracted. After performing PCR it was shown that the gene had been transferred to the plant successfully. For ascertainment and to save the test from any errors the primers were designed for the two promoter and terminator zones in the beginning and end of the gene with no similar arrangement in the control pant.

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1196
EFFICIENT VIRUSE-INDUCED GENE SILENCING IN *NICOTIANA BENTHAMIANA* USING PHYTOENE DESATURASE GENE

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Virus-induced gene silencing (VIGS) is currently a powerful tool for the study of gene function in plants [1]. In this study, we optimized the protocol for virus-induced gene silencing and investigated the efficiency this silencing by a marker gene (phytoene desaturase gene) in *Nicotiana benthamiana.* The phytoene desaturase gene (pds) encodes a rate limiting enzyme in carotenoids biosynthetic pathway and silencing of this gene ultimately leads to photobleaching symptoms.Consequently, an optimal protocol was obtained by the syringe-infiltration method in the leaves of *N. benthamiana* plants. To prepare plant material, seeds were cultured in peat moss under a period with 16hours light at 20°C. *Agrobactriumtumefaciences* strain GV3101 containing pTRV2-empety (as control) and pTRV2-*Ds* PDS (including the endogenous gene from *Datura stramonium*) wereinoculated for infection. Moreover, the 4-leaf stage plants wereinfected using needleless syringe and then let to grow up to 6 weeks. Further, The Plants were harvested in 3 times (2, 4 and 6 weeks) after injection[2]. Viral symptoms were observed on the leaves of inoculated plants 5 days after infection, indicating that the protocol can also be used to silence other genes in *N. benthamiana* plants. Semi-quantitative polymerase chain reaction (RT-PCR) analyses revealed that the expression levels of pds was significantly decreasedin inoculated leaves compared to control plants.These results showed that our optimized protocol can be applied to functional genomic studies in *N. benthamiana*to investigate genes involved in a wide range of biological investigation. A comparative study of gene expression in plant showed pds gene expression increased in silencing heterologe treathment in 6 week after inoculation compared to previous weeks and is illustrated that VIGS is an active and dynamic nature that also can influence on plant physiological parameters. VIGS is a changed epigenetice,therefore This change can be eliminated or Without any change in its DNA nature, be transferred to the next generation [3, 4].

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1200

APPLICATION OF DETERMINATION OF SPECIAL STATION (DSS) METHOD FOR DIAGNOSING EXISTING INTRA-SPECIFIC DIVERSITY IN MEDICAL PLANTS: A CASE STUDY OF *STACHYS LAVANDOLIFOLIA VAHL.*

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To study of intraspecific diversity in *S. lavandolifolia* in Touyserkan city, D.S.S. method was used. Four special habitats of this population were recognized. Essential oil of populations as well as floristic-ecologic data was collected from each special habitat. Essential oil was subjected for GC/MS studies. In survey of all special habitats, Analysis of floristic data (Floristic compositions of each special habitat as floristic marker) led to identification of 3 separate groups that was indicated the existence of intraspecific diversity in this species. Analysis of ecologic data was also confirmed the groupment. The analysis of essential oil pattern showed three quite obvious groups. Therefore in this species, the grouping that introduced with floristic marker, confirmed also with ecological and phytochemical markers. This means that floristic grouping can only be used as a cost-effective and efficient method for studying of intraspecific diversity.

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1221
PREPARATION OF AGAROSE AND SEPHAROSE FROM *GRACILARIOPSIS PERSICA*

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Agar and its purified component, agarose, are two valuable materials that are extracted from agarophytes, a group of red algae. Sepharose is a trade name for a crosslinked, beaded-form of agarose [1]. They have numerous applications in biotechnology, food, medicine, chromatography, and etc. [2, 4]. In this study, agar is extracted from *Gracilariopsis persica*, an Iranian species, and agarose has been purified by anion exchange resin. The application of agar and agarose in culture medium and gel electrophoresis is investigated respectively. The yield of extracted agar is33% that is higher than many commercial agars. The results of bacteria growth on our extracted agar, as culture medium,are noticeable. The amount of contaminant including, copper, iron, and magnesiumare low enough (2.81, 26.45, and 553.47 ppm respectively) that provides a good medium for growing of bacteria. The yield of purified agarose is 70% and it is able to separate DNA fragments remarkably. Agarose changed to bead-form and sepharosewas obtained. It was evaluated for gel base chromatography.

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1225
RP-HPLC-DAD AND COLORIMETRIC ESTIMATION OF TWO GINSENOSIDES IN ROOTS OF *PANAX GINSENG* AND ITS COMMERCIAL PRODUCT

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A famous plant drug, *Panax ginseng* C. A. Meyer (Araliaceae), and a fleshy root herb that after four to six years, the roots (carrot-like) are steamed and dried to prepare "Red Ginseng", while the roots peeled and dried without steaming are known as "White Ginseng" [1]. An extraction procedure performed on Red and White Ginseng root and its commercial product [2]. The ginsenosides Rg_1 and Rb_1 present in roots and extract were subjected to HPLC-DAD analysis. The sum of Rg_1 and Rb_1 were 0.49 and 0.11 (w/w%) in red and white ginseng, and 0.62 (w/w%) in soft gel capsule. Ginseng saponins in white ginseng and the commercial product on the basis of ginsenosides Rg_1 and Rb_1 after a color reaction with vanillin and sulfuric acid were studied spectrophotometrically with respect to molar absorbance's at absorption maximum of 544 nm [3, 4].The sum of ginsenosides Rg_1 and Rb_1 were 0.01, and 0.16 (w/w%) respectively.

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1246
SYNTHESIS OF SILVER NANOPARTICLES USING *GUNDELIA TOURNEFORTII*. ARIAL PARTS EXTRACT AND THEIR ANTIBACTERIAL ACTIVITY

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Natural environment as a source of great with unknown chemical properties and full of vague complexities always have taken into consideration. In this regard, various communities of fauna and organism such as terrestrial and aquatic plants, marine organism, microorganism and etc are contain of significant contribution in the field of nano science research and development [1, 3]. Biosynthesis of silver nanoparticles using plant extracts were identified in currently decades as one of the synthesis contemporary method in nanotechnology science [4]. It is observed that *Gundelia tournefortii* Arial part extract can reduce silver ions into silver nanoparticles within 5 min of reaction time. UV–visible spectroscopy was used for quantification of silver nanoparticle synthesis. The synthesized silver nanoparticles were characterized with field emission scanning electron microscopy (FESEM) X–ray diffraction (XRD) and Fourier transform infrared Spectroscopy (FTIR) and transmission electron microscopy (TEM). Silver (Ag) nanoparticles have been the particular focus of plant–based syntheses. The AgNPs thus obtained showed highly potent antibacterial activity toward gram–positive (*Staphyloccocus aureus* and *Bacillus Cereus*) and gram negative (*Salmonella typhimurium* and *Escherichia coli*) microorganisms. The plant materials mediated synthesis of silver nanoparticles have comparatively rapid and less expensive and wide application to antibacterial therapy in modern medicine.

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1247
STUDY ON PREPARATIVE ISOLATION OF TAXOTERE USING PREPARATIVE LIQUID CHROMATOGRAPHY

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Taxotere (Docetaxel) is an analog of paclitaxel (taxol) semi-synthesized by natural precursor of Pacltixel, 10-decetylbaccatin III (10-DAB III) obtained from Iranian yew, *Taxus baccata* L [1]. Taxotere anticancer effect as a cytotoxic antimicrotubule agentis almost double paclitaxel [2]. Although synthetic media are less complex than natural extracts, there are a lot of synthetic chemicals in the synthetic medium;therefore completely isolation of compounds of interestis highly crucial. Using preparative chromatography as a high efficiency isolation technique is especially demanding in pharmaceutical industry. In this study we develop a large scale liquid chromatography for fast and reliable purification of taxotere from its synthetic medium. In this regard, we studied stability of taxotere during our procedure following by HPLC-DAD and LC-ESI-MS. However, Taxotere is a stable compound in methanol, water, and acetonitrile in 4 °C, it shows instability in higher temperature in longer time (80 ^{0}Cduring 5 h) [3], thenIts instability depends on type of solvent, temperature and time. Solvent removal after preparative HPLC is the most critical steps could affect Taxotere stability. Solvent elimination strategies such as rotary evaporator, liophilization and N_2 evaporation were evaluated and then the results were compared. 20.6 % and 0.6 % of Taxotere in methanol and acetonitrile, respectively, degraded to its isomer with m/z = 830, 4-Epidocetaxel identified by ESI-MS. Using stable conditions, acetonitrile: water as mobile phase, and ater preparative HPLC, Taxotere with a purity of 98.50% were obtained. Our procedure shows a fast and high efficient for large scale production of Taxotere.

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1250

COMPARISION OF FOUR SAPONIN EXTRACTION METHODS FROM LEAVES OF *ACHILEA WILHELMSII* C. KOCH

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Saponins are one of a mixture group belong to plant secondary metabolites that they are often classified as active components in medicinal plants. This chemical compounds have properties such as: anti-microbial, anti-parasitic, anti-inflammatory, anti-allergic, hypoglycaemic and anti-cancer. Aim of this study was optimizing of the procedure for extraction and isolation of saponins from leaf of *Achillea wilhelmsii* C. Koch (Asteraceae). Dried leaf Powdered and extracted with ethanol 70% using a method including three stages: microwave (1 min), ultra sound (30 min) and maceration (24 h). Saponins were isolated from crud extract by four different solvent systems and then saponin content of the each fraction were assayed[1- 3].The results demonstrated that use of different solvents such as ethyl acetate, diethyl ether, petroleum ether and *n*-butanol had significant effects on the saponin content levels isolated from crude extract. The highest saponin content was obtained by ethyl acetate.But, followed test by separation of the saponin solutions on TLC plates, better result had obtained by purification of the saponins via both diethyl ether + *n*-butanol fractions.TLC was performed on silica gel $60HF_{254}$ with three different mobile phases. Our results demonstrated that segregation of the saponin bands on TLC plates was the best by usage of solvent system including n-butanol, ethanol and ammonia. We observed 15 bands for this species on the chromatogram profiles as pink, purple, green, azure, blue and violet bands with Rf: 0.2-0.9. Also, 4 yellow bands were observed.

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1256
SYNTHESIS, STRUCTURAL ELUCIDATION, AND IN VITRO ANTIPROLIFERATIVE AND APOPTOTIC EFFECTS OF A COBALT-CURCUMIN COMPLEX

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Curcumin (Fig. 1) is the principal curcuminoid of turmeric, which is a member of the ginger family. Turmeric is the yellow-orange powder made from the ground root of a specially cultivated variety of Curcuma plant. It is one of the most versatile natural medicines and one of the most important medicines in the Indian and Chinese medical traditions. Curcuminis adiarylheptanoid that incorporates several functional groups. The aromatic ring systems, which arephenols, are connected by two α, β-unsaturated carbonyl groups. Recently, it has been reported to possess anti-inflammatory, antioxidation and antiviral activities. Now, attention has been focused on its antitumor activity. It was found to induce apoptosis of a wide variety of tumor cells including mice sarcoma S180cells, human colon carcinoma HT-29 cells, human renal arcinoma 293 cells, human liver carcinoma HepG2 cells etc [1]. The success of cisplatin has triggered intensive work for discovery of new metal-based anticancer drugs [2]. In this study, we evaluated the anti-proliferative and apoptotic effects of cobalt complexes including curcumin against human cervix epithelial carcinoma (HeLa), cell line and using cisplatin as a comparative standard by MTT assay. Our results presented herein provide experimental evidence that Cobalt-Curcumin complex induce apoptosis in cancer cell lines. Our flow cytometry results confirm that, this complex showed a high population of apoptotic cell higher than cisplatin at the same concentration and could induce apoptosis of HeLa cancer cells.

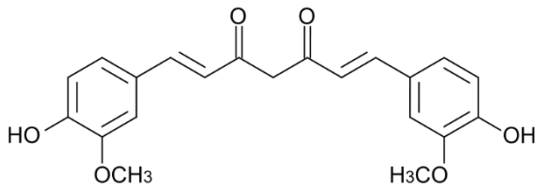

Fig. 1: the structure of Curcumin

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1257
INVESTIGATING THE INTRACTION BETWEEN BERBERINE AND HUMAN TELOMER G-QUADRAPLEX DNA

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G-quadruplexes DNA are higher-order structures formed from G-tetrads that self-stack in metal ions solution especially K^+ and Na^+ ions to form four-stranded DNA. Potential G-quadruplex forming sequences have been identified in eukaryotic telomeres, and non-telomeric genomic DNA. Human telomeric DNA consists of tandem repeats of the sequenced (TTAGGG). Compounds that stabilize G-quadruplex structures of human telomeric sequence have been demonstrated to inhibit the activity of telomerase. Therefore, human telomeric G-quadruplex DNA is a potential target for anticancer drug design. In this investigation, the interaction between berberine and 22-nt G-rich strand of human telomeric DNA was evaluated by three-way fluorescence spectroscopy and analyzed by three-way chemometrics method. Berberine is an isoquinoline alkaloid, present in roots and stem-bark of *Berberis* species. It has a wide variety of pharmacological properties including antihypertensive, anti-inflammatory, antioxidant, antidepressant, anticancer, anti-diarrhoeal, cholagouge, hepatoprotective and antimicrobial activities. To investigate the interaction, K^+ and Na^+ forms of the G-quadruplex DNA was prepared and their structure evaluated by circular dichroism technique. Circular dichroism results showed that the type of G-quadruplex structures doesn't change, but their compactness change due to the interaction with berberine. Intensity of the fluorescence spectrum of berberine increases and its maximum emission shifts to shorter wavelengths after addition of the two forms of telomeric G-quadruplex structures formed in K^+ and Na^+ solution indicating berberine binds to the hydrophobic region of DNA. Chemometrics analysis of the fluorescence spectra showed formation of two species with different population. Absorption spectrum of berberine exhibited hypochromicity and red shift due to progressive addition of the DNA oligomeric stock indicating a stacking interaction between berberine and the quartet of quadruplexes. Furthermore, the binding constant (K_b) value of berberine- DNA interaction was calculated by Scatchard plot using absorption spectroscopy data. The result indicated that K^+ form of the G-quadruplex DNA exhibits stronger berberine binding than Na^+ form. Molecular dynamics simulations were performed to study the effect of Na^+ or K^+ ions on the possibility of distinct structural populations of telomeric DNA. Distinct populations of DNA structures were detected by MD simulations. In conclusion, our result demonstrated that berberine can bind to both Na^+ and K^+ forms of human telomeric G-quadruplex DNA.

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1266
INVESTIGATION OF NANO-SILVER PARTICLE ON ANTIOXIDANT PROPERTIES OF TREATED SAFFRON LEAVES WITH SALINITY STRESS

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Saffron (*Crocus sativus* L.) belongs to Iridaceae family [1]. In the past it has been used as spice and less extent as medicinal plant [1] . Nowadays it used more on medicinal [1]. It is necessary to investigate more on factors such as salinity that decline saffron yield. Salinity stress can be effects on physiological and biochemical features of saffron. One of the strategies to overcome salinity stress is to apply nano-silver.For this purpose, an experiment was performed with using NaCl 100mM plus with nano-silver (80 and 100 ppm). The antioxidants activities were performed with assay of DPPH and pigments content. The highest and lowest antioxidant activities were in 100 mM NaCl plus 100 ppm nano-silver and same salinity with 80 ppm nano-silver compared to control, respectively. The highest rate of chlorophylla and caretenoids were in 100 mM NaCl+100 ppm nano-silver and chrophyll b was in control. The highest and lowest rate of cholorophyll a/b were observed in 100 mM NaCl+80 ppm nano-silver and control respectively. Nano-silver affect on ethylene receptor which led to decrease chlorophyllase and increase chlorophyll and also secondary metabolite such as phenolic groups [2]. The present results approved that, the application of nano-silver is one the strategies for controlling salinity effects.

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1267
CHEMICALL ANALYSIS OF THE ESSENTIAL OIL AND TRICHOME CONTENT OF *SALVIA HYDRANGEA*

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Trichomes are widely distributed over the aerial reproductive and vegetative organs of plants of Lamiaceae. They play defensive roles in the plants, especially with regard to phytophagous insects. In fact these primary secretary organs produce bioactive lipophilic secondary products (essential oils), which may act to protect the aerial parts of the plant against herbivores and pathogens (1-3). The objective of the present paper is to report the volatile constituents of the exudates secreting from the leaves and stems of *S. hydrangea* and in comparison with the essential oil (EO) of the respective organs of the plant. The EOs from different parts of *S. hydrangea* were extracted by hydrodistillation. While the exudates from the surface of the leaves and stems were extracted by dipping the organs into methanol for 30 minutes. The solvents then were removed from the residues by evaporation in reduced pressure. Qualitative and quantitative analysis of the volatiles were carried out by GC/MS and using the mass spectral and GC relative retion indices with the athonethic samples (4). The major constituents of both EOs extracted from the leaves and stems of *S. hydrangea* constituted mainly of hydrocarbon monoterpenes: α-pinene (5.1, 2.1%), β-pinene (9.1, 3.8%); oxygenated monoterpene: 1,8-cineole (21.6, 9.5 %) and the sesquiterpenes: β-caryophyllene (14.9, 27.2 %) and caryophyllene oxide (10.5, 19.0 %) respectively. While the surface exudates of the leaves and stems were different in their major volatile constituents; the leaf surface extract (trichomes exudates) contained mostly the sesquiterpenoids: valeranone (34.9 %), β-caryophyllene (32.7 %), and sesquisabinene (8.6 %) but the oxygenated monoterpenes: α-terpineol (9.8 %) and 1,8-cineole (3.4%) were detected in lower amounts. The composition of the stems exudates volatiles were similar to those detected for the EOs having 1,8-cineole (16.8 %), β-caryophyllene (14.1 %) and caryophyllene oxide (9.38 %) but different to the others in the presence of benzyl benzoate (17.5 %) as a non-terpenoid ester as the main component.The above mentioned results indicated that we may obtain different types of volatiles from different parts of the plants and by application of various methods of extraction.

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1268
PHYTOCHEMICAL INVESTIGATION AND BIOLOGICAL ACTIVITY OF *ANTHEMIS MIRHEYDARI*

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Dichloromethane (DCM) and methanol extracts of *Anthemis mirheydari* Iranshar, an endemic plant from Iran was investigated for its cytotoxic properties and chemical constituents. The cytotoxic activity of both DCM and methanol extracts against three human cancer cell lines including LS180 (human colon adenocarcinoma), MCF-7 (human breast adenocarcinoma) and MOLT-4 (human lymphoblast leukemia) were evaluated. The IC_{50} values of the DCM extract were 30.8±6.7, 25.2±6.5 and 8.6±1.1 µg/ml (mean± SE) for the above mentioned cell lines, respectively, while the methanol extract was not active (IC_{50}s >100 µg/ml). Two triterpenoids, one sterol, and one coumarin; were isolated from the DCM extract. The structures of the compounds were elucidated using different spectral data including ^{1}H NMR, ^{13}C NMR and EI-MS. All of the above natural products have been reported as cytotoxic compounds against human cancer cell lines.

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1272

EXTRACTION OF ORGANIC MATERIAL IN *PELARGONIUM GRAVEOLENS* BEFORE AND AFTER TREATING BY NAA, IDENTIFYING AND MEASUREMANT THEM USING GC/MS AND GC

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NAA is widely used in agriculture for various purposes [1]. The hormone play an important role in the regulation of germination, growth, reproduction [2,3]. In this study the effects of growth hormone (NAA) with different concentrations on essential oil of *Pelargonium graveolens* were evaluated. The plants were sprayed three times in one week with distilled water (as control) or with a solution of NAA with different concentrations. The air-dried leaves were subjected to hydrodistillation, using a Clevenger-type. The oils were analyzed using GC and GC/MS analysis[4]. 54 compound were identified in essential oil of control sample that some detected compounds can be responsible for the plants biological and/ or toxic activities. Results indicate that NAA at high concentrations have significant effect on the essential oil. Some of compounds such as Geraniol in effect of treatment hormone NAA at high concentrations the intensity has decreased. In some cases, certain compounds were eliminated completely from the oil. The use of phytohormones seems a useful strategy for modifying the composition of the essential oil in plants.

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1274

EFFECT OF INDOE-3-ACETIC ACID WITH DIFFERENT CONCENTRATIONS ON CHEMICAL COMPONENTS OF ESSENTIAL OIL OF *PELARGONIUM GRAVEOLENS*

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Phytohormones play an important role in the regulation of germination, growth, reproduction, and protective responses of plants against stress [1-3]. In this study the effects of growth hormone (IAA) with different concentrations on essential oil of Pelargonium graveolens were evaluated. The plants were sprayed three times in one week with distilled water (as control) or with a solution of IAA with different concentrations. The essential oil of treatments and their control were analysed by GC and GC/MC [4]. 54 compound were identified in essential oil that some detected compounds can be responsible for the plants biological and/ or toxic activities. Results indicate that IAA at high concentrations have significant effect on the essential oil. Some of compounds such as Geraniolin effect of treatment hormone IAA at high concentrations the intensity has decreased. In some cases, certain compounds were eliminated completely from the oil. The use of phytohormones seems a useful strategy for modifying the composition of the essential oil in plants.

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1277
COMPARISON OF HORMONAL CHANGES (GA_3) OF THE COMPOSITION OF ESSENTIAL OIL RFOM *PELARGONIUM GRAVEOLENS* LEAF

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Plant hormones are a group of chemically diverse molecules that control virtually all aspects of plant development[1,2]. In this study the effects of Gibberellic acidwith different concentrations of on essential oil of Pelargonium graveolens leaf were evaluated.plants treated under field condition were sprayed withGA_3 (25,50,100ppb)separately three time in a week. After a week aerial parts of plants were harvested and dried in the dark with air stream. The essential oil of dried aerial parts were obtained by hydrodistillation. The composition of the essential oil was analyzed by GC and GC-MS [3]. 54 compound were identified in plant oil. Some detected compounds can be responsible for the plants biological and/ or toxic activities. Results indicate that GA_3 have significant effect on the concentration of essential oil.Many components for example Phenylethyltiglate were decreased in effect of treatment hormone GA3 (25,50 ppb)and some of them such as Rose oxide in effect of treatment hormone GA3 the intensity has increased.It seems a useful method for changing the concentration of the essential oil compounds.

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1281

CHEMICAL COMPOSITION OF ESSENTIAL OIL, ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF EXTRACT OF *STEVIA REBAUDIANA* FROM NORTH OF IRAN

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Crude extracts of spices, herbs, and other plant materials rich in polyphenolics are increasingly of interest to the food industry because they have the capacity to retard oxidative degradation of lipids and thereby improve the quality and nutritional value of food [1]. *Stevia rebaudiana* is a plant species in the genus *Stevia* of the sunflower family (Asteraceae), commonly known as sweet leaf, sweet leaf, sugar leaf. *Stevia* is widely grown for its sweet leaves. The active compounds are various steviol glycosides (mainly stevioside and rebaudioside), which have 250-300 times the sweetness of sugar [2]. A literature survey showed that the *Stevia* species has been found to contain antioxidant and antibacterial activities [3,4]. There are several reports on essential oil composition of *S. rebaudianai* [5,6]. The purpose of the present study was to evaluate the essential oil composition, antioxidant and antibacterial activities of ethanolic extract of leaves of *S. rebaudianai* grown in the north Iran for the first time.The constituents of the volatile oil obtained by hydrodistillation were analyzed by gas chromatography-mass spectroscopy (GC-MS). The major constituents of the essential oil were caryophyllene oxide (16.38%) and (-)-spathulenol (12.97%). Ethanolic extract was prepared and used for determination of antioxidant activity by using DPPH radical scavenging. Ascorbic acid was considered the standard sample and antioxidant activity of ethanolic extract (42.23 µg/ml) was slightly better than standard (46.23 µg/ml). The extract was tested against a panel of microorganisms.Results obtained from measurements of MIC for extract indicate that *S. aureus* and *S. enteritidis* are the most sensitive microorganisms tested, but no activity was observed against gram-negative microorganisms (*E. coli* and *B. subtilis*).

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1282

ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF *CENTAUREA CYANUS* L. EXTRACTS FROM CENTERAL ALBORZ (RINEH)

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The interest for natural extracts in medicine and food industry has grown in recent years. Yet they are hardly little used for controlling microorganisms that effect cultural heritage materials [1]. *Centaurea cyanus* is one of the species of Asteraceae family, commonly known as cornflower.It is an annual plant, growing as a weed in the fields. Different species of this genus have been used in traditional medicine [2].The objective of the present study was to evaluate antioxidant and antibacterial activities of ethanolic and water extracts of *Centaurea cyanus*.The extracts were prepared from dry and powdered plant and used for determination of antioxidant activity by using DPPH assay [3]. Among all of the extracts, the ethanolic extract (0.5 ± 0.01 µg/ml) showed the higher radical scavenging activity than water extract (1.5 ± 0.01 µg/ml). In comparison with ascorbic acid as standard, extracts have shown lower radical scavenging activity.Antibacterial activity was tested using the disc diffusion method with following bacterial species: *Bacillus subtilis*, *Escherichia coli*, *Staphylococcusaureus* and *Salmonella typhi*. Results showed that ethanolic extract was effective against the all bacteria and water extract was only effective against Gram-positive bacteria but did not inhibit activity of Gram-negative microorganisms.

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1289
IN VITRO EVALUATION OF ANTICANCER AND ANTIBACTERIAL ACTIVITY OF *INDIUM CURCUMIN* AND *INDIUM DIACETYLCURCUMIN*

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Curcumin, a yellow pigment isolated from the rhizomes of *Curcuma longa* (turmeric) has demonstrated wide range of pharmacological activities; including antioxidant, anticancer, anti-inflammatory, antibacterial, and antiviral activities. There are also some reports of therapeutic potential of curcumin for Alzheimer's disease, Parkinson disease, diabetes and hypercholesteremia [1]. Curcumin has low systemic bioavailability, because of its low aqueous solubility and poor stability [2]. Complexation of curcumin with metals improves its stability.Indium curcumin ($In(cur)_3$) and and indium diacetylcurcumin ($In(DAC)_3$) was synthesized and charterized by Mohammadi et al. In this study, the cytotoxic effect of these complexes was assessed on bladder and stomach cancer cell lines by MTT *(*Methyl thiazolyl tetrazolium) assay. The result indicated that both complexes inhibit the cell lines viability to different extent.Exposure of bladder cell to $In(cur)_3$ and $In(DAC)_3$ induces almost 50%-60% cell death.The cytotoxic effect of the indium curcumin complexes on the stomach cell was concentration dependent. Exposure of the stomach cancer cell line to 20 µM concentration of $In(cur)_3$ and $In(DAC)_3$ causes to 61% and 36% cell death respectively indicating indium curcumin is more cytotoxic than indium diacetylcurcumin in MTT assay. Futhermore, antibacterial activity of the complexes against *Bacillus pumilus* and *Escherichia coli*was investigated by dilution test method. The result showed that both complexes inhibit *E. coli* growth in a dose-dependent manner, but indium curcumin is considerably more effective than the other indium complex. The result also indicated that none of the complexes have anibacterial effect against *B. pumilus*. On the whole, it can be concluded that the indium curcumin complexes have anticancer and antibacterial potential.

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1293

EVALUATING THE EFFICIENCY OF HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY (HPTLC) AS A MEANS TO SCREENING CRUDE EXTRACT OF *TAXUS* ENDOPHYTIC FUNGI FOR THEIR ABILITY TO PRODUCE TWO IMPORTANT TAXANES INCLUDING PACLITAXEL AND 10-DEACETYLBACCATIN III

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In this study, the efficiency of high performance thin layer chromatography (HPTLC) was evaluated for screening crude extract of *Taxus* endophytic fungi. 50 endophytic fungi isolated from *Taxus baccata L*. and their ability to producing of paclitaxel and 10-deacetylbaccatin III was investigated by HPTLC. It demonstrated that 33 endophytic fungi were producing Paclitaxel and 29 of them were producing 10-DAB III. Also, the presence of Paclitaxel and 10-DAB III were evaluated in 6 and 7 endphytic fungi, respectively. Further analysis was detected by LC-ESI-MS. Results of HPTLC showed that some fungi can not produce Paclitaxel and 10-deacetylbaccatin III, crude extract of four fungi were evaluated by HPLC and results confirmed HPTLC methods. So HPTLC could be a fast, low cost and reliable profiling technique for screening of taxane-producing endophytic fungi before using HPLC.

1294

EFFECT OF CULTURE FILTRATE OF *FUSARIUM GRAMINEARUM* ON PHENYLALANINE AMMONIA-LYASE (PAL) AND CINNAMYL ALCOHOL DEHYDROGENASE (CAD) ACTIVITY IN CELL CULTUREOF *LINUM ALBUM*

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Linum album Kotschy ex Boiss., is a herbaceous medicinal plant of Linaceae family andone of the common species in Iran, has podophyllotoxin (PTOX) and other lignans. These metabolites which occur in a few plant species and have pharmacological significance for its anticancer activities. Manipulation of cell culture media by elicitors is one of the vital strategies for inducing secondary metabolites. Fungal elicitors can effect on the plantdefense system and increase secondary metabolites. In this study, first we filtered culture of *F. graminearum*as by using 0.4 μm filter and after 7 days of pre-culture, the cells were treated with 1 % (v/v) of culture filtrate.Phenylalanine ammonio-lyase(PAL) activity was determined based on the rate of cinnamic acid production, according to Wang et al. (2006). In order to conclude the enzymatic activity of cinnamyl alcohol dehydrogenase (CAD) was used spectrophotometric assay, according to Garden et al. (2003).The results showed that enzymes activity of PAL and CAD which is involved in the first steps of the lignans biosynthesis were activated by culture filtrate of *F.graminearum*, reaching a peak at 3-5 day after treatment.

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1299
EFFECT OF SALICYLIC ACID AND DROUGHT ON ANTIOXIDANT DEFENSE SYSTEM IN *SALVIA NEMOROSA*

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Plant productivity is influenced adversely by environmental stresses such as salinity and drought [1]. It was shown that salicylic acid plays a key role in providing tolerance to the plants, exposed to water stress [2, 3]. To analyze how salicylic acid (SA) can partly alleviate drought-induced oxidative stress and negative impacts of drought on physiology and growth of *Salvia nemorosa*plants, we investigated the physiological responses of *Salvia nemorosa* to SA application under drought stress (50% field capacity). Exposure of plants to water stress led to serious dysfunctions including reduction in shoot biomass and chlorophyll content. A significantly rise in the shoot biomass, chlorophyll content and relative water content was observed in the SA-supplemented water-deficit samples relative to water-deficit treatment.Under drought condition, plants cultivated with SA exhibited better protection from oxidative damage because of higher catalase (CAT) activity and lower levels of malondoialdehyde (MDA) and hydrogen peroxide (H_2O_2). The present study suggests that salicylic acid can play a protective role during drought stress by enhancing the antioxidant defense system.

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1305

AERIAL PART HYDROALCOHOLIC EXTRACT OF *FERULA SZOWITZIANA* AFFECTS THE TIME DURATION OF THE SEIZURE STAGES INDUCED BY PTZ IN RATS

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epilepsy is one of the oldest diseases that human kind recognized. Stimulating events, defect on inhibition, changes in extracellular ions concentration and concurrency in neurons hyperactivity have roles in onset and diffusion of seizure, although its pathogenesis still not entirely clear. In this study the effects of *Ferula szowitziana* extract on time duration (TD) of PTZ induced seizure was investigated in male rats [1, 2]. Stem and leaves hydroalcoholic extract of *Ferula szowitziana* were prepared. Saline, tween 80 and ethanol (8:1:1 respectively) used as solvent. 60 rats (weighing 200-250g) were divided into 6 groups (n=10) include control, sham (intraperitoneal or i.p. injection of solvent) and four i.p. dose of 50, 100, 200 and 400 mg/kg. In order to make seizure an i.p. dose of pentylenetetrazol (45 mg/kg) was used. Finally the time duration of different seizure phases were recorded.The dose of 400 mg/kg, i.p. had better influence in reduction of TD of seizure phases and this reduction was significant in 1st, 2nd and 5th steges of epileptic seizure ($P<0.05$).The results suggest that *Ferula szowitziana* has decreasing effect on TD of seizure phases induced by PTZ that may be due to plant reagents which influense on opioid system [3]. So more research is needed for furtherclarifications of thefactors influencing epilepsy.

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1306
IDENTIFICATIONOF FATTY ACID COMPOUNDS FROM *ACHILLEA TENUIFOLIA* LAM.

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Todays the importance and the role of edible oil and fats in human health is one of the most important field of scientific study. The genus *Achillea* is represented in Iran by nineteen species including 7 endemics [1].This genus is one of the most important genera of the Asteracaefamily.*Achillea tenuifolia*Lam. with small yellow flowers and several times pinnately divided leaves in worm shape is known for many years in the folk medicine. It has been used to reduce sweating and to stop bleeding. It helps regulation of the menstrual cycle and reduces heavy bleeding and pain [2].Traditional medicine has reported analgesic and antiphlogistic for this plant.In this study, the plant material (aerial parts) was collected in Khalkhal–Ardabil road area, at an altitude of 1650 m in Northwest of Iran. Plant materials were air dried and were subjected to 5h of hexane extract in a soxhlet apparatus.The fatty acids were derived to methyl esters and determined by gas chromatography/flame ionization detector (GC/FID) and gas chromatograph/mass spectrometry (GC/MS) systems. The result of identification of fatty acids are as follows:arachidic acid (7.2%), palmitic acid(4.7%), linoleic acid (4.5%), lignoceric acid (3.2%), oleic acid (2.6%), behenic acid (2.7%), stearic acid (1.8%), cerotic acid (1.3%), caprylic acid(0.8%).

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1307
ECHINOPHORA PLATYLOBA AND ANTIMICROBIAL AGENTS

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Echinophora platyloba (belonging to family Apiaceae) is native perennial herb in Iran, with local name of Khosharize, Tigh touragh [1,2].Traditionally, it is used for food seasoning [3,4]. In Hamadan province, its aqueous infusion was claimed to be effective against some bacterial pathogens involved in urinary Tract infections [5,6]; so the aim of this study was to investigate the antimicrobial effects of the plant and determination of Thymol and Carvacrol contents of the plant.The aerial parts of *Echinophora platyloba* spontaneously growing in Hamadan province were harvested in July 2013. A voucher specimen was deposited in the herbarium of department of pharmacognosy, school of pharmacy, Hamadan University of medical sciences. The air-dried aerial parts was powdered and subjected to hydrodistillation by means of Clevenger apparatus for 3h.The essential oil was dried over anhydrous sodium sulphate and kept in refrigerator until use. Essential oil showed moderate antimicrobial activity against *S.aureus* and *S.epidermidis*. But it has no inhibitory effect on growth of E.coli, pseudomonas aeroginosa and Klebsiella pneumonia.Due to these findings, the Thymol and Carvacrol contents of the essential oil was determined by means of GC/FID, which exhibits low level of these two potent antimicrobial agents.

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1309

A TARGETED METABOLOMICS APPROACH TOWARD UNDERSTANDING METABOLIC VARIATIONS IN CUCUMBER UNDER CARBENDAZIM STRESS AND THE EFFECT OF CUCUMBER MATRIX ON DEGRADATION OF CARBENDAZIM

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Carbendazim fungicide is widely applied on cucumber (*Cucumis sativus*). However, concerns are now being raised about its potential adverse impacts on cucumber. In this study, a time-course metabolic change in cucumber was investigated after carbendazim treatment using Gas Chromatography−Mass Spectrometry (GC−MS). According to the results, a wide range of metabolites were dynamically varied as a result of the cucumber response to carbendazim fungicide. Carbendazim acts as an oxidative stress on cucumber that can change the metabolite profiling of cucumber. Metabolites in biological systems are the complement of low molecular weight molecules and their intermediates that reflects the dynamic response to different stresses apply to the plants.Oxidative stress had a profound effect on the central metabolic pathways with extensive metabolic inhibition radiating from the tricarboxylic acid cycle and amino acid metabolism and glycolysis and oxidative pentose phosphate pathway[1, 2]. To characterize the dynamics of metabolic change during oxidative stress, ccumber plants were treated with carbendazim and changes in metabolite abundance quantify in a time series of samples taken over a 16 day period. Carbendazim was exposed on cucumber samples in two concentration level (recommended and higher doze). In the case of pesticides, the determination of metabolites in agricultural products and environment is necessary as some of them could present similar toxicity to or even higher toxicity than the parent compound [3]. The development of analytical methodology for the identification and quantification of carbendazim fungicide and its metabolitesin cucumber was studied.

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1310

LEAF ARCHITECTURE AND MUCILAGE CONTENT IN *VIOLA TRICOLOR*

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Viola genus contains aboute 800 species, widely spread all over the world. While *Viola tricolor* is considered the most important because of mucilage compounds has been seen in their leaves [1]. The aerial parts are use in traditional medicin to treat various skin conditions (eczema, acne, pruritus), bronchitis and rheumatism. In the scientific literature there is little information the anatomical features of viola species[2-4]. In this study was presentedproper protocol to transparent of leaves. According to this protocol, leaf sample were placed in 5% HCL for 6 hours. However, in older leaves of development this time becomes longer, approximately 12 hours.to observe of mucilage structure was used staining method. Slides were prepared from leaves and examined by the microscope. leaf characters and architecture pattern has been studied in Viola tricolor. In general,The leaves are simple with rounded shape in apex, cordrate in base and crenate type in margin. The major venation pattern is reticulate type. The areola size, number of vein endings entering the areola and vein is lets termination number showed variation. The vein endings are usually simple, linear or curved and uni-veinlets with dichotomously branched [1,3]. Beside this regulatory pattern of veins development, mucilage cells in under epidermis of leaves during evolution produced mucilage cavity that containing effective medicinal compounds.in this study, expected thatcould be reported a correlation between leaf architecture and mucilage cavities.

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1314
EFFECTS OF NICKEL ON GROWTH AND METAL ACCUMULATION IN *OCCIMUM BASILICUM* L.

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Sweet basil (*Occimum basilicum* L.) is an aromatic herb with a variety of uses such as aroma additives in food, pharmaceuticals and cosmetics.[1] Ni as a heavy metal is an essential micro nutrient for plants but it is toxic at high concentrations.[2] In this study the effects of Ni on accumulation of Ni and growth in basil plant were investigated. The seeds of basil were grown in solution culture system using perlite as neutral substrate. The 30 days plants were treated with different concentrations of Ni (0, 1, 2.5, 5, 10 ppm). After 10 days treatment, plants were harvested. Growth and Ni composition of plants (using atomic absorption spectrophotometer) were measured. The result showed that dry weight of roots and shoots of plants treated with 1ppm Ni increased in comparison with control plants. However, a decrease in dry weight of roots and shoots of plants treated with the other Ni concentrations was observed. The results of Ni accumulation showed that both roots and shoots could accumulate Ni. When plants were grown in 10 ppm Ni in medium, the concentrations of Ni in roots and shoots were increased to 1176 and 345 ppm, respectively. There were a positive correlation between Ni concentrations in the growth medium and Ni accumulation in roots and shoots of basil plants. It was also noted that accumulation of Ni in the roots was much higher than the shoots. Considering interference of Ni in nitrogen metabolism process and Fe uptake, only very low concentration of Ni could promote plant growth and its high concentration induce toxicity and inhibition of growth in plant. Based on the results, Basil is a relatively Ni sensitive because increasing Ni in the medium reduced biomass significantly, also under 10 ppm Ni in the medium a severe leaf chlorosis and necrosis was observed.

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1315
HAIRY ROOT INDUCTION IN *UTRICA DIOICA* L. BY *AGROBACTERIUM RHIZOGENES* (A4 STRAIN)

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The family of nettle, belonging to medicinal plants, is composed of 600 species distributed among 45 genuses.*Urtica* is an important genus that with 30 species and *Utrica dioica* L. as a bipod nettle is categorized in this group. Nettle (*Urtica dioica)* is widely grown in different parts of the world and has been used to promote health. Numerous analyses of nettle have revealed the presence of more than fifty different chemical constituents. It has been extensively studied and found to contain starch, gum, albumen, sugar, histamine, acetylcholine, choline, serotonin terpene diolsand terpene diol glucosides [3]. Induction of hairy root by *Agrobacteriumrhizogenes*, is one of the best ways for the production of secondary metabolites. In this study, *Urtica dioica* were investigated for induction of hairy root using *Agrobacteriumrhizogenes* (A4 strain). Extensive hairy roots were induced from leaf explant within 2 weeks of infection in MS medium without phytohormone. Polymerase chain reaction analyses with primer for rolB gene confirmed the integration of the T-DNA fragment of Ri plasmid to the genome of hairy roots [1, 2].

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1316
EVALUATION OF VEGETATION COVER AND FLORISTIC COMPOSITION OF MEDICINAL PLANTS IN CHASHM WATRSHED OF SEMNAN PROVINCE

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Chashm watershed with a surface area about 46000 hectares is located near the Shahmirzad city in northern part of Semnan at the 53º 01'to 53º 23'Easthern longitude and 36º 37' to 35º 44' Northern latitude with an altitude of 850-3200m. In this contribution some floristic and ethnobotnical aspects of the area are given according to the conventional methods used in taxonomical and ethnobotnical studies. All collected plants were identified using available floras [1, 2]. A total of 26 Families, 42 Genera and 104 species of medicinal plants were identified from the area. Lamiaceae family with 18 species, Astraceae family with 13 and*Rosaceae* family with 12 species had the highest number of species. The life forms of plants included: hemicryptophytes (46%), therophytes (24%), chamaeophytes (10.4%), geophytes (9.6%) and phanerophytes (10%). The highest geographical distribution was Irano- Turanian (65.6%).The results were compared with some valuable texts and papers about medicinal or ethnobotanical usages of Iranian plant species[3, 4, 5]. The most important medicinal plants of the area are: *Juniperus excelsa* (Cupressaceae), *Polygonatum orientale* (Convalariaceae) *Diospyrus lotus* (Ebanaceae), *Berberis vulgaris* (Berberidaceae), *Cichorium intybus* (Asteraceae) and *Thymus* spp (Lamiaceae). These plants are the most famous medicinal plants and the people are extremely familiar with their traditional usages to remedy of diseases.

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1319
DETERMINATION OF PHENOLIC COMPOUNDS IN MEDICINAL *PROSOPIS FARCTA* BY REVERSED-PHASE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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Prosopis farcta is an important herbal plant as mentioned in ancient literature. It is used traditionally for treatment of various ailments like diarrhea, inflammation, measles, diabetes [1], skin diseases, and prostate disorders. The plant also may be used in the healing of wounds, to reduce cardiac or chest pain [2]. Then, it is necessary to establish unequivocal identification and quantitation of the major potential antioxidant phenolic compounds they contain. In this study, seeds of *P. farcta* were collected from spontaneous plants growing in the southwest area in Iran (Ilam). The seeds were first rinsed in pure sulphuric acid for 15 min, washed abundantly with sterile distilled H_2O and then allowed to germinate.Thereafter, the young seedlings were transferred to half-strength Hoagland's solution for 4 weeks in the greenhouse and then prepared for our experiments. Phenolic compounds were extracted with 1.5 mL of 40 % aqueous methanol, containing 0.5 % acetic acid.phenolic compounds were analysed by rapid and specific reversed-phase high performance liquid chromatography (RP-HPLC) coupled with diode-array detection. HPLC separation was accomplished on Agilent C18 column (5 µm, 250 mm *4.6 mm) with gradient elution of deionized water adjusted %0.01 ortho phosphoric acid and methanol [3]. Gallic acid, (+)-catechin, vitexin, quercetin, narengenin, have been identified in the plant extracts. Among the phenolic compounds vitexin and catechine are present predominantly in the extract (486 and 381 µg g^{-1} FW, respectively). These results suggest that phenolic compounds and flavonoids might contribute to high antioxidant activities of *P. farcta*.

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1320

FLORA OF MEDICINAL PLANTS WITH THE ETHNOBOTANICAL ASPECT IN GHAREH CHAY WATERSHED (GOLESTAN PROVINCE)

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Ethnobotanical study of plants is an important method to obtain the valuable medicinal knowledge of native people and it is used in different traditional localities of Iran [1, 2]. This study tries to understand the traditional usages and benefits of plants in the region. The study aimed to look into the diversity of plant resources that are used by local people for curing various ailments. Questionnaire surveys, participato illictic information on the useu of varios plants. Ghareh Chay watershed is located near the Ramian city in eastern part of Golestan province at the 54° 16´ to 54° 53´ latitude and 36° 46´ to 37° 8´ northern longitude with an altitude of 1419 m, and a surface area of 24816 hectars. In this contribution some floristic and ethnobotanical aspects of the area are given according to the conventional methods used in taxonomical and ethnobotanical studies. All collected plants were identified using available flora [3, 4]. A total of 13 families and 36 genera were identified from the area.The life form of plant species was determined using the Raunkier's method. Phanerophytes comprised 14%, chamaephytes 20%, hemicryptophytes 45%, chryptophytes 6% and therophytes 24%of the flora of the area.This study introduce35 medicinal plant species (belonging to 13 families)which most commonlyusedby indigenous people of local community area. The botanical name, family name, vernacular name, part usedand the application of plant species have been provided in this research. The traditional knowledge was recorded usingpractitioners and village seniors ofregion. We found some medicinal plant species which were traditionally used in area. Finally the traditional benefits of them were describedand then they were compared with data on the medicinal clinical effects of plants.

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1324

CHEMICAL COMPOSITION OF ESSENTIAL OIL, ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF EXTRACT OF *SOPHORA ALOPECUROIDES L.* FROM NORTH OF IRAN

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Crude extracts of spices, herbs, and other plant materials rich in polyphenolics are increasingly of interest to the food industry because they have the capacity to retard oxidative degradation of lipids and thereby improve the quality and nutritional value of food [1]. *Sophora alopecuroides* L.is a plant species in the genussophora of the Fabaceae family (Leguminosae)[2]. *Sophora* species are known to contain quinolizidine alkaloids (QAs) that have important activities (3-4). A literature survey showed that the sophora species has been found to contain antioxidant and antibacterial activities [5,6].The purpose of the present study was to evaluate the essentail oil composition, antioxidant and antibacterial activities of ethanolic extract of leaves of *S. alopecuroides* grown in the north Iran for the first time.The constituents of the volatile oil obtained by hydrodistillation were analyzed by gas chromatography-mass spectroscopy (GC-MS). The major constituents of the essential oil were Heneicosane (32.47%), Thymol (25.45%)and n-Hexadecanoic acid (10.91 %). Ethanolic extract was preparedand used for determination of antioxidant activity by using DPPH radical scavenging. Ascorbic acid was considered the standard sample and antioxidant activity of ethanolic extract (0.5 mg/ml) was comparable with standard (0.05 mg/ml). The extract was tested against a panel of microorganisms. Results obtained from measurements of MIC for extract indicate that *S. aureus* and *B. subtilis* are the most sensitive microorganisms tested, but low activity was observed against gram-negative microorganism (*E. coli* and *S. enteritidis*).

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1330
CORNELIAN CHERRY SEED FLAVONOIDS

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Cornus mas L. (Cornaceae family) known as the European and Asiatic cornelian cherry is a species of dogwood native to Southern Europe and Southwest Asia [1]. The fruit is an oblong, red drupe (2×1.5 cm), containing a single seed, mainly used for food, medicine, ornamental and honey plant [2]. Extract from the fruits is also used in Europe for cosmetic purposes, replacing synthetic astringent substances, and are claimed to exert a favorable actions on the human complexion [3].Some investigations of the nutritional and phytochemical properties of cornelian cherry fruit have been reported. In comparing of the effects of Lovastatin and *C. mas* fruit on fibrinogen level in hypercholesterolemic rabbits was found that fruit powder could reduce the fibrinogen level more than lovastatin [4]. In fruits are used for medical treatment ogastrointestinal disorders and diarrhoea [5]. Other *Cornus* species are used in Chines herbal medicine, due to their tonic, analgesic anddiuretic activities. Some reports have shown antibacterial, antihistamine, anti-alergy and anti-malaria effects [6]. In Asia, *Cornus* fruits are among the major constituents of several antidiabetic herbal extracts (Jayaprakasam et al. 2005). Fruit is rich in antioxidants: i.e. ascorbic acid and flavonoids [7, 8]. Many flavonoids are active principles of medicinal plants, exhibit pharmacological effects and contribute to human health. In this study, seed flavonoids of *Cornus mass* is reported. Aqueous-methanolic extract of prepared seeds of the species was examined to practice flavonoid detection, isolation and identification by 2-Dimensional Paper and Thin Layer Chromatography and available references.Results showed seed flavonoids content of the species is 42gr/kgdw consisting of flavonoid sulphates and flavones *C* and *C-/O* glycosides. Chrysin, kaempferol, luteolin, myercetin, quercetin and rutin were found in the species seed.

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1333
OPTIMIZATION OF RHUBARB ROOT ANTHRAQUINONE GLYCOSIDES EXTRACTION BY ULTRASONIC METHOD

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Rhubarb (*Rheum palmatum*) is a species of plant in the family Polygonaceae. Itis herbaceous perennials growing from short, thick rhizomes. It has large leaves that are somewhat triangular, with long fleshy petioles.In Traditional Chinese medicine, rhubarb root was used for curing stomach ailments, relieving severe constipation, and as a poultice for fevers and swelling [1]. The chief ingredients of Rhubarb root are anthraquinones including rhein and emodin and their glycosides (e.g. glucorhein), which impart cathartic and laxative properties. It is hence useful as a cathartic in case of constipation in Iranian traditional medicine [2]. In this study we compared percolation and ultrasonic extraction methods for extraction of anthraquinone glycosides in rhubarb root. Inultrasonic extraction method four parameters including time (15 min, 30 min, 60 min), temperature (25ºC, 40ºC, 70ºC), solvent (ethanol 40%, 70%, 96%) and ultrasonic power (40%, 80%, 100%) by ultrasonic processor UP200H (200 watts, 24kHz) were investigated. The results showed that the best yield of extraction was with 10.98% of rhein in dry extract takes in 30 min, 25ºC, ethanol 70% and 100% ultrasonic power. All experiments were performed based on British Pharmacopoeia 2013. In industrial scale, extraction of anthraquinone glycosides from rhubarb root is carried out by percolation method that take place at least in five days at the same temperature and solvent conditions. At the end of five days of extraction by percolation method, the dry extract contains 2.5% of rhein. In conclusion, ultrasonic extraction method is affordable in comparison to percolation method in industrial scale.

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1334

CHEMICAL COMPOSITION OF THE ESSENTIAL OIL FROM STEMS, LEAVES AND FLOWERS OF *FERULA FOETIDA*(BUNGE)REGEL. FROM IRAN.

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There areamounting to130 speciesandnearly 30specieshave been reportedin Iran[1]. In this investigation *Ferula foetida* (Bunge) Regel, Collected from shahrood, semnan Province, Iran[1]. The plant material drayed in the shed and suitable air condition. The plant essential oil obtained by hydrodistillation using a Clevenger–type apparatus. The composition of the volatile oil from aerial parts of *Ferulafoetida*was investigated by GC-FID and GC-MS. Kovat's retention indices were calculated using co-chromatographed standards hydrocarbons. The individual compounds were identify by MS and their identity was confirmed by comparing their retention indices relatives to C8 –C32 n-alkanes and by comparing their mass spectra and retention times with those of authentic samples or with data already available in the NIST library and literature Adams [2]. In the flowers oil Thirty three components, representing of the total components were identified 91.4%. 2,3,4,5-tetramethylthiophene with 28% and βPinene with 18.4% were the main constituents in the flower oils, The othr main constituent of the flower oil were E-β-Ocimene and Elemicin(5.4%, 6.7% respectively). 2,3,4,5-tetramethylthiophene with 47.75% and α -Pinene with 47.74% wer the main component in thwenty components, representing of the total components were identified in the leaf oil(85.32%). And 2,3,4,5-tetramethylthiophene, 2,5-Dimethyl-4-ethylthiazole, Elemicin, β- Pinene, α -Pinene, (30.67%, 15.06%,12.61% 7.53%, 12.46% respectively) wer the main coponent in thwenty one components, representing of the total components were identified in the stem oil(89.41%).

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1337

STUDY EFFECTS OF SALINITY STRESS AND NANO-SILVER PARTICLES ON ANTIOXIDANTS PROPERTIES OF SAFFRON (*CROCUS SATIVUS* L.) CORM

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Saffron (*Crocus sativus* L.)is sterilized and member of iridaceae family. It propagated bythecorms [1]. The antioxidant properties of the waking corm are more than corms dormant [2]. Salinity Stress increased antioxidant enzymes activities such as peroxidase [3]. In the present study, the corms in the reproductive stage,the methods of DPPH and gel electrophoresis were used for studing the antioxidant properties of treated corms. Salinity treatment with 100 mM NaCl plusnano-silver (80ppm, 100ppm) were applied. Also distilled water was used for control. DPPH results showed that the control and treated sample with salinity 100 mM plus nano-silver 80 ppm had highest and lowest antioxidant activities respectively. Salinity treatment with 100ppm nano-silver compared to the same salinity but with 80ppm nano-silver showed less sign of stress. Studies showed that nano-silver reduces secondary metabolites [4] such as phenolic groups, which led to decrease in antioxidant activity, proved the results of presnet study. Electrogram observations showed at least 3 peroxidase isoforms, the highest intensity band with Rm=0.147 belong to treatment of 100Mm NaCl and the lowest intensity bond with Rm=0. 142 was for treatment 100Mm NaCl+100ppm nano-silver, which was consistent with the above results.

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1338

CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF ESSENTIAL OIL OF *ARTEMISIA AUCHERI* IN SOYBEEN OIL

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Artemisia genus is an important medicinal plant in Iran. Recent investigations have shown that the antioxidant properties of plants could be correlated with oxidative stress defense and different human diseases [1]. *Artemisia aucheri* plants of the Asteraceae family, is scattered throughout the country. This plant in Iranian traditional medicine is used as an astringent, antiseptic, anti-bacterial, anti-parasitic and anti-poisoning [2]. Essential oil of spices, herbs, and other plant materials rich in polyphenolics are increasingly of interest to the food industry because they have the capacity to retard oxidative degradation of lipids and thereby improve the quality and nutritional value of food [3]. The present study investigated the chemical composition of the essential oil (E.O) extract with clevenger device from aerial parts (flowering stage & leaves) of *Artemisia aucheri* by gas chromatography-mass spectroscopy (GC–MS). In total, many compounds were recognized, accounting for 98.27% of the E.O. The major constituents of the E.O were Borneol (31.27%), Eucalyptol (11.39%), Bornyl acetate (6.32%), β-Cubebene (6.14%), γ-Elemene (5.65%), Camphene (4.83%), Caryophyllene (4.79%). In addition, the antioxidant activity of the E.O was tested. Antioxidant activity was measured by the ability of the E.O to scavenge 1,1-diphenyl-2-picrylhydrazyl (DPPH) radicals.The antioxidative activity has been assessed by methods: free radical scavenging assay with DPPH, inhibition of the lipid peroxidation with the TBA and Proxide test on soybeen oil. TBHQ was taken as positive control. Due to this results the E.O of *Artemisia aucheri* could be a valuable raw material for natural antioxidant additives.

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1339

CHEMICAL COMPOSITION OF THE ESSENTIAL OIL FROM STEMS, LEAVES AND FLOWERS OF *PRANGOS ULOPTERA* DC. FROM IRAN

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The Iranian flora comprises 15 species of prangos, of which 5 are endemic [1]. The plant material was collected from Shahrood, Semnan Province, Iran. Fruits of some Prangos species have been traditionally used in Iran as emollient, carminative and tonic [2]. There are also some reports on antibacterial and antioxidant properties in some Prangos genus [3]. In this investigation *Prangos uloptera* DC, Collected from shahrood, semnan Province, Iran [1]. The plant material drayed in the shed and suitable air condition. The plant essential oil obtained by hydrodistillation using a Clevenger–type apparatus. The composition of the volatile oil from aerial parts of Prangos uloptera was investigated by GC-FID and GC-MS. Kovat's retention indices were calculated using co-chromatographed standards hydrocarbons. The individual compounds were identify by MS and their identity was confirmed by comparing their retention indices relatives to C8 –C32 n-alkanes and by comparing their mass spectra and retention times with those of authentic samples or with data already available in the NIST library and literature Adams[4]. Chemical analysis of the essential oil of plant showed that α-Pinene with 10.03% and 2-methyl- Benzaldehyde with11.37% wer the main coponent in thirty seven components, representing of the total components were identified in the plant oil(89%).The other notable component in the oil were Sabinene, β-Phellandrene, E-β-Ocimene, γ-Terpinene (9.04%, 9.74%, 8.9%, 6.82% respectively)

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1341

CHEMICAL COMPOSITION OF ESSENTIAL OIL, ANTIOXIDANT ACTIVITIES OF EXTRACT OF *ACHILLEA BIEBERSTEINII* FROM NORTH OF IRAN

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Crude extracts of spices, herbs, and other plant materials rich in polyphenolics are increasingly of interest to the food industry because they have the capacity to retard oxidative degradation of lipids and thereby improve the quality and nutritional value of food [1]. Achillea biebersteinii is a plant species in the genus Achillea of the sunflower family (Asteraceae).Achillea biebersteiniia perennial medicinal herb belonging to the Asteraceae family has a relatively wide distribution in different parts of Iran[2].A literature survey showed that the Achillea species has been found to contain antioxidant and antibacterial activities [3]. There are several reports on essential oil composition of A. biebersteinii [3].The present study investigated the chemicalcomposition of the essential oil (EO)extract with clevenger devicefrom aerial parts(flowering stage& leaves) ofAchillea biebersteiniibygas chromatography-mass spectroscopy(GC–MS).In addition, the antioxidant activity of the EO was tested. Antioxidant activity was measured by the abilityof the EO to scavenge 1,1-diphenyl-2-picrylhydrazyl(DPPH) radicals. In total, many compounds were recognized, accounting for 99.03 % of the EO.The major constituents of the EO were Camphor (38.26 %),Eucalyptol (25.96 %),p-Cymene(12.31),α-Terpineol (5.26 %), Eugenol (4.63 %), Carvacrol (2.86 %),α-Pinene (2.82 %).The antioxidative activity has been assessed by methods: free radical scavenging assay with DPPH, inhibition of the lipid peroxidation with the TBAand Proxide teston Rapeseed oil. TBHQ was taken as positive control. Due to this results the EO of Achillea biebersteinii could be a valuable raw material for natural antioxidant additives.

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1351
EXTRACTION OF PHENOLIC COMPOUNDS FROM POMEGRANATE FLOWER

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Pomegranate (*Punica granatum* L.) is an important commercial fruit crop that is extensively cultivated in parts of Asia, North Africa, the Mediterranean and the Middle East. Iran is one of the most important pomegranate producers and exporters in the world, and its total production is more than 670,000 tons [1].The flowers of this plant are used in folk medicine for the treatment of bronchitis, diarrhea, dysentery, ulcers, hepatic damage, sore eyes, and diabetes. Phytochemical investigation of pomegranate powers showed the presence of various phenolic compounds [2]. Some studies have shown that pomegranate flowers have very strong antioxidant activity. Antioxidant properties of plant extracts are apparently related to the content of their phenolic compounds [3].In this study,ultrasound assisted extraction (UAE) was applied for the extraction of phenolic compounds from pomegranate flower. Different experimental parameters such as aqueous ethanol compositions (0-100 %), maceration times before ultrasonic extraction (5-60 min), ultrasonic extraction times (5-30 min) and the effect of solvent to solid ratios (20-60:1) were studied to optimize extraction conditions. The amounts of total phenolic compounds were determined using Folin-Ciocalteu's reagent and the maximum absorption at wavelength 760 nm.The results showed the optimum conditions for extraction of total phenolic compounds from pomegranate flowers were 50% aqueous ethanol as solvent, maceration time of 10 min, ultrasonic extraction time of 15 min and solvent to solid ratio 20:1(v/w).

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1358

COMPARITIVE STUDY ON THE EFFECT OF SOLVENT TYPE IN PHENOLIC AND PHLAVONOID CONTENT OF *PEROVESKIA ABROTANOIDES*

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Perovskia abrotanoides Karel is an aromatic and medicinal plant belonging to the Lamiaceae family. This plant is wildly distributed in Deserts and mountain ranges in North, North East, South East and central Parts of Iran. It is a famous medicinal plant due to some pharmacological and antibacterial effects. [1] The present study describes the total phenolic and flavonoid content of whole plant extracts which were obtained by hydrolyses extraction method using different solvent polarities. [2, 3] The total phenolic amount of different solvents varies between 5.23 to 1.37 mg gallic acid equivalent/g DW in Hexane and Butanol extracts respectively. Similarly the concentrations of flavonoids in the extracts ranged from 3.44 to 0.41 mg rutin equivalent/g DW. The highest amount of both phenolic and flavonoid content was observed in Hexane extract and the lowest was identified in Butanol. It is clearly demonstrated that the Hexane Solvent is the most appropriate solvent for extraction of medicinal compounds of plant.
This finding showed that the solvent type must be regarded as an important key note in extraction and usage of phenol and flavonoid compounds in *perovskia abrotanoides* as a natural source in medicinal plants of Iran.

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1361

TOTAL PHENOLIC AND FLAVONOID CONTENTS OF *CHICHORIUM INTYBUS* USING DIFFERENT SOLVENT POLARITIES

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Chicory (*Chichorium intybus* L.) belongs to the Asteraceae (Compositae) family. This herbaceous and perennial plant wildly distributed in Europe and Asia and cultivated in various regions all around the world. Chicory is a well known medicinal plant in applied medicine and pharmacological studies due to its important secondary metabolites [1]. The aim of this study describes various solvent extracts of *chichorium intybus* and it is the first to compare total phenolic and total flavonoid content of aerial parts of plant. The extracts were obtained by hydrolyses extraction method using different solvent polarities consist of Hexane, Chloroform, Ethyl-Acetate, Butanol and Water. [2, 3] The highest amount of phenolics content was found in The Chloroform extracts (2.36 mg gallic acid equivalent/g DW) followed by Hexane (1.98), Water (1.02), Ethylacetate (1.05) and Butanol (0.93) extracts respectively. While total flavonoid contents of Hexane solvent (1.96 mg rutin equivalent/g DW) was found significantly higher than other solvents consist of 1.36, 0.35, 0.34 and 0.27 for Chloroform, water, Ethyl-Acetate and Butanole extracts respectively. Data from present study revealed that chicory is a rich natural source of phenolic and flavonoid compounds. But the extraction solvent is more affective on the extracted compound amounts.

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1369
LIGNANS ENHANCEMENT IN HAIRY ROOT CULTURES OF *LINUM ALBUM* BY FUNGAL ELICITATION

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Linum album is an herbaceous plant of linaceae family that contains some lignans such as lariciresinol (LARI), secoisolariciresinol, podophyllotoxin (PTOX) and its derivatives which have cytotoxic and antiviral activities [1]. Many experiments were designed to induce and increase the production of some secondary metabolites in tissue cultures of L. album using some biotechnological approaches [2]. In the present study, hairy root cultures of L. album were established by transformation with Agrobacterium rhizogenes strain LBA9404. Then we examined the effects of Piriformospora indica mycelium and culture filtrated as fungal elicitors on the lignans accumulations in hairy root cultures of L. album. P. indica, a member of the newly created order Sebacinales, is extremely versatile in its mycorrhizal associations and its ability to promote plant growth. P. indica is widely distributed as a symptomless root endophyte, and it colonizes members of bryophytes, pteridophytes, gymnosperms and angiosperms [3]. We investigated effect of three concentrations of mycelium and culture filtrate of P. indica (0.5–1–5) % v/v on lignan production in the hairy root cultures. The 12 days hairy roots cultures were supplemented with fungal culture filtrate and mycelium after and the hairy roots were harvested 5 days after elicitation. Then, Lignans content was analyzed by HPLC. Results demonstrated that although, hairy root growth was reduced by increasing in elicitors concentration but PTOX content was improved in elucidated root by mycelium (0.5 %) and culture filtrated (0.5%) 1.3 and 3.056 fold respectively compare with control. LARI production was stimulated reaching a maximum 0.026 mg/g fresh weight (FW) and 0.041 mg/g FW 5 days after the treatment for (0.5 %) and culture filtrated (0.5%), respectively.

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1375

STUDY OF ANALGESIC EFFECT OF *SAMBUCUS NIGRA* LEAVES EXTRACT IN A VISCERAL PAIN MODEL

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There has been growing interest in using plants in medicine and herbal therapy is becoming common practice. There is also a tendency about pharmacological and toxicological studies of plants. There are many reports on analgesic and anti-inflammatory effects of some plants in traditional and modern medicine.but There has been no study related to analgesic effects of *Sambucus nigra* on visceral pain. In the present study, we investigated analgesic effects of hydroalcholic extract of Sambucus nigra in mice. Analgesic response was assessed with Writhing test induced by injection of 0/6% acetic acid into the peritoneal cavity of mice. the effect of Sambucus nigra was compared with that of morphine hydrochloride and isotonic saline. 100mg/kg dose of Sambucus nigra showed statistically significant analgesic effect compared to the control groups but weaker than morphine. Our preliminary data show that Sambucus nigra extract has a mild analgesic effect. This effect is likely to analgesic and anti-inflammatory active ingredients of Sambucus nigra.

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1386
CHARACTERIZATION OF NOVEL AND POTENT RADICAL SCAVENGERS FROM THE CYANOBACTERIUM NOSTOC COMMUNE

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In terrestrial environments, Nostoc commune colonies are subjected to desiccation and UV-irradiation. Protective compounds that are involved in reactive oxygen-scavenging mechanisms must have an important role in increasing cell tolerance to the oxidative stresses associated with desiccation and UV irradiation. Mycosporine-like amino acids (MAAs) function mainly to protect the cells against UV-induced oxidative stress.MAAs are water-soluble pigments that absorb specific UV-B radiation in the range of 280 to 320 nm. They are also thought to be the strongest UVA-absorbing compounds in nature. With their photoprotective and antioxidative properties, MAAs are natural bioactive compounds attractive to cosmeceutical and pharmaceutical applications.In this study, the water extract of N. commune colony with absorption maxima at 312 and 340 nm was studied and three structurally novel MAAs were characterized. The extract contained hybrid MAAs (1050 Da and 880 Da) with two distinct chromophores of 3-aminocyclohexen-1-one and 1,3-diaminocyclohexen linked to 2-O-(β-xylopyranosyl)-β-galactopyranoside. A novel 273-Da MAA with an absorption maximum at 310 nm was also identifiedwhich consisted of a 3-aminocyclohexen-1-one linked to a γ-aminobutyric acid chain. The 1050-Da, 880-Da and 273-Da MAAs accounted for approximately 43%, 16% and 8% of the total MAAs, respectively. These MAAs had potent radical scavenging activities in vitro; the 1050-Da, 880-Da and 273-Da MAAs contributed approximately 27%, 12% and 5% of the total radical scavenging activities in a water extract of N. commune. The results confirmed that the MAAs have multiple roles as a UV protectant and an antioxidant relevant to anhydrobiosis in N. commune. With these MAAs, N.commune is thought to be able to adapt to terrestrial environments with high levels of solar radiation.

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1390

MYCOSPORINE-LIKE AMINO ACIDS AS A TAXONOMICAL MARKER IN THE TERRESTRIAL CYANOBACTERIUM NOSTOC COMMUNE

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The terrestrial cyanobacterium Nostoc commune is a well-known species of the genus Nostoc and a cosmopolitan species that is distributed from the tropics to the polar regions of the Earth. The studies of functional molecules in N. commune, molecular taxonomical studies have revealed that N. commune can be classified into four genotypes based on differences in the 16S rRNA gene sequences. The sequence differences are not great enough to be recognized as distinct species. However, they are significantly different and allow the description of genotype A to D. These genotypes are difficult to distinguish morphologically and there are no ecophysiological differences allowing us to separate them.In this study, during the characterization of mycosporine-like amino acids (MAAs) in field isolated colonies of N. commune, three types of N. commune colonies whose water extracts resulted in different UV-absorbing spectra were found. According to an analysis of the 16S rRNA gene sequence, the N. commune colonies with absorption maxima at approximately 335, 312 and 325 nm in their water extracts were identified as genotypes A, B and D, respectively. Characterization of their MAA contents indicated that these genotypes of N. commune colonies produce structurally distinct MAAs; the genotype A produces the 478-Da, 464-Da, 508-Da and 346-Da MAAs; the genotype B produces the 1050-Da, 880-Da and 273-Da MAAs; the genotype D produces the 612-Da, 508-Da and 450-Da MAAs. These results show that three genotypes of N. commune exclusively produced their own characteristic MAAs, which supports that MAA composition could be a chemotaxonomic marker for the classification of N. commune.

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1404

EXTRACTION OF CURCUMINOID FROM TURMERIC BY ETHANOL USING BOILING MECHANISM

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Turmeric is a spice that comes from the root of *Curcuma longa* L. (Zingibraceae), an Iranian traditional medicinal plant, which widely used as spice and anti-inflammatory agent. Curcuminoids are the main coloring substance turmeric from Zingibraceae and includes three pharmacologically significant compounds as curcumin, demethoxycurcumin and bisdemethoxycurcumin. These three curcuminoids have been shown to demonstrate strong anti-oxidant, anti-inflammatory anti-bacterial and anti-carcinogenic activities. Curcumin as a lipophilic compound can be easily dissolved in organic solvent, so it can be extracted from *C. longa* root with organic solvent such as acetone, methanol, petroleumether, hexane, ethanol by soxhlet.In the present study, ethanol was used to extract curcuminoids includes curcumin and two related compounds demethoxycurcumin and bisdemethoxycurcumin from turmeric by boiling mechanism.
4 gr turmeric was weighed and boiled in 250cc ethanol for 4 hours at 78°C, and then filtered then Filtrated extract were left into hot air oven at 50°C for 24 hours to evaporate the ethanol.The extract (20 mL) was suspensed in 500 mL distilled water and was stirred for 4 hours at 80°C. After that the suspension was centrifuged in 5000 RPM for 5 minute in 4°c. Supernatant was collected and then dried by freeze dryer. Thin-layer chromatography (TLC) was used to determine the purity and fractionation of the curcuminoids. Also functional groups of curcuminoid was determined by FTIR.According to the results yield of curcuminoid was 8.3%. Proporation of curcuminoid fractions separated by TLC in dichloromethane: chloroform: ethylacetat are as 15:80:5 respectively.[1-3]

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1415
SYNTHESIS, STRUCTURAL ELUCIDATION, AND IN VITRO ANTIPROLIFERATIVE AND APOPTOTIC EFFECTS OF A NICKEL-3-HYDROXYFLAVONE COMPLEX

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Flavonoids are low molecular weight polyphenolic phytochemicals, derived from secondary metabolism of plants and play important role in various biological processes. 3-Hydroxyflavone (3HF; fig. 1) is a chemical compound that it is the backbone of all flavonols, a type of flavonoid.Flavones have antioxidant, anti-proliferative, anti-tumor, anti-microbial, estrogenic, acetyl cholinesterase, anti-inflammatory activities and are also used in cancer, cardiovascular disease, neurodegenerative disorders, etc [1]. The success of cisplatin has triggered intensive work for discovery of new metal-based anticancer drugs [2]. In this study, we evaluated the anti-proliferative and apoptotic effects of nickel complexes including 3-Hydroxyflavone against human cervix epithelial carcinoma (HeLa), cell line and using cisplatin as a comparative standard by MTT assay. Our results presented herein provide experimental evidence that nickel-3HF complex induce apoptosis in cancer cell lines. Our flow cytometry results confirm that, this complex showed a high population of apoptotic cell higher than cisplatin at the same concentration and could induce apoptosis of Hela cancer cells.

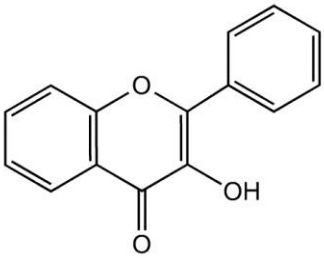

Fig. 1: The structure of 3-Hydroxyflavone (3HF)

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1418
SYNTHESIS, STRUCTURAL ELUCIDATION, AND IN VITRO ANTIPROLIFERATIVE AND APOPTOTIC EFFECTS OF A NICKEL-CURCUMIN COMPLEX

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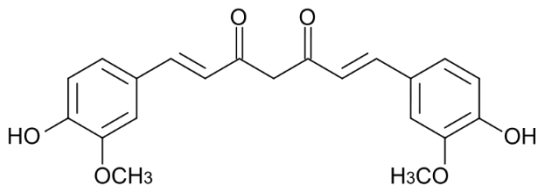
Curcumin (Fig. 1) is the principal curcuminoid of turmeric, which is a member of the ginger family. Turmeric is the yellow-orange powder made from the ground root of a specially cultivated variety of Curcuma plant. It is one of the most versatile natural medicines and one of the most important medicines in the Indian and Chinese medical traditions.Curcumin is a diarylheptanoid that incorporates several functional groups. The aromatic ring systems, which are phenols, are connected by two α,β-unsaturated carbonyl groups.Recently, it has been reported to possess anti-inflammatory, antioxidation and antiviral activities. Now, attention has been focused on its antitumor activity. It was found to induce apoptosis of a wide variety of tumor cells including mice sarcoma S180 cells, human colon carcinoma HT-29 cells, human renal arcinoma 293 cells, human liver carcinomaHepG2 cells etc [1]. The success of cisplatin has triggered intensive work for discovery of new metal-based anticancer drugs [2]. In this study, we evaluated the anti-proliferative and apoptotic effects of Nickel complexes including curcumin against human cervix epithelial carcinoma (HeLa), cell line and using cisplatin as a comparative standard by MTT assay. Our results presented herein provide experimental evidence that Nickel-Curcumin complex induce apoptosis in cancer cell lines. Our flow cytometry results confirm that, this complex showed a high population of apoptotic cell higher than cisplatin at the same concentration and could induce apoptosis of HeLa cancer cells.



ig. 1: the structure of Curcumin

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1422

GLANDULAR TRICHOMES IN *THYMUS DAENENSIS* CELAK.: DISTRIBUTION, TYPE AND SECRETORY ACTIVITY DURING LEAF DEVELOPMENT

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Multiple medicinal properties have been reported for the endemic thymus daenensis [1,2], and are attributed to its essential oil. Oil composition has been analyzed in different regions of Iran, and also during ontogenic stages of T. daenensis meanwhile, the botanical data on the oil producing structures are missing, and the secretion process is unclear. The present research has focused on trichome types and their secretory activity in relation to T.daenensis development. Leaves were collected at four ontogenic stages, form the bud to the mature state, from a natural habitat near Yasuj. Samples were double fixed in glutaraldehyde and osmium tetraoxide, and processed for the investigation by light and scanning electron microscopes. For the histological purpose, cross sections were stained with toluidine blue. For SEM, fixed samples were dehydrated, air dried, and coated with gold. Protective trichomes of different length, and a variety of glandular trichomes covered both leaf surfaces in the youngest leaves of the bud. The peltate, the most abundant trichome type, consisted of a basal cell, a short stalk and eight celled secretory head. All the three capitate type were short-stalked, consisting of a basal cell, a stalk cell and a head cell. Digitiform trichome had also three cells, with a finger-like head. Based on the cellular changes during trichome development, secretory activity of all the glandular trichomes can be summarized in three functional stages: pre-, during and post- secretion. A large subcuticular space characterized the active secretory phase for the peltate trichomes, while capitate and digitiform glands showed a slight detachment of the cuticle in this stage. Other trichome types were also observed in developing T. daenensis leaves. Further histochemical studies will elucidate their protective or secretory aspect. Buds and young expanding leaves showed the highest density of all the trichome types. Trichome density decreased along with the leaf development, and the majority of the trichomes in the mature leaf were in post-secretion stage. The shoot tip and young expanding *T. daenensis* leaves showed the characteristics of active secretory phase, and are therefore recommended for the best medicinal use.

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1428
EVALUATION OF *ACROPTILON REPENS* L. PHENOLIC AND FLAVONOID COMPOUNDS

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Acroptilon repens (L.) (Russian knapweed; fomerly *Centaurea repens*) is a perennial herbaceous plant belonging to the Asteraceae family. This plant is native to Mongolia, western Turkestan, Iran, Turkish Armenia and Asia Minor [1]. Recently, attention has been paid to the identification of new sources of safe natural antioxidant for the food industry. The antioxidant activities of plants are mainly attributed to their phenolic and flavonoid compounds. This research was carried out to evaluate the antioxidant activity of *A. repens* extracted with different solvents. The phenolic and flavonoid compounds of *A. repenis* were also examined using Folin-ciocallteus phenol and aluminum complexation, respectively. *A. repens* contained phenolic and flavonoid compounds and different solvents showed different contents of total phenolics and flavonoids [2, 3]. Significant differences in the phenolic content of Chloroform, Buthanolic, Ethyl acetate and water extracts were observed, with values of 1.33, 1.68, 0.66 and 8.89 mg GAE/g DW, respectively. Similarly, the flavonoid contents were markedly higher in the water extract, with a value of 1.36 mg rutin equivalent/g DW compared to the Chloroform, Buthanolic and Ethyl acetate extract.

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1439
ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF EXTRACT OF CAPSELLA BURSA–PASTORIS FROM NORTH OF IRAN

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Capsella bursa-pastoris, known by its common name shepherd's-purse because of its triangular, purse-like pods, is a small (up to 0.5 m) annual and ruderal species, and a member of the Brassicaceae or mustard family with high nutritional value that can be eaten raw or cooked [1]. Previous phytochemical studies of the genus Capsella revealed the presence of phenolic compounds [2] and alkaloids [3]. A literature survey showed that the Capsella species has been found to contain antioxidant, antibacterial and acetylcholinesterase activities [4]. The purpose of the present study was to evaluate antioxidant and antibacterial activities of ethanolic and aqueous extracts of whole plant (aerial parts and roots). The extracts were prepared and used for determination of antioxidant activity by using DPPH radical scavenging. Ascorbic acid was considered the standard and antioxidant activity of extracts (0.442 mg/ml for ethanol and 0.892 mg/ml for aqueous) were comparable with standard (45.9 µg/ml). This extracts also prevented the growth of *S. aureus*, *S. Enteritidis*, *E. coliand B. Subtilis*. The inhibitory concentration from the growth of this bacteria range from 12.5 mg/ml to 50 mg/ml for *S. Aureus* and *B. Subtilis* and from 25 mg/ml to 50mg/ml for *S. Enteritidis* and *E. coli.*
This study showed that the aerial and root capsella bursa- pastoris exhibits significant antioxidant and antibacterial activities and is good source of natural antioxidant and antibacterial agents.

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1440

ENHANCED VERBASCOSIDE BY ELICITATION IN CELL CULTURE OF S.STRIATA IN BIOREACTOR

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Phenylethanoid glycosides are a class of polyphenols compounds that have been distributed in various plants [1]. Some studies on these medicinal compounds demonstrated that phenylethanoid glycosides have a wide range of biological activities including antibacterial, anticancer, antioxidant, anti-inflammatory, immune muddulator, inhibiting tyrosinase and etc [2]. Recently, these compoundes are notable becuease of their potential in pharmaceutical and industrial application. Hence, modern cell cultivation methods such as bioreactor have been applied in the commercial production of several metabolit. *Scrophularia striata* Boiss. is a native plant species of the Scrophulariaceae family has pharmaceutical phenylethanoid glycosides (verbascoside) [3]. Fungal elicitor is one of the most commonly used elicitors for the induction or enhancement of secondary metabolite production. The this study, we investigated the effect of piriformospora indica on growth and verbascoside accumulation in *S. striata* cell suspension cultures in shake flaska and bioreactor. initially, *P. indica* was prepared in concentration of 250mg/ml and added in final concentrations 0, 0.5, 1 and 2% to 10 dayes cell suspension cultures of *S. striata*. Then, growth parameters and verbascoside accumulation were measured 5 days after elicitation. Finaly, optimum concentration was selected for elicitation in bioreactor. As discribed, the fungal micylium (1%) added to bioreactor medium after 10 days andthe cells were collected 5 days after elicitation. The result showed that although there was not any diffrent in growth rate elicitated cells in bioreactor in compare with control but verbascoside content in elicitated cells was produced 450 fold higher than control. The growth rate and verbascoside content in shake flask showed no different with control but verbascoside concentration of suspension cells cultured in bioreactor was higher (about 2-fold) as that of suspension cells in flask. Therefore, the production of verbascoside was increased when the cell cultures were transferred from shake-flask to bioreactor and elicitated by *p. indica*.

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1443

CHEMICAL COMPOSITION OF ESSENTIAL OIL AND ANTIOXIDANT ACTIVITY OF EXTRACT OF *PHLOMIS RUSSELIANA* FROM NORTH OF IRAN

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Crude extracts of spices, herbs, and other plant materials rich in polyphenolics are increasingly of interest to the food industry because they have the capacity to retard oxidative degradation of lipids and thereby improve the quality and nutritional value of food [1]. The use of synthetic antioxidants for this purpose is gradually being discontinued due to their undesirable side effects. Therefore, extraction and production of natural antioxidants is a necessary [2]. *Phlomis russeliana* is a native plant belongs to Labiatae family which can used more in modern medicine and different industries for its essential oil particulars, in addition to Iranian folk medicine [3].In this study, P. russeliana were collected in full flowering stage from mountain of Reineh area in Mazandaran province, Iran. The parts of *P. russeliana* were subjected to hydrodistillation in a Clevenger-type apparatus. The essential oil was analyzed by GC and GC-MS. The 17 components were identified which contained 95.67 % of the oil. Humulene (% 26.89), Mono(2-ethylhexyl) phthalate (% 20.42), Caryophyllene (%18.74), Borneol (% 5.96) and Camphor (% 4.45) were major components in *P. cancellata* oil. At the next test, effect of essentaial oil on oxidative stability of sunflower was assessed using peroxide value and thiobarbitoric acid index. Ascorbic acid was considered the standard sample. The result showed that essential oil of *P. russeliana* could control peroxide value and thiobarbitoric acid.

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1454
EFFECTS OF STEROID HORMONES ON CALLUS INDUCTIONIN GERMAN CHAMOMILE

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The of mammalian sex hormones have beneficial effects on plant species as they influence cell division, root and shoot growth, flowering, proliferation of callus tissue and pollination and fertilization of plants [1, 2, 3]. In order to investigate the effects of testosterone, progesterone and 17-beta-estradiol hormones on callus induction and growth of German chamomile, a factorial experiment was carried out with five concentration (0, 0.01, 0.1, 1 and 10 mg/l) of these hormons based on completely randomized design (CRD) with three replication. The results showed thatsteroid hormones, alone orin combination with NAA and BAP increased callus fresh weight of both leaf and hypocotyl explants. Generally, at low concentrations (0.01 or 0.1 mg/l), they were more effective in increasing the callus fresh weight of leaf and hypocotyl explants. The 17beta-estradiol and progesterone hormone sat10mg/l and testosterone at 0.01mg/l were more effective for increasing the percentage of direct rooting and root weight of leaf explants. The 17beta-estradiol had a significant effect on the direct rooting and root weight from hypocotyl explant at 10mg/l. However, testosterone and progesterone did not show anysignificant effect onincreasing the percentage of direct rooting and root weight from hypocotylexplant.

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1464

EFFECT OF CHRONIC ADMINISTRATION OF *CANNABIS SATIVA* L. FLOWER TOPS HYDROALCOHOLIC EXTRACT ON LATENTPERIODS OF EPILEPSY SEIZURE STAGES INDUCED BYPENTYLENETETRAZOL IN NEONATE RAT

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Epilepsy is a central nervous system disorder that appears as sudden, transient, repetitive and unpredictable convulsions, originated by interaction between sensory-motor and autonomic systems. Regarding to chronic nature of epilepsy, side effects and resistance to chemical drugs, using herbal medicine and their general acceptance, have received remarkable interest. Cannabis Sativa L. is an ancient and medicinal plant that has been used for treatment of insomnia, nausea, hysteric, pain and convulsion in traditional medicine. Therefore, in this experiment, the effect of hydroalcoholic extract of this plant was studied on pentylenetetrazole-induced seizures in neonate rats. Neonate wistar rats (4days old) were divided into four groups, including a group receiving interaperitoneal(i.p) solvent and three experimental groups (receiving the hydroalcoholic extract doses of 1, 10, 50 mg/kg/i.p). I.P injections were started from 4th day of birth and continued for 6days.In 14 day after birthday, pentylenetetrazol (50 mg/kg/i.p) was injected and convulsive behaviors were recorded by a camera during 60 minutes and different phases of seizures were scored. Extract i.p dose of 10 mg/kg had no significant effect on onset time of different severities of seizure. Rats received 1mg/kg/i.p of extract showed significant reduction of latent periods in tonic-clonic seizures stage. extract injection in dose of 50 mg/kg/i.p delayed the onset time of tonic, clonic and tonic-clonic seizures.Therefore dose 50mg/kg in contrast to dose 1mg/kg increases the latent periods significantly. ($p<0/01$) Our study indicated that the hydroalcoholic extract of *Cannabis Sativa* L. has an appropriate anticonvulsant effect, maybe by activation GABAergic system specialy in higher doses, which needs more study to clarify.

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1467

STUDY OF INTERACTION SILICON AND PHOSPHORUS OF DIFFERENT CONCENTRATIONS ON POTASSIUM AND MAGNESIUM IN SHOOTS AND ROOTS IN DRUG PLANT *CARUM COPTICUM* (L.)

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Carum copticum (L.) is an important medicinal plant that in traditional writings Iran to some of therapeutic effects such as therapeutic effect it on flatulence, indigestion, flatus, etc, are mentioned [1, 2]. Nutritional and environmental growth conditions of plants, significantly influences on the rate beneficial constituents of it. Phosphorus is one of the key elements in plant that plays important roles in plant growth as, it is involved in transport energy in the metabolic processes of the plant, plant cell division, growth and development of subsidiary roots, as well as in formation and transport of substances such as sugars and starches in plants [3,4,5]. Such as phosphorus silicon is an important nutrition element and abundant in Earth's crust. In this research, the effect of different concentrations of phosphorus (0, 1 and 4 ml per liter of NaH_2PO_4 in Long AShtOn medium) and silicon (0 , 1.5 and 2.5 mM of Sodium Meta Silicat) on the of Potassium and Magnesiumcontent in hydroponic culture were studied. Results showed that potassium content of shoot in conditions without Silicon, increased with increasing levels of phosphorus. On control conditions of phosphorus, silicon application also caused significant increase content of potassium shoots. In conditions ¼ Phosphorus concentration, application of 1.5 mM concentration of silicon had significant increase in content of potassium in shoots. In root,without silicon conditions and with application of silicon, by increasing the amount of phosphorus, potassium content decreased. But magnesium of shoots, increased it. In the root, Silicon treatment alone increased magnesium content compared to control treatment, but this increase was not significant. While on non Phosphorus condition, silicon concentration of 1.5 and 2.5 mM increased Magnesium content of root significantly. Therefore, from this research can concluded that silicon application have an influence on magnesium and potassium absorption and transportfrom root to shoot on this plant.

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1470

THE EFFECT OF PLANT PURINE ALKALOIDS ON HUMAN SERUM ADA ACTIVITIES

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Theobromine (3,7-dimethylxanthine) and theophylline (1,3-dimethylxanthine) are purine alkaloids and founded in plant sources such as cocoa. Adenosine deaminase (ADA) is the major enzyme of purine metabolism in human and can be found in all human tissues; itis also important in various diseases. The important role of ADA with irreversible hydrolytic catalyzes of adenosine or deoxyadenosine to inosine or deoxyinosine, respectively [1-4].In this research, the effect of extracted and purified theobromine from cocoa powder and purchased theophylline were investigated on kinetic behavior of adenosine deaminase (ADA) by a UV– Vis spectrophotometer. The effect on therapeutic concentration (100 µM) of theobromine and theophylline (as drug) were assayed on adenosine deaminase activity in Tris-HCl buffer (pH 7.15) by UV-VIS spectroscopy and the results were repeated by using the enzymatic method.The results of enzymatic analysis showed that ADA saturation curve is biphasic and doesn't obey Michaelis-Menten kinetics. Both theobromine and theophylline decreased ADA activity. Furthermore they irreversibly inhibit the enzymatic activity. More analysis showed they effect on active site function either directly or by affecting on homotropic effect quality. The results can be considered in treatment for ADA-related diseases.

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1478

ANTIOXIDANT ACTIVITY AND PHENOLIC CONTENT OF DECOCTION, INFUSION AND METHANOLIC EXTRACTS OF *ECHIUM AMOENUM*

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Gol-gavzaban (*Echium amoenum* Fisch. & Mey.) is one of the most important Iranian medicinal plants related to Boraginaceae family. It is a biennial or perennial herb indigenous to the narrow zone of northern part of Iran and Caucasus, where it grows at an altitude ranging from 60 to 2, 200 m [1]. Petals of *Echium amoenum* have been advocated for a variety of effects such as demulcent, anti-inflammatory and analgesic, especially for common cold, anxiolytic, sedative and other psychiatric symptoms including obsession in folk medicine of Iran [2]. In this study the phenolic content and antioxidant activity of decoction, infusion and methanolic and methanol-water (80:20) extracts of *Echium amoenum* which were prepared by maceration and soxhlet methods were evaluated. Decoction showed the highest concentration of phenolic compounds followed by infusion. These samples also displayed the highest DPPH radical scavenging activity. The results support the idea that water-soluble compounds exert strong antioxidant activity.

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1483

EFFECT OF ELECTROMAGNETIC FIELDS ON ANTIOXIDANT ENZYMES IN VALERIAN (*VALERIANA OFFICINALIS* L.)

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In this research, the effects of electromagnetic field of various strengths (0, 1 and 2mT) have been investigated on antioxidant enzymes activity in Valerian (Valeriana officinalis L.). The dry and wet (soaked for 30 min) Valerian seeds were exposed to electromagnetic fields 30 min per day for 3 days. For each treatment groups and the corresponding control, three replicates with 10 seeds were used. Results showed that electromagnetic fields treatment increased significantly ascorbate peroxidase, guaiacol peroxidase, superoxide dismutase, polyphenol oxidase and lipoxygenase activity compare to control for most treatment groups especially in the groups of dry treated seeds. These results showed that electromagnetic fields probably enhanced oxidative stress and treated Valerian seeds probably increased antioxidant enzymes activity to inhibit overproduction of free radicals against electromagnetic fields tension.

1489

ANTIBACTERIAL ACTIVITY OF *SATUREJA RECHINGERI* METHANOL EXTRACT AGAINST CLINICAL ISOLATES OF *PSEUDOMONAS AERUGINOSA* AND *KLEBSIELLA PNEUMONIAE*

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Due to the rapid increase in resistance of pathogenic bacteria to antibiotics, search for alternative agents such as bioactive plant materials has become of great interest. In this study, the antibacterial activity of *Satureja rechingeri* methanol extract was determined against 7 burn *Pseudomonas aeruginosae* isolates, 15 urinary isolates of *Klebsiella pneumoniae* as well as 6 ATCC standards by disc diffusion [1]. Minimum inhibitory concentrations (MIC) were also measured by the agar dilution method [2].
Disc diffusion results showed that 7/15 *K. pneumoniae* isolates were sensitive to the methanolic extract with inhibition zones (IZ) of 15-31 mm and the rest had IZ of 11.5-13 mm. On the other hand, 6/7 P. aeruginosa were resistant and only one was highly sensitive (IZ=31.5mm). Among the ATCC standards, *B. subtilis* and *S. aureus* showed the highest sensitivity (IZ=21.5 mm) followed by E. coli (IZ=23 mm), E. faecalis (IZ=19 mm) and *K. pneumoniae* (IZ=14.5 mm) but the ATCC *P. aeruginosa* isolate was resistant to the extract. The MIC values confirmed the disc sensitivity results. The results of this research show that *Satureja rechingeri* methanol extract has a potential antibacterial activity against clinical isolates of K. pneumoniae. In addition, susceptibility of S. aureus and E. faecalis ATCC standards suggests a potential use against Gram positive pathogens.

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1496
DIFFERENTIATION OF SECRETORY CANALS IN DILL (*ANETHUM GRAVEOLENS* L.) IN RELATION TO REPRODUCTIVE DEVELOPMENT

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Members of the Apiaceae family are characterized by compressed schizocarp fruit and internal secretory structures known as canals (vittae). Phytochemical screening of dill (Anethum graveolens) seed extract has shown the presence of tannins, flavonoids, alkaloids, saponins and cardiac glycosides with antibacterial properties [1]. Anti – diabetic potential of aqueous and alcoholic dill extracts has been reported [2,3]. No data exists on the botanical aspect of dill fruit and it's secretory canals.The present research has focused on the vittae in dill fruit, with emphasis on their differentiation and secretory activity during reproductive development. Dill flowers and fruits were selected at two and three ontogenic stages, respectively. Samples were double fixed in glutaraldehyde and osmium tetroxide, dehydrated in graded acetone and embedded in spur's resin. 2µm thick sections were stained in toluidine blue and observed under the compound light microscope. Four elongated and two circular secretory canals were observed in dorsal and ventral surfaces of the ovary walls, respectively, before the anthesis. They differentiated during reproductive development and were distinguishable in each fruit mericarp. Each secretory canals was lined with 16 flattened cells. The cells in the pre– secretory phase were characterized by a dense cytoplasm and some small vacuoles. Density of cytoplasm decreased at the secretory phase and the secreted material bordered the canals. At the post–secretory phase, cell walls of the secretory cells compressed.Pre–and post–secretory phases of the canals were observed in post anthesis flowers and ripe fruits, respectively and immature fruits were at the secretory phase. The immature dill fruit seems to show the highest level of secretion. This stage is therefore recommended for the most efficient medicinal use of this popular herb.

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1498

INTERACTION OF SALINITY AND WATERLOGGING ON SOME PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES IN *MENTHA AQUATICA* L.

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Salinity and waterlogging are the restrictive factors for plant growth and development. The aim of this study is to investigate the effect of interaction of salinity and waterlogging on total Chlorophyll, Carotenoids, Hydrogen peroxide, MDA and proline contents in Mentha aquatica L. The seeds were planted in pots filled with pit and perlite with a ratio 1 to 2, and allowed to grow in greenhouse condition. The 50 days old plantlets were cultured in pot filled with perlite and they were irrigated with 1/5 Hoagland solution about 2 weeks. Then the plants were placed under waterlogging and different NaCl concentrations (0, 50, 100, 150mM). Waterlogging treatments include 1 (irrigated with 25 ml of Hoagland solution daily), 2 (irrigating half of pot), and 3 (irrigating 5 cm above the pot surface). Results showed that total Chlorophyll contents increased under salinity stress and decreased under waterlogging. Highest content of chlorophyll was determined at 100mM NaCl.Higher level of NaCl (150 mM) significantly increased Carotenoid content. Interaction between salinity and waterlogging significantly decreased hydrogen peroxide content at all levels of salinity and MDA content decreased up to 100 mM NaCl. Also increase of salinity caused considerable increase in proline content but the content of proline decreased under interaction of salinity with waterlogging. It seems that waterlogging conditions can remarkably alleviate the effects of salinity in M.aquatica.

1500

ANTIBACTERIAL ACTIVITY OF *ARTEMISIA ANNUA* ESSENTIAL OIL AND ITS SYNERGY WITH CIPROFLOXACIN AGAINST CLINICAL ISOLATES OF *KLEBSIELLA PNEUMONIAE* AND *PSEUDOMONAS AERUGINOSA*

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The increasing emergence of multidrug resistant pathogenic bacteria has resulted in seeking new therapeutic regimes such as the combined use of antibiotics and medicinal plants with antimicrobial activity. In this survey, the antibacterial activity of Artemisia annua essential oil and ciprofloxacin were determined separately and in combination against clinical isolates of Klebsiella pneumoniae and Pseudomonas aeruginosa. The aerial parts of Artemisia annua were collected at full flowering stage at Ramsar, Mazandaran, Iran. The essential oil was isolated by hydrodistillation and analyzed by a combination of capillary GC–MS [1.2]. *Artemisia annua* essential oil contained 20 constituents of which the major components were ketone (23.5%), 1,8-Cineole (13.7%), α-pinene (10.5%). Antibacterial activity was measured against 15 urinary *K.pneumoniae* and 15 *P.aeruginosa* burn isolates and 7 ATCC bacterial standards by disc diffusion. Minimum inhibitory concentrations (MIC) of the essential oil and ciprofloxacin were determined by agar dilution. Finally, synergy between the essential oil and ciprofloxacin was measured by the micro dilution assay aganist 7 resistant isolates of K.pneumoniae and 6 resistant isolates of P.aeruginosa.Disc diffusion results showed that all P. aeruginosa isolates were resistant to A. annua essential oil and ciprofloxacin except for one sensitive strain. K. pneumoniae isolates and ATCC strains showed different sensitivities to A. annua essential oil as well as ciprofloxacin. The combination of essential oil and antibiotic showed synergy against 3/7 K. pneumoniae isolates (42.8%), additive effect against three isolates and antagonism against one strain. For P. aeruginosa isolates, there was synergy against one(16.6%) and additive effect against three strains[3]. Generally, *K. pneumoniae* strains were more sensitive to the combination of essential oil and ciprofloxacin compared to *P. aeruginosa*. The results obtained in this research are encouraging and could lead to new choices for treatment of some infections caused by K. pneumonia.

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1506
SALVIA OFFICINALIS EXTRACT DECREASES THE COMPLICATIONS OF DIABETES BY PREVENTING HEMOGLOBIN GLYCATION

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Hyperglycaemia has an important role in the pathogenesis of diabetic complications by increasing protein glycation and the gradual build-up of advanced glycation end products (AGEs) which resulting in structural and functional alteration in proteins [1]. Glycated hemoglobin is derived from the non-enzymatic addition of glucose to valin and lysine residues on the alpha and beta chains of the of the hemoglobin molecule [2]. Protein glycation and AGE are accompanied by increased free radical activity that contributes towards the biomolecular damage in diabetes. since salvia officinalis is a medicinal plant well known for its antioxidant propertie and has ability scavenging of free radicals [3], we investigated the effect of its leaves extract on the glycation of human hemoglobin.Hemoglobin was incubated with glucose in the presence and absence of salvia extract. The glycation extent of hemoglobin was examined by specific fluorescence, Congo red binding assay and circular dichroism (CD). our results represent that salvia extract prevents glycation induce decreasing in free amino groups, increasing in β-sheet structure, altering in the secondary structure. Therefore it can be concluded that the *salvia* extract has a significant antiglycation effect and can prevent of diabetes complications.

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1511
ANTIFUNGAL ACTIVITY OF LEAF AND FRUIT METHANOL EXTRACTS OF *MESPILUS GERMANICA* L. AGAINST *CANDIDA ALBICANS*

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Candidiasis is the most important and prevalent opportunistic fungal disease in human, undoubtedly. Today, several failure are reported in treating patients with Candidiasis. Therefore, researchers tend to use medicinal plants because they are effective and don't have side-effects of chemical drugs [1,2, 3,4]. Antifungal effect of *Mespilus germanica* L. extract on *Candida albicans* was examined in this study. Inhibitory effect of leaf and fruit extracts of *Mespilus germanica* L. on standards strain of *Candida albicans* was done by four diskdiffusion, Well Diffusion Aga, Minimum Bactericidal Concentration (MBC) and Minimum Inhibitory Concentration (MIC) methods. Several dilutions of *Mespilus germanica* L. leaf and fruit extracts were provided and then 10µl fungal suspension was added. The results indicated that methanol extract of *Mespilus germanica* L. leaf and fruit had dose-based antifungal activity against Candida albicans in all four methods. Leaf extract contained more antifungal activity than fruit extract.

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1514
A STUDY ON THE GREEN SYNTHESIS OF SILVER NANOPARTICLES USING *LAUNAEA ACANTHODES* EXTRACT AT ROOM TEMPRETURE

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Tremendous growth in nanotechnology has opened up new frontiers in fundamental and applied aspects, including the synthesis of nano-scale matter and understanding/utilizing their exotic physicochemical and optoelectronic properties. Nanoparticles have received considerable attention in recent years due to their wide range of applications in the fields of diagnostics, biomarker, cell labeling, antimicrobial agents, biological tagging, pharmaceutical applications, environmental pollution control, drug delivery systems, cancer therapy, biosensing and material chemistry. Among noble metal, silver nanoparticles (Ag NPs) in particular are known for their versatile applications in medical industries. Recently, green synthesis methods employing either biological microorganisms or plant extracts have emerged as a simple and alternative method instead of chemical synthesis. Generally, the green synthesis method involves three main steps, (1) solvent medium selection, (2) environmental benign reducing agent selection, and (3) non-toxic substances [1, 2]. In this study, silver NPs were synthesized using the *Launaea acanthodes* extract as a reducing agent. Launaea acanthodes is an annual herb from Asteraceae family (Compositae) with glabrous bushy and branch stems. It is a resistant plant, native in semiarid regions in Iran and grows on ultramafic soils of central Iran. The synthesized silver nanoparticles were characterized by UV-visible spectroscopy, x-ray diffraction (XRD) and infrared spectroscopy (IR). The UV-visible spectrum of synthesized silver nanoparticles showed maximum absorption at 430 nm corresponding to the surface plasmon resonance band of Ag NPs. The XRD analysis revealed that Ag NPs are cubic structuring in shape with an average particle size of 9 nm.

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1515
OPTIMIZING THE CONDITION FOR SEED GERMINATION AND CALLUS INDUCTION IN TWO GENUS OF *CHAMOMILE* PLANT IN VITRO

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Chamomile is a main medicinal and aromatic plant, and native to Iran which has many applications in the pharmaceutical industry. Proliferation of the plant in vitro and optimization of tissue culture systemfor production of secondary metabolites with high antioxidant properties are very valuable. In this study, the optimized condition for seed germination and callus induction of two genus of chamomile: German chamomile (Matricaria chamomile) and Gilani chamomile (Anthemis gilanica) was studied. The seed were sterilized and cultured on MS and ½ MS culture medium [1] and subjected to cold treatment (4˚ C), the cold-dark for 48 hours. Seed germination percentage was calculated after 7 days to induce callus tissue from leaves and roots of both genus under different hormonal treatments: KIN, NAA and 2, 4-D at concentrations of 0.5, 1and 2 mg l-1 and growth parameters were studied after 30 days. The results showed that the highest percentage of germination in both genus was observed in the treatment of cold-dark interaction for German chamomile (50%) and Gilani chamomile (65%). 2, 4-D=1 and Kin=1 mg l-1 were the best combination for callus induction and growth rate in leaves of German chamomile, and NAA=2 and Kin=1 mg l-1 were the best combination for callus induction and growth rate in leaves in Gilani chamomile and the leaves explants were better than the roots. In summary,the interaction of cold-darkis suitable for seed germination and leaf explant of chamomile is the best and suitable explant for callus induction.

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1520
VARIATION OF TOTAL PHENOLIC, FLAVONOIDS AND TANNIN CONTENT IN DIFFERENT EXTRACTS OF CHARKHEH

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It is well known that phenolic compounds are constituents of many plants. Plant phenolic compounds are one of the best sources of natural antioxidants. In this study, the amount of total phenolic compounds, flavonoids and tannin were determinedfor five different extracts (n-butanol, water, ether, ethanol and acetone) of Charkheh plantwhich is an annual herb from Asteraceae family. The aerial parts of this plant were collected from south Khorasan Province in July 2014.The amount of total phenolic content of each extract was measured spectrophotometrically using the Folin-Ciocalteu (FC) reagent according to a laboratory procedure described by Fukumoto et al. with small modifications using gallic acid as standard [1]. Also, total flavonoid content in the extracts was determined using slightly modified colourimetric method described by Jiaet al. based on the formation of flavonoid-aluminum complex [2]. Hence, total tannins were measured according to the method in Makkar et al. with modifications [3]. The results showed that the highest amount of total phenolic compounds has been abserved in the H_2O extract of this plant (9.68 mg gallic acid equivalent (GAE) / gr dry weight (DW)) and for flavonoids, 0.072 mg rutin equivalent / gr DW, which were also obtained from water extract. Furthermore, the highest quantity of tannin was found in H_2O extract (1.791 mg tannic acid equivalent (TAE) / DW).It is suggested that Charkheh plant could play a significant role as antioxidant source, which might enhance the quality of the products in foods, beverages, drinks and pharmaceutical industries.

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1523
FAST HPLC DETERMINATION OF PHENOLIC COMPOUNDS IN NETTLE LEAF AND ITS LEAF EXTRACT

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Nettle leaf is the whole or cut dried leaves of urtica dioica, urtica urens, or a mixture of 2 species. Urtica (Urtica dioica) has been used in herbal medicine, mainly for urinary- tract and rheumatic disorders. *Urtica urens* has been used similarly. It contains a minimum of 0.3% for the sum of caffeoylmalic acid and chlorogenic acid expressed as chlorogenic acid ($C_{16}H_{18}O_6$=353.3), calculated on the dried basis. The aim of the present study is to quantify the caffeoylmalic acid and chlorogenic acid as a marker compound in nettle leaf and its extract by high performance liquid chromatographic methods. HPLC (150 mm × 4.6 mm,5-µm particle size column, mobile phase methanol gradient in a mixture of 15 volumes of methanol and 85 volumes of water adjusted to pH 2.0 with dilute phosphoric acid) was used for the determination of chlorogenic acid. In this research cholorogenic acid and caffeoylmalic acid was determined by fast HPLC in nettle leaf and its dried extract. Amount of flavonoid was 0.76%, 1.40% in nettle leaf and its extract (obtain from freeze dryer) respectively.

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1532
FIRST REPORT OF B CHROMOSOME IN *KELUSSIA ODORATISSIMA* MOZAFF A MEDICINAL PLANT

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Kelussia odoratissima Mozaff. is a wild and endangered endemic plant found only in limited areas of Central Zagros Mountains, Iran. In the present study, chromosomal structure of two population of K. odoratissima was studied and metaphasic cells were obtained from the root of germinated seeds. Slides were prepared and analyzed in microscope (Olympus BX51). The images were captured using the software DP12 controller. The analysis of mitotic cells revealed a diploid number of 22 chromosomes for both populations, with the occurrence of a metacentric B chromosome in all analyzed cells. Supernumerary B Chromosome has not been previously reported in this species. B chromosomes are supernumerary dispensable parts of the karyotype which appear in some individuals of some populations in some species. Often, they have been considered as 'junk DNA' or genomic parasites without functional genes. Some authors suggest a correlation between their presence and environmental factors, or the possibility that these chromosomes convert into a reservoir of genetic variability, showing an evolutionary role. Recent data suggest that B chromosomes carry transcriptionally active genic sequences which could affect the transcriptome profile of their host genome. Because B chromosomes interact with the standard chromosomes, they can play an important role in genome evolution and may be useful for studying molecular evolutionary processes of *K. Odoratissima*, as a wild new species that contain valuable bioactive compounds.

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1539

ELICITOR-INDUCED TROPANE ALKALOID ACCUMULATIONS AND ANTIOXIDANT ACTIVITIES IN PMT OVEREXPRESSING HAIRY ROOTS OF *ATROPA BELLADONNA* L

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Atropa belladonna L. has pharmaceutical tropane alkaloids such as hyoscyamine and scopolamine. In order to increase the production of these metabolites, it can be beneficial the addition of chemical compounds to plant culture mediums [1]. Cerium (Ce) is the second element of the lanthanides that it is involved in plant defense systems [2] and probably can increase the production of secondary metabolites. In this research the effect of cerium on tropane alkaloid accumulations and antioxidant activities in hairy roots of A. belladonna was investigated. These hairy roots, line P2, were established by transformation with Agrobacterium rhizogenes strain C58C1 containing a foreign gene pmt (putrescine methyl transferase, the first enzyme in the biosynthesis pathway of these compounds). In continue, the 12 days hairy roots were fed with different concentrations of Ce(NO3)3 (in final concentrations of 0, 1, 5 and 25 µM) and were harvested 5 days after elicitation. The result showed higher levels of hyoscyamine and scopolamine in the roots treated with 5 µM concentration of Ce(NO3)3 (1.58 and 1.84 fold, respectively). Moreover, high activities of superoxide dismutase, peroxidase and catalase in these roots were observed compared with control (1.62, 1.43 and 1.72 fold, respectively). Further, H2O2 content was decreased after feeding Ce(NO3)3 in the hairy roots(0.43 fold compare with control). The result indicated that Ce caused an increase of tropane alkaloid accumulations. Also, for prevention of oxidative damage in hairy roots the activities of antioxidant enzymes were improved to reduce the content of ROS like H_2O_2.

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1546
STUDY OF MEDICINAL PLANT OF TAMORADI REGION IN BOYIR AHMAD REGION, IRAN

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Iran has one of the most enriched floras of the world. Concerning to this point that noticeable percent of Iran species is much of medicinal plant, so point from this point, it has great potentiality. On the other hand the revealing of lateral effects of chemical medicinal, cause that the usage of medicinal plants are incredibly concerned. This day along all of the world, there is a special attention toward that source in the way of curing. This process is such an incredible process that the exports of pharmacy science named the 20th century the century of returning to the nature and the use of medicinal plants. With regard to importance of medicinal plants, this study has carried out inTamoradi region in Boyr Ahmad Region for identification of medicinal plants of this Region. There were various stages contained collection of rural and locale information about medicinal plants, field and in situ investigations and identification of them in region Boyr Ahmad. The result showed that this study of 139 plant species belongs 49 families collected and identified. Astaraceae family with 12.94 % (18 species), Lamiaceaefamily with 10.07 % (14 species), Apiaceae family with 6.47 % (9 species) and Brassicaceae family with 5.75 % (8 species) were most important species in the region. Based on Raunkiaer method, hemicryptophytes were among the most important life forms comparing with the other ones. The most common chorotypes was mostly Irano-Turanian type.

1555
EFFECTS OF DIFFERENT TEMPERATURE AND LIGHT CONDITIONS ON GERMINATION OF *HYOSCYAMUS NIGER* SEED

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Hyoscyamus niger L. is an important medicinal plant belonging to solanaceae family, and distributes in different regions of Iran. It is a rich source of medicinal substances including tropane alkaloids such as hyoscyamine and scopolamine. In this study, effects of pre-treatment techniques on dormancy and seed germination of H. niger were investigated. Seedssoaked in water for 48 hours, and were cultured on two series of Murashig and Skoog medium[1] (MS and 1/2 MS) under sterile conditions and were placed in a growth chamber with a photoperiod of 16 h light / 8 h dark and 25 °C temperature, respectively.Seeds were pre-treated in different light conditions (0, 19 lux), temperatures (4 and 30 °C) and control (3460 lux at 25 °C) for 72 hours, and seed germination was measured after 15 days. Results showed that seed germination in 1/2 MS was significantly higher than that of MS ($P \leq 0.05$). Seed germination was 45, 70, 25, 4 and 1% in 0 and 19 lux, 4 and 30 °C, and control, respectively. It seems that ½ MS medium with 19 lux light is a good condition for *H. niger* seed germination.

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1563
EFFECT OF SALINITY ON SOME BIOCHEMICAL CHARACTERISTICS IN MEDICINAL PLANT *SATUREJA KHUZISTANICA* JAMZAD

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Satureja khuzistanica Jamzad. belonges to Labiateae family and It is one speciesnative of southern Iran. Carvacrol is essential oil in Satureja khuzistanica. Essential oils that containing carvacrol has been antioxidant and antimicrobial activity. In order to study effects of salinity on the photosynthetic pigments, soluble sugar, proline and protein in *Satureja khuzistanica* plant, experiment was conducted ina completely randomized design (salinity in 4 levels 0, 40, 80 and 120 gr in 100 kg soil) with 6 replicates. This results show that salt stress redused photosynthetic pigments amount by increase the soil salinity from 0 to 40 gr NaCl in 100 kg soil and then increased by 80 gr NaCl in 100 kg soil and again decreased by concentration of 120 gr NaCl in 100 kg soil. The amount of solouble sugar, proline and protein by the soil salinity increased from 0 to 40 gr in 100 kg soil and then decreased in concentration of 80 gr NaCl in 100 kg soil, in 120 gr NaCl in 100 kg soil increased amount of characters. Plants under stress by accumulation of free amino acids, soluble sugars and proteins, reduce their osmotic potential and osmotic adjustment is obtained.

1564

CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL AND DIFFERENT EXTRACTS OF ENDEMIC PLANT *ACHILLEA OXYODONTA*

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Achillea is one of the most important genera of the Asteraceae family, with about 115 species, is widely distributed in Europe, Asia and northern Africa and is naturalised in other parts of the world. Nineteen species of this genus have been recognized in Iran; 7 of these species are endemic. Nowadays, different medicinal functions of Achillea such as spasmolytic, choleretic, treatment of wounds and anti-inflammatory activities make it as an important medicinal plant. In this study, the essential oil from aerial parts of *Achillea oxyodonta*, an endemic taxon collected from Tehran province, was obtained by hydrodistillation and analysed by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). Forty nine components were identified in the oil representing 97.98% of the oil with 1,8-Cineol (11.15%), Camphor (12.83%), cis-β-Farnesene (8.21%) and Spathulenol (13.13%) as main constituents. Antioxidant activities of essential oil and methanolic, aqueous methanolic (50%) and aqueous extracts of *Achillea oxyodonta* species were evaluated with 2,2-diphenyl-1-picrylhydrazyl (DPPH) method. In the DPPH test, methanolic extract showed the best radical scavenging activity with an IC50 value of 179.89 ± 2.81 μg/mL, about 31% of the potency of synthetic standard butylated hydroxyanizole (BHA) as positive control (IC50 = 56.47 ± 0.21 μg/mL). The total phenolic content of the *Achillea oxyodonta* extracts was determined using the Folin-Ciocalteu reagent. There was a significant linear correlation between antioxidant activity and total phenolic content for extracts (coefficient R2=0.9029). Essential oil of *Achillea oxyodonta* species did not demonstrated considerable antioxidant activities.The oil was also screened for antibacterial activity against *Bacillus subtilis*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* by microdilution method. The oil showed pronounced antibacterial activity against all of the bacteria tested [1, 3]. The findings concluded that *Achillea oxyodonta* oil and extract may be supplemented as potent antibacterial and antioxidant agent in food and pharmaceutical systems.

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1567
GREEN SYNTHESIS OF SILVER NANOPARTICLES USING LEAF AQUEOUS EXTRACT OF *FRORIPIA SUBPINNATA*

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Silver nanoparticles (AgNPs) have attracted great interests due to their special properties and applications in various fields such as catalysis, optics, electronics, biotechnology, bioengineering, textile engineering and water treatment [1]. Many methodologies have been used for the synthesis of nanoparticles, like physical routs, chemical and photochemical reduction, electrochemical techniques, and radiolysis methods [2]. Most of these methods are extremely expensive and they also involve the use of toxic and hazardous chemicals as reducing and capping agents which may pose potential environmental and biological risks. Nowadays, green chemistry procedures using various biological systems including yeast, fungi, bacteria and plants extract for the synthesis of nanoparticles are commonly used [3]. The synthesis of nanoparticles using plant extract is more advantageous over microbial route because of simple and user friendly process, economical and less reaction time. We herein report the green synthesis of AgNPs by reduction of silver nitrate using aqueous extract of Froripia usbpinnata leaves as a reducing and a capping agent. This process for the synthesis of AgNPs is rapid, novel and ecofriendly. The formed AgNPs at room temperature are spherical in shape with an average particle size of ~20 nm, crystalline in nature; these properties are confirmed by FESEM and XRD analysis. The particle size seems to be related with the $AgNO_3$ and extract concentration as well as reaction temperature.

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1572
GC-MS ANALYSIS AND ANTIBACTERIAL ACTIVITY OF THE METHANOLIC EXTRACT OF *DICTYOTA DICTOMA* FROM QESHM ISLAND

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The study of macroalgae is very fascinating and it is still not much known about the biology and biological activities of these important marine organisms. Algae and consequently their extracts can be the invaluable sources of biologically active compounds. Their beneficial properties for humans, animals and plants have been studied for the development of new biotechnological products [1,2]. Continuing our research on the bioactive metabolites from Iranian algae [3,4], the dried and grinded brown algae, Dictyota dictoma, gathered from intertidal southern coasts of Qeshm Island was subjected to successive extraction with solvents of different polarities and the extraction conditions were optimized. The methanolic extract was characterized with GC-MS and the antibacterial activity of methanolic extract was studied against two gram negative and three gram positive bacteria including *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Enterococcus faecalis* and *Staphylococcus aureus*, respectively. The results showed the remarkable antibacterial activity of the algal extract with the MIC of 8 and 16 mg ml-1 against *Escherichia coli*, *Pseudomonas aeruginosa* and 0.25, 0.0625 and 0.0625 against *Enterococcus faecalis*, *Enterococcus faecalis* and *Staphylococcus aureus*.

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1576
THE INVESTIGATION OF THE EFFECT OF SILICON AND IRON ON GROWTH, ION CONTENT IN *CARUM COPTICUM* L

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Iron is an essential micronutrient with numerous cellular functions and its deficiency represents one of the most serious problems in human nutrition world wide. Plants have two major problems with iron as a free ion: its insolubility and its toxicity.in this research, we have investigated the effect silicon 0,1/5,2/5 millimolar in deficiency and toxicity of iron on the absorption rate of potassium (K+) and magnesium (Mg2+) in the root and shoot of carum copticum l. plant. The results showed that silicon treatments with the maximum iron concentration following significantly decrease magnesium (Mg2+) in the shoot and also in deficiency conditions of iron, That s significantly caused to increase magnesium (Mg2+) in the root and shoot and the reciprocal effect of silicon and iron s significantly caused to increase potassium (K+) in the root and decrease in the shoot and we can conclude that in iron deficiency conditions,silicon with increasing magnesium (Mg2+) content and improve better growth of the plant and also silicon is caused to increase potassium (K+) absorption that potassium (K+) is considered as one of the primary osmotic substances, which contribute to osmotic adjustment in many plant species [1, 2].

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1578
FACILE GREEN SYNTHESIS OF GOLD NANOPARTICLES USING AQUEOUS EXTRACT OF *FRORIPIA SUBPINNATA*

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Metal nanoparticles have been of great interest due to their distinctive properties such as catalytic, optical, magnetic and electrical [1]. Among the nanoparticles, gold nanoparticles (AuNPs) are one of the promising products in the nanotechnology industry, because of their various biological applications including drug-delivery, tissue/tumor imaging, bio-labeling, biosensors devices, photothermal therapy, and electrochemical immunoassay [2]. Several existing chemical and physical methods have been reported to produce nanoparticles successfully. However, these processes are usually costly and involve using toxic chemicals [3]. Nowadays biosynthesis appears to be a cost efficient and more promising alternative for the preparation of AuNPs due to its simplicity and eco-friendliness.This study reports a green method for the synthesis of gold nanoparticles by reduction of auric acid using the aqueous flavonoid rich extract of Froripia subpinnata. Gold nanoparticles were characterized with different techniques such as UV–vis spectroscopy, FT-IR spectroscopy, X-ray diffraction, and field emission scanning electron microscopy (FESEM). The formation of AuNPs was visually confirmed by color change from yellow to ruby red color, and the reaction was completed within 3 h at room temperature. The effects of gold salt concentration, extract quantity and reaction temperature were also investigated on nanoparticles synthesis.

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1579
INTERACTION OF SALINITY AND ASCORBIC ACID ON CATALASE AND PEROXIDASE AS ANTIOXIDANT ENZYMESE IN *SATUREJA KHUZISTANICA* JAMZAD

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Salt stress causes ionic, osmotic and oxidative stresses in plants. Ascorbic acid is an antioxidant compound that can function as growth regulator. *Satureja khuzistanica* Jamzad. belonges to Labiateae family andIt is one speciesnative of southern Iran. Carvacrol is essential oil in *Satureja khuzistanica*. Essential oils that containing carvacrol has been antioxidant and antimicrobial activity. In order to study the interactioneffectsof salinityand ascorbic acid onthecatalase and peroxidase enzymein *Satureja khuzestanica* plant. Factorial experiment was conducted in a completely randomized design (salinity in 4 levels 0, 40, 80 and 120 gr in 100 kg soil and ascorbic acid in 2 levels 0 and 2 mM) with 6 replicates. This result show that in present and in absent of ascorbic acid, catalas enzyme amount by the soil salinity increased from 0 to 120 gr NaCl in 100 kg soil. The amount of peroxidase enzyme by the soil salinity decreased from 0 to 40 gr in 100 kg soil and then increased to concentration of 120 gr NaCl in 100 kg soil But, In present of ascorbic acid, amount of peroxidase increased by increase the soil salinity from 0 to 40 gr NaCl in 100 kg soil and then decreased to 120 gr NaCl in 100 kg soil.

1583
ANATOMICAL STUDY IN *LYCIUM RUTHENICUM* L

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Species of the genus Lycium, have a variety of biological activities, such as immunoregulation, anti-aging, lowering blood-sugar and blood-fat levels, antimicrobial, anti-oxidant and anti-fatigue activities [1, 2]. *Lycium ruthenicum* L, belongs to the genus *Lycium* of the family Solanaceae. It is a unique nutritional and medicinal plant, witch has been recorded in Tibetan medical classic as a traditional herb. Its ripe fruits had been used for treatment of heart disease, abnormal menstruation and menopause [3]. Previous studies indicate that *L. ruthenicum* has anti-oxidant properties, cell-mediated immunity enhancement and antimicrobial activities. The anatomical properties of L. ruthenicum have not been studied. Therefore, the purpose of this study was to investigate the anatomical properties of vegetative organs of *L. ruthenicum*. The plant specimens was collected from Gogan, East Azerbaijan province. Transverse sections taken from the leaf, stem and root were stained by Carmine and methylene blue and the leaf epidermis stained by methylene blue. In the leaf, the epidermis is composed of a single layer of cells, and the cells are oval or circular. Epidermal cells are covered with a thick cuticle. Trichoms aren't present in the leaf. Stomata type is anisocytic and occurs on both surfaces (amphistomatic leaves). They are located almost on the same level as epidermis cells. Leaf is isobilateral. Palisade parenchyma cells are 3 layered on the upper and lower surface. Spongy parenchyma cells are polygonal. The shape of the palisade parenchyma in transverse section is cylindrical. The vascular bundles are biocollateral. Middle vein on leaf is surrounded by parenchymatic cells and upper and lower parts of vascular bundles are accompanied by collenchyma. In the stem, the epidermis is composed of a single layer of cells, and the cells are rectangular. Epidermal cells are covered with a thin cuticle. Trichoms aren't present in the stem. Peridermis is present under epidermis. Parenchymatous cells are present under Peridermis. The vascular bundles are biocollateral. The pith consists of large orbicular or polyhedral parenchymatic cells which is thinwalled. The root has a primary structure with the beginning of a secondary one. Peridermis is present under rhyzodermis. Parenchymatous cells are 4 layered. Root anatomy of this species has exarch xylary structure. The vascular bundles are radially symmetrical.

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1591

INVESTIGATION OF *AVICENNIA MARINA* GROWTH AND PHENOLIC COMPOUNDS CONTENTS UNDER CRUDE OIL CONTAMINATION

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This study investigated the effect of crude oil-contamination on growth performance and phenolic compounds content of *Avicennia marina*. The experiment was conducted in a nursery site close to Bandar Abbas in the north coast of Persian Gulf. A. marina seeds were sown in different concentrations of the crude oil mixed soil (i.e., 2.5, 5, 7.5, and 10 w/w). The seedling emergence percentage, and root and stem phenolic contents were studied to determine the plant capability to tolerate crude oil-contamination. The results revealed that A. marina can effectively germinate at high crude oil-contaminated soils while plant total biomass reduced significantly. The total phenol content of treated plants was found to increase (about 5 times) as oil contamination of soil raised. This study highlighted the potential role of phenolic compounds as one of the effective biochemical in A. marina to cope with stressful conditions.

1593

INVESTIGATION OF AGE EFFECT ON THE CHEMICAL COMPOSITIONS OF DERIVED ESSENTIAL OIL FROM OLEORESIN, WOOD AND LEAVES OF *PISTACIA ATLANTICA* VAR. MUTICA IN BOUSHEHR PROVINCE

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Pistacia atlantica trees encompass more than 1200000 hectares of forests in the country, particularly in the area of Zagros. These trees can be used as resources for traditionally producing turpentine and gum as well as oleoresin which is effervescent oil produced through extracting the essence from the resin within them. Some young and old Pestaciaatlantica var. mutica trees were found in Poshtpar located in Dashtestan County, Boushehr Province in 2014 which were located in same bioenvironmental conditions such as soil, slope and height. The leaves of these trees were selected (after drying them in the absence of sunlight) and their wood chips and resin were separately collected. Accordingly, their essences were extracted through distillation and the yielded essences were qualitatively and quantitatively identified by using GC-MS. Moreover, the effervescent odorant compounds of resin and the young and old leaves of Pestaciaatlantica var. mutica trees were explored by using Head Space technique. The findings of the research indicated that the majority of compounds within the essence extracted from the resin of young and old trees were respectively as follows: α-Pinene (%68.78) (%73.14), β-Pinene (%3.72) (%2.84), and Limonene (%6.52) (%5.09). Furthermore, these compounds within the essence extracted from the young and old leaves were respectively as: α-Pinene (%18.24) (%6.74), β-Pinene (%2.89) (%1.46), β-Myrcene (%8.77) (0), and Spathulenol (%5.73)(%10/91). Moreover, the essence extracted from the young and old wood chips respectively included: α-Pinene (%34.38) (%5.34), β-Pinene (%4.15) (0), β-Myrcene (%3.85) (0) and Limonene (%7.79) (0). Besides the aforementioned results, the findings related to Head Space technique will be presented in the day of the seminar [1, 2].

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1617
EXTRACTION, PURIFICATION AND IDENTIFICATION OF *PEANUT AGGLUTININ* LECTIN

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Plant lectins are a class of highly diverse proteins plant origin that recognize and bind to specific carbohydrate structural epitopes. This group of carbohydrate-binding proteins function as central mediators of information transfer in biological systems and perform their duties by interacting with glycoproteins, glycolipids and oligosaccharides without altering their structure. Since proteins with legume lectin domains have multiple significant biological functions such as anti-fungal, anti-viral, and most notably anti-tumor activities, which have given them much attention compared with the other plant lectins, peanut (Arachis hypogaea) was selected and focused in our research project [1, 2]. One of the peanut's lectin is Peanut agglutinin (PNA) and is sensitive to galactose. PNA by the molecular weight of 110 KDa is a Homotetrameric protein. When PNA nears the cancer cells binds to the T-antigen that is composed of two galactose [3,4]. Therefore, this lectin is a good marker to determination some cancer's level such as Colon and Breast cancer. Here in size exclusion chromatography and Hydrophilic interaction liquid chromatography (HILIC) were used for PNA native purification. Peanuts was taken and ground and was soaked overnight in PBS. This mixture was centrifuged and then proteins in supernatant were precipitated by salting out method (10%-50%). Monomers of PNA by the molecular weight of 29 KDa were seen in a few ammonium salts fractions. These cuts applied to fast protein liquid chromatography (FPLC) column for PNA purification.

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1637
CHEMICAL ANALYSIS OF DATE AND CHICORY CRUDE EXTRACTS AND THEIR CYTOTOXICITY ASSAY IN HUMAN HEPATOCARCINOMA CELL LINE (HEPG2)

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Plants contain chemicals that are toxic in some cases, but in many cases have beneficial effects in the treatment of diseases. In this study, the aqueous crude extracts of date (*Phoenix dactylifera*) and chicory (*Cichorium intybus* L.) seeds were prepared. Date seeds were crushed to powder after being heated and grilled. Chicory seeds were cleaned and powdered using an electric mill. Every 200 g of powdered chicory seed was soaked in 1L of distilled water and refluxed for 20 minutes in a boiling water bath to make a 20% solution. Both solutions were vacuum filtered through Watman No 1 filter paper and the filtrate was lyophilized. The amounts of flavonoids (12.37 ± 0.13 mg/g chicory, 22.88 ± 0.05 mg/g date), tannins (17.95 ± 0.05 mg/g chicory, 97.01 ± 0.42 mg/g date), total phenolics (31.15 ± 0.02 mg/g chicory, 29.95 ± 0.02 mg/g date) were determined. Using the FRAP test, every 1 mg of chicory and date extract powder was equivalent to 0.1429 mM and 0.1984 mM solutions of FeSO4, respectively. MTT was was perfomed on HePG2 cell culture. According to the results, both chicory and seed extracts were safe and nontoxic up to 10 mg/ml concentration [1, 5].

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1691
ASSESSMENT OF THE BIOLOGICAL PROPERTIES OF HYDROALCOHOLIC EXTRACT AND ESSENTIAL OIL DERIVED FROM *CHELIDONIUM MAJUS* L

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Chelidonium majus L. belongs to the family Papaveraceae is an herbaceous plant, perennial, dicotyledonous [1], to a height of 45-60 cm, leaves divided into five to seven pieces, flattened and serrated green, blue and crack with anti-tumor, anti-microbial and anti-inflammatory properties [2- 6]. All parts of the plant contain orange latex rich in alkaloids, among which the most present are chelidonine, chelerythrine, sanguinarine, berberin and others [7]. In this study, the composition and biological properties of *Chelidonium majus* L. hydroalcoholic extract and the essential oilswas studied. For this purpose, *Chelidonium majus* was collected through the establishment of plots from one location in Mazandaran province (siahbishe-chalus). Plant samples were dried at room temperature and away from sunlight for one week following transferring to the laboratory. The essential oils extracted using Clevenger apparatus and its compounds were analyzed by GC / MS. Then, the hydroalcoholic extraction was made with distilled water and methanol and following estimation of flavonoid rate with standard solutions. Then, the antioxidantactivities of the sample was determined by beta-carotene and DPPH tests. Based on the results of the analysis of GC / MS, 4 compounds were identified inthe essential oil derived fromChelidoniummajus. The flavonoid content was determined (56/85 mg Quercetin per gram of extract. Also, essential oil and extract, significantly inhibited the peroxidation of linoleic acid in beta-carotene test. Antioxidant activity of the essential oil and extract were calculated with DPPH test indicating strong antioxidant activity in compared with Trolox reference.According to the results, oil and extracts derived from *Chelidonium majus* had certain compounds along with significant antioxidant activities.

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1696
COMPARATIVE *KELUSSIA ODORATISSIMA* ESSENTIAL OILS OBTAINED FROM THE VARIOUS PARTS OF THE CLEVENGER-TYPE APPARATUS

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Kelussia is one of the newest genera of Apiaceae family and is represented by only one species, *Kelussia odoratissima* Mozaff., which is found only in Iran. The major compounds of essential oil of aerial parts of K. odoratissima are phthalides. They are bioactive phytochemicals and have important molecular and cellular effects, which include the inhibition of DNMTs by targeting DNA hypermethylation, stimulation of glutathione transferase activity, antiproliferative effects on colon cancer cells, potential anti-fibrotic effects for the treatment and prevention of hepatic fibrosis and protective effects on focal cerebral ischemia in rats. Essential oils of the aerial parts of K. odoratissima from the different habitats is obtained slightly yellow and the yield had been nearly 0.3 % (w/w). In this study, essential oil of *K. odoratissima* leaves was separated from the different parts of the Clevenger-type apparatus and were compared together. The first (1EO, the internal wall of the condenser) and second sample (2EO, aqueous part of distillate collected at up stop-cock valve as well as return tube) were extracted by diethyl ether solvent. Then, the solvent was removed with a rotary vacuum evaporator (rotovap). The third sample, 3EO, was the essential oil separated as an upper layer from the distillate. The color of the samples was light yellow (1Eo), yellow (2EO) and golden yellow. Also, the yield of total essential oil was 0.4 % (w/w). Further studies are needed to see if the changes of chemical composition in the studied oils of K. odoratissima are on the parts of different Clevenger-type apparatus.

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1703
ESSENTIAL OIL COMPOSITION OF THREE ECOTYPES OF *KELUSSIA ODORATISSIMA* MOZAFF

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Kelussia odoratissima is one of the most popular vegetables used in the Central Zagros region, Iran, where it is used fresh in salads, pickled, or in soups, and yogurt as dried powder. This plant is harvested annually from its habitat in high altitude mountains and sold at local markets for a high price. K. odoratissima samples were collected from three regions: 1S and 2S from Isfahan, and 3S from Chaharmahal and Bakhtiyari province. The aerial parts of the plant were dried at room temperature. Dried plant material, were subjected to hydrodistillation in a Clevenger-type apparatus and the essential oil analysis was carried out using GC/MS. The 52 constituents, corresponding to 98.58% of the essential oil of 1S ecotype, were identified, of which the major components are such as Z-ligustilide, Unknown1, and (E)-ligustilide and (Z)-Butylidenephthalide. In the 2S ecotype, 53 compounds were identified as 98.77% of its essential oil (the main compounds composed of Z-ligustilide, Unknown1, 5-Pentyl cyclohexa-1,3-diene and (E)-ligustilide). In the 3S ecotype 24, compounds representing 98.65% of its essential oil were identified, and the main compounds were Z-ligustilide, (Z)-Butylidenephthalide, Unknown1 and (E)-ligustilide. Like other ecotypes, these ecotypes are a very good source of Z-ligustilide that can be used in the pharmaceutical industries. Z-Ligustilide is a characteristic phthalide component of many Apiaceae plants. Z- Ligustilide has been reported to have multiple pharmacological actions, such as antiasthmatic, spasmolytic, and analgesic and as well as mild inhibition on the central nervous system.

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1726
ANTIBACTERIAL ACTIVITY OF ISOLATED COMPOUNDS FROM *MORINGA PEREGRINA*

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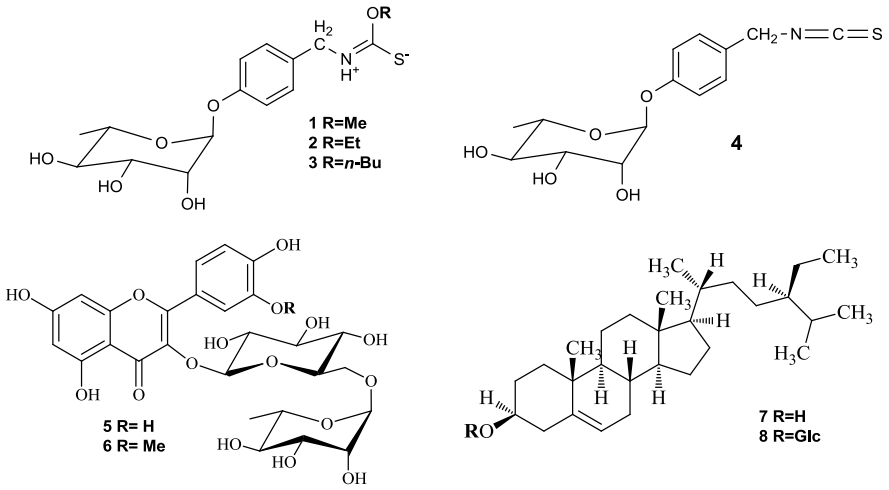
O-Methyl (1), O-ethyl (2), and O-butyl (3) 4-[(α-L-rhamnosyloxy) benzyl] thiocarbamate (E), and 4-(α-L-rhamnosyloxy) benzyl isothiocyanate (4) along with two flavonoid glycosides named rutin (5) and 3'-methyl quercetin-3-O- rutinosid(6)and two steroids, β-sitosterol(7) and daucosterol (8), have been isolated from the aerial parts of *Moringa peregrina*.The antibacterial activity of these compounds was assessed against *Staphylococcus aureus* and *Escherichia coli* as Gram positive and Gram negative bacteria, respectively. The minimum inhibitory concentrations (MIC) were determined according to the standard protocol of CLSI by broth micro-dilution method. The results showed that 4-(α-L-rhamnosyloxy) benzyl isothiocyanate (4) had a potent activity against both bacteria. MIC value of 4 against *S. aureus* and *E. coli* was 12.5 µg/mL and 50 µg/mL, respectively. The activity of the other compounds was almost more than 400 µg/mL.Chloramphenicol was used as a standard with the MIC of 0.5 µg/mL against *S. aureus* and 4 µg/mL against *E. coli*. Due to the results and with comparison to the literature, the isothiocyanate moiety could be an interesting pharmacophore for its antibacterial activity [1, 2].



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1727

ARTECANIN A SESQUITERPENE LACTONE FROM THE AERIAL PART OF *AJANIA SEMNANENSIS* SONBOLI

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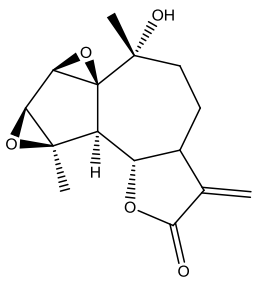
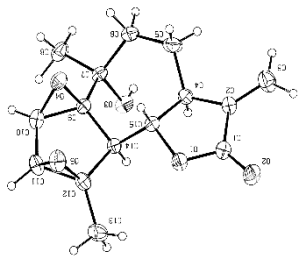
Artecanin is a sesquiterpene lactone which has been isolated from the chloroform extract of AjaniasemnanensisSonboli (Asteraceae). The structure of the compound was elucidated with the 1D and 2D NMR experiments(1HNMR, 13CNMR, DEPT90, DEPT135, COSY, HMQC and HMBC) and the stereochemistry of the compound wasfinally confirmed by the single crystal XRAY analysis. The melting point of artecanin is 253-254°C. Sesquiterpene lactonesexert a broad variety of different biological activities especially in inflammation and cancer but the data on artecanin is rare on database. Although artecanin was previously isolated from some species of Asteraceae but this is the first report of isolation of artecanin from the Ajaniasemnanensis which is an endemic newly introduced Iranian species [1, 3].





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1728
CYTOTOXICITY OF NOVEL 2,3-DIHYDROQUINAZOLIN-4(1*H*)-ONE DERIVATIVES OF DEHYDROABIETYLAMINE DITERPENE AGAINST K562 AND HL60 CANCER CELL LINE

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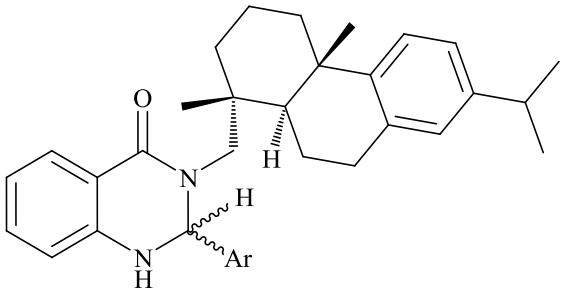
The cytotoxicity of a series of novel 2,3-dihydroquinazolin-4(1H)-one derivatives, with the reaction between dehydroabietylamine (DHA) diterpene, isatoic anhydride and different aromatic aldehydes in the presenceof a catalytic amount of p-toluenesulfonic acid,has been evaluated. Diastereomeric products were separated and their structures were characterized by spectroscopy (1H and 13C NMR, HMQC, IR) and spectrometry (HR-ESIMS) techniques. The cytotoxicity of the synthesized compounds and starting material (DHA) were assessed against two cancer cell lines, K562 and HL60. The cell viability percent of these cell lines have been assessed in 25, 50, 100, 200 and 400 µMof the compounds. The results showed that the synthesized compounds have a similar or lower activity than the DHA as starting material. According to the structure and the potent cores of the final compounds, it was anticipated to have more cytotoxicity for the related compounds. These compounds were slightly soluble in the aqueous media of the cell lines and it may affect their activity. The research for increasing the solubility of the derivatives is an ongoing project [1, 2].



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6
ALLIUM HIRTIFOLIUM EXTRACT AND ITS EFFICACY AGAINST WOUND SKIN INFECTION IN ANIMAL MODEL

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Staphylococcus aureus is the likely common cause of skin wound infections in boils, pustules, carbuncles and post operative infections. Allium hirtifolium was used in folkloric culture as skin disinfectant. In attempt to proof the efficacy of A. hirtifolium aqueous extract in treatment of S. aureus related wound skin infections in mice animal model; we evaluated the efficacy of different formulations of A. hirtifolium aqueous extract (0.1-2%) in comparison with mupirocin in treatment of wound skin infections by skin suture wound model. The A. hirtifolium (0.1%) decreased the log CFU by 2.2±1.7 that was comparable to mupirocin (pvalue>0.05) and improved the healing of the wounds in histopathological examinations. Increasing in concentration of A. hirtifolium extract decreased its efficacy. Other pharmacological and toxicological studies are required for the application of this formulation in clinics.

9
HEPATOPROTECTIVE EFFECT OF SAGE (*SALVIAOFFICINALIS* L.) LEAVESHYDRO-METHANOLIC EXTRACT AGAINST *ASPERGILLUS PARASITICUS* AFLATOXIN-INDUCED LIVER DAMAGE IN MALE RATS

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Different parts of the *Salvia officinalis* L. (sage) (Labiatae) are used to treat liver disorders, traditionally. It is one among the constituents in various folk medicines used for the treatment of liver disorders and other diseases. The aim of the present study is to evaluate the protective effect of Salvia officinalis against experimentally induced liver injury. The methanolic extract of aerial parts of Salvia officinalis was evaluated for the hepatoprotective activity against *Aspergillus parasiticus* aflatoxin induced hepatotoxicity in rats. Various biochemical parameters like serum alanine amino transferase (ALT), aspartate amino transferase (AST), alkaline phosphatase (AP) and total protein (TP) levels were determined. The treatment of aflatoxin at dose 480 □g/kg increased serum ALT, AST and AP levels, while decreased total protein levels in contaminated rats in comparison to control normal rats. Treatment of sage extract at doses 25, 50, 100 and 150 mg/kg mg/kg body weight decreased the raise of serum AST, ALT and AP levels and increased serum total protein level in treated rats in comparison to control rats. This study demonstrates the hepatoprotective activity of Salvia officinalis and thus scientifically supports the usage of this plant in traditional medicine for treatment of liver disorders.

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19

INVESTIGATING THE VASORELAXANT EFFECT OF HYDROALCOHOLIC EXTRACT OF *NIGELLA SATIVA* ON POTASSIUM CHLORIDE INDUCED CONTRACTION *IN THE* PRESENCE OF CALCIUM BLOCKERS IN ISOLATED AORTA

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Nigella sativa (NS) is an annual herbaceous plant that has been used as a natural remedy for number of illnesses such as headache, bronchitis, exema and influenza [1]. NS has also been studied for its pharmacologic effects such as anti diabetic, anti inflammatory, anti oxidant and anti cancer activities [2]. There are some reports of cardiovascular effects of NS such as hypotensive and also negative inotropic effects [3]. In this experimental study, 28 male Wistar rats randomly divided into 4 groups. In groups 1 and 2 the effect of the extract (5, 10, 20 mg/ml) on contracted aorta by chloride potassium (KCl) in intact and denuded endothelium were investegated. In groups 3 the effect of the extract on contracted aorta by KCl in the presence of Ditiazem (Dil) and In groups 4 the effect of the extract on contracted aorta by KCl in the presence of Heparin (Hep) were investegated. The extract significantly relaxed the contracted aorta by KCl in both intact and denuded endothelium. The extract concentrations significantly relaxed KCl induced contraction in the presence of Dil and Hep. The hydroalcoholic extract of NS have the relaxation effect on vascular smooth muscle. The relaxation effect mainly was mediated by inhibition of Ca^{+2} channels and inhibition the release of calcium from intracellular stors in vascular smooth muscle cells.

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20

THE EFFECT OF AROMATHERAPY ON ANXIETY OF TEST IN FEMALE STUDENTS OF ARAK UNIVERSITY OF MEDICAL SCIENCES

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Test anxiety is a condition in which a person worries his/her abilities in a task which results in a decrease in coping with situations like test situations. Studies conducted in Iran have shown that 42.8% of the students have test stress, with a prevalence of 48.4% in female and 35.2% in male students This study was performed to evaluate the effect of the aroma of lavender on test anxiety.Materials and method: this randomized clinical trial was performed on 186 female students. Participants were randomly assigned to either the case or the control group. After obtaining the approval of the ethics committee and informed written consent from the participants, the cases received aromatherapy using 5-6 drops of lavender on a cotton ball placed 5 cm from the nose for 5 minutes every night before sleep up to 7 night. The mean anxiety of test after the intervention was 29.836 (18.905) in the lavender and 32.976 (13.587) in the control group, indicating an insignificant difference (P=0.320),but in intervention group 13.6%(12) hadn't anxiety test vs 4.9%(2) which was significant (p=0.04) our study showed that transient contact with lavender could increase the number of the students who did not have but did not decrease mean test stress. More studies are required in this regard.

21

THE EFFECT OF VALERIAN AND GINGER ON THE DURATION OF PAIN, ANALGESIC USE IN DYSMENORRHEA IN THE STUDENTS OF ARAK UNIVERSITY OF MEDICAL SCIENCES

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This study was performed on to explore the effect of Valerian and Ginger on the duration of pain in dysmenorrheal,analgesic use, and associated symptoms of dysmenorrhea.Material and Methods:This triple blind randomized clinical trial was performed on 210 female in dormitory at Arak University of Medical Sciences in 3 groups that suffering from moderate level of dysmenorrhea according to the visual analog scale(VAS).participant entered one of the three groups of valerian, Ginger, or control after opening the envelope..participants in groups A, B, and C were given capsules containing 250mg Ginger rhizome powder, 350mg Valerian rhizome and root powder, and 250mg sugar respectively and requested to take 1 capsule every 8 hours on the first 3 days of menstruation for 2 consecutive menstrual cycles and complete the second questionnaire once after the first menstruation and once after the second menstruation (during the two cycles of drug use). Written Inform consent was taken all of the student.VMS was used to evaluate the severity of dysmenorrehea. Also, pain duration, using analgesic, were evaluated by questionnaire. descriptive statistics (percentage and mean) and analytical statistics (repeated measurement ANOVA, Tukey, One-way ANOVA at the significance level of (0.05) were used. Total mean pain duration in the second period(2.25±1.1) was more longer than the first month(2±1.1), but the difference between groups was not significant(p=0.25). Difference between groups in using analgesic was significant (F = 4.31, df = 2, p = 0.015). Valerian and Ginger at the doses used in this study didn't reduce pain duration but using analgesic was decreased in second month. Authors recommend more research with other dosage in this field.

23

THE EFFECT OF LAVENDER ESSENCE VIA INHALATION METHOD IN LABOR PAIN

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Studies have showed that half of pregnant women complain severe or intolerable pain. Nowadays , because of side effects on mother and neonate, pharmacological pain relive were used lower Than before and non pharmacological methods are increased. One of the methods is aromatherapy by herbal essence . The aim this study is effect of inhalation lavender essence in labor pain. This is random clinical trial that carried out in 2 groups to effect of lavender essence in labor pain .In case group was used conducted cool vapor of essential oils of lavender 1.5% in active phase by mask and the other group was used only water with mask. Pain was estimated by visual analog scale in 4-6 , 6-8,8-10 dilatations. In each group 60 samples was assigned by convenient sample method but they allocated by random . Written consent was taken and pain estimated before and after intervention in 4-6, 6-8 and 8-10 dilatations by visual analog scale . Analytical statistics such as t-test and א2ere used .Result showed that difference pain before and after intervention in breath technique with lavender was 0.79±2.17 and control group was -0.09 ±1.90 that was significant(p=0.03). This study showed that aromatherapy could be suitable alternative complementary medicine foe labor pain. This method with difference mechanism reduced pain and could use it with different method such as massage ,inhalation, sitz bath and mother could select each method she want.

24

THE GINSENG SUPPLEMENTATION ON LIPID PEROXIDATION AND ANTIOXIDANT BIOMARKERS AFTER EXHAUSTIVE EXERCISE

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Despite the fact that regular exercise training is associated with numerous physiological adaptations, and consequently with numerous health benefits includes prevention of chronic diseases [1-2],however, it has been reported that strenuous acute exercise induces the oxidative stress in active muscles and organism [3].According to the consumption of chemical supplements in athletes can have side effects, herbal and natural supplements may be effective in modulating exercise induced-oxidative stress in athletes. Hence, the present study was conducted to determine the effects of short-term ginseng supplementation on malondialdehyde (MDA), as lipid peroxidation indices, and superoxide dismutase enzyme (SOD) activity in young athletes after exhaustive aerobic exercise.Twenty young athletes (aged 20.23±2.24 years; BMI 22.86 ± 3.68) in semi-experimental study randomly were divided in two placebo and supplement groups. Subjects of supplement group consumed 2gr ginseng capsules daily for one week, whiles other group consumed placebo for the same amount. After seven days of supplementation all subjects of both groups underwent in an exhaustive aerobic exercise test that performed on treadmill. Venous blood samples were collected in four phases; 1) before of starting the supplementation and in the basic state 2) after the end supplementation period and immediately before of exercise 3) immediately after and 4) 24 h after exercise and Plasma MDA concentrations, as lipid peroxidation marker, spectrophotometrically were assayed by measurement of thiobarbituric acid reactive substances (TBARS) assay, also SOD activity was measured. The data was statistically analyzed by repeated measure ANOVA and post hoc bonferroni test at 0/05 significantly.The results of the research indicated that the range change of MDA significantly higher in placebo versus to ginseng group at immediately and 24 hours after aerobic exercise (P=0.001). Moreover, SOD enzyme activity significantly increase in supplement group compared placebo group after exhaustive exercise (P>0.05). In general according to our results it can be said that short-term ginseng supplementation inhabits exhaustive aerobic exercise- induced oxidative stress by decreasing of MDA and increasing of SOD activity as an antioxidant enzyme in young athletes, and therefore it can prevent of free radicals damaging effects. But further work needs to be done to establish exact effect of this supplement in athletes.

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29
EFFECT OF DIETARY INCLUSION OF BLACK CUMIN (*NIGELLA SATIVA*) SEEDS ON HISTOLOGICAL PARAMETERS OF CAECAL TONSILS AND BURSA OF FABRICIUS IN BROILER CHICKENS

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Improving disease resistance in food animals, particularly in the absence of antibiotic treatment, is a key strategy in the effort to increase food safety. Black cumin *(Nigella sativa)* is an aromatic plant which widely grows in different parts of the world and the black cumin seeds (BCS) have been used to promote health for countries especially in the Middle East and Southeast Asia (Al-Gaby, 1998). BCS show immunomodulatory effects. In a study on the effect of BCS on immune system of human, helper T cells to suppressor T cells ratio as well as natural killer cell activity were improved (El-Tahir et al., 1993). In rainbow trout, Dorucu et al. 2009 found that serum proteins and total immunoglobulin levels are increased. This study aimed to evaluate the effect of BCS as an herbal immunomodulatory agent on histological features of caecal tonsils and bursa of Fabricius in broiler chickens. To this end, Fifty, one-day old chickens were randomly divided into five equal groups and fed with diets contained 0.5, 1, 1.5, and 2% of *N. sativa* seeds or basal diet (Control Group) for 45 days. On day 46 birds were slaughtered and 6μm-thick transverse sections were made from caecal tonsils and bursa of Fabricius and stained with H&E. Villus height and villus basal width at the crypt-villus junction, nodular unit width and height, follicular width and muscular layer width in caecal tonsils as well as height of pelicae, follicular width, thickness of follicular cortex and medulla in bursa were determined. In addition, number of follicles in each pelica in bursa of Fabricius and number of follicles per nodular unit in caecal tonsils were also determined under light microscope. The results showed a change in all histomorphometric parameters of caecal tonsils due to *N. sativa* administration which followed a dose-dependent pattern in most cases. Villus height, nodular unit width and muscular layer width were decreased while other parameters increased compared to control group. Although all parameters in bursa increased due to *N. sativa* seed administration, plica height was the only parameter which showed a dose-dependent increase. Regarding other parameters including follicular width, cortical and medullar thickness the outcome of 0.5% and 2% doses were higher than other treated groups. In conclusion, dietary inclusion of *N. sativa* especially at 2% dose during the rearing period of broilers, can improve immune structures of both bursa of Fabricius and caecal tonsils of broilers.

30

EFFECT OF DIETARY INCLUSION OF *ZATARIA MULTIFLORA* ON HISTOLOGICAL PARAMETERS OF BURSA OF FABRICIUS IN BROILERS

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Regarding the remarkable role of bursa of Fabricius as a primary lymphoid organ in poultry, this study aimed to evaluate the effect of long term administration of *Zataria multiflora* as an herbal immunomodulatory agent on histological features of this organ in broiler chickens. To this end, Fifty, one-day old chickens were randomly divided into five equal groups and fed with diets contained 0.5, 1, 1.5, and 2% of *Z.* multiflora (experimental groups) or basal diet (Control Group) for 45 days. On day 46 birds were slaughtered and bursa of Fabricius was dissected immediately. 6µm-thick transverse sections were made and stained with H&E for measuring height of pelicae, follicular width as well as thickness of follicular cortex and medulla by using a linear graticule and number of follicles in each plica under light microscope. The results showed a dose dependent increase in all histomorphometric parameters due to *Z.* multiflora administration. The highest increase was in the thickness of follicular cortex of birds treated with 2% *Z. multiflora*. In conclusion, dietary inclusion of *Z. multiflora* during the rearing period of broilers, dose dependently affects histological structures of bursa of Fabricius in broilers in a way that may enhance its role as a lymphoid organ.

41

PROMISING EFFECT OF TRAGOPOGON GRAMINIFOLIUS DC IN INFLAMMATORY BOWEL DISEASE

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Inflammatory bowel disease (IBD) is a multifactorial disorder with an unknown etiology which is usually a result of exacerbation of oxidative stress and pro-inflammatory cytokines [1,2]. Tragopogon graminifolius (TG), a native plant of Iran, has a vast variety of phytochemicals including tannins, flavonoids and phenolic acids with anti-inflammatory and antioxidant effects which could be effective in IBD [3]. The aim of the current study was to assess the beneficial effects of TG on 2,4,6-trinitrobenzenesulfonic acid (TNBS)-induced colitis. IBD was induced by rectal administration of TNBS and TG ethanolic extract was orally administered for 12 days. Rats were sacrificed on last day and the colons were evaluated macroscopically and microscopically. Tumor necrosis factor-alpha (TNF-α), interleukin-1 beta (IL-1β), total antioxidant capacity (TAP), myeloperoxidase (MPO) and lipid peroxidation (LPO) were also measured in colon tissue samples. TG showed significantly improvements in macroscopic and microscopic scores of IBD. LPO, MPO, TNF-α and IL-1β were decreased in TG treated rats, whereas TAP value was markedly increased. TG could alleviate the complications of colitis by modulation of inflammation and oxidative stress. Phenolic compounds including gallic acid, catechin and ferulic acid are proposed as active ingredients of TG extract. TG demonstrated beneficial effects in the animal model of chronic colitis. Further clinical studies are recommended for the confirmation of TG as a natural treatment for IBD.

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60

IN VITRO EFFECT OF **IRANIAN BORAGE (ECHIUM AMOENUM FISCH)** ON **FLOWCYTOMETRY**-BASED **H2O2 PRODUCTION AND NECROSIS AND BACTERICIDAL ACTIVITY IN** BOVINE **NEUTROPHILS**

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This study was conducted to determine the effect of borage, as an effective medicinal plant, on neutrophils (PMNs) functions. Neutrophils are key functional circulating arm of innate immune system. Blood samples were taken from 8 healthy dairy cows and were isolated by hypotonic lysis technique. Isolated PMNs of cows were exposed to borage extract for 12 hours in the sterile condition with a standard cell culture method. Treated PMNs with borage extract were comparatively used to investigate H_2O_2 production, using percoll (to prevent PMNs` adherence), and dihydrorhodamin (to make green fleurescence). To determine PMNs` necrosis, the incubated PMNs were exposed to PI one minute before entering the flowcytometer to show the necrotic PMNs; for H_2O_2 production PMA was added as a stimulator [1,2]. For evaluation of PMNs` bactericidal activity, the last dilution of serial diluted PMNs-*S. aureus* were incubated in blood agar and the percentage of bactericidal activity were determined using specific formula [3]. Results of flowcytometry assays showed PMNs` H_2O_2 production was greatly higher in treated group with borage extract but the viability was lower. In other words, the percentage of necrosis was higher in treated group with borage extract. Also the bactericidal activity of treated group were much higher than control group. Our result strongly support the immunomodulatory effects of borage in farm animals. So, we suggest that there should be more examination on the borage extract to find the main functional substance and use Iranian borage to strengthen the innate immunity of immunocompromised high yielding dairy cows.

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61
INVESTIGATION ON THE IN VITRO EFFECTS OF BORAGE ON CHEMILUMIN ESCENCE OF BOVINE NEUTROPHILS

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To determine the immunomodulatory effect of borage in animal model, we investigated on neutrophils (PMNs) functions of dairy cows. Borage is a medicinal plant which is used alot in traditional medicine and its therapeutic properties have been prooven borage as very useful medicinal plant. But its immunomodulatory effects have rarely been studied. In this in vitro study, blood samples were taken from 8 healthy dairy cows and were isolated by hypotonic lysis technique. Isolated blood PMNs of healthy cows were exposed to borage extract for 12 hours in the sterile condition with a standard cell culture method, and then stimulated with soluble (phorbol-merystate acetate, PMA) and particle (Latex beads and Pansorbin®) stimuli. The neutrophils capacity for reactive oxygen species (ROS) production and phagocytosis were examined with luminometery techniques, mainly chemilumencence (CL) assay [1-3]. Results of CL assay showed great enhancement of area under the curve (AUC) for treated group with borage extract, strongly revealing the increase in ROS production against stimulators. Also in comparison to control groups Tmax in borage treated groups were much higher; this shows 1) increased intracellular CL and 2) increase the phagocytosis activity of PMNs in treated group. Our results strongly support the immunomodulatory effects of borage in farm animals. So, we suggest that there should be more examination on the borage extract to find the main functional substance for immunoprophylaxis and therapeutic porposes in highy yieling dairy cows.

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62
INVESTIGATE THE EFFECTS OF YEAST ON DIGESTIBILITY AND PRODUCTIVE PARAMETERS IN RUMINANTS

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Nutritional yeast is a deactivated yeast, often a strain of Saccharomyces cerevisiae, It is a source of protein and B-complex vitamins, and is a complete protein. It is also naturally low in fat and sodium and is free of sugar, dairy, and gluten. Sometimes nutritional yeast is fortified with vitamin B12.Nutritional yeast is different from yeast extract, which has a very strong flavor and comes in the form of a dark brown paste.Active yeast supplementation had positive effects on performance of young ruminants through increasing dry matter intake Many researchers investigated the mode of action of yeast which is improvement in rumen development parameters .The results could be attributed to biotic factors such as strain and viability of yeasts and a biotic factors such as nature of the diet and animal management conditions. The objective of this study was to investigate the effects of yeast supplementation either inactivated or dried yeasts in sheep ration on digestibility, nutritive value, performance, some blood and rumen liquor parameters. The procedure was carried out with experimental animals and ration thirty lambs nine months old were divided into three groups according to their live body weight. The experimental groups were offered concentrate feed mixture and clover hay. Animals in the control (T1) group were fed clover hay plus concentrate feed mixture without additives. While, animals in (T2 and 3) group were fed control ration plus inactivated yeast and dried yeast respectively. The concentrate feed mixture (CFM) consisted of 65% whole yellow corn, 15% wheat bran, 15% soybean meal, 1.2% premix, 0.8% common salt and 3% limestone. The commercial inactivated yeast (and dried yeast used in this study were mixed manually with CFM daily at the ratio of 5 g h^{-1} day^{-1}. The CFM was adjusted every two week according to body weight changes. Feed intake was recorded ,daily body weight gain and feed efficiency (g feed/g gain) were calculated. Data concerning nutrients digestibility and nutritive values showed that yeast supplementation either inactivated (T2) or dried (T3) increase the digestibility of all dietary nutrients beside the NDF and cellulose significantly compared with the control. Regarding the nutritive values, there were significant differences ($p<0.05$) in total digestible nutrients (TDN) values being T2 (73.30%) the highest followed by T3 (68.05%) and T1 (62.83%). Supplementation with two yeast products (inactivated or dried) by 5 g h^{-1} day^{-1} increased digestibility of most nutrients.

68
OPTIMIZED FABRICATION OF MENTHOL NANOPOWDER BY ELECTROSPRAY METHOD

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L-menthol [(1R, 3R, 4S)-(-)-menthol] is an extremely important flavour which is main component of mint herb essential oils especially Mentha piperita and Mentha arvensis species. This herbal based material also synthesized chemically in industry. Menthol is used commercially in vast variety of products duo to its antioxidant [1], antibacterial [2], anti-inflammatory and cooling characteristics [3]. Both natural and synthetic menthol is in powder crystalline form and because of its low solubility in aqueous systems, it requires proper formulation in final products. In last decade utilizing nanomaterials because of their specific characteristics, increased dramatically. There are different methods for fabrication of nanoparticles, among them electrospray attract increased attention in last few years. This method is easy and single step, which can be used in pharmaceutical fields [4, 5]. In this research response surface methodology (RSM) was applied to optimize fabrication of menthol nanopowder with electrospray method. Results of scanning electron microscopy (SEM) analysis illustrate that minimum particle size are about 200±30 nm which is relate to 5 % (w/v) menthol solution in Dichloromethane solvent. Optimization results revealed that by increasing menthol solution flow rate, particle diameters increased. It also was observed that by increasing operational voltage between cannula tip and collector, powder formation on the collector surface increased significantly, in contrast higher voltage led to the increase in particle diameters.

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81

THE EFFECT OF CINNAMON, CARDAMOM, SAFFRON AND GINGER CONSUMPTION ON MARKERS OF OXIDATIVE STRESS AND INFLAMMATORY FACTORS IN TYPE 2 DIABETES MELLITUSE PATIENTS: A RANDOMIZED CONTROLLED CLINICAL TRIAL

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Type2 diabetes mellitus (T2DM) occurs in the following of high blood glucose and insulin resistance. Someplants and herbal medicine with high amounts ofphytochemicals have beneficial effects on the therapy of diabetes' risk factors. In this study, cinnamon, cardamom, saffron and ginger were used as supplementary treatment for risk factor in type 2 diabetic patients.This randomized clinical trial included 204 patients with T2DM. Participants were randomly assigned to five groups, Group 1 consumed 3 tea glasses contain 3 gr cinnamon, Group 2 consumed 3 tea glasses contain 3 gr cardamom, Group 3 consumed 3 tea glasses contain 1gr saffron, Group 4 consume 3 tea glasses contain 3 gr ginger and Group 5 was placebo group which consume only 3 tea glasses without these medicine spices, daily for 8 weeks. CRP (C-reactive protein) and F2-Isoprostan, indicators of inflammatory factor and oxidative stress respectively were measured at baseline and 8 weeks after treatment by ELISA test. two hundred four patients completed the study. Mean concentration of F2-isoprostan were significantly decreased after 8 weeks in the ginger group as compared with baseline values (p-value= 0.01). As compared with other groups in diminution of hs-CRP, the treatment effect was statistically significant in the cinnamonand ginger groups(p-value = 0.04and 0.04 respectively) and only marginally significant in saffron group (p-value = 0.07). We found that after 8 weeks of intervention, cinnamon can marginally reduce weight and cardamom and ginger can marginally decreased waist circumferences. After 8 weeks of administrating cinnamon, cardamom, saffron and ginger, we observed that T2DM subjects had a favorable response against oxidative stress and inflammation, key factors in cardiovascular diseases.

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84

INTERFERING OF LIPID RAFT ASSOCIATION: A MECHANISM TO CONTROL INFLUENZA VIRUS INFECTION BY SAMBUCUS NIGRA

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Influenza is a worldwide contagious disease of human and animal populations. The direct transmission of avian influenza viruses to human may raise serious threat to public health and control of pandemic influenza. Emergence of resistance to the approved drugs drives a necessity for the development of new anti influenza agents that act at different stages of the viral life cycle with broad-spectrum reactivity against mammalian and bird subtypes. Several studies have been progressed to introduce herbal components as potential sources of antiviral drugs. Sambucus nigra (elder) fruit is broadly used to treat microbial infections. In the present study, the potential antiviral activity and mechanism action of elder fruit (EF) in human epithelium cell cultures infected with influenza virus were determined. Different concentrations (5, 10, 20, 40 and 80 μg/ml) of the aqueous extract were applied in pre- and post treatment procedures. The interaction between EF and influenza virus were examined by using cell viability, virus titration, quantitative real time RT-PCR, fusion, and lipid raft solubility assays. In pre-treatment and post treatment with lower doses of EF increased viral titer as well as synthesized viral nucleoprotin RNAs indicating the herb had no inhibitory effects on virus replication. At post treatment trial with high dose a significant decrease in virus titer and viral protein synthesis were shown in EF treated cells. The apparent reduction of viral titers in cells that treated by higher doses of EF then infected with virus indicating antiviral effect of the herb targets the viral entry process and acts by blocking hemagglutinin (HA) activities not by interfering with virus replication. To investigate the effect of EF on HA lipid raft association both TX-100-soluble and -insoluble fractions were examined with the respective antibody, analyzed by SDS-PAGE, and detected by Western blot. The results suggest that EF treatment of the influenza virus infected human epithelial cells may involve in lipid raft association which function as platform for formation of viral membrane fusion and budding. Differences in treatment time and dose of EF extract in pre- and post infections of cells with the influenza virus have a marked effect on the efficacy of the herb. These data may help us to design herb-originated biochemical compounds with higher potency to serve as potential antiviral for influenza treatment.

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85

EFFECT OF *SATUREJA HORTENSIS* POWDER SUPPLEMENT ON PAIN IN PATIENTS WITH KNEE OSTEOARTHRITIS: A DOUBLE-BLIND RANDOMIZED CLINICAL TRIAL

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The most prevalent type of arthritis is osteoarthritis which is known with the degenerative knee disease. Limited pieces of evidence have indicated that *satureja* with special phenol compounds is effective in inflammation reduction and pain alleviation. The aim of this study was to investigate the effect of *Satureja Hortensis* powder supplement on pain improvement in patients with knee osteoarthritis. The present study was conducted as a placebo-controlled double-blind randomized clinical trial. 39 patients with OA with medium pain were randomly divided into two groups which received *Satureja Hortensis* powder and placebo. These groups consumed three 200 mg capsules with the same size and form for two months which contained *Satureja Hortensis* powder and starch, respectively. Pain intensity was determined using visual analogue scale (VAS) at the beginning and end of study. Response to the treatment was defined as pain reduction by more than 1.5 scores: To distribute pain intensity before the intervention, there was no significant difference between the two groups. Before the intervention, all people had a pain score between 4 and 7. After the intervention, 95% of the Satureja group and 84% of the placebo group were in this scope. These changes were not statistically different (p=0.12). Median of the pain intensity was not statistically different before and after the intervention. Results of this study showed that *Satureja Hortensis* powder supplement with dose of 600 mg per day for 60 days was not effective on pain alleviation in patients with knee osteoarthritis. Thus, more studies are required.

91
DUAL CAPILARY ELECTROSPRAY ENCAPSULATION OF CURCUMIN/THYMOL WITH CHITOSAN

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Plant derived active pharmaceutical ingredient (API) are potentially useful sources of natural antioxidant, antibacterial and anti inflammatory agents. Thymol and Curcumin are herbal based compound which originated from Thyme and Turmeric plant respectively. Both of these active ingredient have low solubility in aquous systems which decrease their absorption and bioavalability when it is used in bio systems [1, 2]. For fulfill this drawback, vast variety of reaserch were done to change its chemical structure or deliver it with carrier compound. In last decade utilizing nano fabrication method improves some hydrophobic compound delivery in comparison to its bulk usage. Electrosprayed nanoparticles have gain great attraction due to its single step preparation technique and decreased particle sized [3, 4]. In this research, Chitosan biopolymer was used as shell material to encapsulate Thymol and curcumin in dual capillary electrospray method. Response surface methodology (RSM) was used as optimization approach to fabricate minimum sized nanocapsule. Electrical conductivity (EC) data of polymeric solution shows that by increasing CS concentration, EC increased which is related to positive charge density of CS biopolymer. At the other side, increased concentration of CS in solution led to significant increase in solution viscosity. Scanning Electron Microscopy (SEM) data shows that, optimum mean nanocapsule diameter is 140±15 nm at 1 %wt of CS solution at applied voltage of 20 Kv. Further analysis proves that increasing in polymer viscosity led to fabrication of capsule with higher diameter. It might be due to resistance of polymer chain against stretching force of electrical field in electrospray process[5].

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101

C0MPARISON OF SPINY AMARANTH (*AMARANTHUS SPINOSUS* L) ON SKIN WOUND HEALING IN RATS

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Scientific name of spiny amaranth (*Amaranthus spinosus* L) is a species of the family Amaranthaceae is. *Amaranthus spinosus* and perennial grasses and pharmacological properties. The aim of this study was to evaluate wound healing after topical Amaranthus spinosus extract of the aerial parts in rats. ., After induction of anesthesia in 40 male rats, each of them was wounded in the back of the box. . Wound healing in 4 groups: control (A), 11% Ethanol extract (B), 24% Ethanol extract (C), 42% Ethanol extracts (D) were applied. Measuring and analyzing digital images of wounds treated for 21 days were used. Microscopic studies on days 3, 7, 14 and 21 were sampled from the repair. Healing for all treatment groups was determined. Data were analyzed with the software SPSS18. Results showed that the mean wound healed in group (D) was less than the average level of other lesions (01/0> P). The overall outcome of healing based on histopathological groups (D) was better than the other groups.The anti-inflammatory, anti-microbial and restorative plant extracts evergreen plants can be acknowledged that the compounds are effective in the healing of full-thickness skin.

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107

STUDY ON SCOLICIDAL EFFECTS OF *CICHORIUM INTYBUS*

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Medicinal plants have been used for centuries and numerous cultures still rely on indigenous medicinal plants to meet their primary health care needs. Cichorium intybus is a medicinally important plant in Eurasia and in parts of Africa. Studies indicate that ingestion of chicory by farm animals results in reduction of worm burdens, which has prompted its widespread use as a forage supplement. The purpose of the present study was to evaluate scolicidal activity of Cichorium intybus. Protoscolices were aseptically collected from sheep livers containing hydatid cysts. The aerial parts of C. intybus were collected. The plants were dried and then ground to a powder and hydroethanolic extract was prepared. Sevan concentrations of extract (25, 50, 100, 200, 300, 400 and 500 mg/mL) were used. 100 µl protoscoleces-rich sediment was added to the tube and mixed gently and incubated for an hour. Then 0.1 % aq. eosin red stain was added, mixed gently and incubated at 37 ºC for an hour. Then the supernatant was discarded, and protoscoleces sand was washed with 0.9 % PBS several times. Protoscoleces were then examined microscopically for viability. The experiments were performed in duplicate to ensure the reproducibility.When protoscolices were exposed to the C. intybus hydroethanolic extract at concentration of 25 and 50 mg/mL, the mortality rate increased to 24.3% and 43.2%, respectively. The mortality rate of hydatid cyst protoscolices after exposure to concentration of 100, 200, 300 and 400 mg/mL of C. intybus extract was 41.8%, 51.3%, 78.7% and 92.4%. One hundred percent mortality rate was observed with C. intybus extract at concentration of 500 mg/mL.This in vitro study showed that hydroethanolic extract of C. intybus may be considered as an effective natural scolicidal agent.

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108
ANTIBACTERIAL EFFECT OF *CARUM COPTICUM* EXTACT, ON GRAM POSITIVE AND NEGATIVE BACTERIA IN VITRO

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Concurrent with the development of new chemical drugs and antibiotics, their harmful effects are gradullay emerged. Due to lack of harmful effects, herbal medicines have been used in the pharmaceutical industry. The aim of this study was the use of Carum copticum Extact as an herbal medicine for the replacement of antibiotics and chemicals. Antibacterial activities of Ajwan extract has been evaluated against twe gram negative bacteria; *Kelebsiella* and *Escherchia coli* and twe gram positive bacteria; *Streptoccus pneumoniae* and *Staphylococcus aureus*. Minimum inhibitory concentration (MIC) value was determined against all the selected bacteria. The antibacterial activity of Ajwan exteract was observed against all selected pathogens with different MIC. The exteract was effective for *S.aures* with MIC 1.25 mg/ml and *Steptoccous pneumonia* 2/5 mg/ml and followed by E.coli with MIC 2.5 mg/ml, and kelebsiella with MIC 5. the extact of Carom copticum can be used instead of chemical drugs to treat bacterial infection

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110

CYTOTOXIC AND APOPTOTIC EFFECT OF EXTRACTS AND THE ESSENTIAL OIL OF *NEPETA BINALOUDENSIS* JAMZAD ON HUMAN CANCER CELL LINES

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Nepeta binaloudensis Jamzad has been used in traditional medicine of Iran. Here the cytotoxic and apoptogenic activity of methanol extracts, petroleum ether (40-60), methylene chloride, ethyl acetate, n-butanol, and H2O extracts and the essential oil obtained from the aerial parts of the plant have been evaluated on PC3, DU-145 and MCF-7 cells. Cell viability, histograms of PI stained fragmented DNA in apoptotic cells and western blot analysis of proteins involved in the cascade of apoptosis were compared in all samples. Comparing IC50 values showed estrogen receptor positive PC3 and MCF-7 cells were more sensitive to the cytotoxic effect of N. binaloudensis in comparison with hormone-refractory DU-145 cells. Among multiple fractions and essential oil of the plant, methylene chloride fraction and essential oil showed cytotoxicity with IC50 of less than 100 µg/ml. Overall, suggesting N. binaloudensis for further analytical elucidation in respect to finding new cytotoxic chemicals can illuminate the presence of novel phytochemicals with anti-tumor activity.

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111
MELANOGENESIS INHIBITOTORY ACTIVITY OF *NEPETA BINALUDENSIS* L. EXTRACT ON B16 MURINE MELANOMA CELLS

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Nepeta sintenisii Bornm and *Nepeta binaludensis* Jamzad (Lamiaceae) have been used in folk medicine of Iran to cure various diseases. The later plant is an Iranian native medicinal plant that has recently been identified in Razavi Khorasan. We investigated the effects of n-hexane, dichloromethane, ethyl acetate, ethanol and Hydro-ethanol fractions isolated from the plant *N. binaludensis* and *N. sintenisii* on melanogenesis in B16 melanoma cells. To assess the effects of these plants on melanogenesis inhibition various assays were used including cytotoxicity, mushroom tyrosinase inhibition, inhibition of cellular tyrosinase, melanin content, the amount of reactive oxygen species and western blot. n-Hexane fraction of N. binaludensis and methanol and CH2Cl2 fractions of *N. sintenisii* were significantly reduced both the cellular melanin content and tyrosinase activity. Reactive oxygen species was also significantly decreases following treatment of cell with the mentioned fractions. While an AlamarBlue® assay showed no cytotoxicity. Furthermore, we have found that both plants decreased the amount of tyrosinase and microphthalmia-associated transcription factor proteins, which verify the role of suppression of microphthalmia-associated transcription factor protein in melanogenesis inhibition. Taken together the data indicate that N. binaludensis and N. sintenisii inhibit melanin synthesis in B16 melanoma cells with no cytotoxic effects. Therefore, it might prove a useful therapeutic agent for treating hyperpigmentation and an effective component of whitening cosmetics.

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114

EFFECT OF *SATUREJA HORTENSIS* POWDER SUPPLEMENT ON PAIN AND TNF-A IN PATIENTS WITH KNEE OSTEOARTHRITIS: A DOUBLE-BLIND RANDOMIZED CLINICAL TRIAL

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The most prevalent type of arthritis is osteoarthritis which is known with the degenerative knee disease. Limited pieces of evidence have indicated that satureja with special phenol compounds is effective in inflammation reduction and pain alleviation. the aim of this study was to investigate the effect of SaturejaHortensis powder supplement on pain improvement and serum tumor necrosis factor-α (TNF-α) in patients with knee osteoarthritis.The present study was conducted as a placebo-controlled double-blind randomized clinical trial. 39 patients with OA with medium pain were randomly divided into two groups which received *Satureja Hortensis* powder and placebo. These groups consumed three 200 mg capsules with the same size and form for two months which contained *Satureja Hortensis* powder and starch, respectively. Pain intensity was determined using visual analogue scale (VAS).Serum sample were collected before and after the intervention. The concentration of TNF-α were measured with ELISA kit. To distribute pain intensity before the intervention, there was no significant difference between the two groups. Before the intervention, all people had a pain score between 4 and 7. After the intervention, 95% of the *Satureja* group and 84% of the placebo group were in this scope. These changes were not statistically different (p=0.12). Median of the pain intensity was not statistically different before and after the intervention. There was no significant difference between the two groups in concentration of TNF-α before and after intervention.Results of this study showed that SaturejaHortensis powder supplement was not effective on pain alleviation and concentration of TNF-α in patients with knee osteoarthritis.

118
PRELIMINARY EVALUATION EFFECTS OF NATURAL PRODUCTS AND COMPOUNDS OF PLANTS DERIVATION AGAINST FUNGUS ACTIVITY

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Usage of herbal remedies was still widespread because these remedies were cheap, locally available and convenient to administer. Plants are rich source of bioactive secondary metabolites of wide variety such as tannins, terpenoids, saponins, alkaloids, flavonoids, and other compounds, 25 to 50% of current pharmaceuticals are derived from plants reported to have in vitro antifungal properties. Since the plant provides a useful source of lead compounds of novel structure, a wide-scale investigation of species from the tropics has been considered. Therefore, the research on natural products and compounds derived from natural products has accelerated in recent years. Due to their importance in drug discovery, a series of molecules with antifungal activity against different strains of fungus have been found in plants, which are of great importance to humans. These molecules may be used directly or considered as a precursor for developing better molecules. This study attempts to study the current status of important antifungal compounds from plants. The increased use of antifungal agents also resulted in the development of resistance to the present drugs It makes necessary to discover new classes of antifungal compounds to cure fungal infections. Antibacterial Screening and Phytochemical investigation of bark extracts of Acacia was assessed for active principles to ascertain the rationale for its use in traditional medicine. Preliminary phytochemical screening of the stem bark extracts showed that it possessed the active principles - alkaloids, glycosides, saponins, terpenoids and tannins. The antimicrobial activity of the extracts was assayed against pathogenic strains of Bacillus cereus,Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, S. pyrogenes, and Candida albcans using the agar diffusion method. The plant extract exhibited antimicrobial activity against all the test , micro organisms.B. Cereus was the most susceptible to the plant extract while Candida albicans was the most resistant. The minimum inhibitory concentration (MIC) of the stem bark extract of the plant ranged between 30 and 50 mg/ml while the minimum bactericidal concentration ranged between 35 and 60 mg/ml. Therefor acacia could be a good potential source of antimicrobial agent.

122

EFFECT OF POMEGRANATE SEED EXTRACT ON PHYSICAL STAMINA IN MICE

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Fatigue is the disability of body to retaine during exercise. Anti-fatigue effects of many plants have been evaluated and some are accepted in clinic. In the present research, the anti-fatigue effect of pomegranate seed extract was studied on physical stamina and performance in forced swimming test (FST) and on blood biochemical parameters related to fatigue in mice including: glucose (Glc), blood urea nitrogen (BUN), creatin kinase (CK), creatinie, and total protein (TP). Pomegranate seed extract (50, 100, 200 mg/kg) was orally administrated to mice for 10 days. FST was performed on 10 th day and the serum indices were measured. Results showed that the immobility time was reduced dose-dependently compare to control group, the mean glucose level was lower and the mean total CPK was higher in mice reciving 200 mg/kg of the extract in comparision with other groups. Totally according to the obtained results in this study, it may be concluded that pomegranate seed extract would increase the physical stamina in male mice.

125
EFFECT OF THYME EXTRACT (*THYMUS VULGARIS*) ON INTESTINAL *ESCHERICHIA COLI* POPULATION IN BROILER CHICKENS

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A research study was conducted to evaluate the effects of of thyme extract (Thymus vulgaris) on intestinal E.coli populations in broiler chickens. A total of 135 day-old broiler chicks were purchased and divided into 3 equal groups and each group to 3 subgroup of 15 chicks. Chicks of group 1 and 2 received 0.1% and 0.2% of thyme extract respectively in drinking water all period of experiment. Chicks of group 3 were kept as control group and did not receive thyme extract.

Experimental group	*E.coli* counts
0.1% (A)	703± 1.5× 106 (b)
(B) 0.2%	150×103±7070 (a,c)
Control (C)	0.07±1.5×106 (b)

The colony forming units of Escherichia coli in digesta of ileo-cecum in the group B showed a significantly lower number compared with control. However, there was no significant difference observed in E. coli counts between group A and group C. There was significant difference between group B and group A and between group B and group C . This study showed that thyme extract at 0.2% concentration decreased E. coli counts in digesta of ileo-cecum. Beneficial effects of herbal extracts in animal nutrition may include the stimulation of appetite and feed intake, the improvement of endogenous digestive enzyme secretion, activation of immune response and antibacterial, antiviral, antioxidant and antihelminthic actions. Isoprene derivatives, flavonoids, glucosinolates and other plant metabolites may affect the physiological and chemical function of the digestive tract. The stabilizing effect on intestinal microflora may be associated with intermediate nutrient metabolism.Volatile oil from thyme (Thymus vulgaris) was assessed for antibacterial and antiviral activity as inhibitors of microbial growth.

127
CONTROL OF PROSTATE GROWTH ABNORMALITIES BY COMBINATION AND CONSUMPTION OF FOUR FRUITS AND EXPERIMENTAL ADDING OF CANOLA OIL IN TRADITIONAL MEDICINE

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Prostate is a gland that its location is under gall bladder and encompass urethra.this muscle gland is the same as walnuts in size and via secretion of a special fluid once ejaculation, feeds sperms.the most important disorders which may be occur in prostate includs prostate cancer,enlargment of prostate (inflation or non cancerous tumor), prostate inflammation.prostate cancer in early stage is asymptomamtic,but gradually growth and make a pressure on urethra and also exhibit urinary symptoms.diets that have high degree of fat and low degree of fruits and vegetables,increases the chance of prostate cancer.mainly symptoms in men before the age of fourty is incombination with beginning of prostate cancer due to uncontrolled growth of prostate cells, and usually has some signs such as frequency urination specially in night,a discontinuous urination, feeling pain and dysuria in urinating, pain in the lower back and pelvic, hematuria. in this experimental study,therapeutic and inhibitory effects of four fruits (Tomato- apple-carrot - raw beet) in combination with canola oil in some patients which were volunteer,has been studied.effects of this method on 7 patients (X>10ng/ml, High PSA density) were operated, in 4 controls, group 1 without fruits and canola oil(1 person), group 2 with only canola (2 persons), and group 3 with only fruits (2 persons), group 4 with fruits and canola oil together(2 persons),that result s in group 4 were 100% positive in 3 months treatment period ,compared with another groups.good result was obtained on treatment of prostate heyperplastic and hypertrophic cells.in this method from each of mentioned unpeeled fruits (Tomato - apple - carrot - raw beet) 250 gr was selected then mixed and finally prepared stock (1000 cc) was stored in a 4 c degree refregerator.recommended eating was that ,everyday 100-200 cc in 10 Am and 100-200 cc in 16 Pm (2 cc / kg,dosage) and each time followed by one spoon canola oil that, has been mixed with 250 cc water.for making delicious the emulsion, lemon juice was used.the result in terms of quantitative and qualitative was good and has a good effect on treatment of prostate disorder cells. eventually laboratory investigation in terms of prostate specific antigens (X<4ng/ml, PSA) ,reduced proliferation in acinar cells and decrease of intra epithelial dysplasia in biopsy confirmed it.

132
EFFECT CHITOSAN ON BIOLOGICAL ACTIVITY OF ESSENTIAL OIL OF VIOLET LANDRACE OF BASIL (*OCIMUM BASILICUM*)

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Ocimum basilicum (basil) is an annual, herbaceous, white to purple flowering plant, that originated in Iran and India [1] and has become a major essential oil and salad crop in the world and cultured commercially in many countries. Basil possesses a range of biological properties, including, antibacterial, antifungal activity [2] and antioxidant properties [2, 3]. The current work was done to find out the effect of foliar application of chitosan on antibacterial and antioxidant activity of violet landrace of basil (*Ocimum basilicum*) in pot condition. The pot experiment was done at a greenhouse in Shahrekord, Iran in 2014, to investigate the effect of the foliar application of chitosan at the rates of 0.0 (CH0) as a control, 200 (CH1) and 400 (CH2) µL. The antibacterial activity of the essential oil was tested by agar disc diffusion assays against four pathogens (*Bacillus cereus*, *Listeria monocytogenes*, *Staphylococcus aureus* and *Salmonella typhimorium*) and antioxidant activity of essential oils was evaluated by DPPH assays. The data was statistically analyzed using one-way ANOVA by the program SPSS (19.0). Results indicated that foliar application of chitosan influenced antibacterial and antioxidant activity of essential oils. The higher antioxidant and antimicrobial activity was observed with application of chitosan at the rates 400 (CH2) µL. The major implication from this study is that elicitation by chitosan can significantly improve the phenolic components and also have stimulated antioxidant and antimicrobial function.

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135
EFFECTS OF DRYING METHODS ON ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF MOUNTAIN FENNEL (*ZARAVSCHANICA MEMBRANACEA* (BOISS) M. PIMEN)

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Mountain fennel [Zaravschanica membranacea (Boiss.) M. Pimen. syn. Peucedanum membranacea Boiss.] is a plant from the family Apiaceae which grows wild in Zagros mountains range, Iran. The plant has been used as a flavoring agent, especially dairy foods (yoghurt and cheese) and meat by the indigenous people of Chaharmahal va Bakhtiari, southwestern Iran [1]. To determine the effect of drying methods on antioxidant and antibacterial activity of *Z.* membranacea, plants were dried in sunlight, shade, mechanical ovens at 40C and 60C, a microwave oven at 500W and by freeze-drying. The essential oils of plants were extracted by hydrodistillation [2]. The antioxidant activity was determined by using α,α-diphenyl-β- picrylhydrazyl (DPPH) method [3]. In addition, the antibacterial activity of the essential oils against four bacteria, including Bacillus cereus, Listeria monocytogenes, Proteus vulgaris and Salmonella typhimurium was determined by serial dillution assay. Results indicated significant differences among the various drying methods for antioxidant and antibacterial activity essential oils of Z. membranacea. Drying of aerial parts of fennel in the oven at 60C was the most suitable drying method considering highest antioxidant and antibacterial activity.

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136
STUDY ON MINERAL ELEMENT CONTENTS IN *ACACIA TORTILIS* SEEDS

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Acacia is a genus belonging to the Fabaceae family and comprises about 135 species of trees which are widely spread throughout the arid and semi-arid tropics [1]. Aerial parts of A. tortilis are used as anthelmintic and antidiarrheal, and to treat asthma in folk medicine [2]. The seeds of some Acacia species were reported to be used as food and have been assessed for nutritional compositions and were shown to contain considerable amount of oil [3]. Literature survey revealed that no investigation has been done on them by now. The aim of this study was determination of proximate composition, mineral elements (Calcium, Potassium, Iron, Zinc, Sodium, Selenium and Copper), contents in this endemic Iranian seed.A. tortilis seeds were collected in August 2014 from Sarkhun village, Bandar Abbas, Hormozgan Province, Iran. Specimen was identified by R. Asadpour and voucher was deposited in the Herbarium of Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University (IAUPS), Tehran under code number 1537-AUPF. The samples were analyzed by wet digestion method and analysis of mineral element contents analyzed by Atomic Absorption Spectrophotometer in Research Laboratory in Pharmaceutical Sciences Branch, Islamic Azad University.Obviously in A. tortilis the amount of the mineral element contents is high in comparison by other seeds studied in other countries. The value of potassium, iron and Manganese in A. tortilis were 123, 407 and 66 mg/100g DW respectively. Obviously in A. tortilis the amount of the mineral element contents is high in comparison by other seeds. In this study, the nutritive value of A. tortilis seed native to south of Iran was determined and results revealed that it is so rich in mineral elements especially Iron it could be recommended as a dietary supplement for people who need iron. They could be not only very promising raw materials for various industries but also would serves as useful dietary supplements.

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154
A TRADITIONAL PROCESS TO DETHYMOQUINONATE BLACK CUMMIN

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Nigella sativa L. (Ranunculaceae) or black cumin is widely used in traditional medicine especially in South Asia. The therapeuticand pharmacologicactivities mostly belong to volatile oil of its seeds, and thymoquinone is considered as the main bioactive constituent.Since, thymoquinone causes bronchoconstriction in susceptible patients; therefore, omitting this compound from volatile oil is a way to decrease the mentioned side effect [1]. In the present study, we aimed to investigate if the traditional processed form of *Nigella sativa*, presented by Iranian Traditional Medicine [2], can remove thymoquinone from the plant. Seeds of *Nigella sativa* were crushed and subsequently mixed with natural grape vinegar, kept in refrigerator at 4 °Cfor 24 hours and dried at room tempreture. The essential oils obtained from hydrodistillation of crude and processedNigella sativa, were analyzed by GC/MS method. The analysis showed that the processed Nigella sativa essential oil had no thymoquinone in comparison with the crude sample. So it seems that the claim of Iranian Traditional Medicine that the processingNigella sativacan reduce itsbronchoconstriction effect could be proved. Further research is needed to confirmthat, this process can removethe bronchoconstriction effect from this valuable herbal medicine by extensive studies focusing onclinical features.

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165

EFFECTS OF RICE BRAN OIL ON OXIDATIVE STRESS, LIPID PEROXIDATION AND SOME BIOCHEMICAL PARAMETERS IN CHICKEN EMBRYO

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Rice Bran Oil (RBO) is extracted from the outer layer of rice. Little data have been relative to its safety [1, 2]. The present study was conducted to assess its safety in chicken embryo model. RBO were injected at the day 4 of incubation of chickens. The tissues and serum samples were collected. Oxidative stresses of organs and biochemical parameters of serum were measured. The deformities were also investigated, The changes in the liver enzymes activity were not significant. There was significant decrease in lipid peroxidation and same increase was observed in glutathione level. It is suggested that RBO is natural antioxidant sources**.** Low-density lipoprotein cholesterol (LDL) also decreased. No abnormal findings were observed for chicken. This study showed that RBO is not a safety concern. Therefore, this oil may provide effective new oil.

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168

THE TOPICAL EFFECT OF *ALTHAEA OFFICINALIS* MUCILLAGE ON WOUND HEALING IN RABBIT

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Repair is a natural reactin to injury which results in restoration of tissue integrity.Repair of wound will complete within tree phasesincluding: inflamination, pprolifration and remodelling.In this study the healing effect of marshmallow was investigated an exissinal skin wound of rabbit. Althaea flower mucilage ointment (in concenteration at 5%, 10% , 15%) prepared dried powder. Newzeland rabbit of either sexs were wed during the study. Method of cross et al (1995) was ased to make full thikness wound.The animal were devided in to 6 groups: the first group was left without treatment, the second group was treaeted with eucerin, in the third group phenytoin ointment 1% was used and in the other group, different concentration of Althaea officinalis mucilage (5%, 10%, 15% w/w) in eucerin were applied topically. The area surface was measured by a transparent sheetand and the Rate of redaction of wound surface was extrapolated. Histological studies were performed on the 7th day and last day of treatment (an complation of wound closure) complete healing occurred in 21 days.phenytoin caused complete healing within 15 days. In Althaea groups 5%, 10%, 15% wound repair was observed within 16, 17 and 14 days respectively. However the course of healing by 15% *Althaea officinalis* mucilage was 14 days which is 1 day shorther than 1% phenytoin. Significant difference of Althaea mucilage may be more effective in proliferation phase. Phehaps it is able to stimulate the fibroblast and myofibroblast and production of collagenfiber by these cell for the faster closure of wound. The mechanisem of *Althaea officinalis* mucilage in wound healing cannot be explained from the present study it merits further detailed investigations for clinical evalution, And the detail of mechanisem of action however more studies are required to elucidate the enact mechanisem of Althaea mucilage in wound healing.

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169

STUDY OF HEPATOPROTECTIVE EFFECT OF TRAGOPOGON GRAMINIFOLIUS L. HYDROETHANOLIC LEAF EXTRACT IN MALE RAT INDUCED WITH CARBON TETRACHLORIDE (CCL4)

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The liver is the central organ of metabolism and detoxification. The hepatocyte cells could be inflammated and necrotic in toxic disorders when they induced with chemical and microbial toxins. Medicinal plants have hepatoprotectivity effects and can inhibit the toxicity progress in liver. In this study the hepatoprotectivity effect of Tragopogon graminifolius hydroethanolic extract (THE) in male rat were investigated which induced with carbon tetrachloride. 42 male rats with 250-300 gr body weight were divided randomly in 6 groups (n=7): control (taking normal saline, 0.5 ml/ daily, single dose, IP), sham (taking olive oil ,0.5 ml, single dose , IP), carbon tetrachloride (1:1 with olive oil ,0.5 ml single dose, IP), treated 1,2& 3 groups (carbon tetrachloride1:1 with olive oil, 0.5 ml and 200 mg/kg,400 mg/kg and 800 mg/kg THE / daily ,single dose. for 96 hrs, IP). After the examination the blood samples were collected from heart directly and AST, ALT and ALP enzymes were analyzed and the liver tissue samples were isolated and then fixed with formaline for thepreparation of histological sections were performed stained with H & E. Data were analyzed using one-way of statistics ANOVA and significant differences was considered between their standard of $P < 0.05$. Our results showed that the carbon tetrachloride has hepatotoxicity effect in liver. It can cause inflammation and necrosis in liver tissue ($P<0.001$). The THE can inhibit the hepatotoxicity progressing in rats which induced with carbon tetrachloride ($P<0.001$). The enzymes serum in rats induced with carbon tetrachloride were increased compared with control group ($P<0.001$) and intreated rats by THE were decreased significantly compared with toxic groups ($P<0.001$).

176

SUMMER SAVORY (*SATUREJA HORTENSIS*) CAN REDUCE THE SPERMATOTOXIC EFFECTS OF DOXORUBICININ RATS

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Application of doxorubicin (DOX), an anticancer anthracycline antibiotic, carries the risk of serious dose-dependent toxicity to non-target tissues such as testis. We investigated whether DOX-induced spermato toxicity could be prevented by the use of Saturejahortensis alcoholic extract (SE). Male Wistar rats were randomly divided into four groups of six rats each. DOX was administered to two groups of rats in 5 equal intraperitoneal injections over a period of 4 weeks (accumulated dose of 20 mg/kg). One of these groups received SE at a dose of 100 mg/kg per day subcutaneouslyfor 28 days along with DOX. A vehicle-treated control group and a SE control group were also included. Epididymal sperm analyses revealed that DOX causes significant decreases in sperm concentration, viability and motility, while SE co-administration provided marked normalization in the sperm quantity and quality when compared to the DOX-only treated group. Inconclusion,it does not seem unreasonable to suppose that protective effects of SE against DOX-induced reproductive toxicity might have been related to the antioxidativeand anti-inflammatory effects of this substance.

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186
EFFECTS OF PEPPERMINT (*MENTHA PIPERITA* L) ON PERFORMANCE MEAN BODY WEIGHT GAIN AND MORTALITY RATE IN BROILER

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Nowadays the use of medicinal plants in the world is of great prosperity. This study was conducted to determine the performance, the levels of medicinal plants (*Mentha piperita* L.) of broilers fed diets which are among the alternative growth promoters and its effect on factors such as average daily gain, feed conversion and mortality reduction. A total of 1000 broiler chicks were used in this study Five levels of whole peppermint %0.00(Control), % 0.15, %0.3, %0.45. %0.5 were incorporated into the basal diet for six weeks. The feeding period for all groups lasted for 42 days. The results have appeared that there is an improvement in performance traits for all treated groups compared with the control group and the mortality rate has decreased.

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188
THE INHIBITORY EFFECTS OF *GANODERMA LUCIDUM* ON BREAST CANCER

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Ganoderma lucidum has considerable anti-cancer effects. The main aim of this study was to investigate the effects of *Ganoderma lucidum* on breast cancer cells in cell culture. In this laboratory-experimental study, breast cancer cells were randomly divided into control group and groups exposed to 10µg/ml, 100µg/ml and 1mg/ml of hydroalcoholic *Ganoderma lucidum* extract. The toxic effects of extract was measured using MTT assay method. The data were statistically analyzed between groups using ANOVA. Proliferation of of breast cancer cells exposed to 10µg/ml and 100µg/ml of Ganoderma lucidum extract significantly decreased compared to control group ($p<0.001$). Ganoderma lucidum can decrease proliferation of breast cancer cells; according to which, it is suggested to use this plant extract for breast cancer treatment.

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190
NEUROPROTECTIVE EFFECTS OF *SALVIA ARISTATA* ON HYDROGEN PEROXIDE-INDUCED APOPTOSIS IN SH-SY5Y NEUROBLASTOMA CELLS

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Alzheimer's disease (AD) is a multifaceted neurodegenerative disorder characterized by the progressive deterioration of cognition and memory in association with widespread neuronal loss and the deposit of senile plaques [1]. To date, the cause and the mechanism by which neurons die as a result of AD still remain unclear, yet several lines of evidence support the involvement of apoptosis [2]. In this study, we investigated the neuroprotective effects of *S.* aristata extract on H2O2-induced apoptosis in human dopaminergic cells, SH-SY5Y. Our results showed that H2O2-induced cytotoxicity in SH-SY5Y cells was suppressed by treatment with S. aristata. Moreover S. aristata was very effective in attenuating the disruption of mitochondrial membrane potential and apoptotic cell death induced by H2O2. S. aristata suppressed the down-regulation of Bcl-2, the upregulation of Bax, and the release of mitochondrial cytochrome c to cytosol. S. aristata attenuated caspase-3, and -9 activation, and eventually protected cells against H2O2-induced apoptosis. Taken together, these results suggest that treatment of SH-SY5Y cells with S. aristata can block H2O2-induced apoptosis by regulating Bcl-2 family members and by suppressing cytochrome c release and caspase cascade activation.

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197
ANTIBACTERIAL ACTIVITY OF A FOLK MIXTURE OF *PISTACHIO VERA* AND *MENTHA PIPERITA* AND OIL OF *THYMUS VULGARIS*

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Scientists make attempt to develop new inhibitory agents against pathogen bacteria, fungi, viruses, and parasites for many decades, since extended application of conventional antibiotics has led to the emergence of drug resistance. Plants have been used to treat infectious diseases for centuries as traditional medicines. In the present study, essential oils and decoctions of peppermint stem and pistachio hull as well as oil of aerial parts of thyme were obtained by steam distillation using a Clevenger-type apparatus. They were tested for their inhibitory effects against four standard bacteria strains Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, and Enterococcus faecalis, and two isolated strains from diseased hen including Salmonella thyphimurium, E. coli using disk diffusion method and Microdilution method to evaluate their minimum inhibitory concentration (MIC) [1]. The results showed that the oil of thyme had anti-bacterial property on all tested bacteria with inhibition zone diameters (IZD: mm) ranged between 20.7-34.7 mm. While, peppermint oil was just active against S. aureus and E. coli standard strains and S. thyphimurium-isolated bacterium with IZDs of 15.7 ± 0.5, 12.7 ± 0.5, and 12.7 ± 0.5, respectively. Decoctions of peppermint and pistachio hull as well as oil pistachio hull were not active against tested bacteria [2].

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199

VOLATILE OIL COMPOSITION OF THE FRUITS OF PLATYCHAETE AUCHERI (BOISS) BOISS

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The essential oil content in the fruits of the endemic species of Platychaete aucheri growing wild in the south of Iran was found to be 0.05 % based on the fresh weight. The oil was analyzed by GC and GC–MS. Twenty two constituents were identified which constituted 96.5 % of the oil. The major components of the oil were tetracosane (16.6%), bornyl formate (9.1%), nonacosane (7.5%), bornyl acetate (6.5%), nonadecane (6.3%) and hexacosane (6.1%).

200
ANTILEISHMANIAL *NIGELLA SATIVA* EXTRACT ACTIVITY ON URBAN CUTANEOUS LEISHMANIASIS IN BALB/C MICE

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Leishmaniasis is wide range, worldwide, without drug, vaccine, secticide and has not sterile immunity and efforts in this field have not been successful. Herbaceous plants tomentose perennial official Siah Daneh and scientific name Nigella sativa. *Nigella sativa* L. is an annual dicotyledonous of Ranunculaceae family known commonly as “Siah Daneh” (Persian) and “Black Cumin” (English). Many therapeutic effects of *Nigella sativa*, such as: antibacterial, antifungal, anti- helminthes, antiprotozoan, anti- inflammatory, antioxidant is reported. "Traditionally in the past as a poultice to treat skin, superficial cuts, wounds and acne has been used. Its disinfectant properties at the site of the wound have been proved. The present study was carried out to Antileishmanial Nigella sativa extract activity on urban Cutaneous Leishmaniasis in BALB/c mice. Sufficient twigs of Black seeds fgrains were minced and dissolved in Methanol 80%. Then sterilized and prepared as topica with concentration of 40, 60 and 80%. Amastigote was isolated from mice spleens and then transformed to promastigotes in Novy-Nicolle-Mac Neal (NNN medium supplemented with penicillin (100 U/ml), streptomycin (100µg/ml) and 20% heat-inactivated fetal calf serum (FCS) at 25°CIn the lab, 40 BABL/c mice were infected with the parasite Leishmania major [MRHO/IR/75/ER]. They were divided into four control groups that group that received 40, 60, and 80%. As well, the foot and the size of the lesion were measured; the weight was also taken in all mice in the four groups by using scale and coliss every week until the death of the last mouse in the control group. The mean of the measurement and weight of the mice that were received 40,60 and 80% of the extract –Nigella sativa showed significant difference comparing with the mean of P = 0.000. And the mean of lesion size of the mice that received 40, 60 & 80% of extract of *Nigella sativa* showed significant difference with the mean of the lesion size in controls groups. (P = 0.0000). As a whole, comparison with control group, the process weight decrease increase of lesion size in mice receiving Nigella sativa extract was significant. It show that could rebate of parasite.

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216
IN VITRO ANTIBACTERIAL PROPERTIES OF AQUEOUS EXTRACT OF GARLIC AGAINST ON DIARRHEA CAUSING BACTERIA

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Garlic (*Allium sativum*) has been considered to be an excellent medical panacea and a natural antimicrobial agent that can be considered as an alternative form of treatment of pathogenic infections. The aim of this studywas to assess the effect of different concentrations of aqueousextract of garlicpowder (AEGP)and aqueous extract of garlic tablet (AEGT) against three gram-negative diarrhea causing bacteria including Salmonella typhimurium, Shigelladysenteriaeand Escherichia coli, in vitro. In this research, aqueous extracts of garlic were prepared using Bakri and Douglas method. Also Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of AEGP and AEGT were tested through StandardTube Test.Data were analyzed byStudentt Test of SPSS software.The MICs of AEGP and AEGT against on Salmonella typhimurium, Shigelladysenteriae and Escherichia coliwere 12.5,12.5, 6.25 mg/ml and 40, 40, 20 mg/ml respectively. The MBCs of AEGP and AEGTon tested microorganisms were 25,25, 12.5 mg/mland 80, 80, 40 mg/ml respectively.The results of present study showed that the inhibitory and bactericidal effects ofAEGP was much more than that ofAEGT ($P<0.05$), either on tested microorganismsin vitro.The results of our research indicated that aqueous extract of garlic (AEG) especially AEGP have a significant antibacterial effects on the testeddiarrhea causing microorganisms,in vitro.Further studies will be needed for pharmacological standardization and clinical evaluation of garlic aqueous extract, in vivo.

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225
STUDY OF THE EFFECT OF *MATRICARIA CHAMOMILLA* AQUEOUS EXTRACT ON SOME OF BIOCHEMICAL PARAMETERS IN MALE RATS

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Matricaria chamomilla is one of the most ancient and well-known medicinal plants, and its role in the treatment of a wide range of diseases has been studied [1-6], but effects of this plant unknown on biochemical parameters. The aim of this study was to investigate the effect of Matricaria chamomilla aqueous extract on some of biochemical parameters in male adult rats. In this experimental study, the animals were divided into two groups: the control group, which received distilled water orally, and the experimental group, which received 100 mg/kg of Matricaria chamomilla aqueous extract via gavage feeding once daily for a 4-week period. After the treatment period, some of biochemical parameters such as FBS, ALT, AST, ALP, urea, creatinie and uric acid were measured. Results showed that FBS significantly ($p<0.05$) decreased compared with control group but ALT, AST and ALP none significantly decreased and urea, creatinine and uric acid none significantly increased compared with control group. The results of this study demonstrated that aqueous extract of *Matricaria chamomilla* could change some of biochemical parameters in male rats. But the use of this plant in traditional medicine and the same results in humans requires further study.

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227

EFFECTS OF DRIED *GLYCYRRHIZA GLABRA* (LICORICE) EXTRACT WITH LOW CALORIE DIET ON CARDIOVASCULAR RISK FACTORS IN OVERWEIGHT AND OBESE SUBJECTS: A RANDOMIZED CONTROLLED CLINICAL TRIAL

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Cardiovascular diseases (CVD) are important public health concerns in both developed and developing countries. Dyslipidemia, high blood pressure and obesityare major risk factor for developing CVD. The aim of the present study was to determine effects of dried licorice extract with low-calorie diet on lipid concentrations, high blood pressure and body weight in overweight and obese subjects. In this double blind randomized controlled clinical trial, 64 overweight and obese subjects (27 men, 37 women) aged 30-60 yrs old were recruited. They were randomly divided into intervention (n=32) and control (n=32) group. Both groups received weight loss diet and 1.5 g/day dried licorice extract (with lowered-Glycyrrhizin content)or placebo, respectively for 8 weeks. Lipid profile, blood pressure, anthropometric indices (weight, height)were measured at baseline and at the end of the study. Body Mass index (BMI) was calculated. Analysis of covariances (ANCOVA) and paired t-test were used for comparison measured values. SPSS vertion 16.0 was applied for all data analysis. $P<0.05$ considered significant. Fifty-eight participants completed the trial (intervention=29; control=29). The mean age and BMI were 36.06±11.97yrs and 33.6±4.8 kg/m^2, respectively. At baseline, there were no significant differences between two groups, except for low density lipoprotein cholesterol (LDL-c) levels. After the intervention period, total cholesterol and LDL-c levels were significantly decreased ($P<0.01$ for both values), but no changes in triglyceride,high density lipiprotein levels and blood pressure were observed.At the end of the study, body weight in both groups decreased compared to the baseline ($P=0.01$). But it was significant between two groups.Supplementation with licorice extract concurrent with low-calorie diet can efficiently improve lipid profile in overweight and obese subjects.

228

NIGELLA SATIVA OIL AFFECTS GLUCOSE HOMEOSTASIS AND LIPID CONCENTRATIONS IN PATIENTS WITH TYPE 2 DIABETES: A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL

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Diabetes mellitus is an increasing global health concern. Current evidence demonstrated beneficial effects of some medicinal herbs for controlling glycemic status such as Nigella sativa.The aim of the present study was to determine effects of Nigella sativa (NS) oil on glycemic homoeostasis and lipid concentrations in patients with type 2 diabetes (T2DM).In this double-blind placebo-controlled randomized clinical trial, 72 subjects at Endocrinology Clinics of Kermanshah were randomly divided into intervention (n=36) and control group (n=36). Participants were patients aged 30-60 years old with T2DM.They received 3 g/d NS oil or sunflower (as placebo) soft gel capsules onethree times a dayfor 12 weeks.The participants were asked not to change their usual physical activity and diet and they were advised to contact research staff if they changedthe dose ortype of their medications throughout the trial.Researches and participants were blinded to randomization and allocation. At baseline and at the end of the trial, body weight, body mass index (BMI) and biochemical parameters were evaluated. Sixty-seven patients completed the trial (intervention n=34, placebo n=33). Two groups were similar in the baseline characteristics. After the intervention, body weight and BMIdecreased in the intervention group compared to the baseline(-3.7% vs. 0.8% in both weight and BMI), but it was not significant between two groups. Comparison of the two groups indicated that fasting plasma glucose (-9.1%), HbA1c (-5.1%), triglyceride (-4.3%) and low density lipoprotein cholesterol (-17.6%) changed significantly in intervention group compared to the control group ($p<0.05$, adjusted for confounder factors including body weight, BMI, dietary intake and baseline values). Insulin resistance(-20.3%) decreased and high density lipoprotein cholesterol (19.0%) increased in the intervention group, but after adjusting for confounder factors, they were not significant.NS oil as a complementary therapies can improve glycemic status and lipid profile in patients with T2DM.

241
IN VITRO PROTECTIVE EFFECTS OF *SCUTELLARIA LITWINOWII* ROOT EXTRACT AGAINST H2O2-INDUCED DNA DAMAGE AND CYTOTOXICITY

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Despite the wide range of investigations on the therapeutic potentials of herbal extracts in cancer cell lines, there is not usually enough data on their effects on normal cells. Recently, both antitumoral and anti-oxidant properties of Scutellaria litwinowii extracts have been reported on different cancer cell lines. In the present study, the possible protective effects of S. litwinowii root extracts against cytotoxicity and DNA damage induced by hydrogen peroxide (H2O2) on normal cells were investigated using MTT and Comet assays, respective A method of sequential extraction with solvents of different polarities was used to generate methanolic, de-fatted, and dichloromethane fractions. MTT and Comet assays were performed to evaluate, respectively, changes in cell viability and levels of DNA damage from H2O2. In a pre-treatment regimen, test materials were applied to the cells prior to H2O2 treatment, while in a co-treatment protocol, cells were treated simultaneously with H2O2 and extracts. In the co-treatment studies, only methanolic extract at 1,000 µg/mL ($p < 0.001$) imparted a significant protective effect as shown in the MTT assay. Pre-treatment of cells for 24 h with different concentrations of the test materials did not lead to any significant protection. Results from the Comet assays in the co-treatment studies suggested a significant ($p < 0.01$) protective effect of the test materials against DNA damage caused by H2O2. However, in the pre-treatment studies, only methanolic extract at ≥500 µg/mL showed a protective effect ($p < 0.01$). Considering the probable high levels of phenolic and flavonoid compounds in the methanolic extract, these compounds may impart the noted protective effects of the S. litwinowii root through the scavenging of free radicals.

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256
NUTRITIVE VALUE AND MINERAL ESSENTIAL ELEMENT CONTENTS IN *ACACIA OERFOTA* SEEDS

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Acacias have diverse and extensive uses, ranging from food (many species contain edible shoots and seeds, and the flowers are used to produce a delicate and non-crystallizing honey) and medicine to paint and perfume to timber and firewood. The leaves of many species bear large amounts of tannins, with wide commercial production for tanning leather. Acacia is a pantropical and subtropical genus abundant throughout Australia, Asia, Africa and the Americas [1]. *Acacia* species thrive in a diverse range of habitat and environments. In the North America and Europe, acacia ingredients are used in soft drinks, chewing gums, candies, and mints [2]. The aim of this study was determination of proximate composition, mineral elements (Calcium, Potassium, Iron, Zinc, Sodium, Selenium and Copper) contents in this endemic Iranian seed. A. oerfota seeds were collected in August 2014 from Sarkhun village, Bandar Abbas, Hormozgan Province, Iran. Specimen was identified by R. Asadpour and voucher was deposited in the Herbarium of Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University (IAUPS). The samples were analyzed by wet digestion method and analysis of mineral element contents analyzed by Atomic Absorption Spectrophotometer in Research Laboratory in Pharmaceutical Sciences Branch, Islamic Azad University. Obviously in A. oerfota the amount of the some mineral element contents is high in comparison by other seeds studied in other countries. The value of Zinc, Potassium and Manganese in A. oerfota were 355, 118and 148 mg/100g DW respectively. Obviously in A. oerfota the amount of the mineral element contents is high in comparison by other seeds. Our results revealed that it could be recommended as a dietary supplement for people who need essential mineral elements. Traditionally the plant used widely for the treatment of various ailments, but scientifically few of them was screened out. Therefore the scientific studies should be conducted to investigate the unexploited potential of Acacia *A. oerfota* (L.).

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275
ANALYSIS OF PHYTOCHEMICAL COMPONENTS AND ANTIMICROBIAL ACTIVITY OF *ALOE VERA* L. FRESH GEL

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Aloe vera is native plant of North Africa. Using of medicinal plants has been increased because of fewer side effects and less expensive. In this study the aqueous, ethanol, methanol and aceton extracts of Aloe vera gel were studied for their antimicrobial activity against Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa using Well Diffusion Agar and MIC methods.The methanol showed higher activity while aqueous extract had no antimicrobial activity. Antibacterial effects were examined based on well diffusion agar and Minimum Inhibitory Concentration (MIC). Extracts were prepared by Maceration method, for the preparation of ethanol and methanol extracts, fresh leaf gel was dried in the oven at 80 0C for 24h and then powdered. one gram of this powder was soaked in 10ml of each of the solvents for 24 h. The contents were then filtered through Whattman filter paper no. 1.The filtered extracts was centrifuged at 4000 g for 10 minutes[1].The supernatant was evaporated at room temperature then added distilled water 50:50 and collected in sterile flask stored at refrigerator at 4 0C. Results showed that the ethanol and methanol extract of Aloe vera was most effective on P.aeruginosa and the aceton extract was most effective on Staphylococcus aureus. Four methods were used to analysis phytochemical components of Aloe vera L. extracts. In the FTIR analysis, 10 bioactive phytochemical compounds were identified.The strong absorption band at 1620-1610 cm-1is due to C=C streaching wich indicates the presence of vinyl ether and Aloin compound. In GC/MS the chemical compositions of the n-hexane extract of Aloe vera were investigated and revealved the existence of 11 bioactive compounds. In UV spectroscopy of Aloe vera gel two peaks at 250nm and 330nm showed the presence of Aloin and phenolic compound. Isolation of the glycoprotein fraction of Aloe vera was examined by SDS-PAGE the molecular weight of this fraction was 18kD showed inhibitory activity.

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281

NIGELLA SATIVA CAN REDUCE APPETITE AND BODY WEIGHT IN OBESE WOMEN

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Obesity is a main challenge to human health worldwide. Reducing feelings of hunger makes it easier to adhere to low-calorie diet. The aim of the present study was to determine effects of *Nigella sativa* (NS) oil on appetite and body weight in obese women. In this before-after clinical trial, 25 volunteer women aged 30-60yrs old with body mass index (BMI) 30-35 kg/m2 were recruited. They received 3 ml/day NS oil for 4 weeks with low-calorie diet. Dietary intake and anthropometric indices (body weight, height, BMI) were evaluated at baseline and at the end of the trial. Dietary intakes were evaluated using a 3-day food dairy (two weekdays and one weekend). For each participant, total dietary intake and dietary intakein each main meal (breakfast, lunch, and dinner) and snack were evaluated. Pair t-test was used for comparison body weight and dietary intake before and after of the intervention. Twenty-three subjects completed the trial. Mean of weight and BMI were 82.3±10.4 kg and 33.6±1.63kg/m2, respectively at baseline. After the intervention, significant reduction in body weight (- 3.7%) were observed. Mean of energy, carbohydrate, protein and fat intake were 2140±230 kcal, 278.2.50±60 g/day, 69.5±13.4 g/day and 83.2±26.7g/day, respectively at baseline. After the intervention, energy (-17%), carbohydrate (-23.6%) and fat (-14.8%) intake were decreased compared to the baseline. But no significant reduction in dietary protein intake (-4.8%) was observed. Also, there were no significant differences in energy and macronutrient (carbohydrate, protein, fat) intake in snacks at baseline and after the intervention ($p<0.05$ in all variables).But energy and macronutrient intake in lunch and dinner significantly decreased after the study. Moreover, all participants declared reduction in appetite and early feeling offullness particularly in main meals. NS oil can decrease appetite and body weight in obese women. Supplementation with NS oil can be a useful complementary therapy in obese women who adhere to losing weight diet.

282
IN VITRO ANTIFUNGAL ACTIVITY OF *PISTACIA ATLANTICA* DESF EXTRACTS AGAINST SOME PATHOGENIC DERMATOPHYTE STRAINS

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During the last decades, the number of people suffering from dermatophytoses has seriously increased, mainly due to the development of resistant strains of microorganisms to a range of formally efficient antibiotics. The present study was aimed to evaluate the antidermatophytic properties of to evaluate the in vitro antifungal effects of various extracts of Pistacia atlantica Desf. against some pathogenic dermatophyte strains. In this study, in vitro antidermatophytic activity P. atlantica leaf and fruit extracts against Trichophyton mentagrophytes, Microsporum canis, and Microsporum gypseum was studied by determination of minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) using broth microdilution method, according to the protocol M38-A2 of the Clinical and Laboratory Standards Institute (CLSI) for filamentous fungi with some modifications. The findings indicated that all the extracts demonstrated both fungistatic and fungicidal activities with the MIC ranging from 2.33 to 13.33 mg/mL and the MFC ranging from 5.33 to 32 mg/mL, respectively. Among the tested extracts wet fruit methanolic extract significantly ($p<0.05$) was much more effective than other extracts once they exhibited lower MIC (ranging from 2.33 to 6.66 mg/mL) and MFC (ranging from 5.33 to 10.66 mg/mL) values for all the tested dermatophyte strains. In contrast, the lowest antidermatophytic effect was related to leaf aqueous extract with the highest MIC (ranging from 6.66 to 13.33 mg/mL) and MFC (ranging from 16 to 32 mg/mL) values. The findings of this study suggest a first step in the search of new antidermatophytic drugs and aid the use of P. atlantica in the traditional medicine for dermatophytic infections.

291
PROTECTIVE EFFECT OF *HIBISCUS SABDARIFFA* AGAINST SERUM/GLUCOSE DEPRIVATION-INDUCED PC12 CELLS INJURY

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The finding of natural products with antioxidant and antiapoptotic properties has been one of the interesting approaches in the search for the treatment of neurodegenerative diseases including ischemic stroke. Serum/glucose deprivation (SGD) has provided as a model for the understanding of the molecular mechanisms of neuronal damage during ischemia in vitro and for the expansion of neuroprotective drugs against ischemia-induced brain injury. Recent studies showed that Hibiscus sabdariffa exert pharmacological actions such as potent antioxidant. So, in this study we investigated the protective effect of extract of H.sabdariffa against SGD-induced PC12 cells injury.The cells were pretreated with different concentrations of H .sabdariffa extract (HSE) for 2 hr, and then exposed to SGD condition for 6, 12 and 18 hr. SGD caused a major reduction in cell viability after 6, 12 and 18 hr, as compared with control cells ($P< 0.001$). Pretreatment with HSE (30-500 μg/mL) significantly increased cell viability following SGD insult for 6, 12 and 18 hr. A significant increase in cell apoptosis was seen in cells under SGD condition after 12 hr, as compared with control cells ($P< 0.001$). Pretreatment with HSE significantly decreased cell apoptosis subsequent SGD condition after12 hr at concentration of 60, 125 and 250. These data showed that HSE had a protective property under SGD condition in PC12 cells, suggesting that H. sabdariffa has the potential to be used as a new therapeutic approach for neurodegenerative disorders.

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302
EVALUATION OF THE EFFECT OF GREEN TEA EXTRACT ON PREVENTION OF GINGIVAL BLEEDING AFTER POSTERIOR MANDIBULAR TEETH EXTRACTION: A RANDOMIZED CONTROLLED TRIAL

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Removing tooth results in gingival bleeding. Several measures are taken to stop bleeding. In this study, the effect of green tea extract on cessation of bleeding and oozing after removing of mandibular molars was investigated. This was a controlled, randomized, clinical trial carried out on 62 patients who referred for extraction of their mandibular molars. The volunteers were randomly and equally divided into treatment and control groups. In the first group, green tea extract-impregnated sterile gauze was used after removing the tooth. In the second group, green tea extract-free gauze was applied. Active bleeding and oozing monitoring was done every 5 minutes until cessation of bleeding and one hour after that, respectively. The results were compared using t-test. The mean ± SD of bleeding duration in green tea group was significantly lower than control group (5.87 ± 1.76 versus 10.09 ± 3.61 minutes, P=0.001). In addition, the number of people with oozing one hour after surgery was significantly lower in the green tea group (6 versus 2 persons, P=0.001). This study showed that green tea extract contributes to significant decline in bleeding of the socket caused by tooth extraction, as well as in reduction of oozing.

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316

ANTIMICROBIAL ACTIVITY OF ESSENTIAL OIL FROM OLIVERIADECUMBENS VENT AGAINST *STAPHYLOCOCCUS AUREUS, E.COLI, MICROSPORUM.CANIS*

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Oliveria decumbens Vent. (Umbelliferae) is a shrub commonly found in the South East of Iran. Its aerial part is extensively used in herbal medicin . In this study, the antimicrobial activity of *O. decumbens* essential oil extracted from aerial parts of plant against a panel of microorganisms including : *S. aureus*, *E.coli*, *M. Canis* were assessed by macro dilution assay.The main components of essential oil are thymol (26.9%), carvacrol (0.25%), p-cymene (13.3%) and Gamma terpinene (11%). (mahbobi1387). Essential oil of aerial parts with MIC: 0.025µl/ml *S.aureus*, 0.00625 µl/ml *E. coli*, 0.05 M.canis had a good inhibitory effect. Thus, microorganisms differ in their resistance to *O. decumbens* oil. High amount of thymol, carvacrol and p-cymene in *Olivera decumbens* essential oil may be a reason of antimicrobial effects of the planet and the plant essential oil can be use in treatment of feline and canine pyoderma. Therefore, further studies are required to evaluate in vivo efficacy.

319

THE SDUDY OF PLANT EXTRACTS OF *DATURA STRAMONIOM* FOR SEDATION & ANESTHESIA ON FISH CARP

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In the twenty century was a great deal of research on medical plants and the active ingredient of the drug with a new approach was introduced in the medical world.one third of the drugs that are consumed by the human are type of plant. the trend towards the use of herbal medicines is increasing gradually. dature plants are contain hyoscine,hyoscyamine and atropine. it'sseeadscotain alkaloid and some fixed oil most of the compounds are in the seeds,then the leaves and then in the stem.approved medical uses,mostly due to atropine.the drug is considered as strategic for sedative anti asthma,antiseptic,etc.for sedation auesthesia on fish,vegetable seeds were provided to the ./5 kg.the seeds were ground and mixed with methanol 70% in a ratio of one to four.after evaporation of the alcohol and extract prepration,it with doses ./3,./6 and 1.2 ppm used in 20 liter of water.the results showed the fish was not observed initial dose response but,as the dose was much more, sedation was observed in fish.this research with report ,Ahmadianetal (1998) that *datura* plant have properties sedative is corresponded.

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321
THE EFFECT OF DIFFERENT LEVELS OF *SATUREJA KHUZISTANICA* ESSENCE ON INTESTINAL HISTOLOGY OF BROILERS FED DIETS CONTAINING WHEAT

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An experiment was conducted to evaluate the effect of *Satureja Khuzistanica* essence on intestinal histology of broilers in completely randomized design with 2*3 factorial arrangement for 42 days. In this experiment, two hundred and sixty four one –day- old chicks were randomly assigned into 6 treatments with 4 replicates and 11 birds per each. Treatments consisted of different levels of wheat (0 and 50% of diet) and different levels of essence (0, 250 and 500 ppm). At the end of the experiment, 2 birds of each replicate was randomly selected and slaughtered and samples of the duodenum, and jejunum were subsequently removed, fixed in Bouin solution, and later embedded in paraffin and stained with hematoxylin-eosin. The parameters analyzed were villus height and crypt depth. The results showed that villus height of jejunum and duodenum was significantly decreased by increasing levels of essence (P<0/05). Villus height of duodenum and jejunum was significantly decreased and crypt depth of duodenum increased in wheat-based diets (p<0/05). Ratio of height to crypt depth in the duodenum also increased in level 500 ppm essence. The interaction of wheat and essence significantly influenced duodenal villus heights.Maximum height was observed in wheat-based diets without essence. Viveros [1] reported shorter and thicker villi of intestine in birds fed diets based on wheat and barley which agrees with the results of this experiment. The results showed that addition of essence in wheat-based diets had positive effects on intestinal histology.

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325
PRODUCTION OF NATURAL WOUND DRESSING FROM POLYVINYL ALCOHOL FILM ENRICHED BY NANOPARTICLES BY *ZATARIA MULTIFLORA* ESSENTIAL OIL

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Development of biodegradable and biocompatible films has become a very attractive optio and production of low cost biodegradable film with strong antibacterial activities is gradually obtained extensive concern in the world. In this study, improvement of polyvinyl alcohol (PVA) film properties incorporated with Zataria multiflora essential oil (ZMO) as a potential antioxidant/antibacterial wound dressing was investigated. PVA wound dressing were prepared from PVA solutions (2% w/v) containing ZMO (2, 4, 6, 8 and 10% w/w of PVA).Water solubility, water swelling, water uptake and water vapor permeability for pure PVA films were 57 ± 1.1%, 337 ± 12% , 99 ± 3.2%, 0.453 ± 0.015 g.mm/m2.kPa.h, respectively. Incorporation of ZMO into PVA films caused a significant decrease in swelling and water uptake and increase in solubility and water vapor permeability. Tensile strength, elongation at break and young's modulus for pure PVA films were 13.5 ± 0.61 MPa, 216 ± 4% and 15.2 ± 0.8 MPa, respectively. Incorporation of ZMO into PVA films caused significant decrease in tensile strength and young's modulus and increase in elongation at break of the films. Pure PVA film showed UV-visible light absorbance ranging from 280 to 440 nm with maximum absorbance at 320 nm. Addition of ZMO caused a significant increase in light absorbance and opacity. PVA films exhibited no antioxidant activity while, PVA/ZMO films exhibited excellent antioxidant properties. PVA/ZMO films also exhibited excellent antifungal activity against fungi tested. Our results suggest that the PVA/ZMO films could be used as a very attractive alternative to traditional materials for different biomedical applications.

337

IN VIVO IMMUNOMODULATION ACTIVITY OF POLYSACCHARIDES EXTRACT OF *ASTRAGALUS VERUS OLIVIER* IN NMRI MICE

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Astragalus verus Olivier, has been used as an immuno promoting remedy in Kurdish ethno medicine, Asia (traditional medicine) and aim of present survey was to determine of the effects of immunomodulatory activities of polysaccharides extract of A. verus in a mice model .(1,2,3,4,5,7,9,10,11). animals injected with the aqueous extract (5, 10 and 20mg/kg) of Astragalus verus Olivier, intra peritoneal ,and Hem agglutinating antibody titers of serum, as a factor of humeral mediated immunity were investigated at days 0 and 14. Also, Footpad swelling test was used to determine delayed type hypersensitivity (DTH) for cell mediated immunity in animals that received extract via gavage.(6,8,9) . It was found that the polysaccharides extracts (5, 10, 20mg/kg) of Astragalus verus Olivier did not appear to have hem agglutinating activity on SRBC, indicating that this extract have not Lectin-like activity. Moreover, the DTH reaction promotes on 14 days after administration of 10mg/kg ($p<0.05$) of Astragalus verus Olivier, showing the CMI response of the extract. In this study, by attention to the above lines, we could conclude that Astragalus verus Olivier has the potential in vivo immunomodulation activities and these new findings support our pervious in vitro studies.

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341
ANTIMICROBIAL EFFECTS OF 20% HYDROALCOHOLIC EXTRACT OF GERMAN CHAMOMILE (*MATRICARIA CHAMOMILLA* L.) ON *STAPHYLOCOCCUS EPIDERMIDIS, PSEUDOMONAS AERUGINOSA* AND *ENTEROCOCCUS*

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Matricaria chamomila is a popular medicinal plant useful in various ailments. Matricaria shows different pharmacological activities like anti-inflammatory, anti-cancer, treatment of stress and depression, anti-allergic, immunomodulatory and antimicrobial[1,2,3,4,5]. The main constituents of this plant include the terpenoids α-bisabolol and its oxides and azulenes, including chamazulene. In this study the antimicrobial effects of 20% hydroalcoholic extract of German Chamomile (*Matricaria chamomilla* L.) as a natural antimicrobial herbs on staphylococcus epidermidis, pseudomonas aeruginosa, and enterococcus were investigated. For evaluating antimicrobial effects of chamomile extract, agar dilution method was used. Effect of the extract on the growth of bacterial colonies on agar medium containing the bacteria after 12-24 hours incubation at 37 ° C was investigated. Chamomile extract in ½ and ¼ dilutions avoided the growth of colonies of Staphylococcus epidermidis but it has not any antibacterial effect on Pseudomonas aeruginosa and Enterococcus. According to the study, 20% Hydroalcoholic extracts of German chamomile in high dilution has antimicrobial properties against staphylococcus epidermidis but it was unable to prevent the growth of colonies of Pseudomonas aeruginosa and Enterococcus. These data led us to approach the conclusion that, the 20% hydroalcoholic extract of German Chamomile may be used as a commercial antibiotic against staphylococcus epidermidis.

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346

HEMATO-IMMUNOLOGICAL AND BIOCHEMICAL INDICES IN JUVENILE BELUGA (HUSO HUSO) FOLLOWING THE DIET SUPPLEMENTED WITH NETTLE (*URTICA DIOICA*)

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The present study investigated the effects of different dietary nettle (Urticadioica) levels on biochemical, hematological and immunological parameters in beluga (Husohuso). Fish were divided into 4 groups before being fed for 8 weeks with 0%, 3%, 6% and 12% of nettle. The blood samples were collected on week 4 and 8. The use of nettle were not significantly changed the mean cell volume , mean cell haemoglobin, lymphocytes, eosinophils, albumin, glucose, alanine aminotransferase , aspartate aminotransferase, alkaline phosphatase and lysozyme activity on week 4 and 8. After 4 weeks, the total red blood cell (RBC) and haematocrit (Ht) showed a significant increase in 12% nettle group compared to the 3% nettle and control groups but haemoglobin (Hb) had a significant change in 12% nettle compared to the control. At the same time was not found a significant change in the mean cell haemoglobin concentration (MCHC), total white blood cell (WBC), neutrophils, respiratory burst activity (RB), total immunoglobulin (Ig) and total protein (TP), triglyceride (Tri) and cholesterol (Chol). After 8 weeks, the fish treated with nettle exhibited significantly increase in neutrophil and Hb levels compared to the control and between treatment groups, 12% nettle group shown the highest Hb while RBC and Hct values significantly rose in fish fed by 12% compared to the control. Supplementing %6 and 12% nettle increased the WBC and MCHC compared the other groups. The group fed 12% showed a highly significant difference in RB, TP and Ig after 8 weeks. However, Tri and Chol were significantly decreased in the juvenile beluga fed by the %6 and 12% nettle diet compared the other groups. The results suggest that by using this herb there will be an improvement hemato- biochemical parameters and immune function of juvenile beluga.

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349

EVALUATION EFFECTS OF OREGANO AGAINST BACTERIAL AND FUNGAL DISEASES ON RESPIRATORY AGENTS DISEASES IN BREEDER CHICKENS FARM

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Bacterial and fungal diseases are occurred mostly in breeding chicken farms and make common problems in the poultry industrial. Oregano as a natural product in medicine treatment has antibacterial and antifungal activities so these therapeutic effects have been approved in most valid pharmacopeias. Active ingredients of oregano herb have synergistic effects and can intensify, the therapeutic of each others .The scientific name is thymus vulgaris and classified in family labiateae . It contained phenolic compounds with high antibacterial and antifungal effects in breeder chickens. The most important of them are thymol , carvacrol , paracymol , cineol and essential oil . It can prevent and treatment bacterial and fungal diseases and also it has probiotic effects. Previous studies have shown that mechanism of action for antibacterial and antifungal effects are related to their effects on cell membrane. Experimental tests show that 0.1 solution of oregano reduced the growth of the following pathogens as 95-99.5% .1- Candida albicans 2- Pseudomonas aeruginosa 3- Salmonella typhimurium 4- Staphylococcus faecalis . In this herb, the mechanism of action is to change the permeability of pathogen cell membrane for potassium. This herbal medicine can be used for prevention of growing bacteria and fungi in poultry feed and it can be used for treating bacterial and fungal diseases. Experimental tests show that oregano as a solution in drinking water reduces symptoms of infectious coryza disease in poultry and affects on ornitobacteriunm Rhinotracheal bacterial disease (ORT) in breeder chickens as well. The results show that rate of mortality is better than controls. This herbal medicine should be used in the beginning of symptoms of infection diseases and its dosage depends on the age of flock. It has been recommended to dissolve 0ne liter of pure form of oregano in one thousand liters of water.

355
EFFECT OF GLYCIN ON THE DISSOLUTION OF CUMIN AND LIME SOFT GELATIN CAPSULES

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Soft gelatin capsules (Softgels) offer the possibility of delivering a liquid in a solid oral dosage form. Gelatin, as a water-soluble protein produced from hydrolysis of animal collagen, has been widely used in these applications. Because gelatin can be obtained from inexpensive sources derived from waste or by-products of manufacturing processes comprising tannery, pharmaceutical, and food segments, it can be taken as a renewable and biodegradable material [1]. In the other hand, gelatin capsule crosslinking is a well-known phenomenon that results in reduced dissolution of capsule products with the passage of time and/or under accelerated stability conditions [2]. In this work, gelatin cross-linking reactions were conducted using natural essential oil such as lime oil and cumin oil as cross-linking agents. It has been suggested that diacids such as glycin in some gelatin capsule formulation preventing the interaction of aldehyde with the gelatin shell, thereby preventing gelatin crosslinking. This knowledge was utilized by adding glycin to the cumin and lime soft capsules formula. The results of these tests clearly demonstrated that when glycin are present in cumin and lime gelatin capsule formulation, pellicle formation or crosslinking of the gelatin capsules is prevented. Another proposed theory evolved from observations made during manufacturing. It appeared that glycin facilitated solubilization of gelatin in the dissolution of herbal soft capsule.

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372

TOXICITY AND CHEMICAL COMPOSITIONS OF ESSENTIAL OILS ISOLATED FROM THREE ACANTHOLIMON SPECIES TO *ORYZEAPHILUS MERCATOR* (COLEOPTERA: SILVANIDAE) AND *TRIBOLIUM CASTANEUM* (COLEOPTERA: TENERBRIONIDAE)

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Aerial parts of *A. atropatanum*, *A. gilliiatii* and *A. tragacanthium* were collected at the flowering period from wild population growing in East Azarbaijan province, Iran. Voucher specimens were authenticated by the Pharmacognosy Department and voucher specimens, Nos 2555, 2556 and 2557, deposited in the herbarium of Pharmacognosy department of pharmacy faculty of Guilan University of medical sciences, Iran. The air-dried ground aerial parts of the three species (500 gr) were subjected to hydrodistillation for 3 h in a Clevenger-type apparatus, yielding 0.9%, 1.5% and 1.8% v/w, respectively, of essential oil. Yellowish oils (by dry mass) with a fragrant smell. The essential oil samples were dried over anhydrous sodium sulphate (Na2SO4) and stored at 4 °C in the dark until tested and analysis by gas chromatography (GC) and gas chromatography–mass spectrometry (GC–MS). Three Acantholimon spices yielded yellowish oils (0.9%, 1.5% and 1. 8% v/w on dry weight basis). The major components of the essential oils are hexahydrofarnesyl acetone (22.9%), lauric acid (7.8%), phytol (6.8%) and hexahydrofarnesyl acetone (22.9), palmitic acid (21.3%) and phytol (6.8%) in A.gilliiatii and A.tragacanthium respectively. Conversely, A. atropatanum essential oil has relatively high amount of farnesyl acetone (33.7%), germacrane D (5.3%) and linalool (3.4%) according to this observation probably hexahydrofarnesyl acetone, farnesyl acetone and phytol are special marker in this genus. The oils showed 90.0, 45.0 and 55.0 % mortality of *O. Mercator* and 85.7, 40.0, 50.0% mortality of *T. castaneum* at a dose of 12 µl /l air after 48h of exposure respectively.

380

EVALUATE THE EFFECT ANTI BACTERIAL *FERULA ASSA-FOETIDA* L , *CARUM COPTICUM* , *MENTHA PIPERITA* L ETHANOL EXTRACT ON STANDARD SENSITIVE & METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS, ESCHERICHIA COLI* O157H7 AND *SALMONELLA TYPHIMURIUM*

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Iran is the richest country In terms of Distribution of medicinal plants and the growth of these plants. increased of drug resistance against different antibiotics in most bacteria The cause is increased interest in the development of natural antimicrobial compound [1]. The aim of this study was to evaluate the antibacterial effect of ethanol extracts ofFerula assa-foetida, Carumcopticum and Menthapiperita strains on standard pathogenic bacteria methicillin resistant staphylococcus aureus (MRSA) ATCC 33591 , methicillin sensitive staphylococcus aureus (MSSA) ATCC 29213 ,E.coli ATCC 43895 ,salmonella typhimurium ATCC 14028. plant ethanol extract was performed by maceration method. well diffusion ,disk dfiffusion and microdilution method was used to determining the minimum inhibitory concentration (MIC) each of the extracts against four species of bacteria.Results :the Minimum inhibitory concentrations of Ferulaassa -foetida, Carumcopticum and Menthapiperita extract for MRSA was50,25, 3.25 mg/ml respectively and for MSSA was 25,25, 3.25mg/ml. The minimum inhibitory concentration of Carum copticum and peppermint on E. coli O157:H7 was 50, 25mg/ml while Ferula assafoetida had no effect. The minimum inhibitory concentration of Mentha piperita on Salmonella typhimurium was 12.5 mg/ ml while the Ferula assa-foetida and Carum copticum extracts have no impact. Therefore, according to the results, natural compounds such as essential oils and plant extracts recommended to Control disease .

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383
OPTIMIZING THE PRODUCTION OF *VIOLA ODORATA* OIL (AN IRANIAN TRADITIONAL DRUG) ACCORDING TO PHYTOCHEMICAL FACTORS

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Sweet violet oil (Rowghan-e Banafsha) is an Iranian traditional drug used topical in insomnia, hot and dry headache, and joints rigidity [1-3]. Traditional manuscripts have reported third different methods of preparation for this medicine; the first is macerating voila flower in sweet almond oil for 7 days under sunlight (sample 1); the second is macerating voila flower in sweet almond oil for 7 days at 40°C (sample 2); and the third is macerating voila flower in water for 5 hours, heat the water until the volume reaches to a quarter, then filtering the extract and boiling the mixture of the extract with sweet almond oil to evaporate aqueous part (sample 3). The first method is more preferable in traditional medicine but because of the simplicity of third method, it is more suitable for industrializing. To find the pros and cons of these third methods, total phenolics, and oil rancidity indices i.e. acid and peroxide values were determined.
The results showed that sample 3 had greater amounts of total phenolics based on gallic acid (Sample 1: 0.048%, Sample 2: 0.0353%, and Sample 3: 0.113%). About oil rancidity indices, all samples were in standard ranges but indices of sample 3 were more preferable than sample 1 and 2. It could be due to long exposure of sample 1 to sunlight and sample 2 to permanent heat. According to the results, sample 3 had more amounts of flavonoids. It has more chemical stability than other samples. Therefore, sample 3 is more preferable than sample 1 and 2. Appropriate antioxidants should be utilized to protect sample 1 and 2 against sunlight and heat oxidation.

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384
QUANTIFICATION OF 8-PRENYLNARINGENIN AND XANTHOHUMOL IN HOP EXTRACTS AND ITS PREPARATION

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Hop (*Humulus lupulus* L.) is a perennial plant belonging to the Cannabaceae, containing the interesting prenylflavonoids such as xanthohumol (XN) and 8-prenylnaringenin (8-PN). A selective and sensitive analytical method, based on HPLC has been developed for quantitative determination of XN and 8-PN in hop extracts and a gel prepared from hop extract [1, 2]. Extraction of hop cones was carried out with several solvents. Analysis was performed using a C18 column at 290 and 370 nm at 25 °C [3]. The amounts of XN and 8-PN were determined in hop extracts and gel using standard solutions. The quantities of 8-PN in the hop cone, 50% ethanol extract and 70% ethanol extract were 0.01%, 0.05% and 0.04%, respectively. The gel contains 6.2×10-4% 8-PN and 2.0×10-3 % XN. The precision and accuracy were evaluated by replicate analysis of samples.

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385
HPLC AND UV SPECTROPHOTOMETRIC METHODS FOR THE DETERMINATION OF FLAVONOIDS IN ELDER FRUIT

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Sambucus nigra, elder, is used in traditional medicine as diuretics and to treat colds, influenza, inflammation and diabetes. Elder flower and fruit is also a rich source of bioactive metabolites such as flavonoids, triterpenoids and phenolic acids [1]. The aim of the present study is to quantify total flavonoids and chlorogenic acid as a marker compound in fruits of *Sambucus nigra* by colorimetric and reversed-phase high-performance liquid chromatographic (RP-HPLC) methods. Total flavonoid content expressed as isoquercitroside was measured by the aluminium chloride at 425 nm. The obtained results by colorimetric method showed flavonoid content in the range of 0.20-0.77%. HPLC (150 mm × 4.6 mm, 5-µm particle size column, mobile phase methanol gradient in a 4.0% aqueous solution of acetic acid; run time 20 min) was used for the determination of chlorogenic acid. The chlorogenic acid content in fruit samples ranged from 0.09 to 0.33% [2, 3].

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386
DETERMINATION OF CANNABINOIDS IN LEAF AND STEM OF CANNABIS BY HPLC

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The plant Cannabis sativa L. belongs to the family of the Cannabinaceae. Two major cannabinoids, 9-tetrahydrocannabinol (THC) and cannabidiol (CBD) in cannabis have been quantified by high-performance liquid chromatography [1]. Cannabinoids extraction in leaf and stem of cannabis was performed using three different methods included methanol, ethanol and mixture of methanol:chloroform. Quantitative determination of its most prominent cannabinoids THC and CBD of cannabis were performed on a C_{18} column (Nucleodur) at gradient elution at 220 nm and acetonitrile and buffer solution (KH_2PO_4 pH=5.0) as mobile phase. Results indicated that chloroform:methanol mixture have the highest rate in extraction of active ingredients [2, 3].

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388
SATUREJA HORTENSISHYDROALCOHOLIC EXTRACTAMELIORATES DOXORUBICIN-EVOKED TERATOZOOSPERMIA IN RAT

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Clinical application of doxorubicin (DOX), a nonselective class I anthracycline, carries substantial riskof reproductive toxicity. This study was designed to determine whether Saturejahortensishydroalcoholic extract (SE) could play a beneficial role in counteracting the spermatotoxic effects of DOX in rat. Male Wistar rats were randomly divided into four groups of six animals each. DOX was administered to two groups of rats in 5 equal intraperitoneal injections over a period of 4 weeks (accumulated dose of 20 mg/kg). One of these groups received SE at a dose of 100 mg/kg per day subcutaneouslyfor 28 days along with DOX. Vehicle-treated control group and SE-onlytreated group were also included. Teratozoospermia index (TZI) was defined as the number of abnormalities present per abnormal spermatozoon.In DOX-treated rats, TZI value was statistically higher than those of the control animals. SE co-administration significantly restored TZI value compared to DOX-only treated group. Inconclusion,this in vivo study provided evidence that SE could effectively ameliorate deleterious spermatotoxic effects of DOX in rat. Further studies are necessary to explore the protective effect of S. hortensis against devastating adverse effects of DOX in clinical practices.

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400

EVALUATION OF BURN WOUND HEALING EFFECT OF TRADITIONAL PREPARATION OF AMYGDALUS EBURNEA WITH PISTACIA ATLANTICA IN MICE

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Burn incidence and mortality rates, is one of the problems of Third World countries. Also severity of injuries in these countries is typically much larger than European countries. Based on above expression and importance of burn incidence and severity of the injury many efforts have been made to accelerate wound healing in burn patients and some drugs have also been introduced for this purpose. Qosk is a plant from Rosaceae family is used for wound healing of burn damages since olden time and is still used by people of the Baft city. Kondork is a plant from Anacardiaceae family produces resin that is useful for a wide range of traditional applications. The aim of this study was to investigate the effects of traditional cream of this two plants on the third-degree burn wound healing in mice and compared with silver sulfadiazine ointment, Kondork group and the control group. This study was conducted on four groups of adult male mice. 1.5 cm of third degree burn wound was created in the back of mice by steam boiled water after anesthetizing. Traditional burn ointment containing Qosk and Kondork, Kondork and Silver sulfadiazine cream was consumed locally an hours after burning. In the days after burning the wound area, the percentage of wound and the percentage of recovery until the day fifteen were measured and pathology studies were done in the days 6 and 12. This study showed that healing percentage in traditional ointment of Qosk and Kondork was 74.03% while in silver groups was 63.92% and in Kondork group was 62.95% and in control groups was 56.18% ($p < 0.05$). Therefore the percentage of burn wound healing in traditional ointment of Qosk and Kondork was more than silver sulfadiazine, Kondork and control groups in all days and the percentage of burn wound healing in control group was lower than the other groups. Based on these results, the traditional burn ointment containing Qosk and Kondork is effective on burn wound healing in mice and it is proposed to prepare local formulation of these traditional plants such as cream or ointment for pharmaceutical marketing.

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419
COMPARISON BETWEEN THE EFFECT OF KOMBUCHA PREPARED FROM GREEN TEA AND KOMBUCHA PREPARED FROM BLACK TEA ON THE LEVEL OF BLOOD GLUCOSE AND LIPID PROFILE OF DIABETIC RATS

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Diabetes is a chronic and progressive disease which causes disability and premature mortality. Moreover, lipid disorder is one of the most common disorders in this disease, which causes the emergence and intensification of its short- and long-term side effects. The present study was aimed to compare between the effect of kombucha prepared from green tea and also from black tea on the level of blood glucose and lipid profile in diabetic rats. Animals were randomly divided into five groups: (1) the control group (non-diabetic); (2) the diabetic group receiving green tea; (3) the diabetic group receiving kombucha prepared from green tea; (4) the diabetic group receiving black tea; and (5) the diabetic group receiving kombucha prepared from black tea. Green tea kombucha, black tea kombucha and also green tea and black tea brewed at a daily rate of 5 mL/kg for four weeks were given to animals of groups five, four, three, and two, respectively, while group one was gavaged with water. Then, the animals were anesthetized and by sampling blood from their heart and then preparing serum, glucose and lipid profiles were measured. In a comparison between groups 3 and 5, the serum glucose level had a significant reduction in group (3) in comparison with group (5). Also, the increase in the concentration of HDL in group (3) was more appreciable. Furthermore, the decrease in the mean concentrations of VLDL, total cholesterol and triglycerides was more significant in group 3; however, the decreased VLDL concentration was not considerable in this group. Compared with kombucha prepared from black tea, consumption of kombucha prepared from green tea significantly reduced blood glucose and lipid parameters, LDL, total cholesterol, and triglyceride and also increased the HDL. Therefore, after asserting its effectiveness in humans, it can be used in the treatment of diabetes and lipid disorders.

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421
PROMOTING EFFECT OF GINSENOSIDE RB1 FOR GLUT-4 GENE EXPRESSION AND CELLULAR SYNTHESIS IN C2CL2 MUSCLE CELLS

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Ginseng is a most popular herb that its antidiabetic mechanisms have been studied for over a decade. Although stimulation of GLUT-4 redistribution in adipocyte and muscle cells has been described by different ginsenosides isolated from ginseng, however effect of ginsenoside Rb1 on the gene expression of GLUT-4 has not been reported so far. To investigate the effect of Rb1 on the GLUT-4 gene expression level we incubated the differentiated C2C12 myotubes with different concentrations of Rb1 (0.001, 0.01, 0.1, 1, 10 and 100 µM) for different times (1, 3, 6 and 12 hours). In general we found that Rb1 at all doses increased basal gene expression level of GLUT-4 in compared with untreated cells. Rb1 at doses of 1 and 0.1 µM and after 3hr had the maximal stimulatory effect. Results presented here help to better understand the mechanistic action of Rb1 ginsenoside on glucose uptake in muscle cells and it provides a rationale data for future applications of ginseng as a candidate for diabetes therapy.

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423

GREEN SYNTHESIS OF NANO SILVER PARTICLES USING PERSIMMON EXTRACT

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The development of the biological synthesis of nanoparticles using microorganisms or plant extracts plays an important role in the field of nanotechnology. In nanotechnology, particles sized between 100 and 1 nanometres are considered to be nanoparticles. In this work, we describe a cost effective and environment friendly technique for green synthesis of silver nanoparticles from 1mM AgNO3 solution through the extract of persimmon fruit as reducing as well as capping agent. . The synthesized nanoparticles were characterized using UV-vis spectroscopy, X-ray diffraction (XRD), transmission electron microscopy (TEM). The XRD pattern indicates that the nanoparticles had a spherical structure, The particle size was found to less than 100 nm in all three experimental conditions. Well-dispersed silver nanoparticles were observed in the TEM image.

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426
ANTI-NOCICEPTIVE EFFECTS OF THE AQUEOUS EXTRACT OF THE TEUCRIUM PERSICUM BOISS.IN CHRONIC PAIN MODELS IN MICE

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Therapeutic properties of Teucrium species as an antioxidant, antibacterial, analgesic, anticancer, diuretic and tonic compounds have been proved earlier. In this study, the anti-nociceptive and anti-inflammatory effects of the aqueous extract of Teucrium Persicum on chronic pain and inflammatory models were investigated by formalin, Hot-plate and cotton pellet- induced granuloma models in mice, respectively.
Materials and Methods: Teucrium Persicum aqueous extracts (100, 200 and 400 mg/kg) were orally gavaged for one week. On day 8th, the time spent and the number of lickings was recorded. Morphine and diclofenac were used intraperitoneally as positive controls. In sciatic nerve ligated animals, as a model of neuropathic pain, doses (100, 200 and 400 mg/kg) of Teucrium Persicum were orally administered for 14 consecutive days. The analgesic effect of this extract was examined 14 days after sciatic nerve ligation using the hot-plate test. Controls received saline and imipramine (40 mg/kg) intraperitoneally. In the formalin test, one week oral administration of all Teucrium Persicum aqueous extract concentrations (100, 200 and 400 mg/kg) caused a significant decrease on the licking response compared to the control negative animals. In the hot plate test, doses of 200 and 400 mg/kg showed significant analgesic effects in sciatic nerve ligated animals. Anti-inflammatory effects of this extract were assessed by Cotton pellet- induced granuloma model in mice. Oral administration of the aqueous extract of Teucrium Persicum revealed significant analgesic effect on chronic pain in both formalin test and sciatic nerve ligated animals.

428
SCOPOLAMINE- INDUCED AVOIDANCE MEMORY RETENTION IMPAIRMENTS REVERSED BY MOMORDICA CHARANTIA HYDROALCOHOLIC EXTRACT IN MICE

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The effects of Momordica charantia hydroalcoholic extract on avoidance memory retention were investigated by step-through passive avoidance task in mice. Extract was prepared by maceration method and different doses (10, 25, 50, 100 and 200 mg/kg) of this hydroalcoholic extract were administered via oral gavage needles for 14 consecutive days. Findings of the present study showed that the dose of 25 mg/kg had the best memory improvement effects. In order to find the effective possible mechanism, intra-peritoneal injections of scopolamine were administered at the last four days of extract treatments (25 mg/kg) and the effects of the extract on scopolamine-induced avoidance memory retention impairments were investigated 24, 48, 96 and 168 h after training in step-through task. Taken together findings of this study suggest that the improvement ability of Momordica charantia on passive avoidance memory may be relates to its components such as alkaloids, steroidal saponins, insulin-like peptides, minerals, sodium and potassium.

435

THE EFFECT OF SILICON ON REDUCING THE DAMAGING EFFECT AND ANTIOXIDANT ENZYMES ON ECHIUM AMOENUM THAT EXPOSED TO CADMIUM STRESS

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Some researchers reported that silicon (Si) increase tolerance in some higher Plants against biotic and abiotic stress[1]. The beneficial effects of Si are mainly associated with its high deposition in plant tissue and enhancing their strength and rigidity. We investigated the role of Si against cadmium stress in (Echium amoenum) in green house condition. When the seventh leaves was be appeared,plants were pre treated with five levels of Si: 0,0.2, 0.5, 0.7and 1.5 mM Si (as sodium trisilicate, Na2(sio2)3) and after that plants were treated with two levels of Cd (30 and 90 mM). The effects of Silicon and Cd were investigated on some physiological and biochemical parameters such as: lipid peroxidation (malondialdehyde (MDA) and other aldehydes, Catalase and Superoxide dismutase content. Our results showed that Cd significantly increased MDA, other aldehydes,catalase and Superoxide dismutase content in Echium and silicon offset the negative effect and increased tolerance of Echium against Cd stress. From this results we concluded that Si increase membrane integrity and antioxidative ability in this plant against cd stress.

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447

HYPERPIGMENTATION ACTIVITY OF POLAR EXTRACTS AND FRACTIONS OF THE AERIAL PARTS OF PHLOMIS RIGIDA

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The genus Phlomis (Lamiaceae) comprising nearly 100 species, is widely distributed in Asia, Euroup, and North Africa. Plants belonging to this genus have been shown to contain flavonoid glycosides, iridoid glucosides and phenylethanoid glycosides [1]. *Phlomis rigida* is mainly distributed in Iran and Turkey. Up to know, eight iridoid glucosides have been isolated from the aerial parts of *P. rigida* [2]. The aim of this study is to evaluate and compare the tyrosinase activity of the polar fractions of *Phlomis rigida* (Lamiaceae) that prepared by two different extraction methods. Method A (fractionation of the total extract): the dried powdered of aerial parts (30g) of *P. rigida* were extracted by methanol (80%) and then it fractionated with *n*-hexane, chloroform, ethyl acetate and *n*-butanol, respectively. Method (B): the dried powdered aerial parts (30g) of *P. rigida* were extracted with n-hexane, chloroform, ethyl acetate and *n*-butanol, respectively. Different concentrations of the polar extracts/fractions (ethyl acetate and *n*-butanol) of *P. rigida* were evaluated in the free radical-scavenging activity by using 1, 1-diphenyl-2-picrylhydrazyl (DPPH) and mushroom tyrosinase activity *in vitro*. Both extraction methods, the tyrosinase activity of mushroom tyrosinase increased in a dose dependent manner after 30 min. Kojic acid a known depigmenting agent used as a reference drug reduced tyrosinase activity in about 80%. In addition the antioxidant activity decreased in a concentration dependent manner. The results showed there were no significant differences ($P<0.05$) in means values between two methods. Therefore, the polar extract of *P. rigida* can be considered as a natural source for treatment of hypopigmentation diseases, such as vitiligo.

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469

TITLE: COMPARING THE EFFECTS OF FENNEL AND MEFENAMIC ACID FOR THE TREATMENT OF PRIMARY DYSMENORRHEA

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To compare the effect of *Foeniculum vulgare* variety *dulce* (Sweet Fennel) and mefenamic acid for the treatment of primary dysmenorrhea. Methods: Seventy women, 15–24 years old from a local university and high-school, who complained of dysmenorrhea were enrolled. Ten cases were excluded due to evidence of secondary dysmenorrhea. The remaining 60 patients were classified as mild, moderate and severe on the basis of a verbal multidimensional scoring system. Thirty patients with mild dysmenorrhea were also excluded from the study. Each of the 30 cases with moderate to severe dysmenorrhea was evaluated for three cycles. In the first cycle no medication was given (control cycle), in the second cycle the cases were treated by mefenamic acid (250 mg q6h orally) and in the third cycle, essence of Fennel's fruit with 2% concentration (25 drops q4h orally), was prescribed at the beginning of the cycle. These cycles were compared day by day for the effect, potency, time of initiation of action and also complications associated with each treatment modality, by using a self-scoring system. Intensity of pain was reported by using a 10-point linear analog technique. Statistical analyses were performed by the independent sample *t*-test, paired *t*-test and repeated measurement analysis method. Results: In the study group the mean age of menarche was 12.5±1.3 years, the mean duration of menstruation was 6.6±1.4 days with the mean cycle days of 27±3. The findings observed during menses were as follows: headache in 26.7%, nausea in 63.3%, vomiting in 23.3%, diarrhea in 33.3%, fatigue in 93.3% and leaving the daily tasks undone was reported in 86.9% of the cases. Both of the drugs effectively relieved menstrual pain as compared with the control cycles (P-0.001). The mean duration of initiation of action was 67.5±46.06 min for mefenamic acid and 75±48.9 min for fennel. The difference was not statistically significant (P=0.57). Mefenamic acid had a more potent effect than fennel on the second and third menstrual days (P=0.05), however, the difference on the other days was not significant. No complication was reported in mefenamic acid treated cycles, but five cases (16.6%) withdrew from the study due to fennel's odor and one case (3.11%) reported a mild increase in the amount of her menstrual flow. Conclusions: The essence of fennel can be used as a safe and effective herbal drug for primary dysmenorrhea, however, it may have a lower potency than mefenamic acid in the dosages used for this study.

477

CHEMICAL COMPOSITION EVALUATION OF IRANIAN BITTER ORANGE FLOWER DISTILLED WATER, AND COMPARISON WITH ITS OIL WHICH WAS EXTRACTED WITH TWO METHODS

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Sour or bitter orange is the common name of Citrus aurantium L., that its flower distilled water has been used in traditional medicine as a remedy for the treatment of mild depression, sedation and also as a heart tonic in Iran. In this study, bitter orange flower distilled water and its essential oil that has been prepared with simple distillation and a Clevenger-type apparatus, were investigated by gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS). Chemical constituents of volatile from a purchased sample were also studied. The most abundant components present in all the samples are Linalool and α-Terpineol, which have different distribution in water and oily phase. The results of this research provided a scientific viewpoint into the effective compounds of bitter orange flower distilled water and its essential oil, and to some extent unravel a way to the efficient therapeutic application of sour orange. [1,2]

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479

HAEMATOLOGICAL AND IMMUNOLOGICAL INDICES IN RAINBOW TROUT (ONCORHYNCHUS MYKISS) FED WITH ALOE VERA EXTRACT SUPPLEMENTATION FEED

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It has been proved that use of medicinal herbs in fish diet enhance the immune system against infections with various bacteria, especially, Aeromonas hydrophila in different species of fish which is of the major bacterial pathogens, leading to heavy mortality rate [1-2] and decrease the productivity efficiency, causing high economic loss of the fish farmers [3]. Aloe vera belonging to family liliaceae is widely distribution in the tropical and subtropical regions of the world [4]. The aim of this study was to evaluate the effects of Aloe vera extract (AE) on the immunity responses and hematological parameters in rainbow trout (Oncorhynchus mykiss) fry to develop alternative drug for the prevention or treatment of diseases in aquaculture. The study was conducted on 600 rainbow trout (Oncorynchus mykiss) fry with an average initial body weight of 13±0.05g. Fish were randomly allocated into two treatment groups including: 1) placebo-treated group (control), 2) Aloe vera extract-treated group, each of three replicates. The fishes were hand-fed once a day with diet medicated AE or placebo (70 % lactose, 10 % starch and 20 % talc) at a rate of 1% of feed weight in the first feeding and three times a day with normal diet for 8 weeks. At the end of every two weeks (2, 4, 6 and 8 weeks) 24 hrs after feeding, the hematological and immunological changes due to dietary Aloe vera extract or placebo were analyzed. The results showed that serum total protein, albumin and globulin, respiratory burst activity, phagocytic activity and serum lysozyme activity vary among the two treatment groups which were found to be higher in AE-treated group ($p<0.05$). It was concluded that supplementation of AE at a rate of 1% registered higher immunological responses. Therefore, supplementation of AE in aquaculture diets would also reduce the usage of antibiotics and chemicals.

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482
PROTECTIVE EFFECT OF PELARGONIUM ROSEUM ESSENTIAL OIL IN COLITIS INDUCED BY ACETIC ACID IN RAT

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Pelargonium roseum (Pelargonium graveolens) is a species indigenous to Southern Africa (widespread especially in the Cape Town region) belonging to the Geraniaceae family (1). Essential oils of Pelargonium species were found to have pharmacological activity (2). Inflammatory bowel disease (IBD) is a chronically relapsing inflammation of the gastrointestinal tract, of which the definite etiology remains ambiguous. Considering the adverse effects and incomplete efficacy of currently administered drugs, it is indispensable to explore new candidates with more desirable therapeutic profiles. The present study describes the chemical composition, anti-inflammatory activity of Pelargonium graveolens essential oil. The essential oil profile was determined by GC and GC-MS. The main compounds were citronellol (24.54%), geraniol (15.33%), citronellyl formate (10.66%) and linalool (9.80%) (3). The essential oil of pelargonium roseum was given orally to three experimental groups of rats in 100, 200, and 400mg/kg in 5 days. The vehicle group was fed with tween 2% (each groups with 6 rats). Six days after acetic acid 4% (rectal) administration, animals were scarified and the colonic tissues were dissected and measured macroscopic score. Compared with the control group, 200mg/kg of pelargonium roseum essential oil treatment decreased ($p < 0.05$) the macroscopic scores. This study suggested that pelargonium roseum essential oil have anti-inflammatory effects on colitis; therefore, after further studies, it may be used as a protective anti-inflammatory.

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490
FABRICATION OF CURCUMIN POLYMERIC MICRO- AND NANO-CAPSULES VIA COAXIAL ELECTROSPRAY METHOD AND DETERMINING THE EFFECT OF SOLVENT ON THE PROCESS

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Curcumin (diferuloylmethane), a polyphenolic compound and the active ingredient of turmeric which is derived from the rhizome of the plant Curcuma longa, has several therapeutic properties including anti-cancer, anti-inflammation, antimicrobial and anti-carcinogenic activities. Despite of all its biological effect its application has been limited because of low water solubility and instability in aqueous solutions. Using a novel drug delivery system such as encapsulation of the curcumin in a polymeric shell is one of the way that can resolve the aforementioned drawbacks [1-3]. In this study polymeric micro- and nano-capsules of curcumin were successfully prepared by using a coaxial electrospray process. The influence of two different solvents on the preparation and size of the micro- and nano-capsules was evaluated. Based on the previous study the mixture of N,N-Dimethylmethanamide(DMF) /chloroform (75:25) and N,N-Dimethylacetamide (DMAc)/chloroform (60:25) was chosen as the solvent of the polymeric shell. DMF/chloroform mixture leads to beaded particles with size diameter of 1.09 micrometer, but when DMAc/chloroform mixture is used 1.37 micrometer particle is prepared.

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495

ANTI-INFLAMMATORY EFFECT OF *PISTACIA ATLANTICA* SUBSP. KURDICA VOLATILE OIL AND GUM ON ACETIC ACID-INDUCED ACUTE COLITIS IN RATS

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Baneh tree or Pistacia atlantica Subsp. Kurdica is an endemic plant of Iran belongs to the Anacardiaceae family and has various traditional uses including diuretic, astringent, anti-diarrheal and improves some of the symptoms of gastrointestinal upsets. In this study we decided to investigate the effects of various fractions of baneh gum with different doses on an animal model of ulcerative colitis as one of the important chronic inflammatory bowel diseases of the gastrointestinal tract. The volatile oil and aqueous gum suspension were prepared and the constituents of the volatile oil were investigated by GC/MS. They used to treat colitis induced by acetic acid 4% in rat. Three doses of gum (100, 200 and 400 mg/kg) were administered both orally (p.o.) and intra-rectally (i.r.) while volatile oil was administered p.o. with doses 100, 200 and 400 µl/kg for four constitutive days. Anti-inflammatory effects of test compounds were compared with oral prednisolone and hydrocortisone enema. Wet colon weight/ length ratio and tissue damage scores and area as well as indices of colitis and tissue myeloperoxidase activity were evaluated for each specimen. Results: α-pinene was the main constituent of baneh volatile oil (41.23%). We observed therapeutic effects in applied doses of oral gum as well as volatile oil to reduce all the indices of colitis and myeloperoxidase activity. Unlike the oral form of gum, rectal administration of gum was not significantly effective to improvecolitis. This research has shown the anti-inflammatory potential of oral gum of Pistacia atlantica Subsp. Kurdica and its volatile oil in experimentally induced colitis.

505
IN VITRO ANTIFUNGAL ACTIVITY OF NETTLE (*URTICA DIOICA*) ETALONIC EXTERACT ON SAPROLEGNIA SP. ISOLATED FROM RAINBOW TROUT (*ONCORHYNCHUS MIKISS*) HATCHERY

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In the present study, antifungal activity of nettle (*Urtica dioica*) etalonic extract against Saprolegnia sp. was evaluated. To evaluating of nettle extract antifungal activity, several doses including 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650 and 700 ppm were added to yeast extract glucose agar (YGA) (three 70 mm diameter plates were used to each doses), a 5 mm diameter punch obtain by lancet of Saprolegnia sp. mycelium were inoculated to each plate and the plates were incubated at 25°C for 6 days. The growth diameters of colonies were recorded from one day after culture to five days after it. In addition, a control negative (inoculated and without nettle extract) were used. The results of growth rates of colonies showed, the growth rate of control group was completed after 3 days. However, the growth of colonies was not observed in all treatment groups until the third day. On the third day, the colonies were growth in 150, 200, 250 and300ppm groups and on the fourth day the growth of colonies were observed in 350, 400, 450 and 500 ppm groups. The end of time trial, the growth of colonies was found in 550 ppm but no growth was observed in the last three doses. This study describes the antifungal activity of nettle extract for developing alternative and native control method against Saprolegniasis.

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508

GENETIC DIVIRSITY OF *WITHANIA COAGULANS*, IN VITRO PRODUCTION AND ANTICANCER POTENTIAL OF WITHAFERINA

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The genus *Withania* (fam. Solanaceae) comprises 26 species. This genus in the flora of Iran is represented by 2 species W. somnifera and W.coagulans, both of which have high medicinal value. In the present study, the seeds of 20 W.coagulans accessions were sown in controlled condition for assessing of genetic diversity in morphological, biochemical and DNA (AFLP) levels. So, In vitro production of Withaferin A by Hairy root culture and elicitation was accomplished. Finally, the cytotoxic effect of Withaferin A on Esophageal Cancer cell line (KYSE-30) was evaluated. Genetic diversity evaluation by morphological, biochemical and AFLP markers showed high level of genetic variation in W.coagulans accessions. Principal component analysis (PCA) base on morphological traits indicated that first three principal components with eigenvalues more than 1 explained 86.62% of the variability amongst accessions. Through cluster analysis based on Euclidian distance and Ward method, accessions divided into three groups. The phytochemical investigation showed the presence of withaferin A (14.80-70.38 µg/g D.W) in all accessions that varied among accessions. Cluster analysis based on 10 biochemical traits by Ward method divided populations into three groups. Six EcoRI/MseI AFLP primer combinations produced 410 scorable bands of size 43- 1127 bp, out of which 339 (82.6%) were polymorphic across the twenty-one accessions. The highest and lowest numbers of polymorphic bands were generated by AFLP primer combinations E-ACC+M-CAA and E-ACG+M-CAT, respectively. The topology of the dendrogram revealed that all 20 W. coagulans accessions were basically classified into four main clusters. The results indicated a high level of genetic variation in W.coagulans accessions. In this study the successful hairy root induction was achieved by using A. rhizogenesis strain A13 on ½ MS medium. The highest amount of Withaferin A (168.16±4.39 µg/g D.W) was produced in hairy root by elicitation with Aspergillus niger extract. Hairy root extract showed cytotoxicity effect on KYSE-30 cancer cells (IC50; 21µg/ml).

509
ANTIPROLIFERATIVE EFFECT OF *BERBERIS VULGARIS* EXTRACT ON CANINE MAMMARY GLAND CANCER CELLS CULTURE

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Berberis vulgaris (Barberry) is a well-known plant with traditional herbal medical history. Barberry extract is an isoquinolone alkaloid, which has a wide range of pharmacological and biochemical effect, such as anti-diarrheal, anti-arrhythmic and anti-inflammatory activities. The aim of this study was to evaluate invitro, the antiproliferative effect of Barberry extract against canine mammary gland carcinoma cell line (CF41.Mg). The cells were treated with different concentration of Barberry extract. The 3-(4,5-dimethyl-2-thiazolyl)-2,5-diphenyl-2tetrazolium bromide (MTT) assay was used to detect cell viability. Treatment with Barberry extract (100 microM) for 72 h resulted in a significant decrease in cell viability. Since the Barberry exrract induced cancer cell death, we suggest the Berberis vulgaris exrract may be used a candidate drug for the inhibition of proliferation of canine breast cancer cells. [1,2].

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520
TRANQUILIZER AND ANXIOLYTIC EFFECT OF HYDRO- EXTRACT OF *MATRICARIA RECUTITA* IN MICE

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Anxiety disorders are amongst the most popular diseases which interfere with normal life. From the past, the role of medicinal plants has been a subject of intense interest. In ancient Iran herbal extracts played an important part in traditional medicine and had a special place in the establishment of the therapeutic value of new approaches. Environmental conditions and stresses can alter active substances of chamomile. The purpose of this study was to investigate sedative and anti-anxiety of *Matricaria recutita* extract. In experimental group of Albino male mice, hydro- extract of *Matricaria recutita* doses at 5, 15 and 25 mg/kg were intraperitonealy (IP) administered and diazepam with 0.5 mg/kg via the same route in control group (5 minutes prior) for pre-anethetic drugs to the assessment of the sedative effect in anesthesia with thiopental sodium 0.5%, 50 mg/kg and for evaluating of the anti-anxiety effects ‘‘Elevated plus maze’’was used. The results represent a significant increase for recovery time (normal standing on the table) which was induced by thiopental anesthesia, as well as a significant increase in the time expired in the terminal end of open arms in the treated groups with 25 mg/kg of extract.The sedative effect of *M. recutita* is probably related to its benzodiazepine like components which act on benzodiazepine receptors, Apigenin in the M. recutita extract. Its anxiolytic mechanism might believe to affect GABA receptors and has a minor tranquilizer effect. It is used to treat sleep problems and anti-anxiety.

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523

EFFECT OF ALHAGI CAMELORUM FISCH HYDROALCOHOLIC EXTRAC CYTOTOXICITY ON HUMAN PERIPHERAL BLOOD MONONUCLEAR CELLS (PBMCS)

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Plants have been an exemplary source of medicine. Alhagi camelorum fisch known as camelthorn is a rich source of various antioxidants. In addition, itsanti-microbial, anti-cancer and anti-inflammatory activity has been suggested based on some evidence. There are some reports showing beneficial applications of A. camelorum fischin treatment of wide range of diseases including inflammation, liver disorders, gastrointestinal discomfort types, rheumatism and kidney stone. The cytotoxic effects of this plant were reported according to previous in vitro studies on cancer cell lines. However, there is still a great deal of uncertainty about its effects on cell viability of other cells. Thus, we aimed to investigate its cytotoxic activity on normal human PBMC as a well known cellular model of immune system to see the effect of plant on immune cells. Ethanol extracts of A. camelorum from the roots were screened for cytotoxic activities. Cytotoxicity test was carried out using methyl thiazolyl tetrazolium (MTT) on the human PBMCs. PBMCs were incubated with different concentrations of extract in RPMI medium (10, 50, 100, 200 and 500 µg/ml) for 24h. No cytotoxicity was detected in human peripheral blood mononuclear cells in any concentration and cell viability was >95%. In conclusion, it seems likely that A. camelorum can be considered as a therapeutic approach on diseases related to immune cell dysfunction with no deleterious effects of cell viability, although further studies are necessary in this regard [1-4] .

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524

DETERMINE THE EFFECT OF *ALOE VERA* ON SOME INDICATORS OF CELL DAMAGE AFTER A PERIOD OF AEROBIC EXERCISE IN MALE ATHLETES, 15-18 YEARS

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Aloe vera has long ago many applications .The leaves of this plant contain a high concentration of anthraquinone compounds which are anti-inflammatory, anti-cancer, anti-ulcer and antioxidant. The purpose of this study was to determine the effect of Aloe Vera on some indicators of cell damage after a period of aerobic exercise in male athletes18-15years. In this study,20 male students weight was 64.85 ± .51 and height was 172.05 ± 6.4 were randomly assigned to two groups of Imam Ali College of Physical Education Supplement (n = 10) and placebo (10 people). Then aerobic training was conducted for 4 weeks in the supplemented group were taking 3 capsules, each capsule contains 2 grams of dried Aloe Vera and placebo group were taking 3 capsules containing Dextrin daily after every meal. To determine the index of cell injury markers CK, LDH and CRP were used and blood samples were collected 24 hours before and after each test Cooper with student in the lab. To describe data, analytical data, and for the mean and standard deviation of repeated measures ANOVA and independent T-test was used for comparison between groups. If significant results were observed Bonferroni post hoc test were used. Significance level was P ≤ 0/05. The use of Aloe Vera during aerobic exercise significantly, cautious reduced LDH (P=0/006)in the supplement group compared to placebo was 15% reduction and CRP (P=0/008) in the supplement group compared to placebo was reduced by 11%. There was no significant reduction in CK (P ≤ 0/05). Overall the findings of this study showed that Aloe Vera reduces cell damage and inflammation indicators. This result may reflect the role of Aloe Vera has anti-inflammatory and antioxidant.

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528
QUANTIFICATION OF TOTAL PHENOL AND FLAVONOL CONTENTS IN A GALACTOGOGUE HERBAL MIXTURE

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This study was done to quantification of total phenol and flavonol contents in a galactogogue herbal mixture. A mixture of *Galega officinalis* L. and *Nigella sativa* L. powders (4:1 w/w), which had been shown milk stimulating activity on Holstein cows in a previously accomplished study, was extracted with hydro alcoholic solvent (80% aq. methanol) and its total phenol and total flavonol contents were measured according to standard defined methods. Total phenol and total flavonol contents were 77.72±0.104 µg of gallic acid equivalent (GAE) and 0.231±0.018 µg of quercetin equivalent (QE) per mg of dry extract respectively. With respect to positive effects of phenolic compounds on milk quantity and quality of Hostein cows, this herbal extract can be standardized based on its total phenol and total flavonol contents and the standardized extract can be formulated as a veterinary galactogogue supplement in future [1-2].

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529

THE STUDY OF ETANOLIC GARLIC EXTRACT EFFECT ON *LEISHMANIA MAJOR* IN VITRO

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Leishmania is on of the zoonotic diseases that is caused by leishmania [1, 2]. It is from oder kinetoplastida and in vertebrate lives in mononuclear cells and there are transmitted by sandflies [3, 4]. Today it is treated by Antimoan compounds like Glocantime that has sude effect and cardiac and hepatic toxicity. In this study the antileishmania effect of etanolic extract of garlic was evaluated in culture [5, 6]. After leishmania major MRHO/IR/15/ER was cultured in RPMI and determined logarithmic phase in 72 hours, various concentrations of garlic extract (0/1 , 0/01 , 0/001 percent) was added to tube containing parasites. The results showed that in various concentrations of garlic extract, with the passage of timesurvival percent reduced, so that in 300 minutes in three concentrations it reaches zero and in 75, 90, 105, 120 and 180 times, had significant differention in various concentrations and whatever it is's concentrations is more. Survival percent is more too and the best concentration of garlic extract was 0/1 percent extract in pured distilled water.

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530
EFFECTS OF TOPICAL GEL FORMULATION OF *FUMARIA VAILLANTII* ON RAT MODEL OF WOUND HEALING

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Many plant drugs have been used in management and treatment of wound over the years. Fumaria is a member of the Fumariacea family and has been used as a wound-healing remedy in Iranian traditional medicine. Previous studies reported the antioxidant as well as anti-inflammatory effects of Fumaria vaillantii [1,2]. The present study evaluated wound healing potential of gel formulation of Fumaria vallantii total extract by excision wound model in male albino wistar rats. The dried powdered plant was macerated by ethanol: water (80:20) three times at room temperature for 72h [2]. The obtained total extract was then formulated. The parameters studied included rate of wound contraction. Briefly, a circular wound was made on dorsal thoracic region of 20 rats and divided randomly into four groups of 5 rats each; Group 1 : treated with topical gel total extract of Fumaria vaillantii (10%), Group 2: negative control that did not received any treatment, Group 3: received vehicle, Group 4: Alpha ointment as positive control. Gel of total extract, vehicle and Alpha ointment were topically applied once a day for 20 days and wound healing rates were calculated on days 2,4,6, 8, 10, 12 [4].Our results showed an increase in the rate of wound contraction tissue compared to negative control group and vehicle group at different days. Our obtained results suggest the gel formulation of F. vaillantii total extract as a good source in wound healing which absolutely needs further experiments.

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537

SCREENING OF 70 EXTRACTS FROM NATIVE IRANIAN PLANTS FOR ANTI RABIES VIRUS EFFECT

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Although there is an restrictive idea that treatment of rabies is impossible but there are some evidences of cure especially by the plants (1) on the other hand as Kathleen Hefferon pointed "herbal medicines can only be helpful to the 80% of the world's population that stands little chance of ever having access to Westernized modern pharmaceuticals"(1). To achieve this goal, plants'screening is a suitable manner. In this study a screening was performed on seventy aqueous extracts prepared from Iranian native plants to find out any anti rabies effects in them. In the presence of several extracts such as *Erodium* only 1% of cells were infected to rabies virus and in the case of some others like *Rhus* the percent of infected cells decreased to 3o% while without those extracts 100% cells were infected. Microplate techniqe: The effect of seventy aqueous extracts from Iranian native plants were tested in the 96- well flat bottom TC micro plates. At the first, BHK-21 cells were cultivated in 96-well flat bottom TC micro plates, then extracts were added in three different dilutions and finally Pasteur strain of fixed rabies virus was added . The percentage of infected BHK-21 cells was determined by fluorescent focus method and calculations were performed by Reed & Muench method. This study performed in the presence of several appropriate controls. Clearly the rate of cell infectivity was differ with presence or absence of extract. When it was used one virus with constant potency on BHK cells, we observed different percentage of cell infectivity after adding of some extracts. It can reveal that there is a decrease of cell infectivity by some extracts. It has been shown therefore there is an antirabies effect among these extracts what can be a starting point for more studies in this field. A special note of thanks to Dr Anahita Dehmobedsharifabadi for donating plant extracts.

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543

EFFECT OF HIBISCUS ESCULENTUS FRUIT EXTRACT ON FORMALIN-INDUCED CHRONIC PAIN DEVELOPED IN MALE MICE

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Pain is the most important human difficulties and different methods have been used to eliminate or reduce it .Chronic pain is main symptom of numerous disorders.Analgesic effects for many herbal medication have been evaluated so far and some are accepted in clinic. Hibiscus Esculentus fruit has some known effects such as : decreasing blood lipid level , anti spasmodic, wound healer, disinfectant. In the present research , the effect of Hibiscus Esculantus fruit Extract on chronic pain induced by formalin test was studied in male mice. Methods: Hydroalcoholic Extract of Hibiscus Esculantus fruit Extract prepared 12, 25 and 50 mg/kg was administrated to male Balb/c mice for 14 days and the control group only received Distilled water. Formalin test was performed after 30 minutes. Results: The paine score in groupe receiving Hibiscus Esculantus fruit extract with dose of 12 mg/kg had significant effect in minutes 10 and 50 and the extract with dose of 25 mg/kg had significant effect in minutes 10,20, and 50 in comparison with control group. However the pain score in the group received extract with dose of 50 mg/kg was differed from control group in all minutes. Conclusions: Totally, according to the obtained results in this study it can be concluded that Hibiscus Esculantus fruit Extract would have good analgesic effects on chronic pain with dose-dependentpattern. .

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557

EVALUTION OF ANTICOAGULANT EFFECT OF *OCIMUM* AND *THYMUS* BY IN SILICO AND IN VITRO METHODS

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Blood coagulation disorders specially thromboembolic diseases are one the major factors of morbidity worldwide, that some causes of this are aging, bad dietary, smoking, lack of adequate mobility, high blood pressure, high fat and etc. [1]. Therefore, the use of anticoagulant drugs is inevitable. Some major anticoagulant drugs such as Heparin, Warfarin and Aspirin have been utilized to prevent and treat thromboembolic diseases [2]. Different drugs can affect the process of blood coagulation and the procedure of treatment; hence, the use of high consumption herbal medicine along with anticoagulant drugs should be regulated. In addition, new anticoagulant drugs with the minimum side effects and maximum efficiency should be discovered. In current research, the in silico investigation based on cheminformatics methods have been performed to introduce new plants with acceptable anticoagulant effects. At first step of in silico part, major scientific resources and databases have been explored to construct a database of entire plants and substances with anticoagulant effects. Then, the chemical structure of synthetic and non-synthetic substances in related to constructed database have been investigated and collected as active subset database. In the next step, the similarity search methodology has been employed to investigate possible compounds with minimum 90 percent similarity with mentioned active subset database. Finally, according to the results of similarity search, the investigation has been carried out via Iranian folk medicine to find in vitro candidate herbs containing at least one of the similar substances to the reference anticoagulant substances. To begin in vitro phase, candidate herbs have been obtained, systematically classified for the herbarium and prepared to extract based on percolation method [3]. Ultimately, the anticoagulant effect of Ocimum sp. and Thymus sp. from the list of candidate plants have been evaluated via standard PT (Prothrombin Time) and PTT (Partial Thromboplastin Time) tests on normal human blood in three concentrations of extracts and the results are reported.

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559

EFFECT OF DIETARY DIFFERENT LEVEL OF YARROW (*ACHILLEA WILHELMSII*) EXTRACT ON GROWTH PERFORMANCE, BODY COMPOSITION, INTESTINAL MICROBIATA AND SURVIVAL RATE OF RAINBOW RTOUT (*ONCORHYNCHUS MYKISS*)

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Use of extract herb that beneficially affects the host by selectively stimulating the growth of and/or activating the metabolism of health-promoting bacteria in the intestinal tract, is a novel concept in aquaculture An 8-week feeding experiment was conducted to investigate the effects of dietary yarrow (Achillea wilhelmsii) extract on growth performance, intestinal microflora, body composition and survival rate of rainbow trout (Oncorhynchus mikiss). Three replicate groups of fish (initially averaging weight as group 30. 3± 0.18 g) were fed diets containing % 0, % 0.5, % 1.0 and % 2.0 yarrow extract. At the end of the trial, growth factors including final weight, weight gain, specific growth rate (SGR), feed conversion ratio (FCR), intestinal bacteria and survival rate of fish were evaluated among different groups. The results showed that the growth factors, lactic acid bacteria and survival rate of fish fed with 2% yarrow extract were significantly higher than other treatments ($P<0.05$). The results of this trial showed that the body composition rainbow trout was not affected by different doses of yarrow extract after 8 weeks ($P> 0.05$). Based on the results, using of yarrow (Achillea wilhelmsii) extract, especially at the level of 2 % can improve the growth performance and survival rate of rainbow trout and it seems that this herb is suitable candidate as promoting growth to intrudes to aquaculture industry in Iran.

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562

SURVEY ANTIBACTERIAL EFFECTS OF SOME OF THE HERBAL ESSENTIAL OILS ON *AEROMONAS HYDROPHILA* ISOLATED FROM COMMON CARP (*CYPRINUS CARPIO*)

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By increasing resistance of *Aeromonas hydrophila* to antibacterial drugs, using herbal plants with antibacterial properties is necessary. In this study, antibacterial effects of essential oils of Eryngium campestre, Cuminum cyminum, Pimpinella affinis and Allium sativum on A. hydrophila isolated from common carp (Cyprinus carpio) were investigated. The leaves of the plants, were dried and their essential oils was obtained by Clevenger apparatus. Serial dilutions of each oil was prepared. The minimum inhibitory concentration (MIC), minimum bactericidal concentration (MBC) and inhibition zone diameter were found by dilution methods in liquid media and agar disk. The MIC of essential of E. campestre, C. cyminum, P. affinis and A. sativum were 0.12, >0.5, 0.5 and 0.06 (µg/ml), respectively, MBC of the essential of E. campestre, C. cyminum, P. affinis and A. sativum was 0.5, >1, 1 and 0.12 (µg/ml) respectively, and diameter of zone of inhibition were 20.6±1.1 (mm), 16.8±0.5, 17.8±0.6 and 23.8 ±1.4 mm were, respectively, against A. hydrophila. Results of present study demonstrated that the essential oils of E. campestre and A. sativum were appropriate antibacterial agents on A. hydrophila. So, using these herbal essential oils as alternative to treatmente infections caused by A. hydrophila was recommended.

567
EVALUATIONOF GASTROPROTECTIVE EFFECTS OF AQUEOUS STEM BARK EXTRACT OF *ZIZIPHUS JUJUBA* L. AGAINST HCL/ETHANOL-INDUCED GASTRIC MUCOSAL INJURY IN RATS

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Ziziphus jujuba stem bark is used in Iranian Traditional Medicine as the treatment of many diseases specially gastrointestinal disease and wound healing [1,2]. Based on traditional books, the present investigation evaluated the gastroprotective effects of standardized aqueous extracts of *Z. jujuba* stem bark against acidified ethanol-induced gastric ulcers as well as anti hylocobacter pylori activity of the plant extract. Five groups of rats were orally pre-treated with normal saline (0.9%) as ulcer group, 150 mg/kg of ranitidine as positive group, 100mg, 200mg and 400mg of standardized extract solution as the experimental groups. Two hours later, acidified ethanol solution was given by gavages in order to induction of gastric ulcer. The antibacterial effect of extract against clinical strains of *H. pylori* was evaluated through disc diffusion method [3]. The ulcer group exhibited significantly severe mucosal injury as compared with ranitidine or extract which shows significant protection towards gastric mucosal injury. The plant promotes ulcer protection as it shows significant reduction of ulcer area, and histology showed marked reduction of edema in mucosal and submucosal layer compared with ulcer group. The extract showed no effect against on *H. pylori*. The present study indicates that Z. jujuba stem bark extract has a potential antiulcer activity which might be due to its protective activity and increased resistance to necrotizing agents, providing a direct, protective effect on the gastric mucosa. Our study showed that anti-H. pylori activity is not among gastroprotective mechanism of Z. jujuba. Further pre-clinical and clinical investigations for evaluating natural active agents and efficacy of this plant are recommended.

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578

COMPARISON OF THE EFFECT OF HYDROALCOHOLIC EXTRACT OF *MELISSA OFFICINALIS* WITH OSELTAMIVIR AGAINST INFLUENZA VIRUS SUBTYPE H1N1 REPLICATION IN MDCK CELL CULTURE

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Influenza A viruses can infect a wide range of avian and mammalian species, including humans. H1N1, a subtype of influenza A virus, is considered the most common cause of influenza in humans. During recent decades, approved vaccines and anti-flu drugs are developed for prevention and control of seasonal and pandemic influenza. However, the formation of drug resistance to synthetic anti-influenza agents can reduce their efficiency. Therefore, use of traditional medicine and herbs has been considered as alternatives. In this regard, the current research was carried out to study the antiviral properties of Melissa Officinalis, a popular herbal medicine, compared with Oseltamivir. First, the 50% Toxic Dose (TD50) of the hydroalkoholic extract of The Melissa Officinalis leaves was determined using the MTT method in Madin–Darbey–Canine Kidney (MDCK) cell culture. Then, in treatment group A, the MDCK cell monolayer in 96-well plates prepared and inoculated with 0.1 MOI of H1N1 virus in each well. After an hour, the plant extract was added to wells with different concentrations. In treatment group B, H1N1 viral particles at MOI of 0.1 were incubated with different concentrations of the plant extract for one hour at 4˚c, and then added to the cultured cells. In treatment group C, only Oseltamivir was added to the cultured cells one hour after inoculation of the virus. In treatment group D, combinations of three concentrations of Oseltamivir with three concentrations of the plant extract were added to the cultured cells in order to study the synergistic antiviral effects. In the control group, only viral particles were added to the cultured cells. 48-72 hrs post-inoculation, the cultured cells were evaluated for the Cytopathic Effects (CPE) under a light microscope and the virus titer was determined using Hemagglutination and 50% Tissue Culture Infective Dose (TCID50) assays. The current study showed that treatment of the H1N1 infected cultured cells with different concentrations of the hydroalkoholic extract of Melissa Officinalis leaves reduced the virus titer from Log10 4 in the control group to zero-Log10 2 in treatment groups in TCDI50 assay. In the HA test the average virus titer was reduced from 50 in control group to 15-20 in treatment groups. Synergistic antiviral effects were observed between Oseltamivir and the Melissa Officinalis extract at the proposed concentrations in HA test. In conclusion, the hydroalkoholic extract of Melissa Officinalis has significant anti-influenza properties in the MDCK cell culture.

584

SURVEYING THE EFFECTS OF IN-OVO INJECTION OF AQUATIC EXTRACT OF SAFFRON ON VIABILITY OF CHICKEN EMBRYOS

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Low doses of saffron have been recommended for the treatment of several conditions including pertussis, asthma, menstrual cramps, infertility, inflammation, depression, headache and nausea [1-3]. It has been reported that high doses of saffron were used to induce abortion and end unwanted pregnancies. Goal of this study was to investigate the effects of in-ovo injection of different doses of saffron on viability of chick embryos in different stages of incubation. Eighty four fertilized eggs were randomly divided into 12 groups of 7 eggs each. Doses of 400, 800 and 1200 µg/ml of saffron extract were prepared for treatment groups 1, 2 and 3, respectively. On days 2, 9 and 18 of incubation, 0.4 ml of the prepared doses were injected into the yolk sac of each egg belonging to the related treatment group. The eggs of control group were only injected by 0.4 ml of distilled water. Viability of the embryos was checked throughout all the experiment period by candling and the dead embryos were removed. The data were analyzed using a one-way ANOVA with Tukey corrections. All treatment groups injected in day 2 of incubation showed embryonic death; however, the mortality rate in treatment group 3 (1200 µg/ml) was significantly higher than treatment groups 1 (400 µg/ml) and 2 (800 µg/ml) ($P<0.05$). Among the groups injected on day 9 of incubation, the embryonic mortality was observed only in treatment group 3 (1200 µg/ml). No mortality was observed in treatment groups which were injected in day 18 of incubation. No embryonic death occurred in control groups. Results of this study revealed that in-ovo administration of aquatic extract of saffron at high doses and in early development stages can be lethal and causes embryonic death, which is probably due to the inhibitory effect of saffron on angiogenesis during these development stages.

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585

PROTECTIVE EFFECTS OF GINGER EXTRACT AGAINST ASPARTAME-INDUCED HEPATOTOXICITY IN RATS

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Aspartame (L-aspartyl L-phenylalanine methylester) is an artificial non-saccharide sweetener that is widely used as a sugar substitute in foods and drinks [1]. Following aspartame consumption, the concentrations of its metabolites are increased in the blood. These by-products include oxygen containing molecules that damage vital cell components through oxidation. There have been reports of liver damage attributed to aspartame [2]. Ginger, the rhizome of the plant Zingiber officinale, is an edible root crop that has many health benefits as an herbal medicine and is identified as a potent anti-oxidant [3]. We therefore hypothesize that ginger extract ameliorate the hepatotoxic effects of aspartame. In this study, forty male albino rats weighting 120-140 g were selected and then randomly divided into four groups of 10 rats each as follows: first group was given aspartame dissolved in water (1200 mg/kg_{bw}); the second group was given ethanolic ginger extract dissolved in water (350 mg/kg_{bw}); the third group was given aspartame (1500 mg/kg_{bw}) together with ginger extract (350 mg/kg_{bw}); and controls were given water freely. After 45 days, at the end of experiment period, biochemical profile of the rats including ALT, AST, ALP and GGT was determined. Histology samples were also taken from liver tissue. The data were analyzed using one-way ANOVA in SPSS. In group treated with aspartame only, plasma levels of ALT, AST, ALP and GGT were significantly increased ($p<0.05$) and leukocyte infiltration to liver tissue was observed. In group received aspartame together with ginger extract, plasma levels of the mentioned enzymes were significantly lower than those of the first group (aspartame only), and a decrease was also observed in leukocyte infiltration to liver tissue ($p<0/05$). The groups treated with ginger solely, showed no change in enzyme profile as well as liver tissue, compared with control groups. Results of the present study confirmed that mid-term intake of aspartame may produce liver injury. It also revealed that administration of ginger extract combined with aspartame can significantly ameliorate the oxidative and deteriorative effects of aspartame on liver. It's worth mentioning that ginger extract solely and at the mentioned dose had no hepatotoxicity.

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587

PREVENTIVE EFFECTS OF FENNEL EXTRACT AGAINST ETHANOL-INDUCED GASTRIC MUCOSAL LESIONS IN RATS

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Fennel (*Foeniculum vulgare*) is a flowering plant species which has been used as a flavoring agent as well as an herbal remedy for poisoning and GI conditions. There have been several reports of antioxidant and anti-inflammatory effects of fennel [1,2]. Fennel seed contain 3-6% of an essential oil that is responsible for its characteristics. Ulcerative lesions of the gastrointestinal tract are one of the main side effects attributed to the use of NSAIDS, alcohol and stress [3,4,5]. However, the mechanism of NSAIDS, ethanol and other drug induced gastric lesions is unclear, accumulating neutrophils, oxygen free radicals and inhibition of prostaglandins play a crucial role. Considering the medicinal history of fennel, we investigated its effects on ethanol-induced gastric mucosal lesions. Eighteen male Wistar rats weighing about 230 g were divided into three groups of six animals each. The animals were fasted for 24-h prior to the experiment. One ml of 80% ethanol was used orally to produce gastric ulcers. In another group, the rats were pretreated with 100 mg/kg of fennel methanolic extract one hour before the ethanol treatment. Normal saline was given to control rats. One hour after the ethanol administration, the animals were sacrificed. The lengths of the necrotising lesions in stomach were examined at 10-x magnification. Stomachs from all the treated groups were also histopathologically examined. Ethanol administration resulted in marked gross mucosal lesions in stomach. These lesions were characterized by multiple haemorrhagic red bands of different sizes. Animals treated with fennel extract showed significant protection against ethanol-induced gastric damage. Fennel treated rats showed mild ulcers with interstitial hemorrhage. The intensity of lesions and hemorrhage was significantly reduced with fennel extract. The size of the ulcer was significantly reduced in animals pretreated with fennel compared to ethanol treated rats. On microscopic examination, ethanol treated rats showed total mucosal ulceration, hemorrhage and segmental mucosal necrosis of gastric epithelium. Only patchy mucosal epithelial loss was seen in fennel treated rats. In the present study fennel methanolic extract significantly protected the rats from ethanol-induced mucosal injury. This may be due to its antioxidant property. Fennel exerts its beneficial effect by neutralizing hydroxyl and peroxyl radicals**.**

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588
EVALUATE THE EFFECT OF DIFFERENT HERBAL DIET ON RAINBOW TROUT IMMUNE SYSTEM

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To study the effect of several herb dark on immune system growth performance of Rainbow trout. An experiment was designed by 252 fish with initial body weight 50 5 g at 8 week feeding trial. Experimental fish in a completely randomized design with 7 treatments and 3 replicates and each replicate fish were divided into 12 pieces. The experimental treatments consisted of 1% oil 1-satureja bakhtiari 2-thyme logifolia 6-nor mountain regular diet of olive oil+ 7-a normal diet (controls) were included. Results showed the highest levels of safety factors relating to the percentage of phagocytosis and the number and the rate of crime Fagvsyth Igm three plant essential oils in oregano, satureja Khustaniea, dracocephalum multicaule (p<0/05). Lymphocytes in the blood and blood heterophile between yourself and the control diet containing the essential oil of satureja statistical difference was observed (p<0/05). The hematocrit, hemoglobin, monocytes and Ayvzvfyl . There was no significant difference. The use of essential oils and herbs, especially the dark Nnayan improve the status indicator. Feed conversion of fish that were fed with the oil of plants was significantly decreased. The lowest feed conversion group was fed with oregano. Feed intake was not affected by oil. Rainbow trout diet improves performance and increase efficiency and safety of the fish.

592
EFFECT OF CURCUMIN ON OSTEOGENIC DIFFERENTIATION OF RAT ADIPOSE TISSUE-DERIVED MESENCHYMAL STEM CELLS

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Curcumin (1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione) is a phenolic natural product isolated from the rhizome of *Curcuma longa* (turmeric) and modulates important molecular targets such as transcription factors, enzymes, cell cycle proteins, cytokines, receptors, cell surface adhesion molecules and bone remodeling. Curcumin is now considered to take part in the regulation of bone remodeling. Therefore, the effect of curcumin on osteogenesis of MSCs warranted further evaluation. The adipose tissue-derived mesenchymal stem cells (ASCs) are heterogeneous population of cells with multilineage differentiation potential into osteoblast and adipogenic. The present study describes the effect of curcumin on rat MSC (rMSCs) differentiation into osteoblasts. Material and methods: Rat adipose tissue MSCs were isolated and treated with or without curcumin. Osteoblast differentiation was confirmed by Alizarin red staining and determined by alkaline phosphatase (ALP) activity, calcium assay and the expression of osteocalcin (OCN) and ALP gene. Results: Curcumin increased ALP activity, ca formation and osteoblast-specific mRNA expression of OCN and ALP when rADSCs were cultured in osteogenic medium. Conclusions: These findings demonstrate that curcumin, a naturally occurring compound can promote osteogenic differentiation of rADSCs. The findings of this study may offer strategy in the management of metabolic disorders related diseases such as osteoporosis.

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597

ANTI-BACTERIAL EFFECT OF *SATUREJA MONTANA* L. ESSENTIAL OILE ON *STREPTOCOCCUS MUTANS* IN-VITRO CONDITIONS

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Two major oral diseases (dental caries, Periodontal Disease) is resulting imbalance of microbial flora which could be due to the emergence of potentially pathogenic bacteria. Streptococcus mutans is strains of these pathogens as a cause of dental caries in the mouth. Satureja montana L. is one of the medicinal plants with anti-bacterial effects. In this research, the effect of different concentration of Satureja Montana L. essential oils was examined on Streptococcus mutans. Eight concentrations of Achillea millefolium L. essential oils (1000, 5000, 10000, 15000, 20000, 50000, 100000 and 200000 mgl-1), chlorhexidine (0.2%), sodium hypochlorite (2/5%, 5.25%), antibiotic metronidazole (5mg disks), amoxicillin (25 mg) and control (Tween 80) were assessed. The experiment carried out based on Completely Randomized Design (CRD) with four replications. The essential oils were extracted by Clevenger method. The results showed significant effect of assessed treatments on bacterium growth. Zone of growth inhibition of various concentrations of *Satureja montana* L. essential oils from 10.6 to 17.4 mm was variable. Application of 100000 and 200000 mgl-1 of *Satureja montana* L. essential oils was effective than sodium hypochlorite 2.5% and 5.25% (with 17.31 and 13.57 mm zone of growth inhibition, respectively). Amoxicillin had maximum inhabitation effect on bacterium growth (with 19.9 mm) and metronidazole and Tween 80 (as control) had the minimum effect on bacterium growth. The tube dilution method showed that at 100 microgram of *Satureja montanan* L. essential oils per 2.5 milliliters liquid culture broth, is minimum bactericidal concentration (MBC).

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598
PHARMACOLOGICAL AND HISTOLOGICAL PROPERTIES OF *NARDOSTACHYS JATAMANSI* HYDROALCOHOLIC EXTRACT ON ETHANOL-INDUCED GASTRIC UCER IN RATS

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In traditional Iranian medicine (TIM), there are so many medicinal plants for prevention and treatment of gastrointestinal disorders such as gastric ulcer. Nardostachys jatamansi (NJ) in TIM literatures is mentioned with protective effect in gastric disorders. In this study total phenolic and total flavonoid content were quantified in Hydroalcoholic extract of NJ. Effects of various doses of NJ hydroalcoholic extract (20, 40 and 80 mg/kg, p.o) were studied on ethanol-induced gastric ulcer model in rats. Gastric ulcers were measured macroscopically, and then gastric tissues were prepared for histological analysis by a light microscope. The total phenolic and total flavonoid content of NJ extract were 11.616 ± 0.21mg Gallic acid equivalent/g and 35.28 ± 0.23 mg of Catechin equivalent /g of dry extract respectively by reference to related standard curves. In the ethanol-induced ulcer protocol, administration of ethanol 80% led to apparent gastric ulcers in rats. In macroscopic examination of stomachs, comparing to control group, oral administration of three doses (20, 40 and 80 mg/kg) NJ caused a significant inhibition of ethanol-induced gastric ulcer compared with Ranitidine (50 mg/kg) ($p< 0.01$). All doses also showed significant protection rate (%) compared to control group ($p< 0.001$). In the control group, severe mucosal damage was appeared as hemorrhagic lesions. The submucosa was edematous and inflammatory reaction and bleeding was observed. Animals pre-treated with NJ or Ranitidine, showed mild mucosal damage and submucosal edema; In NJ pre-treated groups submucosa, had a mild inflammation, mucosal layer was thin with no or little ulceration and bleeding; the severity of the ulcers and inflammation were significantly reduced in rats that were pre-treated by increasing doses of NJ. Ethanol as an oxidative stress agent causes proceeding cell death in gastric mucosal cells and peptic ulcers. Mucosal damage leads to generation of reactive oxygen and free radicals . Reports have shown NJ has considerable antioxidant and free radical scavenging property that could be related to its polyphenolic contents. From obtained results it can be concluded that NJ is effective gastroprotective agent. Further, it seems that the gastroprotective effect of current research may be due to its anti-oxidant mechanism of action.

606

EFFECT OF *SATUREJA MONTANA* L., ESSENTIAL OIL ON *CANDIDA ALBICANS* IN-VITRO CONDITIONS

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Candidiasis is one of the most common opportunistic fungal diseases in humans. This disease is caused by a fungus, yeast called Candida. In this study, the inhibitory effect of essential oils of *Satureja montana* L. was studied on isolated samples of Candida albicans .The effect of the essential oils of Satureja montana at concentrations of 1000, 5000, 10000, 15000, 20000, 50000 and 100,000 ppm on C. albicans (ATCC 10231) was examined . Fluconazole and Nystatin were used as controls. The experiment carried out based on Completely Randomized Design (CRD) with four replications. Results of variance analysis showed significant differents between the assessed treatments. All of the Satureja montana L. essential oils concentrations showed inhibitory activity for Candida albicans, but at 100,000 ppm, the effect of essential oil was similar to that of Nystatin and Fluconazole. The essential oils of Satureja montana L. had an antifungal effect on Candida albicans. Further investigations are needed to detect the effectiveness of this plant for treatment of candida infections.

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612
CARROT SEED IN IRANIAN TRADITIONAL MEDICINE AND NEW MEDICINE

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Carrot (*Daucus carota* L.) of the Apiaceae family is an annual or biannual herb mostly preserved to the temperate areas of Europe, Asia and Africa. Different parts of the carrot are used in traditional medicine for the treatment of a wide spectrum of diseases. The purpose of this study was to evaluate the treatment effects of the carrot seed in Iranian traditional medicine and modern medicine.This study is a review in which used some reference books of the Iranian Traditional Medicine, like The Canon of Medicine, Makhzan ul-Advia, Gharabadin-e Kabir, *Al-shamel, Tohfeh*-I *Hakim Momen* and etc. some keywords " carrot seed" also has been searched in modern medicine databases such as PubMed, Google Scholar and Sid. Finally, these data was collected and classified. According to sources, Iranian Traditional Medicine, carrot seed has hot and moist temperament. This plant increases the erection in men and fertility in women. It also has a diuretic effect and causes menstruation. Carrot seed is also effective in other body systems such as GI and urinary system Including cramping, expulsion of kidney stones and elimination of urinary retention. It is also effective in healing wounds and leg pain. Many products is made of carrots such as jam, juice, pudding, etc. Many studies have been done on the treatment effects of carrot seed. This studies has demonstrated the antioxidant, antibacterial, anti-inflammatory, analgesic, antiseptic, carminative, hypoglycemic, diuretic, and hepatoprotective effects of carrot seed. By comparing the effects of carrot seed in traditional medicine and modern medicine, we find that the plant ,according to traditional sources, have large effects on the reproductive system and can play an important role in reproductive disorders and infertility. New research has examined some properties of carrot seeds, but some important properties that are not studied. According to the negligible side effects of this plant clinical studies to investigate the effect of this herb can solve some of the problems in treatment of these patients.

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613

ANTIDERMATOPHYTIC ACTIVITY OF *URTICA DIOICA* L. AGAINST MICROSPORUM CANIS IN A GUINEA PIG MODEL

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Dermatophytosis or ringworm is a contagious fungal infection of the skin that is caused by dermatophytes and is a threat against human health. In recent years, infections caused by these fungi have been increased. Microsporum canis is a zoophilic dermatophyte that is concerned as one of the major causes of dermatophyte infections (ringworm of the head, body and beard) . Based on traditional applications of Urtica dioica in various dermatological problems and its approved antifungal activity in traditional medicine, the aim of this study was to evaluate its antidermatophytic activity against M. canis in guinea pig model of dermatophytosis. The hydroalcoholic extract of the plant aerial parts was prepared by maceration method. Thirty male albino guinea pigs, weighing 500-600g, were divided into six equal groups. The dorsum of animals was infected with M. canis and topically treated as follows: control group received no treatment; negative control group (DMSO group) received dimethyl sulfoxide 10% (vehicle); positive control group (PC) received 1% terbinafine dissolved in DMSO 10%; three other groups, SN10%, SN20% and SN30%, received 10, 20 and 30% hydroalcoholic extract dissolved in DMSO 10%, respectively. The lesions were clinically followed-up and compared with control group animals on days 15 and 30 post-inoculation according to the methodology previously described.The severity of dermatophytosis also was numerically scored according to our previous study as follows: 0, none or cure of the lesion; 1, insignificant; 2, slight; 3, moderate and 4, severe. PC and SN30% groups showed normal hair growth on day 15 while their skin looked healthy on day 30 post-inoculation. Lesion severity and clinical scores declined in PC and SN30% groups in comparison to control group on day 30 post-inoculation. Also, on day 30 post-inoculation, the clinical efficacy of the test solutions increased to 11.76, 23.52, 76.47, 5.88 and 94.11% for SN10%, SN20%, SN30%, DMSO and PC groups, respectively. In the present study, the hydroalcohol extract of U. dioica improved symptoms and aesthetic problems of dermatophytosis in guinea pig model. These results could be due to the atifungal and immunomodulatory activities of the plant. So, the hydroalcoholic extract of U. dioica could be further developed, with a view to its possibe use as an adjunct remedy for topical treatment of dermatophytosis.

616

ANTIFUNGAL EFFECTS OF TOTAL EXTRACS OF ROSEMARY LEAF AGAINST MICROSPORUM CANIS AND TRICOPHYTON TONSURANS

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The dermatophytes are a group of closely related fungi that have the capacity to invade keratinized tissue (skin, hair, and nails) of humans and other animals to produce an infection, dermatophytosis [1]. The percentage of patients who develop invasive fungal infections has increased dramatically in recent decades [2]. Microsporum canis is a zoophilic dermatophyte that is concerned as one of the major causes of dermatophyte infections [3]. Trichophyton tonsurans is also an anthropophilic dermatophyte and causes endothrix, body and nail ringworms [4]. Rosmarinus officinalis L. is the herb that its antifungal effects have proven in several studies. In this study, the antifungal effects of R. officinalis leaf has been evaluated against M. canis and T. tonsurans. The total aqueous and hydroalcoholic extracts were prepared from the dried leaves of the plant. Five concentrations (0.625, 1.25, 2.5, 5 and 10mg/ml) were prepared from the total extracts in Sabouraud's dextrose agar medium. Antifungal effects of the extracts was investigated by agar dilution method against T. tonsurans and M. canis. In this study, terbinafine was used as a positive control. Minimum inhibitory concentrations (MICs) of hydroalcoholic extract was determined 1.25mg/ml against both two fungi and MICs of aqueous extract was obtained 10mg/ml and 5mg/ml against T. tonsurans and M. canis respectively. In this study, also MICs of terbinafine were recorded 0.05µg/ml against both two fungi.The results of this study showed that both two total extracts of R. officinalis leaves have antifungal effects against two fungi. But the hydroalcoholic extract showed more antidermatophytic activity compared with the aqueous extract. From the results obtained, it can be deduced that in terms of antifungal potency, the total extracts were not comparable with terbinafine. However, the hydroalcoholic extract of R. officinalis leaf can be considered as a natural antifungal agent against T. tonsurans and M. canis.

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628

THE STUDY OF DUMMY ROOT HYDROALCOHOLIC EXTRACT ANTIDEPRESSANT EFFECT ON MALE MICE

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Depression is one of the mops prevalent psychological abnormalities and the novel findings allow for the increase of this disease. So far the effects of anti depressant of various herbs has been investigated some of which have been adopted in some clinics. The study aims to determine the effects of anti depressant of Biebersteinia multifida DC who's anti-inflation and anti-pain effect have been Affirmed. In this study, the tests of mandatory swimming, suspension and open box on the lab rats were performed and the effect of different doses of Biebersteinia multifida DC with the effect of fluoxetine was compared. the oral consumption of Biebersteinia multifida DC with doses 7, 4, and 10 mg per kilogram of weight for 1, 7, and 14 days decreased the depression during suspension test significantly which was similar to the fluoxetine effect and in the mandatory swimming test, the oral consumption of dose 4 mg per kilogram of the herb extract for 1 and 7 days decreased the motionlessness in comparison to the control group. Given the findings of the study which confirms the anti depressant effect of the Biebersteinia multifida DC like fluoxetine, it can be likely that this effect is stemmed from change in the rate of monoamine release in the central neural system.

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629
LARVICIDAL PROPERTY OF *AJUGA CHAMAECISTUS* SSP. TOMENTELLA ON MALARIA VECTOR ANOPHELES STEPHENSI

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The genus *Ajuga*, belongs to Lamiaceae family, is one of the exclusive subspecies in the flora of Iran. The plants of this genus are used traditionally for treatment of joints pain, gout, jaundice, and as insecticide [1- 3]. The aim of this study was to evaluate larvicidal activity of methanol 80% extract and partition fractions of hexane, chloroform, and ethyl acetate obtained from aerial parts of Ajuga chamaecistus subsp tomentella (Boiss) Rech. F against malaria vector Anopheles stephensi under laboratory conditions. According to the results, among different fractions, hexane fraction has the most larvicidal activity with mortality rate of 100% in centration of 120 ppm and LC 50 of 96 ppm. The results suggested that the hexane fraction of Ajuga chamaecistus subsp tomentella (Boiss) Rech. F can be used as a natural and biodegradable insecticide. More researches to identify active ingredients of hexane fraction may be needed.

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631
EVALUATING BARBERRY ROOT EXTRACT TOPICAL GEL ON CHEMOTHERAPY-INDUCED ORAL MUCOSITIS

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Oral mucositis (OM) is a common, though debilitating adverse reaction in chemotherapy and in head and neck cancer patients undergoing radiotherapy. Cytotoxic effects of chemotherapy agents lead to inflammation and breakdown of oral mucous. Common clinical manifestations include erythema, pain and irritation, xerostomia (dry mouth), loss of taste, ulcers and infection with viral and bacterial agents, difficulty in food and fluid intake, dysphagia (difficulty swallowing), weight loss and malnutrition. These symptoms reduce patients' quality of life while increasing costs, making chemotherapy/radiotherapy treatments difficult and unbearable for the patients.[1] Noting that no definitive approach to the prevention or treatment of oral mucositis has been identified yet, this study investigates, through clinical trial, the use of Barberry root extract topical gel as an adjunct treatment. 25 cancer patients aged 20-80 years, who were receiving chemotherapy regimen with high incidence of oral mucositis, entered this study. All the patients had experienced OM associated with at least one prior course of chemotherapy. This research was designed as a cross-over study in which patients served as their own control. After receiving one cycle of treatment with barberry oral gel, they received normal saline as control in the following cycle of chemotherapy. Thus patients should have undergone at least 2 cycles of identical chemotherapy regimen. In our study we tried to follow patients for 4 identical courses. In the treatment cycle, patients applied barberry oral gel 2.5% two times daily for 2 weeks, starting from the first day of chemotherapy course. PROMS (patient reported oral mucositis system) scale and WHO oral toxicity grading system were used as assessment scales through the cycle and at the end of each cycle respectively. Till now, positive effects on pain and food intake associated with oral mucositis have been observed in some of the patients. Statistical analysis will be performed once data from all the patients has been gathered.

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639

COMPARATIVE STUDIES OF THE ANTIBACTERIAL ACTIVITY OF *THYMUS DAENENSIS* ESSENTIAL OIL AND ITS NANOEMULSIFIED SUSPENSION AGAINST E*SCHERCHIA COLI*

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Essential oils (EOs) derived from the aromatic and medicinal plants have become very popular in many food-processing applications for controlling food-borne pathogens [1]. The nanoemulsified (NE) formulations using plant based oils and non-ionic surfactants are used as a natural antibacterial compound in the food industry recently [2]. In this study, the antibacterial activity of Thymus EO and its NE against *E coli* was evaluated with broth dilution method and the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) value were determined. Also, the kinetics of killing bacteria was investigated with time killing assay. The MIC value for NE was 0.4 mg/ml, whereas this value was 4 mg/ml for EO. Kill-time assay also showed that NE killed all the bacteria in 5 minutes, while the number of viable cells in treatment with EO decreased from 11 to 8 $\log_{10}$ CFU/mL at the cultivation time of 1 hour.The results of the present study demonstrated that the nanoemulsified Thymus EO showed better antibacterial activity against *E coli* compared to the pure EO confirmed by the time kill studies. A better interaction of the nano size oil droplets may be accounted for the improved antibacterial activity in nanoemulsion formulations.

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643

ANTINOCICEPTIVE AND ANTI INFLAMMATORY EFFECTS OF EXTRACTS OF *LEPIDIUM DRABA* L. IN MICE

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Lepidium draba L. (Brassicaceae family; synonym: Cardaria draba (L.) Desv.) is an edible herb. *Lepidium* species traditionally used as the treatment of insects bite, Hyperlipidemia, hyperglycemia as well as it consume as Tonic, Expectorant, febrifuge, stomachic, diuretic, antiscorbot [1, 2] The phytochemical investigation of Lepidium species have shown the occurrence of glucoraphanin, Glucosinalbin, flavonoids (isorhamnetin quercetin, kaempferol, glycosides), isothiocyanates, sulforaphane [3]. The previous studies on *L. sativum* and *L. latifolium* were revealed that they have anti nociceptive effect. Therefore this study was aimed at assessment of seeds and aerial parts extract of C. draba on inflammation and pain using thermal (tail flick, hot plat) and chemical (formalin and acetic acid test) models of nociception, behavioral controls and inflammatory test (cotton pellet). The results of the study were clearly showed antinociceptive and anti inflammatory activity. This effects probably are linked to the presence of phenolic compounds in the plant extracts. The presence of phenolic agent in extracts was confirmed by TLC using reference compounds.The finding of present study confirm antinoceptive and anti-inflammatory activity in both extracts of L. draba, which supports the previous studies on its same species (*L. sativum* and *L. latifolium*).

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644

STUDY OF HISTOLOGICAL AND HISTOMETRICAL CHANGES OF THE PLACENTA AFTER ADMINISTRATION OF MILFOIL (*ACHILLEA WILHEMSII*) HYDROALCHOLIC EXTRACT IN RAT

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Medicinal herbal plant had been applicated for treatment of blood hypertension, diabetus and reproductive disorders. Recently, it has been interested on the effects of various medical plant on the fertility and the rate of reproduction in both male and females. Since *Achillea* has been used for some disorders treatment include menopausal, or inflamative also there are no a study on the its side effects on the histology structure of placenta; the current study was undertaken. In this study, 40 female pregnant wistar rats were allocated as random to Four equal groups includes one control and three experimental groups. Control group animal were treated with tap water on 6-16 days the experimental groups were gavaged with *Achillea* plant extract as 200, 400, and 600 mg/kg concentration in the same time and voute on the 17 days of pregnancy. The animals were eutanized and tissue specimens were taken then stained with H&E method and studied under light microscopy. Result were analized using SPSS software and one-way ANOVA and Tukey post hoc tests. Result showed in the 400 and 600 mg/kg *Achillea* extract treated animals: sever placental congestion, elevation in the thickness of spongium of placenta, increasing in the number of the glycogenic cells, increasing in the number of giant cells, elevation in the thickness of LIM of placenta as well as desidual thickness were seen. Also, there was no significant alterations in the placental tissue of 200 mg/kg group when compared with control. Anatomical results include significant increase in the placental weight, diameter, thickness, index and a significant decrease in the fetal weight and length were seen in the 400 and 600 mg/kg plant extract treated animals.

648

HISTOMETRICAL AND HISTOLOGICAL CHANGES OF RAT DEODENUME FOLLOWING ADMINISTRATION OF ETHANOL AND OLEUROPEIN

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Since role of oleuropein as the most important phenolic compounds of olive has been concluded in protection of gastric mucosal layer and other tissues; the aim of present study was histometrically and histologically evaluation duodenum of rat after ethanol and oleuropein administration. Six groups of male rats were treated as following: control (normal saline), oleuropein (5 mg/kg), ethanol (1ml), and ethanol with oleuropein by 3 doses 5, 10 and 50 mg/kg. Oleuropein was orally administrated for 3 days and ethanol was orally administrated one hour after last oleuropein administration. The rats were euthanized by ether one hour after ethanol administration and duodenum was removed and evaluated by macroscopic and microscopic examination. Ethanol destroyed gastric mucosal layer of duodenum since thickness of epithelial tissue, number of columnar cells, number of goblet cells, length of villi and thickness of mucosal layer was significantly decreased in comparison with control group. Use of oleuropein 5 and 10 mg/kg decreased effect of ethanol. However, oleuropein 50 mg/kg did not protect duodenum but acted as oxidant agent and increased injuries. Thus, oleuropein with low dose can be protective for duodenum against ethanol.

650

REDUCTION OF ACRYLAMIDE FORMATION IN POTATO CHIPS BY EDIBLE PLANTS

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Acrylamide is a synthetic compound that is used especially as a polymer precursor (polyacrylamide). For the first time, in April 2002, acrylamide was reported in carbohydrate-rich fried foods such as potato chips, french-fries, biscuits, bread and coffee by the Swedish National Food Administration and University of Stockholm. The presence of acrylamide in the human diet is a potential risk as a neurotoxic and carcinogenic agent. Scientists have started a big effort to reduce the formation of acrylamide in foods; therefore they try to find materials or methods that reduce the concentration of acrylamide in fried foods. In this way, some studies focus on the effects of medicinal plants on the formation of acrylamide. Parsley (*Petroselinum crispum* Mill.), coriander (*Coriandrum sativum* L.) and dill (*Anethum graveolens* L.) are three edible vegetables that are widely used in the world as a flavoring agent in food products, perfume and cosmetic industries as well as pharmaceutical industries. The aim of this study is assessment of effects of these three edible and medicinal plants on the formation of acrylamide in potato chips. reversed-phase high performance liquid chromatography was used as acrylamide quantification using purified water as mobile phase. All of plant extracts significantly inhibited formation of acrylamide($P<0.001$). C. sativum, A. graveolence, P. crispum hydroalcoholic extracts intensified acrylamide formation with decreases of 24.19% , 20.87 % and 22% , respectively. The current study suggests a use of mentioned vegetables can reduce acrylamide formation in fried foods.

651

STUDY OF ANTI-OBESITY EFFECT OF SIX MEDICINAL PLANTS (*CARUM COPTICUM, ORIGANUM MAJORANA*, RUTA …)

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Obesity is common in peoples with modern life. And it is cause of most diseases including diabetes, a hyperlipidaemia and cardio vascular problems. Most therapies for obesity have severe side effects; it seems that using herbal remedies makes this side effects less. In order to evaluate the effect of some herbs which have been used in traditional medicine for obesity, we choosed six of them (Carum copticum, Origanum majorana, Ruta graveolens, Cuminum cyminum, Foeniculum vulgare, Lak) Mice was the animal used for this purpose. We prepared hydro alcoholic extract of them and dried to a powder and gave the animals as gavage. In each study, we used 6 animals for both samples and blank. We measured weight change after 14 days of therapy. Our study revealed that Carum capticum was effective in lowering the weight with 22.64 $^{+}_{-}$ 0.53 respectively .

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652
QUALITATIVE AND QUANTITATIVE ANALYSIS OF PLANT MATERIALS

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Plant materials are used throughout different countries as home remedies for the prevention and treatment of various diseases, over-the-counter drug products and raw materials for the pharmaceutical industry, and represent a considerable proportion of the global drug market. It is needed to ensure the quality of medicinal plant products by using modern control techniques and applying suitable standards. In the present study, we classified a series of tests for assessing the quality of medicinal plant materials. It constituted a collection of test procedures to support the development of national standards based on local market conditions, with due regard to existing national legislation and national and regional norms. Plant preparations have a very special characteristic that distinguish them from chemical medicines, because a single plant may contain a great number of bioactive compounds and a combination of plants even more. This complexity is one of the most important challenges to researchers attempting to identify a single bioactive compound or chemical group in the enormous universe that comprises a single crude extract. Several techniques similar to those used for the analysis of synthetic drugs are also frequently employed for analysis of medicinal plant materials (e.g. volumetric analysis, gravimetric determinations, gas chromatography, column chromatography, high performance liquid chromatography and spectrophotometric methods). Sample preparation is one of the critical steps in analysis of plants. Some modern sample- preparation techniques include solid-phase microextraction, supercritical- fluid extraction, pressurized- liquid extraction, microwave- assisted extraction, solid-phase extraction, and surfactant-mediated extraction. Subsequent evaluation revealed some products to be adulterated with other related plants from the same genus or family. Determination of adulteration in herbal products could be achieved by some accurate physical and chemical analysis [1-3].

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654
EVALUATION OF GOITROGENIC EFFECT OF FLIXWEED

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Flixweed (*Descurainia sophia* L. from family *Cruciferae*) has long been used in traditionalmedicines such as Iranian Traditional Medicine to cure different ailments [1]. The seeds have few goitrogenic glucosinolates that inhibit the uptake of iodine by the thyroid gland and has been reported that at high doses over prolonged periods, can decrease thyroid hormones (thyroxine T3 and T4) in animals [2]. This study aims to investigate the goitrogenic effect of flixweed on human bodies. A before-after single group clinical trial was conducted, for evaluating the laxative effect of flixweed by using comparison of the serum TSH levels before and after using the flixweed. In a 13patient sample (3 male and 10 female) with the mean age of 46.50 years (22-75, SD ±15.20), the mean BMI of 25.67 (20-32±2.934), the mean treatment period of 47 days(28-80 days, SD ±17.56), and the mean daily dose as the best constipation response of 48.75 gram/day (20-100±22.60), the final serum TSH levels showed a mean increase of 0.261 uIU/ml ±1.33, whereas statically there was no significant difference by Wilcoxon signed-rank test (p value:0.213). Further research with a sufficiently largesampleis required to investigate whether higher doses and longer treatment periods can have an influenceonthyroid hormone and TSHlevels.

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668
TERPENE CONSTITUENTS OF CHRYSOPOGON AUCHERI (BOISS.) STAPF. ROOTS

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The essential oil content in the roots of *Chrysopogon aucheri* growing wild in south of Iran was found to be 0.1 % based on the fresh weight. The oil was analyzed by gas chromatography (GC) and GC-mass spectrometry (GC-MS). Twenty constituents were defined, which approximately constituted 97.3% of the root oil. Monoterpenes consist more than 88% of the oil of which the major components were characterized as α-pinene (23.1%), E,β-ocimene (20.9%), Z, β-ocimene (12.0%) and α-phellandrene (10.8%).

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675

EFFECT OF AQUEOUS AND ALCOHOLIC EXTRACTS OF SOUR CHERRY FRUIT STALK ON ETHYLENE GLYCOL-INDUCED RENAL STONE IN MALE WISTAR RATS

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Considering the evidence which show the effect of herbal medicine on renal stone treatment [1, 2], the aim of this study was to evaluate the efficacy of sour cherry fruit stalk on prevention and treatment of calcium oxalate stone in rats. For this purpose, in the present experimental study, fifty male Wistar rats were randomly divided into ten groups (each group 5 rats) and then studied for 30 days. The Healthy control group only received normal water and a regular diet. The negative control group received 1% ethylene glycol in water during the study. The preventive groups received either 750 mg/kg aqueous extract or alcoholic extract of sour cherry fruit stalk with 1% ethylene glycol every day. The treatment groups received 1% ethylene glycol every day. These groups have also received either 1500 mg/kg aqueous extract or alcoholic extract of sour cherry fruit stalk from day 14 to the end of the experiment. At the end of experiment, under anesthesia, blood samples were taken directly from the heart. Data analysis was done by the SPSS software using One-way ANOVA. The results showed that the levels of BUN and Creatinine in the negative control group, the preventive and treatment groups received alcoholic extract of sour cherry fruit stalk in comparison to the healthy control group were significantly higher ($p<0.05$). There were no significant difference between experimental groups received aqueous extract of sour cherry fruit stalk and the healthy control group ($p>0.05$). This could be concluded that aqueous extract of sour cherry fruit stalk have a preventive effect on the formation of renal stones and is able to prevent kidney disfunction in kidney of male wistar rats.

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705
EFFECTS OF SESAME SEED ON MENSTRUAL BLEEDING CESSATION

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Sesamum indicum L. is used as an effective treatment for menstrual bleeding cessation in traditional Iranian medicine clinics. Its therapeutic effect has not been approved by scientific studies yet though. 8 patients aged between 15- 40 years who had menstrual bleeding cessation for more than two months were enrolled the study. 60 grams bags of black Sesame seeds were given to the patients to be boiled and mixed with honey and be used for five days. Patients were followed by telephone calls. the mean age was 22.8 years. All patients were married. 5 patients had menstrual bleeding in an average of 9.2 days after sesame consumption. 2 of them had complaint of dysmenorrhea. One patient reported to have more, two patients less and two patients equal amount of bleeding than last menstrual bleeding episodes. 3 patients didn't use the drug because of nausea, unpleasant taste and having menstruation before drug usage. this study shows that sesame is maybe a good choice in patients with hormonal treatment contraindications. The mechanism for this effect is not well known. It seems that maybe the sesame seeds lignans or the regulating effect of this seed on the homeostatic system is responsible for this effect. Due to the small sample size and lack of control group, larger trials are recommended to approve this hypothesis.

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709
BIOCHEMICAL STUDY OF THE EFFECTS OF *ARTEMISIA ABSINTHIUM* AND DAM KEREM ON THE COETANEOUS WOUND HEALING IN RAT

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Wound and its management are the most common health problems in human and veterinary medicine. Herbal therapy is becoming increasingly popular among patients and physicians. This study was conducted to evaluate the effects of Artemisia absinthium and dam kerem on full thickness wounds, were assessed by biochemical methods. 36 male Sprague-Dawley rats were grouped into four groups. Excisions were created surgically on the animals' skin. Groups 1, 2 and 3 were treated with extract of A. absinthium, combination of A. absinthium and dam kerem and dam kerem alone, while Group 4 was untreated. Wound biopsy specimens were collected on Days 5, 10 and 16 and analyzed. Results showed that the hydroxyproline content in groups 1, 2 and 3 were significantly higher in various post wounding days. The mean of hexosamine in all treated groups was higher than that in control group. In all treated groups, group 2 showed higher biochemical parameters. The present study has demonstrated that combination of A. absinthium and dam kerem includes properties that accelerate wound healing activities, compared to control group.

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710

COMPARISONS QUALITATIVE AND QUANTITATIVE ANALYSIS OF THREE FORMS *OF SARCOPOTERIUM SPINOSUM* FROM VARIOUS WORLD HABITATS.

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Sarcopoterium spinosum (L.) sp., a common plant in the Mediterranean region (Sud -Italy,Iran, Spain), is widely used as an antidiabetic drug (Insulin simile) by Bedouin healers. However, the antidiabetic properties of Sarcopoterium spinosum had not been fully studied. In our previous study we validated quality and quantity of present substances of Sarcopoterium spinosum by using Chromatography analysis. The aim of this study was to further clarify it's the better quality and quantity of various forms of plants applicable in medicinal products. It was used different solvents – eluents applicable in coulomb chromatography and TLC, THLC analyze systems. It was determined a different result of Polyphenols, Tannins and Acid Substances which are the great importance in pharmaceutical activity and medicinal products.

715

FLORISTIC & ETHNOBOTANICAL STUDIES OF SARBAND (SHAZAND-MARKAZI PROVINCE) MEDICINAL PLANTS

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Iran by the reason having different weather and ecological position has one the largest medicinal plant treasures in the world [1]. Human has used medicinal plants for his aching therapy from olden times. Synthetic drugs have more side effects, so today pharmaceutical knowledge is trying to union establishment between homeopathic and allopathic [2].Therefore studying medicinal ethnobotany is importance. Sarband District is located in Markazi Province with 33° 46´ N, 49° 14´ E and 2037m height. It has various reserves of medicinal plants and its native peoples use some of them for their disease treatment [3,4]. Floristic studies of Shazand District was done. All collected plant samples identified using botanical keys and references and voucher specimens were deposited at the Arak University herbarium. Also some information was recorded about using the plants as food and druges form the region. Results showed existing 139 species from 32 families that the most species were from Lamiaceae, Fabaceae, Asteraceae and Apiaceae respectively. 15 families are presented with 1 species in this study. Almost of the studied species had edible or medicinal propertises that compeleting the study about their ethnobotany and phytochemical propertises is continued.

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716
EFFECTS OF EXTRACT OF *CROCUS SATIVUS* ON PHYSICAL STAMINA IN BALB/C MICE

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Fatigue is the inability of body to retain energy during exercise. Anti-fatigue effects of many plants have been evaluated and some are accepted in clinic. In the present research, the anti-fatigue effect of *Crocus Sativus* extract was studied on the performance of Forced Swimming Test (FST), Open Field Test (Activity, Grooming, Urination and Defication) and on blood biochemical parameters related to fatigue in mice including: Glucose (GLU), Blood Urea Nitrogen (BUN), Creatine Phosphokinase (CPK), and Lactat Dehydrogenase (LDH). *Crocus Sativus* extract (25, 50, 100 and 150 mg/kg) was orally (Gavage) administrated to mice for 14 days. A significant reduction in immobility time in FST was observed by 25, 150 mg/kg extract as compared with the control group. In Open Field Test by 150 mg/kg extract as compared with the control group significant increase in grooming time was observed. In addition, BUN by 150 mg/kg extract as compared with the control group a significant reduction was observed. Dose-dependant gradually decreasing in CPK was observed, but statistically was not significant. The content of LDH was significantly decreased by 25 and 150 mg/kg extract. Finally the content of GLU by 50, 100 and 150 mg/kg extract was increased significantly. The result predict a potential benefit of *Crocus Sativus* extract as an anti-fatigue treatment and for improving physical stamina.

722
RUTA GRAVEOLENS L. (RUTACEAE) AERIAL PART FLAVONOIDS

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Ruta graveolens L. (Sadab, bitter herb or Rue) from Rutaceae is a medicinal plant used since time immemorial in Ethanobotany [1]. Ruta species contain many active principles. More than 100 compounds have been identified up to now from R. graveolens. These belong to four major classes of substances: alkaloids, coumarins, flavonoids and essential oil. Characterization of these compounds may find potential applications in pharmaceutical and drug industry [2]. The inhibitory effects of *R. graveolens*, Quercetin and its glycoside form, Rutin showed moderate inhibition on Xanthine Oxidase activity [3]. Ratheesh et al (2010) studied on Protective effects of isolated polyphenolic and alkaloid fractions of Ruta graveolens L. on acute and chronic models of inflammation [4]. In this study, aerial part flavonoids of *R. graveolens* is reported. Aqueous-methanolic extract of collected plant material from Yazd was examined to practice flavonoid detection, isolation and identification by 2-Dimensional Paper and Thin Layer Chromatography, TLC Scanner3 and available references [5,6]. Results showed aerial part of the species contains flavones C and C-/O glycosides, flavonoid sulphates and aglycones. Rutin, Quercetin, Kaempferol and Vitexin were found in the species aerial part. Characterization of *R. graveolens* compounds may find potential applications in pharmaceutical and drug industry. Further studies may also aim in the screening of this plant for antiviral activity against HIV and other dreadful diseases.

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723

ANTIOXIDANT, ANTIMICROBIAL AND CYTOTOXIC ACTIVITIES OF *EREMOSTACHYS MACROPHYLLA* MONTBR. & AUCH. AERIAL PARTS

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Nowadays, medicinal plants as the source of natural compounds have played an important role of biological and pharmacological properties in the treatment of many diseases which are giving to researchers new visions both in their natural forms and also as templates for synthetic modifications of novel drugs [1, 2]. Herbal medicines have been demonstrated potential antibacterial, antiprotozoal and antiviral activities. Also medicinal herbs have a vital role in the prevention and treatment of cancer.Therefore, it is necessary to achieve the new bioactive agents for introducing herbal remedies.The aerial parts of Eremostachys macrophylla as one of the Iranian endemic plants was studied for general toxicity, antioxidant, antimicrobial and cytotoxic activities. Brine shrimp lethality test (BSLT) and free radical scavenging activity test (FRST) by DPPH were used for general toxicity and antioxidant properties, respectively. cytotoxic investigations were assessed by MTT assay and antimicrobial effects were evaluated by disk diffusion method. Three different extracts (n.Hexan, DCM, MeOH) of aerial parts of E. macrophylla were used for these assay. In this examination n.Hexane extract was the most active fraction in brine shrimp lethality test and methanol (MeOH) extract showed significant antioxidant effects. MTT assay was used on a normal and two cancer cell lines: Human Umbilical Vein Endothelial Cells (HUVEC), human colorectal adenocarcinoma (HT29) and human lung carcinoma (A549). Results showed cytotoxicity of n-Hexan and MeOH extracts against HT29 and all three n.Hexan, DCM and MeOH extracts against A549 cell lines. Also these three extracts didn't show any significant effects against HUVEC. Finally, these extracts didn't have any antimicrobial effects against gram positive, gram negative and candida albikans species. MeOH extract of E. macrophylla aerial parts possessed potential antioxidant effects and cytotoxic activity against HT29 cell line. Also n.Hexane extract of the plant had the most cytotoxic effects against Artemia salina and A549 cell line. All three extracts had no cytotoxic effect on normal cells.

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735
THE EFFECT OF *CYNARA SCOLYMUS* L.ON FATTY LIVER INDICES

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Liver steatosis causes progression in liver damage and accelerates liver fibrosis. Liver damage may enhance the blood enzymes of AST and ALT. Infiltration of fat in liver is associated with an increasing in its echogenicity, depending on the severity of the fat infiltration. This study was done to investigate the effect of 45 days twice daily drinking of *Cynara scolymus L.* (Artichoke) herbal tea on the levels of AST, ALT and liver parenchyma echogenicity of 15 patients (ten women and five men), aged from 25 to 63 years old in Hamedan city, Iran. The blood enzymes assay and liver sonography were performed after clinical diagnosis and after treatment. Subjects were divided based on the ultrasound criterion for fatty liver disease as follows: mild (5 patients) as grade1, moderate (8 patients) as grade2 and severe (2 patients) as grade3. The results showed that 11 patients had a decrease in fatty liver grade by the treatment ($p \leq 0.05$). However, 4 women didn't show expected change in the grade of fatty liver. The mean ± standard deviations of the measured enzymes of all patients before and after the treatment were 47.67± 22.367 vs. 29.47 ± 13.01 for ALT and 36.87 ± 11.52 vs. 24.20 ± 9.31for AST. Statistical analysis of the results by *T. test* show significant decrease for ALT and AST levels ($p \leq 0.01$). In conclusion, the results of this study showed that the medicinal plant of *Cynara scolymus* can be used to as valuable herb for reducing fatty liver grade and its complications.

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737

IN VITRO ANTIFUNGAL ACTIVITY OF *SALVIA OFFICINALIS* OIL ON DIFFERENT *CANDIDA* SPECIES

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Medicinal plants have the ability to inhibit the growth of wide range of pathogenic microorganisms due to presence of essential oils. Essential oils are complex volatile compounds, naturally synthesized by various parts of the plant during the secondary metabolism of plants. This study was undertaken to explore the effect of branches, flowers and leaves oils of *Salvia officinalis* against *Candida albicans*, C. glabrata and C. parapsilosis. Essential oil was extracted and analyzed by gas chromatography–mass spectrometry. The susceptibility profiles of different Candida species were determined by micro broth dilution assays with oil extracts and a panel of antifungal agents. Based on the obtained results, Essential oils of flowers and leaves have the highest antifungal activity, and could serve as a natural alternative to synthetic fungicides for the control of Candida species. These results indicate that essential oil of S. officinalis could be used for management of these pathogens as a potential source of sustainable eco-friendly botanical fungicides [1, 2].

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739
ANTIMICROBIAL EFFECT OF EXTRACT OF *ALLIUM SATIVUM*, *ALLOE VERA* AND *ARTEMESIA ABSINTHIUM* ON *BACILLUS SUBTILIS*

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Antimicrobial and antiviral effects of *Allium sativum*, *Alloe vera* and *Artemesia absinthium* have been proved. We aimed to investigate the effects of extract of Allium sativum, Alloe vera and Artemesia absinthium on the growth of Bacillus subtilis to take the place of chemical drugs. Therapeutic properties of essential oil and extracts against bacterial and non bacterial diseases are known since ancient times and many studies on different plant species and their essential oil or extracts effect on microorganisms are done. In this study, the effect of hydro alcoholic extract of Allium sativum, Alloe vera and Artemesia absinthium on Bacillus subtilis was tested in laboratory conditions. Extracts (70% hydro alcoholic) were prepared by Maceration method and were examined in on Bacillus subtilis on Mueller Hinton agar medium. The hydro alcoholic extracts of Allium sativum had no effect on Bacillus subtilis but Alloe vera (leaf extract) and Artemesia absinthium had significant effect on this bacterium ($p<0.001$); So that the zone diameter of no growing was 20.4 mm and 16.9 mm, respectively (714 mg/ml). These values were obtained lower than Gentamicin and Ciprofloxacin (20.4 and 32.4 mm, respectively) but were more than Ofloxacin (18.4 mm). MIC (minimum inhibitory concentration) and MBC (minimum bactericidal concentration) of Aloe Vera extract on Bacillus subtilis were obtained in 230 and 410 mg/ml, respectively. The extract of gel of Alloe vera had no effect on Bacillus subtilis. Results showed that Lavandula Artemesia absinthium has antimicrobial effects on Bacillus subtilis more than Alloe vera and Allium sativum. Given the effects of Alloe vera and Artemesia absinthium in laboratory conditions, we hope that these extracts will be used instead of chemical substances for making nutritional supplements to control human diseases.

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743

EVALUATION OF ANTIFUNGAL ACTIVITY OF ESSENTIAL OILS OF SOME MEDICINAL PLANTS AGAINST *RHIZOCTONIA SOLANI*

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The use of essential oils in control of plant pathogenic fungi that is renewable and environmentally friendly as biological methods have been proposed in recent years. In this examination, investigated the antifungal activities of essential oils of Origanum vulgar, Carum carvi, Anethum gravcolens, Thymus vulgaris, Ocimum basilicum, Cinnamomum zeylanicum, Thymus transcaspicus, Rosmarinum officinalis and Allium hirtifolium against Rhizoctonia solani that causing root and crown rot of tomato in vitro by mixing PDA medium with six different concentrations by means of combination randomized completely factorial design with four replications. Results of mycelial growth after five days at 25±1̊ C showed that the essential oil of thyme (Thymus transcaspicus) no inhibitory effect at a concentration of 1000ppm but essential oils of caraway, dill, cinnamon and basil in a concentration of 800ppm reduced fungal growth by 100 percent. Also, essential oils of oregano, thyme, chives and rosemary at 400ppm concentration completely prevented the growth of fungal colonies. Essential oil of oregano had fungistatic effect at a 1000ppm concentration, while the essence of caraway and dill had fungicide effect at 800ppm concentration. Our results showed that increasing amount of essential oil and kind of it can conclude different effects on different fungus. The amount and type of these metabolites in plant growth depends on environmental conditions and geographic location [1].

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745
EXTRACTION AND PURIFICATION OF ELLAGIC ACID FROM WASTE MATERIALS OF POMEGRANATE

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As peel of *Punica granatum* (pomegranate) are not currently utilized for commercial purposes, it is discarded as a waste and becoming a source of pollution. The peel of pomegranate contains hundreds of phytochemicals and pomegranate extracts have recently been shown to exhibit antioxidant properties, thought to be due to the action of ellagic acid (EA), the main polyphenol in pomegranate [1]. In fact the antioxidative activity of pomegranate extracts surpasses that of green tea, which is currently undergoing clinical trial evaluation for treatment of prostatic disease [2]. EA inhibited 71.2% lipid peroxidation of a linoleic acid emulsion at 45µg/mL concentration. On the other hand, butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), α-tocopherol and ascorbic acid displayed 69.8%, 66.8%, 64.5% and 59.7% inhibition on the peroxidation of linoleic acid emulsion at the same concentration, respectively [3]. Also, many studies have shown anticancer activity of EA [4,5]. These results suggested that EA (Figure 1) can be used in the pharmacological, food industry and medicine. In this study we worked on the extraction and purification of EA from waste materials of pomegranate. Because the drug cannot be administered in the form of pill as it is insoluble in water. So, the drug is encapsulated in two types of product, one containing 40% EA, used as antioxidant supplement and another contains purified EA used as cancer-chemopreventive.

Fig. 1. Chemical structure of ellagic acid.

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749

STUDY ON CYTOTOXIC ACTIVITY OF SOME MEDICINAL PLANTS FROM TAKESTAN DISTRICT OF QAZVIN

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Medicinal plants have been investigated for possible anti-cancer effects.The aim of the present study was to examine the cytotoxic activity of several medicinal plants on different tumor cell lines.11 selected plant species which have been used in folkloric prescriptions were collected from different sites of Qazvin district of Iran. The methanolic extracts of the plants were prepared and their cytotoxic effects on four human cancer cell lines (A549, human lung adenocarcinoma; MCF7, human breast adenocarcinoma; HepG2, hepatocellular carcinoma and HT-29, human colon carcinoma) and one normal cell line (MDBK, bovine kidney) were examined using the MTT assay. Three of these were exhibited antiproliferative activity against one or more of the cell lines. The extract from arctium lappa demonstrated the highest cytotoxicity with IC50 of 19.79, 27.55 and 33.92 μg.mL−1 against MCF7, HepG2 and HT- 29 cells, respectively.For some of the plants, their traditional use was correlated with the cytotoxic results, whereas for others the results may support the non-cytotoxicity of species used traditionally as natural remedies.The cytotoxic species could be considered as potential of anticancer compounds.

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761

THE EFFECTS OF HYDROALCOHOLIC EXTRACT OF ''FORTUYNIA BUNGEI BOISS'' PLANT ON PARKINSON'S DISEASE CATATONIA CAUSED BY PERPHRNAZINE IN MICE

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Parkinson's disease is the second most common neurodegenerative disease after Alzheimer's disease, characterized by selective degeneration disorder and loss of dopaminergic neurons in substantia nigra [SN] of the ventral mid brain leading to dopamine depletion in the striatum. Many medications, such as perphenazine can cause reversible parkinson's syndrome. So far, the effect of natural antioxidants [such as polyphenolic compounds in food and vegetables] inpreventing or delaying neuro degenerative disease has been demonstrated. considering that the extract of *Fortuynia bungei boiss* contains nomerous polyphenols and antioxidants, and according to current approaches to the treatment with plants, this pant is expected to be beneficialto relieve catatonia symptoms of parkinson's disease. 50 adualt male mice were dividedinto 5 groups of 10 animals. in the 5 groups of mice, 3 different doses of the hydroalcohollic extract of plant, solvent and levodopa was given orally for 2 weeks. Half an hour after the last dose, perphenazine [10 mg/kg.ip] was injected intra peritoneally in each group. half an hour later, the rigidity score was evaluated according to statistic finding, significant differences between the control group and the doses of 10 and 40 mg/kg were observed. so that, the average of rigidityin both groups was lower than control group in 120 to 180 minutes. the present study demonstrates that the *Fortuynia bungei boiss's* extract is effective on the rigidity score in perphenazine-induced Parkinson's disease model in mice. Parkinson's disease, *Fortuynia bugei boiss plant* , perphenazine , polyphenol, antioxidant.

766
ANXIOLYTIC ACTIVITY OF AQUEOUS EXTRACT FRACTIONS OF *CORIANDRUM SATIVUM* IN MICE

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Among medicinal plants, *Coriandrum sativum* L. has been recommended for relief of anxiety and insomnia in Iranian folk medicine [1]. Our previous study showed that the aqueous extract of coriander seeds had anxiolytic effect at a dose of 100mg/kg on the elevated plus-maze test [2]. Therefore, the aim of this study was to identify the most effective fraction of coriander aqueous extract. First, the aqueous extract was fractionated with n-butanol to give n-butanol and water residue fractions. The water residue fraction was then applied to silicagel column chromatography to obtain five fractions. The water residue fraction was also fractionated with sephadex LH-20 as a stationary phase. Consequently, the water fraction isolated with sephadex LH-20 was applied to TLC and three fractions were obtained. The anxiolytic effects of different fractions were examine in male Albino mine using elevated plus-maze. Diazepam (0.3mg/kg) was used as a positive control in all experiments. Among the fractions tested on the elevated plus-maze, the fraction (a) isolated by TLC procedure was the most effective one as it showed a greater increase in open arm entry than those of other fractions at similar doses. So, future studies to identify the active compound (s) responsible for the anxiolytic effect should be focused on this fraction.

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774

THE EFFECT OF CINNAMON ON THE IMMUNE SYSTEM IN BROILERS

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Cinnamomum cassia bark is the outer skin of an evergreen tall tree belonging to the family Lauraceae. Its extracts contain several active components such as essential oils (cinnamic aldehyde and cinnamyl aldehyde tannin, mucus and carbohydrates[1,2]. They have various biological functions including anti-oxidant, antimicrobial anti-inflammation, anti-diabetic effects [3]. The contents of glutathione (GSH) and lipid-conjugated dienes were studied in rats fed a high-fat diet along with cinnamon and it was reported that cinnamon stimulates the activity of antioxidant enzymes. anti-tumor effect of cinnamon extracts is directly linked with enhanced pro-apoptotic activity and inhibition of NF_B and AP1 activities and their target genes in vitro and in vivo mouse melanoma model.The present investigation shows that *Cinnamomum zeylanicum* essential oil exhibits a significant antioxidant activity in fattening chickens and can be used as a source of antioxidant in dietary supplement. A total of 100 day-old Ross broiler chickens were purchased from Amol Poultry Company (Amol Company, mazandaran, Iran). The chicks were divided into 4 groups: 1,2,3 and Control Group. Birds feed containing 1%, 2% and 3% respectively was cinnamon, And a control group without cinnamon. Chicken vaccination program are as follows: 6 Day old dual vaccine injection Newcastle-flu vaccine + B1, 14 days vaccine Gumboro D78, 20 and 30 days vaccine Lasuta. To study the effect of cinnamon on the immune system of chickens, the chickens were sampled on days 20-30 and 40 days so that from each group, 10 pieces and used to test serum HI antibodies to Newcastle disease and avian influenza were determined. Newcastle test results show that, at day 20, with the percentage of cinnamon in the diet of chickens, which also increased the amount of cinnamon positive role in enhancing Newcastle antibody. Most scientific studies on the activity of the immune system as the title Newcastle consider the results of this study show: Cinnamon can be used as a food additive in poultry diets to boost the immune system and increase resistance to disease bird.

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777

THE MOST USEFUL HERBS OF IRANIAN TRADITIONAL MEDICINE PRESCRIBED FOR PALPITATION

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Palpitation is a common, unpleasant, and often alarming awareness of heartbeats. It may result from increased conscious perception of the normal cardiac rhythm or from any cardiac arrhythmia producing changes in heart rate, rhythm, or contraction pattern, and may be reported as a skipping, pounding, fluttering, or similar sensation [1]. Chest pain and palpitations are common in the general population, with prevalence rates of 20–40% and 11%,respectively, and are the two most common reasons for referral to a cardiologist [2]. Most people with palpitations are diagnosed with either cardiac arrhythmias or anxiety. Rarer causes of palpitations include hyperdynamic circulatory states such as drugs and medications(e.g. caffeine), non-arrhythmic cardiac causes (e.g. valvular disease)and extracardiac causes (e.g. hyperthyroidism, anaemia) [3]. Follow-up studies have reported poor outcomes in terms of maintenance of symptoms that affect daily life, worry about the heart, and increased use of health care services [2]. palpitation is a well-known disorder in Iranian Traditional Medicine (ITM). The word “khafaghan” used by Avicenna and some other famous Iranian Traditional physicians to describ this condition in their manuscripts precisely. Iranain scholars believed that intemprament was the main cause of palpitation and herbal therapy was the major treatment prescribed by them. In this study, six Iranian ancient medical texts i.e. Canon of Medicine (Avicena 980-1037 AD), Alhavi (Razes 865-925 AD) Tohfat ul-Mo,menin (Mo,men tonekaboni 17th century), Makhzan ul-Advia(Aghili 18thcentury), Ekhtiarat Badi,i (Ansari 1329-1404 AD), and Al-abnia An-Haghyegh el-advia (Heravi 11thcentury) were studied for anti- palpitation medicines. Subsequent to our study, the herbal medicine were listed and scored based on the frequency of their prescriptibility. Moreover, the effort has been taken to provide the best scientific name for each plant.This study showed that Citrus medica, Ocimum pilosum, Fraxinus excelsior and Aurudo bambos were the most frequent herbs mentioned in ITM prescriptions. These herbs can be introduced as new anti- palpitation herbal medicines for clinical researches.

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810
EVALUATION OF ANTIPLATELET ACTIVITY OF A SELECTED GROUP OF MONOTERPENES

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Platelet aggregation has an essential role in pathogenesis of thrombosis, heart attacks and stroke. Several antiplatelet drugs such as aspirin, clopidogrel are currently used in clinic, but they cause some adverse effects and suffer from some limitations. Therefore research for finding new antiplatelet agents especially in herbal plants is ongoing. Monoterpenes are the major constituents of plants and have various pharmacological effects such as antifungal, antibacterial, antioxidant, anticancer, antispasmodic, hypotensive and vasorelaxant [1]. There are some reports indicating that monoterpenes can be useful for prevention and/or treatment of cardiovascular disease (CVD). Therefore this study was designed to explore the antiplatelet activity of a selected group of terpens. In vitro antiplatelet effects of (-)-β-pinene, (+)-α-pinene, (-)-α-pinene, 1,8-cineol, (-)-menthone, (-)-fenchone, (+)-fenchone, (+)-camphene, (-)-borneol, (-)-menthol and trans-anethol on human platelet rich plasma (PRP) were evaluated using arachidonic acid (AA) and adenosine diphosphate (ADP) as inducer according to Born method [2]. The results showed that (+)- α- pinene and trans-anethol were the most potent antiplatelet aggregation agents with >90% inhibition at 1 mM concentration. IC50 for all the terpenes were calculated and compared.

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817

ANTIDIABETIC ACTIVITY OF AQUEOUS EXTRACT OF *CAPPARIS SPINOSA* ON STREPTOZOTOCIN-INDUCED-DIABETIC RATS

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Diabetes mellitus is the sixth leading cause of death in the world, and majority of diabetic patients have type-2 diabetes. Capparis spinosa Leaves, a profusely branched hedge plant, is used in Iranian traditional medicine.Capparis spinosa aerial organs were extracted with water and concentrated to dryness. The water extract was investigated for possible hypoglycemic effect produced by single oral administration at various dose levels 10, 20, 40, 60 and 80 mg/kg in the Streptozotocin induced diabetic rats and compared against normal saline control and Glibenclamide as a negative and positive control, respectivily. The LD50 value was determined as 160 mg/kg body weight by acute toxicity study.A maximum fall of plasma glucose level was observed after 3 days of treatment when administered with aqueous extract of Capparis spinosa at 60 and 80 mg/kg oral administrations and 2 ml Sub coetaneous administration comparison to Glibenclamide as a control.The findings from the study suggest that the Capparis spinosa aerial organs may be prescribed as an adjunct to traditional formulation and drug treatment for controlling diabetes mellitus, although the mechanism of action is unclear and requires further pharmacological and biochemical studies.

820

EVALUATION OF ANTI-DEPRESSANT EFFECTS OF FORTUYNIA BUNGEI BOISS EXTRACT IN MALE MICE IN PHYSIOPHARMACOLOGY LABORATORY OF ISLAMIC AZAD UNIVERSITY IN TEHRAN

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This study was performed to evaluate the anti-depressant effects of *Fortuynia bungei Boiss* hydroalcoholic extract and compare with anti-depressant effects of citalopram in 50 male mice using forced swimming test (FST) and Open field test (OFT). This interventional-analytical study was done on 50 male mice in five groups of ten. In the first group (control) no medication was used. In the second group 10 mg/kg citalopram, and in the next three treated groups hydroalcoholic extract of *Fortuynia bungei Boiss* at concentrations of 10 mg/kg, 20 mg/kg and 40 mg/kg were administered orally using feeding needle, once-daily for two weeks and 30 minutes before two testes named FST and OFT. The results of FST revealed that the *Fortuynia bungei Boiss* extract increased the immobility time of the mice in comparison whit Citalopram group($p<0.01$). After reviewing the test results of OFT, it was found that the *Fortuynia bungei Boiss* extract increased the average number of crossed lines. However there were no significant statistical differences between groups. Finally, the results of the FTS showed that the *Fortuynia bungei Boiss* extract not only had no anti-depressant effects in male mice, but also it induced depression, due to increased immobility time observed using extract in comparison whit control group. The results of the OFT showed that the *Fortuynia bungei Boiss* extract has stimulatory effect, that the rate of this effects increases whit higher does.

827
ANTIDIABETIC ACTIVITY OF KOMBUCHA TEA ON STREPTOZOTOCIN-INDUCED DIABETIC RATS

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Kombucha is a refreshing beverage obtained by the fermentation of sugared tea with a symbiotic culture of acetic acid bacteria and fungi, which is consumed worldwide for its beneficial properties on human health. Diabetes mellitus is the sixth leading cause of death in the world, and majority of diabetic patients have type-2 diabetes. Important progress has been made in the past decade concerning research findings on kombucha tea and reports claiming that kombucha can prevent various types of cancer and cardiovascular diseases, promote liver and digestive functions, reduce inflammatory problems, stimulate the immune system, and can have many other benefits. Therefore, the present study was undertaken to evaluate the putative anti-diabetic activity of the Kombucha Tea. The aim of the study was to experimentally validate the use of Kombucha Tea in the folk treatment of diabetes in an animal model of hyperglycemia. The animal model consisted of experimentally induced hyperglycemia in Male wistar rats by 50 mg/kg STZ. Kombucha tea is prepared by placing the kombucha culture (tea fungus) into a sugared tea broth for fermentation. The amounts of tea, sugar, and tea fungus differ in different places. The modified procedure is as follows: tap water (1 L) is boiled and during boiling 80 g sucrose is stirred in. Then 5 g Gilan tea leaves is added and removed by filtration after 15 min. After cooling to room temperature (22 ºC) the tea is inoculated with 24 g tea fungus (the culture) and poured into a beaker (1 L) previously sterilized with boiling water. The growth of undesirable microorganisms is inhibited by the addition of 0.05 L previously fermented kombucha, thus lowering the pH. The incubation is carried out at 23 ºC to 25 ºC for two weeks.The beaker is covered with a paper towel to keep insects, especially Drosophila fruit flies away. After 13 to 16 d, the remaining beverage is filtered and stored in capped bottles at RT or prepared powder of Kombucha Tea by evaporated system.The aqueous extract was investigated for possible hypoglycemic effect produced by single oral administration at 100 mg/kg dose in the Streptozotocin induced diabetic rats and compared against normal saline control and Glibenclamide as negative and positive control, respectively.

839
SELF MEDICATIVE BEHAVIOR OF SHEEP EXPERIENCING GASTROINTESTINAL NEMATODE INFECTIONS

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Internal parasitism is one of the greatest disease problems in grazing livestock worldwide, and it is a growing concern given increasing resistance to commonly used anthelmintics. As a result, considerable attention is being given to the antiparasitic properties of plant secondary metabolites (PSM) [1]. The aim of this study was to investigate self medicative behavior of sheep using free choice effects of Prangos ferulacea as PSM-containing forage on internal parasite of sheep. Seven lambs with natural gastrointestinal parasitic burdens (PB) and 7 non parasitized lambs (NP) were offered a choice of alfalfa (Medicago sativa) and P. ferulacea before and after they were conditioned with the postingestive effects of tannins. Preference for P. ferulacea did not differ between groups before experiencing the post ingestive effects of tannins ($P = 0.44$). In contrast, when tested with a parasite burden, lambs in PB consumed more P. ferulacea ($P < 0.05$), showed greater preference for this medicinal plant. Alfalfa consumption did not differ between two groups. Ingestion of P. ferulacea by lambs in PB was followed by reduced fecal egg counts (FEC; $P < 0.05$). In conclusion, parasitized lambs increased their intake of PSM-containing forage when they experienced a parasite burden, which suggests they self-medicated with medicinal plant against parasites.

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855

ANTIOXIDANT AND NEPHROPROTECTIVE OF METHANOLIC EXTRACT OF *SALIX CAPREA* IN CISPLATIN-INDUCED TOXICITY IN EXPERIMENTAL MALE RAT

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Many drugs used in chemotherapy have hepatotoxicity and nephrotoxicity potential such as Cisplatin (CP). Cisplatin is a major antineoplastic drug used for the treatment of solid tumors and high doses of CP (5 mg/kg) have been known to cause nephrotoxicity and hepatotoxicity. Natural antioxidants exhibit a wide range of antioxidant and nephroperotective activities and therefor can reduce CP-induced toxicity. This study investigated nephroprotective and antioxidant activity of Salix Caprea against CP toxicity in albino male rat. After a single dose (5 mg/kg) of CP administration (intraperitoneal), in experimental groups the extract was given at the doses 100 mg/kg daily during 10 days and of the saline treated control groups. Renal function markers (blood urea nitrogen and creatinine), and total antioxidant capacity (TAC) were determined by the auto analyzer and Serum malondialdehyde (MDA) was measured by the feluorimetry method. Data was analyzed by SPSS, and statistical tests such as T-test and Chi-square were used. Extract of Flower Salix Caprea a significant ($P < 0.05$) preventive role against CP toxicity by decreasing BUN and creatinine. There was no significant difference between the two groups in relation to mean serum levels of MDA. In contrast, the mean serum levels of TAC was significantly higher than in control groups. This suggests that Salix Caprea has a protective capacity and antioxidant activity against CP toxicity and suitable for oxidative stress conditions.

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856

COMPOSITION OF THE ESSENTIAL OILS OF *HIPPOMARATHRUM MICROCARPUM* GROWING WILD IN IRAN AND ANTIBACTERIAL EFFECTS

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In this study , resulted composition of *Hippomarathrum microcarpum* flower essential oil decomposition was evaluated . this vegetation has one species in Iran and numerous amount of it are found in mountains of country north. This vegetation was collected from Gajereh in 45 km northern region of Tehran . Essential oil were extracted by Clevenger apparatus. Resulted essential oil was 1.6(v/w%) and injected to GC/MS device .majority of essential oil Composition were Germacrene –B(33.59%), Gamma-Elemene (19.53%) , Alpha-pinene(8.03%)and Germacrene-D(5.41%). Essential oil of vegetation flower were tested to identify their antibacterial effect. Inhibition effect on Psuedomonas aeruginosa was 17mm but this effect was not significants to other bactrias .

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859

ANTICANCER PLANTS: A REVIEW OF ISLAMIC TRADITIONAL MEDICINE TEXTBOOKS

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Islamic Traditional Medicine (ITM) is a holistic system of medicine which has been developed and practiced in Islamic territory during The Islamic Golden Age till today. Cancer was a known disease for the great scholars of this school such as Avicenna, Rhazes, Ahvazi and Jorjani. In their books, they discussed different types of cancer, its diagnosis and treatment. In this article, we aim to find medicinal plants used to treat cancers affecting various parts of the body, from the ITM point of view and to study the conformity of these data with the modern experimental researches [1-5]. Data on the medicinal plants used to treat cancer obtained from major ITM books.In addition, an extensive search on bibliographic databases (Web of Science, Pubmed, Science direct, Scopus, etc.) was performed to reconfirm anticancer, cytotoxic and anti-proliferative activities of reported herbs. Many medicinal plants are used to treat cancer in ITM. Recent experimental data confirms the effectiveness of the most ITM reported plants. In conclusion, studying ITM recommendations for the treatment of different diseases can lead to the discovery of new bioactive compounds and therapeutic methods.

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860

STUDY OF ANTIBACTERIAL ACTIVITY OF *FERULAGO ANGULATA* METHANOLIC EXTRACT

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Ferulago angulata known as Chavil is an Iranian endemic plant that has been used as the food preservative and natural flavor since long times. Considering to increased attention of various field of biological science to studying of plant extracts, the aim of this study has the effect of extract of *Ferulago angulata* on the activity of 3 isolated of gram negative and gram positive bacteria, *Escherichia coli*, *Staphylococcus aureus* and *Bacillus ceros*. Methanol extract was obtained by percolation method and antibacterial effect was evaluated by disc diffusion methods. The results in this study showed that methanol extract had inhibitory effect against all tested pathogen and maximum inhibitory effect on *S. aureus*. Thus, Plant's extract are naturally occurring phytochemicals which have various applications and have long been known and used throughout the world for treatment of many diseases, and there is at least some evidence that natural products such as essential oil and extracts may tend to have less deleterious side effects than corresponding synthetic drugs[1, 2].

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865
EFFECTS OF *NIGELLA SATIVA* WATER EXTRACTS ON DIABETIC RATS

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Nigella sativa L (Ranunculacea) or black cumin is an ancient folk medicine that is well known all around the world especially in eastern countries [1-3]. Diabetic nephropathy is certainly one of the most severe complications of diabetes which develops in 15-25% of type 1 diabetic patients and in progressed cases can even lead to renal function failure [4]. *Nigella sativa* leaves were obtained from the Research Center of Agriculture and Natural Resources.*N.sativa* leaves have been shown to contain distinct bioactive components. This study aimed at the effects of *N.sativa* water extracts on some complications of diabetic nephropathy.Diabetic rats were received *N.sativa* water extracts as monotherapy or in a 1:1 combination at doses of 100 mg/kg. day by gavage[5]. Serum levels of superoxide dismutase, catalase, and glutathione peroxidase of the treated groups were compared to that of both normal and diabetic control groups. After six weeks, all applied treatments led to recovery in the studied parameters but the *N.sativa* extracts dosed at 100 mg/kg.day was the most efficient as recovered superoxide dismutase levels of the diabetic rats to that of the normal rats. Moreover, the 100 mg/kg.day dosage of the combined extracts increased the renal levels of catalase and glutathione peroxidase enzymes even more than those of the normal rats and ameliorated the observed glomerular hypertrophy and interstitial inflammation.

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866

EFFECTS OF *URTICA DIOICA* AND *RHUS CORIARIA* ON DIABETIC NEPHROPATHY, LIVER DAMAGE AND DYSLIPIDEMIA

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Extracts of *Urtica dioica* (L) (UD) and *Rhus coriaria* (L) (RC) have been reported to have some antidiabetic properties [1]. This study investigated the effects of UD and RC water extracts and their 1:1 (w/w) combination on diabetic nephropathy, damage of liver and some metabolic parameters. Streptozotocine-induced diabetic rats were received UD, RC and their combination at a final dose of 100 mg/ kg by oral gavage [2, 3]. And 24 rat used for this study. The glomeruli space and interstitial inflammation were histologically examined and the serum levels of creatinine and Urea was assessed. Histological activity index of liver, some liver function related enzymes; blood glucose and lipid profile was assessed as well as [4, 5]. After five weeks of treatment, UD extract remedied the interstitial inflammation. The creatinine and Urea levels of serum were seen to be decreased by UD and the UD/RC mixture. In addition, RC had a remarkable healing effect on glomeruli space. Disturbed liver histological activity index was recovered by UD administration and the augmented liver function related enzymes such as alkaline phosphatase and alanine aminotransferase were obviously decreased by the UD/RC mixture. All plant extracts especially the UD/RC mixture reduced the serum levels of glucose. The UD was the best treatment on the deregulated levels of triglycerides and low density lipoprotein cholesterol. The UD/RC mixture was the most efficient treatment on the elevated levels of total cholesterol as well as. . All analyses were performed using the SPSS software (SPSS version 16, Chicago, IL, USA). $P < 0.05$ was considered statistically significant [6]. This study revealed that UD, RC and their combination had considerable healing effects against diabetic nephropathy, liver damage and dyslipidemia.

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872

TOXICITY EVALUATION OF EXTRACT OF BANANA PEEL AT NANO SCALE IN TWO SPOT GOURAMI FISH

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Natural extracts of fruit and peels obtained from the plant Musa sp (musaceae) consist of various chemical compounds such as Melatonin, Serotonin, Catecholamine which can be effective for treatment of diseases such as depression, and Parkinson syndrome. In present study the acute toxicity of extract of banana peel as nano scale which might potentially cross the blood brain barrier and in this regard being more effective for clinical use is evaluated using a bioassay technique. Nano extracts of banana peels (NEBP) which were prepared by the previous studies and also confirmed by Scanning Electron Microscopy (SEM), were studied in this study in order to be determined its general toxicological profile.Different concentrations of NEBP which ranged from 2 to 20 ng/µl were applied to gourami fish fry two spotted (*Trichogaster trichopterus*) for one week assay. LC_{50} values for each assay were obtained by probit analysis after taking average for three distinct experiments.The mean LC_{50} value obtained from lethality of gourami fish fry to NEBP was as 102.84 ± 15.65 ng/µl.The bioassay results showed that the extract of banana peels has dose dependent toxicity to gourami fish and can be considered as significantly active [1,2].

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879

EFFECT OF A PHYTOGENIC FEED ADDITIVE ON HEALTH AND PERFORMANCE OF HOLESTEIN CALVES

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During the recent years, the use of phytogenic compounds as an alternative to antibiotic growth promoters has been increased in animal nutrition [1].Carvacrol and Anethole have antibacterial and fungal effects [2, 3], and Limonene is an antimicrobial which improve feed palatability too [4]. However, little informations are existed on the effects of using these materials on the health and performance of animals. Biomin PEP include of theses phytogenic compounds (Carvacrol, Anethole, Limonene) and fructooligosacharids.The aim of this study was to evaluate the effects of Biomin supplementation on feed intake, weight gain and health status of Holestein calves.Twenty four head calves were divided into 3 groups immediately after birth and fed them with one of the following diets till weaning. Diet1: feeding with milk and concentrate (Control group) Diet 2: feeding with milk for 10 days and after that feeding with milk and concentrate containing Biomin Diet 3: feeding with milk containing Biomin for 10 days and after that feeding with milk and concentrate containing Biomin. Weight gain of calves was measured at 10, 30, 60 and 90 days of age and their concentrate consumption was measured daily.No significant difference was observed between weight gain in group 2 and control group but there was a significant difference between group 3 and other two groups in this factor. The results of this study indicated that consumption of Biomin in both milk and concentrate may have a considerable effect on weight gain and health of calve. However, the use of this feed additive in the concentrate did not show a significant effect on these parameters. Further studies are necessary to elucidate the effects of these phytogenic compounds on the health and performance of various animal species at different stage of growth and production.

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883
OLIVE LEAF EXTRACT EFFECT ON THE WOUNDS 8 CORROSION FIN FISH

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The olive tree is one of the worlds largest horticultural product many countries such as the mediteranian countries and Iran because of importance of food in olive,cultivation of this plant enjoys significant.olive is containing compounds such as unsaturated fatty acids,vitamins, Iron, etc. In addition to the olive a valuable nutrient and energy is also used to feed poultry and fish.olive leaves is contain compound such oleuropine, gilstroid, phenolic pound, caffeic acid and etc. The fish may be due to the invasion of microorganisms in environment, wounded body the fins will create corrosion. today, For the prevention and treatment of many disease waste, require drug combination is that no drug residues and no negative effect on the environment.tinctures can be a good alternative approaches for this purpose. For testing, a significant amount of olive tree leaves after drying and grinding were wet in 70% ethanol for days, the extract was filtered .The solvent was evaporated in vacuum and temperature condition 40 °C . Extract prepared with bathroom between 5-10ml per liter of water to be used in wound healing and corrosion fin fish.during wound healing and corrosion fin was shorter at higher doses.various physiological factors affect in wound healing,such as hyaluronic acid, the skin is able to absorb it to accelerate wound healing process.coca et al (2011) showed that oleuropin olive leaf extract is effective in wound healing.oleuropin perhaps by stimulating hyaluronic acid leads to healing.vitamin C plays an important role in stimulating the activity of immune restoration of skin ulcers.high vitamin C in olive leaf can repair damage in the body fish.the results showed that olive leaf extract can help repair damage foreign body of fish.

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890

ANTICONVULSANT ACTIVITY OF *DOREMA AMMONIACUM* GUM: POSSIBLE MECHANISM OF ACTION

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Epilepsy is one of the most common neurological disorders and is estimated that about 1% of the world population suffer from this disease. There are some herbs in Iranian traditional medicine used for treatment of epilepsy and seizure. In the present study anticonvulsant activity of *Dorema ammoniacum* gum aqueous solution (DAG) and its possible mechanisms of action were studied. In this study, an anticonvulsant effect of DAG was examined using pentylentetrazole (PTZ) model in mice. Thirty male albino mice were divided randomly to 5 groups, and pretreated with normal saline (group I), Diazepam (Group II), and different doses of DAG (500, 700, 1000 mg/kg, i.p.) (Groups III, IV and V respectively), prior to injection of PTZ. The latency and duration of seizures were recorded 30 minutes after injection of PTZ. Pretreatment with naloxone and flumazenil used to further clarify the mechanisms of anticonvulsant action.DAG showed significant anticonvulsant activity with all doses used (500, 700, 1000 mg/kg).The gum could delay the onset of seizures induced by PTZ and decrease the duration of seizures in a dose dependent manner in comparison to control group. Treatment by flumazenil (2 mg/kg) before gum aqueous solution (700 mg/kg) could inhibit the effect of gum on duration and latency of seizure to some extent and administration of naloxone (5mg/kg) before gum aqueous solution also significantly inhibited changes in latency and duration of seizure produced by DAG. This study showed that DAG has significant anticonvulsant effect in PTZ-induced seizures in mice, in a dose dependent manner and these effects may be related to effect of it on GABAergic and opioid systems. More studies are needed in order to investigate its exact mechanism.

896

EVALUATION OF ANTIOXIDANT AND ANTI-MELANOGENIC ACTIVITY OF DIFFERENT EXTRACTS OF AERIAL PARTS OF *N. SINTENISIS* BY PREVENTING TYROSINASE ACTIVITY IN MURINE MELANOMA B16F10 CELLS

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Nepeta sintenisii Bornm (Lamiaceae) has been used in folk medicine of Iran to cure various diseases [1, 2]. We investigated the effects of *n*-hexane, dichloromethane, ethyl acetate, ethanol and Hydro-ethanol fractions isolated from the plant *N. sintenisii* on melanogenesis in B16 melanoma cells. To assess the effects of these plants on melanogenesis inhibition, various assays were used including cytotoxicity, mushroom tyrosinase inhibition, inhibition of cellular tyrosinase, melanin content, the amount of reactive oxygen species and western blot. Methanol and CH_2Cl_2 fractions of *N. sintenisii* significantly reduced both the cellular melanin content and tyrosinase activity. Reactive oxygen species was also significantly decreased following the treatment of cell with the mentioned fractions, while an AlamarBlue® assay showed no cytotoxicity. Furthermore, we have found that this plant decreased the amount of tyrosinase and microphthalmia-associated transcription factor proteins, which verify the role of suppression of microphthalmia-associated transcription factor protein in melanogenesis inhibition [3]. Taken together the data indicate that *N. sintenisii* inhibit melanin synthesis in B16 melanoma cells with no cytotoxic effects.Therefore, it might prove a useful therapeutic agent for treating hyperpigmentation and an effective component of whitening cosmetics.

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898

APPLICATION THE USE OF HERBAL PLANTS IN THE PATIENTS CANDIDATE FOR HEART SURGERY IN SELECTED HOSPITALS IN MASHHAD IN 2014

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The use of herbal plants is of special importance for the health of the society and the treatment and prevention of diseases. But since the simultaneous use of herbal plants and chemical medicine before surgery can result in complications, the present study was conducted to examine the simultaneous use of cardiac medication and herbal plants with the potential of interaction within 2-3 weeks before surgery. The present study is a descriptive one.The research community included all the patients who were candidates for heart surgery, referring to selected hospitals in Mashhad. Of these, 458 were selected using aimed sampling method. The information required for the questionnaire was divided into three types: first, personal information; second, information about the disease and the use of cardiac medication, and third, the use of herbal plants 2-3 weeks before surgery.To validate the results of the study, the content validation method and the re-test were used. Also, to analyze the data, descriptive and inferential statistics and SPSS software (version 19) were used. The findings of the study showed that 100% of the patients used herbal plants, among which onion,tea,garlic,black pepper were the most frequent. 79.5 % of the patients had not consulted their doctors about the use of herbal plants and in 95.4% of the cases, no mention of the use of herbal plants had been made in the patients' history. More than 90% of the patients had no idea they were not supposed to use herbal plants a few days before surgery. 59% of the patients taking Atorvastatin also took garlic. 22-23 of the patients took grape-fruit and tea herb, 82% of the patients taking metoprolol took tea as well, 25% of the patients taking Lozartan ate grape-fruit; 25% of the patients taking captopril used green and red pepper simultaneously and finally more than 70% of the patients took aspirin and onion, or black pepper and plavix and garlic simultaneously. The results of the study highlights the importance of conducting regular and effective educational programs aimed at promoting the knowledge of patients and health workers. Such programs should be able to provide them with a knowledge of what to take, what not to take and the side effects and the possible interactions of the chemical drugs and herbal plants.The study also emphasizes the importance of recording the use of herbal plants in the patient's history.

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903

EFFECT OF ALCOHOLIC EXTRACT OF *FICUS BENGHALENSIS* ON REPRODUCTIVE PERFORMANCE, HEMATOLOGY AND BIOCHEMICAL PARAMETERS IN MICE

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Ficus benghalensis has antioxidant properties, strengthens the immune system, anti-fungal, antibacterial and sexual stimulant and sexual power amplifier. In the present study the effects of alcoholic extract of Ficus benghalensison on reproductive performance, hematology and biochemistry parameters in small laboratory male mice were studied.In this study, mice were fed with concentrations of 0 (group 1) control, 2500 (group 2), 500 (group 3) and 750 (group 4) milligrams of extract per kilogram of body weight for 30 days. At the end of the experiment reproductive performance, hematology and biochemical parameters were analyzed.Testosterone levels in groups 3 and 4 compared with the control group was significantly higher ($P < 0.05$). Testis weight in group 4 was significantly higher than the other treatments ($P < 0.05$).Results of the white cell count and total protein showed that there was no significant difference among 1, 2 and 3 group but group 4 was significantly higher than the other groups ($p < 0.05$). The level of red cells was no significant differences between the different groups ($P > 0.0 5$). Moreover, the mating frequency in group 3 and 4 were significantly higher than the other groups ($P < 0.0 5$) The results suggest that extract of Ficus benghalensis can improve the reproductive performance. Hence, further research in this area is recommended.

905
EFFECTS OF *CORCHORUS OLITORIUS* EXTRACT ON REPRODUCTIVE PARAMETERS IN MICE

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A very long time plants were valuable resources of medicinal compounds for humans.In the present study the effects of ethanol extract of *Coruchorus olitorius* leaves on reproductive factors of mice were studied.The extract of 4 treatments of 0 (control, group 1), 250 (group 2), 500 (group 3) and 750 (group 4) milligrams per kilogram of body weight was added to the diet of mice. At the end of the experiment, testis weight, plasma concentrations of FSH, LH and testosterone using the Tukey test was analyzed.Results showed that testosterone levels in treatments 3 and 4 were significantly lower than other treatments ($P<0.05$). The weight of testis in groups 3 and 4 were significantly lower than group 1 and 2 ($P<0.05$). However, no significant differences observed between groups 3 and ($P>0.05$). LH levels in groups 1 and 2 were significantly lower than other treatments ($P<0.05$). Moreover, The amount of FSH in treatment 4 was significantly higher than other groups ($P<0.05$).Results showed that the extract of Coruchorus olitorius can prevent the reproduction activities in male mice. Hence, we recommend it for controlling the reproductive activities.

912
ANTIDIABETIC EFFECT OF *ROSA DAMASCENA* IN STZ-INDUCED DIABETIC RATS

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Use of medicinal plants for attenuation of hyperglycemia to normal level is clinically very important. We decided to assess antidiabetic effect of Rosa damascena in STZ-induced diabetic rats.Forty five male rats were randomized into 9 groups consisting of 5 animals in each group. Diabetes was induced by intraperitoneal administration of streptozotocin1 60mg/kg animal body weight in 8 groups (group2-9). Group 1: normal control rats, administered with normal saline daily for 14 days; group 2-4 : diabetic animal received 250, 500 and 1000 mg/kg animal body weight of Rosa damascene aqueous extract respectively; groups 5-9: diabetic rats, treated daily with glibenclamide (3 mg/kg), metformine (15 mg/kg), glibenclamide (3 mg/kg) + Rosa damascene aqueous extract (1000 mg/kg) and metformin (15 mg/kg) + Rosa damascene aqueous extract (1000 mg/kg) respectively; Normal saline, extracts and standard drugs were administrated as gavage by special tube daily for 14 consecutive days. Finally, plasma glucose, ALT, AST, HLD, TG, total Cholesterol and liver glycogen were evaluated.Doses 250, 500 and 1000 mg/kg of extract and also extract plus reference drugs showed significant decrease in blood glucose and increase in liver glycogen levels. Extract did not change the amount of factors cholesterol, TG, LDL and liver enzymes ALT and AST, but effective in order to increase HDL.The pharmacological effects of Rosa are partly attributed to their abundance of phenolics compound which possess a wide range of activities such as antioxidant, free-radical scavenging, antidiabetic and anti inflammatory effects.

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952

IMPPROVED GLYCEMIC CONTROL IN PATIENTS WITH ADVANCED TYPE 2 DABETES MELLITUS TAKING *URTICA DIOICA* LEAF EXTRACT: A RANDOMIZED DOUBLE-BLIND PLACEBO-CONTROLLED CLINICAL TRIAL

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Advanced type 2 diabetes mellitus (T2DM) needing insulin therapy is common. Most conventional anti-hyperglycemic drugs have limited efficacies and important side effects, so that better anti-hyperglycemic agents are needed. *Urtica dioica* L. (nettle) leaves have insulin secretagogue, PPARγ agonistic and alpha-glucosidase inhibitory effects. Moreover, nettle leaves are used in the traditional medicine as an anti-hyperglycemic agent to treat diabetes mellitus. Thus, efficacy and safety of nettle in the treatment of patients with advanced type 2 diabetes mellitus needing insulin were studied.In this randomized double-blind placebo-controlled clinical trial, the effects of taking nettle leaf extract (one 500 mg capsule every 8 hours for 3 months) combined with the conventional oral anti-hyperglycemic drugs on the blood levels of fasting glucose, postprandial glucose, glycosylated hemoglobin (HbA1c), creatinine and liver enzymes SGOT and SGPT and systolic and diastolic blood pressures were evaluated in 46 patients and compared with the placebo group (n=46). The extract lowered the blood levels of fasting glucose, 2 hour postprandial glucose and HbA1c significantly ($P<0.001$, $P= 0.009$ and $P=0.006$ respectively) without any significant effects on the other parameters ($P>0.05$) compared with placebo at the endpoint.Nettle may safely improve glycemic control in type 2 diabetic patients needing insulin therapy.

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954

PROTECTIVE EFFECTS OF *VACCINIUM ARCTOSTAPHYLOS* L., BERBERIS THUNBERGII VAR. ATROPURPUREA D.C., *ELAEAGNUS ANGUSTIFOLIA* L. AND *LAUNEA ACANTHODES* O. KUNTZE AGAINST INDOMETHACIN-INDUCED GASTRIC ULCERS IN RATS

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Data suggest that V. arctostaphylos, B. thunbergii var. atropurpurea, E. angustifolia and L. acanthodes may prevent gastric ulcers induced by Non-steroidal anti-inflammatory drugs (NSAIDs) [1-4]. To explore the ulcer-protective potential of these plants in indomethacin-induced gastric ulcers in rats.Saline, hydro-alcoholic extract of each plant (100, 400, 800 mg/kg) and omeprazole (30 mg/kg) were gavaged to the groups of animals for 4 consecutive days. Gastric ulcers were induced by the one time gavage of indomethacin (30 mg/kg, p.o.). On the fifth day, each group was pretreated with physiological saline as control, extract (100, 400 or 800 mg/kg, p.o.) or omeprazole (30 mg/kg, p.o.) 30 min before the indomethacin administration. The animals were killed 6 h after the indomethacin administration. The stomachs were removed, opened along the greater curvature and washed in physiological saline.A person unaware of the type of treatment received by the animals examined the stomachs under a 3-fold magnifier.The areas and lengths of hemorrhagic lesions induced by indomethacin were measured using a dial caliper and the sum of measurements for each animal was referred to as the ulcer index.All extracts reduced the ulcer index significantly compared to the control group ($P < 0.05$). These plants prevent NSAID-induced gastric ulcers in rats. The efficacy and potency of the gastro-protective effect of L. acanthodes appears to be higher than the other 3 plants.

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960
THE EFFECT OF THE EXTRACT OF *ACHILLEA MILLEFOLIUM* ON PROTOZOAN ECTOPARASITE OF FISH

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Increased protein requirements in healthy, and non-human pharmaceutical residue requires a fundamental change in health maintenance and training of livestock, poltyry and fish..To in still new ideas can gradually reduce use of synthetic drugs in farm animals. That supply the protein needs breeding different species of fish. That the protein structure, compared with other protein products have specific characteristics,we should try to suplly them in condition of organic farming.Fish farm enviroments,due to environmental stress. They are always possible to be ivade by protozoan parasites and other organisms,Therefore, the use of drugs can be effectives in the prevention and controle of invasive organisms.and in the second be contain organic growth.,the use of herbs is required. For this reson Achillea millefolium extract was used for this research purposesThis plant is used in the pharmaceulitical industry very much. Its active ingredient appetizer and used to to disinfect the mouth. compounds include Inulin,Tanin,Syanydryk acid,and etc.The actic substances of plant is,matricarin that have drug effects. To perform test were prepared 250Gm of plant branches. After mixing was soaked in 70% ethanol. To get out of effective material the mixure was plated on gyractor.Then it was kept in a sealed container for 3 days.we have filtered out and finally to obtain extract the alcohol evaporate, put it in the bathroom 400c, and was selected 5 aquarium with a volum of 20liters of water and each of the 25 pieces of fish infected to parasite and a control group. Exctract was used at doses of ./25,./5,./75,1,2,3,4 and 5ml per liter of water. The meathod of short-term and long-term treatment with bath.The result showed that the treatments used have been effective in reducing and destroy parasitic infection. About the effects of antibacterial and antiparasite of extract Achillea Millefoliumhave been presented different reports by researchers. Aljancic et al (1999) reported that the extract has a broad antibacterial effect.Shirani-bidabadi et al (2009) reported that the extract has a broad anti leishmanias effects.

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961
EVALUATION OF THE ANTIBACTERIAL ACTIVITY OF THE ESSENCE OF AERIAL PART OF *TANACETUM BUJNORDENS* (RECH.F.)) AGAINST SIX BACTERIAL STRAINS

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Several studies demonstrated the antibacterial effects of the species from of Asteraceae family1. Therefore in this study the antibacterial activity of the aerial parts of fresh Tanacetum bujnurdense essence against six bacterial stains were evaluated. Primary antibacterial effect of the essence were evaluated against Micrococcus luteus ATCC 9341, Staphylococcus aureus ATCC 6538, Methicillin Resistance Staphylococcus aureus ATCC 25923, Pseudomonas aeruginosa ATCC 9027, Salmonella typhi ATCC 19430, Escherichia coli ATCC 2592 by cup-plate method and then MIC and MBC were determined by micro dilution method according to CLSI recommended method2. The MIC and MBC of the essence against S. aureus ATCC 2593, S. aureus ATCC 6538, M. luteus, S. typhi ATCC 19430, E. coli and P. aeruginosa ATCC 9027 were 4, 3, 4, 3, 3, 2 µl/ml respectively. The most sensitive bacteria was P.aeruginosa while S. aureus ATCC 2593 showed the most resistance to the essence with the highest MIC and lowest inhibition zone diameter. The results of both Cup_plate and micro_dilutionmethod demonstrated that aerial parts of fresh Tanacetum bujnurdens can inhibit the growth of all six evaluated bacterial stains with remarkable bactericidal effect. This effect may due to the several flavonoids which compose the essential oil3.

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963

SAFETY AND EFFICACY OF PROCESSED *CITRULLUS COLCYNTHIS* L. FRUIT IN TREATMENT OF HYPERLIPIDEMIC TYPE II DIABETIC PATIENTS: A RANDOMIZED, PLACEBO-CONTROLLED CLINICAL TRIAL

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Due to high prevalence of diabetes with hyperlipidemia and associated high risk of cardiovascular disease, much interest exists for safe medications including medicinal plants [1].Considering traditional use of Citrullus colocynthis L.(C. colocynthis) for treatment of diabetes despite toxicity [2], clinical evaluation of safety and efficacy of the processed C. colocynthis fruit is necessary.In this clinical trial the safety and efficacy of the processed C. colocynthis fruit in hyperlipidemic type II diabetic patients were evaluated. 60 hyperlipidemic type 2 diabetic patients were randomly allocated to C. colocynthis and placebo groups.The patients in one group treated with processed C. colocynthis capsules (100 mg) and other group placebo three times a day for 1 month. The fasting blood glucose, cholesterol, LDL, HDL, and triglyceride levels as primary outcome and aspartate transaminase, alanine transaminase and creatinine levels as secondary outcome were measured in both groups at the baseline and the endpoint.In the C.colocynthis group fasting blood glucose, cholesterol and LDL levels were significantly reduced at the endpoint compared with the baseline. There were no significant changes in any blood parameters in C. colocynthis group compared with placebo at the endpoint. There were no gastrointestinal, liver and kidney function adverse effects during the study in both groups.The results suggest that processed C. colocynthis fruit extract may be a safe anti-hyperglycemic and anti-hyper-cholesterolemic agent in hyperlipidemic type II diabetic patients.

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979

EVALUATION OF WOUND HEALING ACTIVITY OF *ECHINOPHORA PLATYLOBA* EXTRACT ON EXPERIMENTAL FULL THICKNESS SKIN WOUND HEALING IN RAT

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This study aimed to evaluate the healing effects platyloba (*Echinophora platyloba*) extract the repair of experimental full-thickness wounds in rats was studied. In this study, 60 adult male Wistar rats aged 15-14 weeks and weighing 10 ± 200 g was used.First, during general anesthesia, the dorsal surface of the scapula to the ileum preparation and scrub and a 15 mm diameter circular wound on the back of them (the area between the Scapula and Ischial tuberosity) was created. Wound as mentioned above, the rats were randomly divided into 3 groups of 20 each: control (Witness), control (placebo) and 3% ointment treatment groups. The control (Witness) group received no treatment. In the control group composition Vaseline and serine as placebo and in the ointment treatment group mice, the extract was used every day. Rubbing ointment on the wound was performed without anesthesia and within a prescribed time. To evaluate the histopathological, at the end of the days 3, 7, 14 and 21 tissue samples were collected for the experiments.To assess the degree of inflammatory cells, the creation of vessels, the migration of fibroblasts, epithelial tissue formation and deposition of collagen fibers, histopathological studies were performed and after statistical analysis of histopathological data, the results showed that treatment group mice significantly ($p<0.05$) in most of the studied factors in wound healing at different days showed a better performance. Based on these results, it seems that platyloba extract has appropriate and acceptable effects on the healing of full-thickness skin wound healing in rats.

980

EVALUATION OF WOUND HEALING ACTIVITY OF QUINCE SEEDS GEL COMPARED WITH THE SILVER SULFADIAZINE ON EXPERIMENTAL SKIN BURN HEALING IN RAT

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Medicinal properties "fruit" (Quince) scientific name Cydonia oblonga has been considered in terms of traditional medicine. In this study the therapeutic effects of the gel “Quince Seeds “during the healing process is studied.In this study, 90 adult male Wistar rats were used. To create a burn, mice with a dose of ketamine hydrochloride 60 mg / Kg and xylazine dose 6 mg / Kg animals were anesthetized and the area between the back (scapula and ischial tuberosity) to burn shaved and by Betadine scrub preparation out. Burns was created by HOSNUTER et al. The size of 1 cm diameter and degree burns caused by a third-degree burns (full thickness) sets. After the burn, mice were randomly divided into three groups (A, B, C) and each group consisted of 30 mice were divided. Each of the five subgroups (5s, 4s, 3s, 2s, 1s) were divided into groups of 6 mice each were used. The following main groups of groups (A, B, C) were divided as follows:The first subgroup (1s), (negative control) received the gel base.The second subgroup (2s), (positive control) received Silver sulfadiazine.The following groups of three, four and five (3 s, 4 s, 5s), get the amount of 5%, 10% and 15% extract ointment studied respectively. On days 7, 14 and 21 after the burn to the first group of mice (A), second (B) and third (C) of the desired tissue samples are removed respectively and the formation of epithelial tissue, the presence of inflammatory cells, the fibroblasts, vascular morbidity rate and amount of collagen fibers were formed by histopathological study.After statistical analysis of Histopathology data, the results showed that the treatment group was significantly extracts of 10 and 15% ($p < 0.05$) at most two factors, provide better performance than other groups to have different days. The results of this study indicate that Quince Seeds extract has appropriate and acceptable effects on to reduce side effects and improve the treatment of burns.

982
MENTHA LONGIFOLIA ESSENTIAL OIL TO THE CAPSULE FORMULATION

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Given the prevalence of resistance to many synthetic antibiotics need to replace or associated with the resources of natural antibiotic is necessary.Iran is a rich source of medicinal plants used in traditional medicine for the treatment of a disease is infectious. *Mentha longifolia* L. of the mint family Automatic growth in many fields and streams go around have acceptable of anti-bacterial and anti Fungal effects.After collecting and drying plant extracts was colected by Clevenger apparatus compounds using GC-MS identification and their levels were measured too.Oils derived from plants that were formulated using various materials such as Avicel/PEG/PEG and avicel/Lactose which was poured into hard capsules Essence dose in each capsule was determined according to various articles that were identical in all formulations.Qualitative and quantitative experiments and chemical control of drug release from the base done and at two days after the capsule formulation in room temperature and two weeks after the formulation was kept in an incubator at a temperature of forty degrees Qualitative and quantitative experiments done again to control the quality and quantity for choosing the best formulation of essential maintenance was carried out whereby a formulation was selected.

987

EFFECT OF SAGE (*SALVIA OFFICINALIS* L.) LEAVES HYDRO-METHANOLIC EXTRACT ON LIVER TISSUE IN ASPERGILLUS PARASITICUS AFLATOXIN-INDUCED LIVER DAMAGE IN MALE RATS

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Different parts of the *Salvia officinalis* L. are used to treat liver disorders, traditionally. The aim of the study is to evaluate the protective effect of *Salvia officinalis* against Aspergillus parasiticus aflatoxin induced hepatotoxicity in rats. In the present study, groups included intact, control and experimental groups. The animals were poisoned by intraperitoneal injection of aflatoxin at dose 450 µg/kg once a week for 8 weeks period. Sage hydro-methanolic extract was administrated at dose 25, 50, 100 and 150 mg/kg orally for 8 weeks. After 8 weeks, animals were anesthetized by ether and the livers were weighted and 3□ sections of liver were prepared and stained by Hematoxillin-Eosin staining. Score of liver tissue damages was obtained by sum of damage scores in each sample. The results showed aflatoxin injection increased liver weights and liver damages in poisoned rats in comparison to healthy group. Treatment of sage extract at doses 25, 50, 100 and 150 mg/kg mg/kg body weight decreased the liver weight and damages in poisoned rats in comparison to control poisoned rats. This study demonstrates the hepatoprotective activity of Salvia officinalis on liver inflammation and damage induced by aflatoxin.

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1004
COMPARISON STUDIES OF ACETYLCHOLIONESTERASE INHIBITORS PHYSOSTIGMINE AND EXTRACT CELERY FOR ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is the most common cause of senile dementia in later life. Whereas several neurotransmitter systems are known to be involved and depleted in AD, the cholinergic system still receives the greatest attention by far.This is particularly true with regards to pharmacotherapy research and development [1] due to the involvement of the cholinergic system in learning and memory processing [2]. One promising therapeutic strategy for re-activating central cholinergic function has been the use of inhibitors of acetylcholinesterase (AChE), the enzyme responsible for the metabolic hydrolysis of ACh. Hypothetically, AChE inhibitors should increase the efficiency of cholinergic transmission by preventing the hydrolysis of released ACh, thus making more Ach available at the cholinergic synapse [3-5]. Such AChE inhibitors as physostigmine or tacrine are known to have limitations for clinical use due to their short half-lives and/or untoward side effects [6]. During screening for AChE inhibitors from natural resources, we found that a total extract of celery showed significant inhibition towards AChE.Celery is a plant. The fruit and seeds are dried or pressed into oil for use as medicine. Some people also take celery juice as medicine.Both physostigmine and extract celery inhibited AChE activity in a dose- dependent manner and Ki values of physostmine and celery were 40 and 5620 µg/ml respectively.This inhibitory effect of physostigmin is 140 fold more than celery. However, celery has not bad effect of chemical drugs.

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1010

TREATMENT OF IDIOPATHIC HIRSUTISM WITH 755-NM ALEXANDRITE LASER PLUS TOPICAL LICORICE: A DOUBLE BLIND RANDOMIZED CONTROLLED TRIAL

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Hirsutism is one of the most prevalent health problems in women of reproductive age that can significantly impact on their quality of life. The aim of the study was to compare the effect of 755-nm alexandrite hair removal laser versus alexandrite laser plus topical licorice on improvement of mild to moderate idiopathic hirsutism.A double-blind, randomized placebo-controlled study was done on 90 subjects, aged 15 to 45 years. The patients were allocated into two groups.Alexandrite laser plus 15% Licorice gel (group A) and placebo (group B). Each subject received one of both products over one side of face, twice daily for 24 weeks on the hirsute locations. Each group underwent five sessions at 6-week intervals of alexandrite laser.To minimize the effects of confounding variables, the test performed on two separate zones of patients' skin. The primary outcome was the changes in terminal hair density at the end of study. The terminal hair was counted by the investigator.All patients completed the study.There was no statistically significant difference among characteristics between two groups ($p>0.05$). The mean± SD difference of terminal hairs in the group A was 7.05±4.55 for zone 1 and 6.06±3.70 for zone 2 consecutively.Conversely in the group B it was 3.18±1.75 for zone 1 and 2.49±1.63 for zone 2. There was statistically significant difference between these group ($p<0.001$). There were no serious adverse reactions. Treatment of idiopathic hirsutism with 755-nm alexandrite laser plus topical licorice is more effective than alexandrite laser alone.

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1021
BIOCHEMICAL AND HISTOPATHOLOGICAL EFFECTS OF MAGLIASA, A TRADITIONAL PERSIAN MEDICINE, IN EXPERIMENTAL COLITIS

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Magliasa is a herbal formula which used in traditional Persian medicine for disease with similar symptoms of inflammatory bowel disease (IBD).The aim of the present study is to investigate the biochemical and histopathological effect of Magliasa in experimental colitis. For this purpose, colitis was then induced in male rats by instillation of 2,4,6-trinitrobenzenesulfonic acid (TNBS) in all groups, aside from the SHAM group. The experimental groups consisted of: the SHAM group that received only normal saline; the Mag-50, Mag-100 and Mag-200 groups, which received 50, 100 and 200 mg/kg per day of Magliasa, respectively; the control group, which received vehicle water orally; the infliximab group, which received infliximab (5 mg/kg per day, subcutaneously); and the Dexa group, which received dexamethasone (1 mg/kg per day, orally). After completing the treatment period (2 wk), the rats were sacrificed, the colon was removed, its macroscopic and microscopic changes were recorded, and tumor necrosis factor-alpha (TNF-α), interleukin-1 beta (IL-1b), total antioxidant capacity, myeloperoxidase (MPO), and lipid peroxidation (LPO) were assessed in colon homogenate. Macroscopic scores significantly decreased in Mag-100 (1.80 ± 0.58, $P = 0.019$) and Mag-200 (1.20 ± 0.20, $P = 0.001$) compared to the control group (3.40 ± 0.24), although some inflammation and hyperaemia were evident. Treatment of rats by dexamethasone (0.33 ± 0.21, $P < 0.001$) and infliximab (0.83 ± 0.31, $P < 0.001$) remarkably attenuated scores where mild hyperemia was observed macroscopically. In comparison to the control group (4.00 ± 0.32), only Mag-200 (1.60 ± 0.40) showed a significant decrease in colonic histopathological scores ($P = 0.005$). Minimal mucosal inflammation was observed in the Dexa group (0.67 ± 0.21, $P < 0.001$).The levels of TNF-α, IL-1β and MPO were significantly lower in all groups compared to the controls ($P < 0.05$). A significant decrease in LPO was seen in the Mag-200 (3.27 ± 0.77, $P = 0.01$) and Dexa (3.44 ± 0.22, $P = 0.011$) groups in comparison to the control group (6.43 ± 0.61).Only dexamethasone caused a significant increase in antioxidant power in comparison to the control group (346.73 ± 9.9 vs 228.33 ± 2.75, $P < 0.001$). Infliximab and different doses of Magliasa did not show any remarkable increase in antioxidant capacity ($P > 0.05$).The effect of Magliasa in all of mentioned parameters, except antioxidant capacity, was dose dependent. The effects of Magliasa in TNBS-induced colitis are encouraging and warrant clinical trials for further confirmation.

1026

THE COMPARISON OF *ALLIUM HIRTIFOLIUM* HYDROALCOHOLIC EXTRACT &N-ACETYLCYSTEIN(NAC) ON THE OXIDATIVE STRESS BIOMARKERS IN ACUTE PARAQUAT TOXICITY IN BLOOD RAT

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Shallot (*Allium hirtifolium* Boiss.) is a perennial plant from Alliaceae family. The purpose of this study was to investigate the effect of aqueous extract *Allium hirtifolium* against paraquat (PQ) oxidative stress-induced injury in association with its antioxidant activity compared to N acetylcystein (NAC). Effective doses of *Allium hirtifolium* (100mg/kg and 300mg/kg) PQ (50mg/kg) and NAC(6.25 mg/kg) were administered alone or in combination for 24 hours with gavages. At the end of the experiment, plasma of the animals was separated. The activity of enzymatic scavengers such as catalase (CAT),lipid peroxidation (LPO) and total antioxidant capacity (TAC) were measured.In blood samples, CAT activity was higher in the PQ groups as compared with control. *Allium hirtifolium* extract increased TAC in plasma compared with PQ group.Administration of NAC increased TAC compared with control group.

In conclusion, *Allium hirtifolium* as natural antioxidant may be considered beneficial for the protection oxidative injury in PQ poisoning.

1030
ANTIBACTERIAL EFFECTS OF ESSENTIAL OIL OF THE SEEDS PIMPINELLA ANISUM AND *ARTEMISIA DRACUNCULUS* ON ERWINIA AMYLOVORA & AGROBACTERIUM TUMEFACIENS & PSEUDOMONAS SYRIGAE PV. SYRINGAE

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Essential oil composition is suitable as an alternative to chemical composition. Many plants are compounds with control properties recently the use of herbal products as an alternative to chemical pesticides for controlling plant destructive factors have become more important and among vegetable oils are special attention. The present study aims to examine the antibacterial effects of essential oils, seeds of Pimpinella anisum and leaves of Artemisia dracunculus on the Erwinia amylovora, Agrobacterium tumefaciens and Pseudomonas syringae pv syringae was. Using essential oils distilled water was prepared by Clevenger apparatus. Test the temperature 28±2 o C and 65±5 per cent relative humidity and in the dark based on completely randomized design with 5 levels (10, 20, 30, 40 and 50 ml) and 3 replicates for each concentration of essential oils with the during the visit was conducted a week. The results of the comparison showed that the LC50 essential oil leaves of Artemisia dracunculus isolated bacteria to the essential oils, seeds of Pimpinella anisum better control and the bacterium Erwinia amylovora with the least amount of oil in both plant controls and the highest rate of oil consumption in the bacterium Pseudomonas syringae pv syringae. Essential oils case use influence good control on bacteria disease herbal respectively [1, 2].

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1033
THE ANTIOXIDANT CAPACITIES AND TOTAL PHENOLIC CONTENTS OF AJWAN (*TRACHYCPERMUM AMMI*) ULTARASOUND ASSISTED EXTRACTS IN IRAN

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Trachyspermum ammi (L.) Sprague or commonly Ajwain is a herbaceous herb belonging to the family Apiaceae and vastly grows in Egypt, Iran, Pakistan, Afghanistan, and India as well as European region. Known as Zenyan or Nankhah in medical and pharmaceutical manuscript of medieval Persia, seeds of Ajwain were highly administered by traditional healers and traditionally employed for different ailments. Due to its various chemical constituents, the herb seeds were also evaluated for its numerous pharmacological properties. Free radicals are highly reactive molecules may cause great damage to cell membranes and DNA and Result in inducing oxidation DNA mutations leading to cancer, degenerative, and other diseases. Plant antioxidant derived may be preventive of free radical damages. Accordingly, current work was carried out to investigated the antioxidant activity of Ajwan exctract which is prepared by ultrasound assisted method and compare it with classic one. The Stems and flower sample of Ajwan air-dried, finely ground and were extracted by ethanol: water (70:30) for 48 h in CM and 10 minute in UAM. Extracts were filtered and dried under vacuum. The antioxidant activity of both two ethanolic extracts of Ajwan from Khorasan were analyzed by [1,1diphenyl-2 picrylhydrazyl (DPPH) radical method. In addition, for determination of antioxidant components total phenolic content was also analyzed. The result indicated that the total phenolic content of Ajwan increased from 99.6 to 112.2 mg Gallic acid/g extract as measured by the Folin–Ciocalteau method when used UAM. Values of DPPH are increased from 1304 to 1356 µmol trolex/g too. This study clearly demonstrated that Ajwan extract exhibit significant antioxidant activity when used UAM as extarction method.

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1039

TITLE:INNOVATION ,COMMERCIALIZATION,PRODUCTION PLANT DROPS,ORAL MEDICATION NABID DRUG

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The present research has been conducted on studying a new and unique drug called Nabid that is an oral and herbal drop.The drug has also been studied in Tehran University's Pharmacology Research College under No. RTRG 1378 on ۲۰۰۷/۰۵/۳۰ in fixed concentration up to 1 ml at 20 grams on 60 mice in oral form using gavage for a period of 90 days after which no side effects were reported for the drug application.The drug has also undergone human clinical tests under registration No. 31/3/502 RP on 07/07/2010 in which the drug was consumed by 30 adult people (women and men) selected randomly from Rafsanjan Medical Sciences University aging 20-25 who had one tooth operated on lower jaw. Their level of pain was measured respectively in 6, 12, 24 and 48 hours after the surgery. The research results on effectiveness of the drug demonstrated that the pain level expressed by Nabid Darou taking patients was reduced significantly; also the bleeding level was less in Nabid Darou taking patients. Meantime, standardization and stabilization of the drug has been conducted in Karaj Jihad Daneshgahi's Research Center. Nabid Darou Iranian Co.is proud to have produced a totally herbal drug containing no chemical supplementary agent and preservatives. Mohammad Kaboli, the researcher and inventor of this unique, cheap and healthy drug, has brought it for the people of the globe as a gift after too much endeavor and registering the patent in 2013 in Department of Food and Drug Affairs of Ministry of Health and Treatment. The drug functions as a bleeding controller, painkiller, antiseptic, anti-inflammation and soreit also heals all oral diseases related too teeth, mouth, larynx, gingiva, tonsil ulcer, aphtha, especially the wounds caused by the hidden wisdom tooth surgeryand tooth pullout. Nabid DarouDrop can be used to heal all surgical incisions and wounds including the bedsore and any other wound.This is a multipurpose medicine and can be used for all age ranges including children or older people. So far no side effect has been reported for Nabid even with respect to diabetic patients. The drug is also helpful for those patients who suffer from high levels of blood fat and urea. Nabid Darou Drop is a good alternative for nearly any antibiotic and painkiller.Nabid Darou Drop should be applied on wounds with no coverage or bandage like sterile gauzes etc.Nabid Darou Drop has been confirmed by the International Clinical Technical Department of Ministry of Health and Treatment by the registration code IRCT201101085565N1.By The Lord's mercy, the inventor of Nabid Darou Drop has received various awards and trophies in 2009 and 2013 (Geneva – Switzerland) and also in Asia (Malaysia).The drug has also received several trophies, appreciation certificates and medals from various fairs and congresses after being confirmed by the Iranian Ministry of Science and Technology.

1041
'GENOPROTECTIVE EFFECTS OF *ORIGANUM VULGARE* ETHANOLIC EXTRACT AGAINST CYCLOPHOSPHAMIDE-INDUCED GENOTOXICITY IN MOUSE BONE MARROW CELLS

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Cyclophosphamide (CP), an alkylating chemotherapeutic agent, can bind DNA, causing chromosome breaks, micronucleus (Mn) formation, and cell death. Because *Origanum vulgare* L.(Lamiaceae) has antioxidative properties, it might protect against DNA damage.The genoprotective effect of *O. vulgare* ethanolic extract against CP-induced genotoxicity in mouse bone marrow cells was evaluated using a Mn assay (1,2). Mice were pre-treated with aerial parts of O.vulgare ethanolic extract at different doses (50, 100, 200, or 400 mg/kg) for 7 d.One hour after the last administration of O. vulgare, animals were injected with CP at 200 mg/kg. After 24 h, the bone marrow cells of both femurs were flushed and the frequency of MnPCEs was evaluated to measure the chromosomal damages. In addition, the number of PCEs per 1000 NCEs in each animal was recorded to evaluate the bone-marrow suppression; mitotic activity was calculated as [PCE/(PCE + NCE)]_100 to assess the cell division.At 400 mg/kg, O. vulgare displayed its maximum protective effect, reduced the number of MnPCEs from 10.52 ± 1.07 for CP group to 2.17 ± 0.26 and completely normalized the mitotic activity (p50.001). Origanum vulgare also led to significant proliferation and hypercellularity of immature myeloid elements after the mice were treated with CP, mitigating the bone marrow suppression. Origanum vulgare ethanolic extract exerts a potent genoprotective effect against CP-induced genotoxicity in mice bone marrow, which might be possibly due to the scavenging of free radicals during oxidative stress conditions.

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1042

PROTECTIVE EFFECT OF MOMORDICA CHARANTIA FRUIT EXTRACT AGAINST OXIDATIVE STRESS INDUCED BY HYPERLIPIDEMIA AND HISTOLOGICAL CHANGES IN HYPERLIPIDEMIC RATS

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New research indicates direct link between oxidative stress and obesity [1, 2]. The present study was carried out to identify the effect of momordica charantia fruit extract on malondialdehyde levels and histopatological change of hyperlipidemic rats. 40 male rats were divided into four equal groups (3 treatments 1 control group). First group group treated with 20 mg of M. charantia extract per kg b.w. The second and third group treated with 40 and 80 mg of M. charantia extract per kg b.w. however, control group just received distilled water. Finally, tissue fragments were taken from the Liver and after preparing tissue and coloring, they were gone under microscopic Studies. Data were analyzed using ANOVA and Tukey test. The results showed significant decreases in malonedialdehyde concentrations and hepatocellular damage in the group receiving 80 mg of M. charantia fruit extract per kg b.w ($P \leq 0.05$). Herbal foods such as momordica charantia fruit offer a therapeutic strategy to improve obesity-associated hyperlipidemia and liver diseases.

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1049

THE EFFECT *MATRICARIA CHAMOMILE* OF EXTRACT ON WOUND HEALING BODY OF GOLD FISH BY LOCAL AND THERAPEUTIC BATH

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Matricaria chamomile grows in the most areas of Iran and have many medicinal properties. properties such as gastrointestinal, endocrine, skeletal,brain, heart,healing, anti-inflammatory, etc. The plant compounds contains coumarins, flavonoids, volatile oils, amino acids and etc. The most important properties anti-inflammatory and it's healing is related to Kamazoline. Body and gills of fish may due to the influx of living and non-living pathogens cause ulcer.This caused stress, reduced growth and reproduction in them. Therefore one of the methods of treathment, use of antibiotic, oral and therapeutic bath.Since the use of antibiotics in addition to drug residues, have environmental destructive. Therefore the use of herbal remedies that can be effective in healing wound in fish,provides organic fish farming conditions. In this study,the effectiveness of *Matricaria chamomile* extract on wounds body of the fish was determined experimentaly. The researcher were considered with 6 aquarium volume 60 liter of water an environmental conditions. In the aquarium is translating the number 10 pieces fish. We created equal wounds with using scissors and scalpel on the body of all fish. A control group without treatment, four groups treatment with different doeses method of therapeutic bath and a group treatment with topical ointment for ten day. The research showed that wound healing has been with local therapy faster than therapeutic baths. Wound healing was longer in the control group.Today,for wound healing of body fish used of different chemical agent,that may be harmful to humans. Because many people tend to use herbal medicines to treatment and healing,applied and clinical research to prove the effects of Matricaria chamomile extract. It seems reasonable the extract use in this study according to the traditional story books and different reports effects on wound healing. Kazemipour etal (2005) and Viola et al (1999) reported that *Matricaria chamomile* extract has a good effect on wound healing as well as anti-inflammatory effect. Therefore researchers results and findings of this study showed that *Matricaria chamomile* extract is effective on wound healing of body fish.

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1053
THE EFFECT OF OLIVE LEAF EXTRACT ON THE WOUNDS 8 CORROSION FIN FISH

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The olive tree is one of the worlds largest horticultural product many countries such as the mediteranian countries and Iran because of importance of food in olive,cultivation of this plant enjoys significant.olive is containing compounds such as unsaturated fatty acids,vitamins,Iron,etc.In addition to the olive a valuable nutrient and energy is also used to feed poultry and fish.olive leaves is contain compound such oleuropine,gilstroid,phenolic pound,caffeic acid and etc.The fish may be due to the invasion of microorganisms in environment, wounded body the fins will create corrosion.today,For the prevention and treatment of many disease waste,require drug combination is that no drug residues and no negative effect on the environment.tinctures can be a good alternative approaches for this purpose. For testing, a significant amount of olive tree leaves after drying and grinding were wet in 70% ethanol for days,the extract was filtered.The solvent was evaporated in vacuum and temperature condition 40 °C . Extract prepared with bathroom between 5-10ml per liter of water to be used in wound healing and corrosion fin fish.during wound healing and corrosion fin was shorter at higher doses.various physiological factors affect in wound healing,such as hyaluronic acid,the skin is able to absorb it to accelerate wound healing process.coca et al (2011) showed that oleuropin olive leaf extract is effective in wound healing.oleuropin perhaps by stimulating hyaluronic acid leads to healing.vitamin C plays an important role in stimulating the activity of immune restoration of skin ulcers.high vitamin C in olive leaf can repair damage in the body fish.the results showed that olive leaf extract can help repair damage foreign body of fish.

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1056
COMPARISON OF HEADSPACE SINGLE-DROP MICROEXTRACTION AND HYDRODISTILLATION FOR THE DETERMINATION OF CAMPHOR CONTENT OF *ACHILLEA SANTOLINA* L USING CAPILLARY GAS CHROMATOGRAPHY

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Headspace single-drop microextraction (HS-SDME) has never been used for the extraction and analysis of camphor content of Achillea santolina L. On the other hand, no information is currently available for the amount of camphor in this species across Iran. For these reasons, HS-SDME technique was compared with the hydrodistillation (HD) extraction method in order to find the content of this compound in this plant.Achillea santolina L.was collected from Baluchestan area near Taftan volcano [1]. After drying and grinding, two extraction methods, i.e. HS-SDME and HD, coupled to gas chromatography were used and optimized for the determination of camphor in the plant. For HS-SDME, a microdrop of extracting solvent extruded from the needle tip of a gas chromatographic syringe was inserted into the headspace above the plant sample. After extraction, the microdrop was transferred into a GC [2].The experimental parameters of both extraction methods were investigated and their precisions were also studied.The HS-SDME was performed using a 2.5 µL droplet of benzyl alcohol as extracting solvent and extraction time of 40 min and sample amount of 2.0 g were chosen.The results were compared for two techniques from different viewpoints including efficiency of extraction, quantity of the analyte extracted and extraction time. Using HD, the amount of camphor extracted was found to be 37.2% of the total essence extracted; while HS-SDME showed this amount is 40.1%, which are in agreement together. HS-SDME has advantages such as wider linear dynamic range and capability of analysis of tiny amounts plants.Reproducibility found to be 1.3% and 3.5% (as relative standard deviation) for HS-SDME and HD respectively.The results demonstrated that both HS-SPME and HD can be applied successfully for the extraction and separation of volatiles such as camphor from plants; however their limit of detection, linearity and reproducibility is complementary to each other.

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1057
ANTIBACTERIAL ACTIVITY OF *ZATARIA MULTIFLORA* BIOSS ESSENTIAL OIL AGAINST E.COLI O157:H7 IN COMMERCIAL BEEF SOUP

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Application of natural compounds, including essential oils (EOs) is an effective method against growth of bacterial pathogens in foods. *Z. multiflora* Boiss. is one of the Iranian traditional spices and it has antimicrobial effect on the pathogenic bacteria which are agents for some current foodborne intoxications. Applications of natural ingredients not only increase the shelf life of food but also omit the problems of synthetic preservatives compounds [1]. *E. coli* O157:H7 is one of the most dangerous bacteria among gasterointestinal pathogenic micro-organisms [2].The purpose of this study was to investigate the antibacterial effect of *Zataria multiflora* Bioss. EO against *E. Coli* O157:H7 in commercial beef soup as a food model. In this study, different concentrations of Zataria multiflora Boiss. EO (%0.1 to %1) was used on TSB broth to determine MIC with macro dilution method. MIC of Z. multiflora Boiss EO was estimated %0.3 ± %0.08. Then, effect of some concentrations of the EO (1×MIC, 2×MIC and 3×MIC) on bacterial growth curve of E.coli O157:H7 was investigated in beef soup inoculating with E.coli O157:H7 (105cfu/ml) over 72 h (at 30 °C) and over 168 h (at 8 °C). Colony counting at 72 h in the presence of the EO (1×MIC, 2×MIC and 3×MIC) showed that the growth rate was reduced 3 log cfu/ml to no growth at 30 °C, and 2.4 log cfu/ml to no growth at 8 °C, compared to control cultures. Based on the findings of this study, Z. multiflora Boiss EO had a strong antibacterial effect in beef soup as a food model.

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1063
STUDY OF THE EFFECT OF SILYMARIN ON VIABILITY OF BREAST CANCER CELL LINES

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Breast cancer is the most prevalence cancer and results in 14% of cancer-related deaths among women worldwide.The aim of this study was to investigate the anticancer effects of Silymarin on two breast cancer cell lines (BT-474, SK-BR-3).Two breast cancer cell lines SK-BR-3 and BT-474 were incubated for 24 hours in standard conditions before adding 100, 200, 400, 800, 1600 μM Silymarin to each well.Alamar blue was then added to the wells after 24, 48 and 72 hours of incubation and cell viability was determined using fluorescence reader to detect the optical density. Results were analyzed using generalized estimating equations (GEE) method in STATA 12.0.we demonstrated the *Silybum marianum* inhibition of two-cell lines SK-BR-3 and BT-474 growth at different concentrations after 24, 48 and 72 hours. Silymarin increased cell death in both cell lines. Silymarin can be combined with other anti-neoplastic agents to obtain better results.

1068

PROTECTIV EFFECTS OF *PORTULACA OLERACEA* SEED EXTRACT ON LEVEL OF MALONE DIALDEHYDE IN THE TESTIS AND SPERMATOGENESIS IN DIABETIC RATS

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Diabetes is associated with impaired glucose metabolism. Malone dialdehyde is a specific marker for lipid peroxidation [1, 2]. In this study role of Hydro-alcoholic extract of Portulaca oleracea seed in preventing the harmful effects of diabetes was examined. Forty streptozocin -induced diabetic rats were treated with hydroalcoholic extract of Portulaca oleracea (200 and 400 mg/kg body weight) for one month. After 30 days, tissue level of malone dialdehyde were determined.The result of this study showed that oral administration of *Portulaca oleracea* seed extract, caused a significant decrease in serum malone dialdehydeand and testicular histopathology.Oral administration of Hydro-alcoholic extract of Portulaca oleracea seed is effective in reducing malone dialdehyde in testis and histopathological change of testis. Portulaca oleracea seed extract can have a protective role in the testes of rats against oxidative stress induced by diabetes. By reducing the level of malone dialdehyde. And prevent the histopathological changes of testis associated with streptozotocin induced diabetes in rats.

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1073
EFFECTS OF HYDROALCOHOLIC EXTRACT OF *PORTULACA OLERACEA* SEED ON MALONE DIALDEHYDE AND GLYCATED HEMOGLOBIN LEVEL IN DIABETIC RATS

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Diabetes is associated with impaired glucose metabolism. Malone dialdehyde is a specific marker for lipid peroxidation [1, 2].The aim of this study was to examine Glycated hemoglobin (HbA1C) and malone dialdehyde (MDA) in diabetic rats treated with Hydro-alcoholic extract of Portulaca oleracea.In this study, forty streptozocin - induced diabetic rats were treated with hydroalcoholic extract of Portulaca oleracea (200 and 400 mg/kg body weight) for one month.After 30 days, serum malone dialdehyde levels were determined by commercial kit.The liver of rats were fixed and after tissue processing stained with H&E for light microscopic investigations. The result of this study showed that gavage injection of purslane seed extract, caused a significant decrease in serum malone dialdehydeand and HbA1C. Conclusion: Oral administration of Hydro-alcoholic extract of purslane is effective in reducing malone dialdehyde and Glycated hemoglobin.Portulaca oleracea seed extract has hypoglycemic effect by decreasing HbA1C and improvement of the liver function by reducing the level of malone dialdehyde. Administration of Hydro-alcoholic extract of purslane also prevent the histopathological changes of liver associated with diabetes.

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1081

EFFICACY OF *NIGELLA SATIVA* OIL WITH LOW-CALORIE DIET ON SERUM LEVELS OF INFLAMMATORY CYTOKINES IN OBESE FEMALES

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Inflammation is one of the main mechanisms in the development of metabolic complications in obesity.Previous studies provided evidence on anti-obesity properties of some medicinal herbs such as *Nigella sativa. Nigella sativa* Linn (NS) or Black seeds is a kind of species that is found widely in Iran. Anti-hyperglycemic, antioxidative and anti-inflammatory effects of NS were reported in animal and cell line study.The aim of the present study was to determine the effects of NS oil with low-calorie diet on inflammatory biomarkers in obese women. In this double-blind placebo-controlled randomized clinical trial, 60 volunteer women aged 30-50 yrs old with body mass index (BMI) 30-35 kg/m2 were recruited. They were randomly allocated to intervention (n=30) and control group (n=30).All the participants received an individualized low-calorie diet. Intervention and placebo groups received 3 ml/day NS oil and placebo, respectively for 8 weeks.NS oil had been prepared using the cold press procedure.Fatty acid concentrations of NS oil was determined by the gas-chromatography-mass spectrometry technique.At baseline and at the end of study, Interlukin-6 (IL-6), high-sensitivity C-reactive protein (hs-CRP) and Tumor necrosis factor alpha (TNF-alpha) were measured.T-test and Mann-Whitney U tests were used for comparison the quantitative parameters. SPSS version 16.0 was used for all data analysis.$P<0.05$ considered significant. Three main fatty acids of NS oil were Linoleic acid (58.4%), Oleic acid (23%) and Palmitic acid (12%).The mean age and BMI of participants were 35.5±8.8 yrs and 33.3± 1.2 kg/m^2, respectively. Body weight decreased in both groups ($P<0.05$) at the end of the trial.Comparison of the two groups indicated a significant reduction in TNF-alpha and hs-CRP concentrations in intervention group compared to the placebo group at the end of the study ($p<0.05$ for both values). But only a slight decline was observed in the levels of IL-6 in intervention group ($P=0.9$). NS oil with low-calorie diet can decrease body weight and improve inflammatory parameters in obese females after 8 weeks.

1090

PRELIMINARY EVALUATION OF MOMORDICA CHARANTIA FRUIT EXTRACT AS A LAXATIVE MEDICINE IN DOGS

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Constipation is one of the most commonly occurring digestive disorders of dogs [1]. Momordica charantia (Karela) is one of the most popular plants in tropical regions, particularly in southwest Asia. This plant is grown for the first time in Sistan and Baluchistan province. Karela has many beneficial effects from the viewpoint of traditional medicine. Boiled extract of Momordica charantia has been traditionally used as laxative in human being [2]. In the present study, we aimed to examine the probable toxic effects of boiled karela extract in 12 dogs.Clinical parameters (heart rate, respiratory rate and temperature) and Serum levels of hepatic enzymes such as ALT، ALP ، BUN، albumin and creatinine were measured during 10 days of the experiment. All parameters were within the normal range and there were no statistical differences among the different groups، suggesting a relatively high therapeutic index for oiled karela extract in dogs.The high dose of the extract (100mg/kg/d) caused diarrhea in the animals.Clinical parameters revealed a relatively broad margin of safety for the momordicha charantia extract. The results of this study indicates that boiled extract of Momordica charantia could have therapeutic value as a laxative drug.

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1099
ANTIFUNGAL AND ANTI-INFLAMMATORY ACTIVITIES OF CRUDE EXTRACT FROM NITRARIA SCHOBERI FRUITS

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This study is the first comprehensive investigation of the antifungal and anti-inflammatory activities of crude extract from *Nitraria schoberi* L. (Zygophyllaceae) fruits.The antifungal activity of N. schoberi fruits was tested against different fungi, including Aspergillus niger and Candida albicans, with 300 lg/mL of fruit extract being the most effective concentration.The percentage of anti-inflammatory activity assayed for N. schoberi fruit extract at 100, 200 and 500 lg/mL was 36.12, 59.89 and 88.33 %, respectively. N. schoberi fruits possess potent antifungal and anti-inflammatory properties, and may be used as an antifungal to treat diseases and/or as a protective agent against disorders associated with oxidative stress and inflammation.

1101
ANTIMICROBIAL ACTIVITY OF *PULICARIA VULGARIS* ESSENTIAL OIL

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The present study investigated the antimicrobial activity of the essential oil against Gram-positive bacteria (Bacillus cereus and Staphylococcus aureus), Gram-negative bacteria (Escherichia coli and Pseudomonas aeruginosa) and fungi (Aspergillus niger and Candida albicans) was tested. Results of antibacterial test of P. vulgaris essential oil showed that all assayed concentrations significantly inhibited the growth of B. cereus, S. aureus, E. coli, and P. aeruginosa at $P < 0.05$. MIC for B. cereus, S. aureus, E. coli, P.aeruginosa was 17.5, 25.2, 19.4 and 33.2 μg/mL respectively; antifungal screening of the essential oil of P. vulgaris showed that the oil significantly inhibited the growth of A. niger and C. albicans (MIC = 15.5 and 9.9 μg/mL, respectively). The potent antimicrobial and cytotoxic activities of the EO may be attributed to its high contents of thymol, carvotanacetone and thymol isobutyrate. Antimicrobial chemo-therapies are showing diminishing effectiveness because of emergence of drug-resistance. Hence, using efficient natural chemotherapeutic agents such as Pulicaria vulgaris essential oil with fewer side effects is an encouraging approach to fight cancer and infectious diseases in medicine, agriculture, food science and related fields.

1103
IN VITRO ANTIBACTERIAL ACTIVITY OF *ACHILLEA WILHELMSII* C. KOCH ESSENTIAL OIL ON METHICILLIN-SUSCEPTIBLE AND METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* SPP.

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The present study investigated the antibacterial activity of the essential oil (EO) from aerial parts (flowering stage) of *Achillea wilhelmsii* C. Koch. The antimicrobial activity of the EO against methicillin-susceptible and methicillin-resistant Staphylococcus aureus (MRSA) strains was tested. Results showed that A.wilhelmsii essential oil affected methicillin-sensitive Staphylococcus aureus (MSSA) and MRSA, but the impact was more effective on MSSA. A. wilhelmsii C.Koch has emerged as an important medicinal plant.Its EO could be commercialized for its antioxidant, insecticidal and antibacterial applications, or used in the pharmaceutical, cosmetic or perfume industries.

1123
EFFECT OF *CUMINIUM CYMINIUM* L. ON MINIMUM INHIBITORY CONCENTRATION AND MINIMUM BACTERICIDAL CONCENTRATION OF VIBRIO PARAHAEMOLYTICUS

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Vibrio parahaemolyticus is a halophilic bacterium and often causes gastroenteritis because of consumption of raw or inadequately cooked seafood [1]. Cuminum cyminum L. has been allocated the topic of some recent studies in addition to its well-documented traditional usage for treatment of toothache, dyspepsia, diarrhea, epilepsy and jaundice [2]. Lyophilized culture of V. parahaemolyticus ATCC 43996 was grown twice in tubes containing 10 mL of BHI broth at 35°C for 6 h followed by streaking on BHI agar slant and incubation under the same condition. The culture was stored at ambient temperature (22–25 °C) and subcultured monthly. In this study, the MIC and MBC of Cuminum cyminum essential oil at concentrations of 0, 0.005, 0.01, 0.02,0.03, 0.04, 0.05, 0.06, 0.07 and 0.08% on Vibrio parahaemolyticus, was determined by using macro and microdilution methods. MIC of Cuminum cyminum essential oil was estimated 0.05 and 0.07 using macro and micridilution , respectively. According to the results Cuminum cyminum essential oil showed to be effective against bacterial growth and production of TDH toxin. Its potential application in food systems may be suggested.

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1132
HEPATOPROTECTIVE EFFECT OF MARINE ALGAE *SARGASSUM CILIFORIUM* EXTRACT ON ACETAMINOPHEN INDUCED HEPATITIS IN GOLD FISH (CARASSIUS AURATUS AURATUS)

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Hepatoprotective and antioxidative effects of marine algae Sargassum cilliforium extract on acetaminophen induced hepatitis were investigated in gold fish. Hot water extract of Sargassum cilliforium was prepared based on the method of Fujiki et al [1]. All injection extracts were prepared with a phosphate buffer saline to make (2, 6, 10, 20 µg g -1) [2]. Fishes were exposed to acetaminophen (800 mg kg-1) for induction of hepatitis. The hepatoprotective effects were assessed by monitoring the marker enzymes ALP, SGPT, SGOT, LDL-cholesterol, HDL-cholesterol, TG and cholesterol.Gold fishes were treated randomly in to 7 groups. Group I served as normal control.Group II were given 800 mg kg-1 acetaminophen. Fishes in group III were given ./2 ml buffer phosphate saline. Group IV, V, VI and VII were given 2, 6, 10, 20 µg g-1 Sargassum extract respectively.After six days, fishes were given 800 mg kg-1 acetaminophen to induced oxidative liver injury. The extract prevented further morphological degeneration in liver tissues of treated fishes. More over Sargassum cilliforium successfully scavenged 1, 1, diphenyl-2picryl-hydrazyl (DPPH) [3]. The prior injection of Sargassum cilliforium (2, 6, 10, 20 µg/g body wt./day for a period of 6 days) extract showed considerable prevention in the severe disturbances of lipid profile and metabolizing enzymes triggered by acetaminophen during hepatic injury.Liver histology also showed convincing supportive evidence regarding their protective nature of Sargassum against fatty changes induced during acetaminophen intoxication [4].

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1135
EVALUATING ANXIOLYTIC EFFECT OF ALCOHOLIC EXTRACT OF *MORUS ALBA* LEAVES IN RATS

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The alcoholic extract of *Morus Alba* leaves contains high levels of polyphenols and flavonoids compound.According to anxiolytic effect of these compounds, this study was performed to evaluate the anxiolytic effect of alcoholic extract of Morus Alba leaves in rats.This experimental study was performed on 32 male wistar rats were randomly allocated into 4 groups (n=8 for each): Groups received alcoholic extract of Morus Alba leaves (100, 200, and 400 mg/kg) and control group.This extract was administered through gavage every day for 4 weeks.Finally, the anxiolytic potential of alcoholic extract of *Morus Alba* leaves was evaluated by elevated plus-maze test. Our finding showed that administration of this extract at 400 mg/kg markedly increased both the number of entry to and time spent in the open arm of elevated plus-maze. But this extract at 100 and 200 mg/kg there was no anxiolytic action in plus maze.In conclusion, the alcoholic extract of Morus Alba leaves has the anxiolytic effect in rats.This effect may be due to flavonoids and polyphenol compounds of this extract.

1136

CROCIN, THE MAIN ACTIVE SAFFRON CONSTITUENT, AS AN ADJUNCTIVE TREATMENT IN MAJOR DEPRESSIVE DISORDER: A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED, PILOT CLINICAL TRIAL

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Herbal remedies play an important role in treatment of psychiatric disorders [1, 2]. Some well-designed clinical trials have indicated the efficacy of saffron in mild and moderate depression. The aim of this study was to assess the efficacy of crocin, the main active constituent of saffron, as an adjunctive treatment in major depressive disorder (MDD).This study was a randomized, double-blind, placebo-controlled, pilot clinical trial. It was carried out during 4 weeks in two groups (placebo and treatment) on 40 MDD patients between 24 to 50 years old in Ibne-Sina psychiatric hospital, Mashhad, Iran, from March 2013 to December 2013.The crocin group (n=20) was taken one selective serotonin reuptake inhibitor (SSRI) drug (fluoxetine 20 mg/day or sertraline 50 mg/day or citalopram 20 mg/day) plus crocin tablets (30 mg/day; 15 mg BID) and placebo group (n=20) was administered one SSRI (fluoxetine 20 mg/day or sertraline 50 mg/day or citalopram 20 mg/day) plus placebo (two placebo tablets per day) for 4 weeks. Both groups filled beck depression inventory (BDI), beck anxiety inventory (BAI), general health questionnaire (GHQ), the mood disorder questionnaire (MDQ), side effect evaluation questionnaire, and demographic questionnaire before and after one month intervention.The crocin group showed significantly improved scores on BDI, BAI and GHQ compared to placebo group (Pvalue<0.0001).The averages of decrease in BDI, BAI and GHQ scores in placebo group were 6.15, 2.6 and 10.3 respectively, whereas the values in crocin group were 17.6, 12.7 and 17.2 after 4 weeks trial. Poor patient compliance with medications and short trial period, small sample size and self-report assessments were the major limitations of this study.These results demonstrated the effect of crocin in depression and could be administered in treatment of MDD patients.

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1145

MICROSCOPIC EVALUATION OF *PLANTAGO MAJOR* FOR THE HEALING AND GASTROPROTECTIVE EFFECT OF STOMACH MUCOSECTOMY IN RABBIT

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Stomach ulcers, necrotic areas and irritate the mucous layer that are causing pain and bleeding. Secrete excessive acid and subsequently intensified the Helicobacter pylori was the most important cause of stomach ulcers. Treatments usually simultaneous use of antacids, antibiotic drug with a protective mucous layer is recommended. Plantago Major (Barhang = Persian name) is one of the oldest and most widely used herbs in the world and Iran.It is worthy of important compounds such as mucilage, tannin, flavonoids. This herb has healing properties for ulcers, Anti-inflammatory & bacterial, antioxidant, and immune system stimulation.The purpose of this study was to evaluate the healing effects of Plantago Major on experimental ulcers in the stomach mucous layer.36 new zealand rabbits were operated by laparotomy. Then created a circular cut (0/6mm) by punch biopsy of stomach mucous layer and this layer was removed. After surgery, the rabbits were divided in 2 equal groups (n=18), in group 1 (control): the rabbits just ate their usual food and in group 2 (plantago major): Every day 100 mg plantago major were eaten to rabbits. On days 1 - 3-7, six rabbits from each group were sacrificed.Then the mucous layer of the stomach were sampled and Pathology evaluation was conducted. In pathology studies, there were some fibroblasts, new connective tissue and angiogenesis in plantago major group, that was more than control group and the size of the ulcer in this group was the least.Meanwhile the level of inflammation reactions formation in plantago major groups were less than control group.the results show that plantago major extract cause the accelerated wound healing in rabbit model.

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1154
EFFECTS OF HYDROALCOHOL WALNUT EXTRACT AGAINST GAMA RAY INDUCED OXIDATIVE DAMAGE IN MICE

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Ionizing radiations induce reactive oxygen species radicals that follows a cascade of events leading to DNA damage. The radioprotective activity of plant mediated through several mechanisms. The majority of plants contain polyphenols, scavenging of radiation-induced free radicals and elevation of cellular antioxidants by plants in irradiated systems could be leading mechanisms for radioprotection [1]. The walnutextract was administered Peritonealto mice (100, 200, 300 mg/kg) then exposed to whole-body against gamma-radiation (1 mcri). The ability of the extract to offer protection against whole-body gamma-radiation exposure was analysed by performing assay enzymes antioxidant contain SOD, Catalase, on mouse serum.This study confirmed hat walnutextract protect against lipid peroxidation via scavenging of radiation-induced free radicals and increase Potential antioxidant enzems of cellular Humans are exposed to ionizing radiations during diagnostic, therapeutic and industrial purposes. walnutextract have medicinal properties [2]. This protect against the radiation-induced damage by scavenging of free radicals and increasing antioxidant status. The polyphenols present in the walnutextract may upregulate mRNAs of antioxidant enzymes such as catalase, glutathione transferase, glutathione peroxidase, superoxide dismutase and thus may counteract the oxidative stress-induced by ionizing radiations [2]. Administration of the extract can prevent a radiation-induced decline in antioxidant enzyme levels.

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1157
LEISHMANIACIDAL EFFECT OF *PORTULACA OLERACEA* L. SEED EXTRACT ON LEISHMANIA MAJOR PROMASTIGOTES IN VITRO

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Portulaca oleracea is the Portulacaceae family that used in the treatment of bacterial dysentery, deworming of Taenia and Oxyure as well as relief of insect and scorpion bites. In the present study the effect of different concentrations of seed extract of Portulacaole raceaon on killing of L. major promastigotes was evaluated in vitro. First, the Portulaca oleracea seed was soaked in 85% alcohol and alcoholic extract was prepared.Then, different concentrations of seed extract (10 mg/ml, 20 mg/ml, 25 mg/ml, and 50 mg/ml) were prepared and added into culture of promastigotes of L.major then, incubated at 24° C for 48h. Finally, the number of parasites in each well was counted by Neubauer slide after 48hours. The mortality of the parasite was assessed by MTT assay. The results showed that, the anti-leishmanial activity of ethanol extract of Portulaca oleracea is dose dependent. Accordingly, the extract at a concentration of 50 mg/ml killed all the parasites, and its IC50 was calculated 25mg / ml after 24 hours incubation. The results of the present study indicated the leishmaniacidal effect of Portulaca oleracea L. seed extract.

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1161
EXTRACTION AND STRUCTURE ELUCIDATION OF *SWERTIA LONGIFOLIA* TERPENOIDS

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Swertia genus, belonging to the family Gentianaceae, comprises different species, most of which have been used in traditional medicine of several cultures as antidiabetic, anti-pyretic, analgesic, gastro and liver tonic. Swertia longifolia Boiss. is the only species of Swertia growing in Iran [1,2]. In the present investigation, phytochemical study of S. longifolia has been performed. Aerial parts of the plant were extracted with maceration method using hexane, chloroform and methanol, respectively. The components of the chloroform fraction of the plant were isolated by different chromatographic methods and their structures determined by 1H-NMR, 13C-NMR data. The structures of the purified compounds were identified as Ursolic acid, daucosterol and swertiamarin. Ursolic acid has triterpenoid structure, while daucosterol and swertiamarin have steroid and monoterpenois structures, respectively. All the compounds have been reported from the species for the first time. According the different biological activities of the purified compounds, various properties are expected from S. longifolia which need to be investigated.

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1174

EVALUATING THE EFFECT OF *TRIBULUS TERRESTERIS* EXTRACT ON EXCERSION OF CALCIUM OXALATE CRYSTAL IN EXPERIMENTAL HYPEROXALURIA IN CATS

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Recurrence and side effects of current treatments for urolithiasis confine their application, so other options using traditional herbal therapy is being sought.In this study we have tried to evaluate the antilithiatic effects of herbal extraxt of Tribulus terrestris which is often used to treat different kinds of urinary diseases such as urolithiasis in human on cats. To evaluate the therapeutic effect of plant, the hydro alcoholic extract of T.terrestris was assessed for activity against induced urolithiasis in cats. The extract of such herb was administered at daily oral doses of 200 mg/kg for 30 days. Microscopic analysis of urine sediments and ultrasonographic study of kidneys and urinary bladder confirmed inhibition of crystal formation in tested cats.Our results indicate this herbal extract could be potential candidate for prevention of urolithiasis in cats. Further studies are needed to clarify precise anti-crystallization mechanism of T.terrestris in cats [1, 2].

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1176
EVALUATION OF ANTIOXIDANT ACTIVITY AND PHENOLIC CONTENTS AND IDENTIFICATION OF MAIN COMPOUNDS OF VARIOUS EXTRACTS OF *ARTEMISIA AUCHERI* AERIAL PARTS

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Natural antioxidants save the human body against free radicals that may cause some chronic disease including cancer, cardiovascular diseases and cataract [1]. *Artemisia aucheri* Boiss.which is called "Dermaneyekoohi" in Persian language, is a widely distributed plant in Iran [2]. The aim of the present work is to undertake an investigation of the antioxidant activity and phenolic content as well as identification of main compounds of the most active extract and fraction from the aerial parts of A. aucheri grown in Iran.Antioxidant activity and total phenolic contents (TPC) of five different extracts (petroleum ether, dichloromethane, ethyl acetate, ethanol and ethanol-water) and five fractions of ethanolic extract was investigated by three different methods [2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method, ferrous ion chelating (FIC) assay and β- carotene bleaching (BCB) test] and Folin- Ciocalteu method. Purification of the major constituents of the most active fraction was done by preparative and semi preparative HPLC. For one of isolated compounds, structure elucidation was achieved using spectroscopic techniques including ESIMS and 1D, 2D NMR experiments.Hydroethanolic extract exhibited the stronger inhibitory activity on bleaching of β-carotene and formation of ferrous- ferrozine complex in comparison with the other extracts.Among all the extracts analyzed, the ethyl acetate and ethanolic extracts exhibited higher phenolic contents respectively.The ethanolic extract was the most active one in DPPH radical scavenging activity, as well.Fraction 40% MeOH in water showed both the highest total phenolic content and the most DPPH radical scavenging activity while there were no statistically significant correlations between TPC and EC50 values of DPPH and BCB assays.The results of Friedman test did not show any significant difference between the two aforementioned assays in screening the samples for the antioxidant ability.There was no statistical judgment for FIC assay because of inactivity of almost all the samples.One known caffeic acid derivative, ethyl caffeat, was isolated from the most active fraction of ethanolic extract. The finding of present study suggests that aerial parts of A.aucheri could be regarded as a potential source of natural antioxidants.

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1183

THE SURVEY OF *WITHANI SOMNIFERA* EXTRACTION AGAINST RESISTANT STRAINS OF *PSEUDOMONAS AERUGINOSA* BACTERIA TO SELECTIVE ANTIBIOTICS

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Due to more resistance of pathogenic bacteria to new and current antibiotics researchers are interested to find the plant medical with antimicrobial activity in order to replacing chemical drugs [1,2]. In this study, the effect of Withani somnifera on growh inhibition of some Pseudomonas aeruginosa strains was investigated.Plant extraction was performed using Rotary apparatus.Seventeen *P. aeruginosa* strains were isolated from urinary infections of hospitalized patients.The MIC and MBC of winter cherry were determined by disk diffusion Kirby-Bauer method using different concentrations. Our results showed that *P. aeruginosa* strains were resistant to used antibiotics. Inhibition tests showed different reaction of bacteria to same concentration of antibacterial druges as: Cefexime (11.94%), ceftazidime (52.23%), piperacillin (88.5%). The MIC concentration for plant extract was determined of 100ppm. Based on these results we could conclude the plant exract of winter cherry is effective against human bacterial and useful for pharmacological industry and are suitable material for replacing chemical substance.
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1184

ANTIMICROBIAL ACTIVITY OF *CHAMAEMELUM NOBILE* EXTRACT AGAINST ACINETOBACTER BAUMANNII

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Plants medicinal plays a important role in the health of human. Chamaemelum nobile is a low perennial plant found in dry fields and around gardens[1,2]. The purpose of this study was to assay the antimicrobial activity of Chamemelum nobile extract against Acinetobacter baumannii as a human pathogenic bacteria. For this purpose. plant extraction was done using rotary apparatus. MIC and MBC of plant extract were measured by broth microdiluation method using different concentrations of plant extract. microdiluation method.The result showed the high MIC (the minimum inhibitory concentration) was obtained at the concentration of 50 ppm and 2 tested strains were exactly inhibited by this concentration.The lowest MIC was at the concentration of 25 ppm.In this concentration, 9 strain of tested strains were totally inhibited.

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1195

EVALUATING EFFECT OF ALCOHOLIC EXTRACT OF *MORUS ALBA* LEAVES ON SCOPOLAMINE-INDUCED MEMORY IMPAIRMENT IN RATS

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The alcoholic extract of *Morus Alba* leaves contain high levels of flavonoids and polyphenols compounds and antioxidant activity.The goal of this study was to evaluate the effects of alcoholic extract of Morus Alba leaves on memory impairment caused by scopolamine. The rats were divided into positive control group (Received scopolamine), negative control group and 3 treatment groups (scopolamine + extract at 100, 200 and 400 mg/kg).This extract was administered through gavage every day for 4 weeks. Finally learning and memory was evaluated using the Morris water maze. Our finding showed that time latency in the positive control group was higher than negative control group ($P<0.05$).However, administration of this extract at all doses significantly reduced time latency in received scopolamine animals ($P<0.05$). In addition, time spent in target quadrant by positive control group was lower than negative control group ($P<0.05$).While, administration of this extract at 200 and 400 mg/kg markedly increased time spent in target quadrant ($P<0.05$). In conclusion, the alcoholic extract of *Morus Alba* leaves improves spatial learning and memory in received scopolamine animals.

1205
OLEUROPEIN ATTENUATES DELTAMETHRIN-INDUCED APOPTOSIS IN RAT CEREBELLAR PURKINJE NEURONS

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Deltamethrin (DM) is a synthetic pyrethroid insecticide that can elicit neurotoxicity, leading to apoptosis.There is accumulating evidence that oleuropein (OE) has anti-apoptotic effect.The purpose of this study was to determine DM toxicity and anti-apoptotic effect of OE pretreatment in cerebellar Purkinje neurons.Rats were randomly divided into four groups each as follow: DM treated group (12.5 mg/kg; single dose), OE treated group (20 mg/kg per day), DM plus OE treated group, and vehicle group.Sections of cerebellum were taken 24 hours after deltamethrin injection and studied for histopathological and immunohistochemistry assessment. Further characteristics of degeneration in Purkinje neurons were observed in DM group compared with DM plus OE group. Compared with DM group (9.56±1.69), the positive staining for Bax in Purkinje neurones was decreased in DM plus OE group (2.99±0.50) but upper than OE (0.72±0.15) and vehicle (0.57±0.03) groups.Compared with DM group (0.50±0.05), the positive staining for Bcl-2 in Purkinje neurones was increased in DM plus OE group (3.29±0.18) but lower than OE (4.38±0.80) and vehicle (5.87±1.93) groups.Our results suggest that DM induces apoptosis in Purkinje cells which is subsided by oleuropein.

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1208
EVALUATION OF ANTI-MALARIAL ACTIVITY OF *ARTEMISIA TURCAMANICA* AND A. KOPETDAGHENSIS BY CELL-FREE B-HEMATIN FORMATION ASSAY

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The genus *Artemisia* L., is one of the largest and most widely distributed genera of the family Asteraceae. This genus with its common Persian name “Dermane” and the common English name “Wormwood” is the most notable due to the anti-malarial drug “artemisinin” that obtained from A.annua.In continuation of our investigation on Iranian Artemisia species, different extracts from aerial parts of A. turcamanica and A. kopetdaghensis were screened for their anti-malarial activity by cell-free β-hematin formation assay.100 of aerial parts of each plant were extracted successively with petroleum ether (PE), dichloromethane (DCM), Ethyl acetate (EtOAC), ethanol and ethanol-water.In anti-malarial assay, heme substrate, varying concentration of plant extracts, oleic acid, HCl and sodium acetate was added to each Eppendorf tubes.After one night incubation, β-hematin crystals were washed sequentially with SDS buffer and alkaline bicarbonate solution for complete purifying crystals.Finally, the β-hematin crystals were dissolved in NaOH and the absorbance was measured at 400 nm.The results were reported as % inhibition (I %) of heme crystallization compared to positive control Chloroquine. In the case of A. turcamanica, PE extract displayed the most potent anti-malarial activity with IC50 value of 0.91 mg/mL and IC90 value of 1.54 mg/mL while about A. kopetdaghensis; DCM extract showed potent effects with IC50 value of 1.05 mg/mL and IC90 value of 1.20 mg/mL.In conclusion, it will be of interest to purify and identify the anti-malarial components in potent extracts to find new potential drugs.

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1210
AN INVESTIGATION IN THE ANTIBACTERIAL ACTIVITY OF POMEGRANATE PEEL EXTRACT AND ITS EFFECT ON HAMBURGER RETENTIVITY

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Because of the increasing resistance of bacteria to antibiotics and their side effects, the use of herbs and plant extracts is very attractive.Nowadays consumers are interested in the functional foods.Pomegranate is an important nutritious-medicinal plant which has been used by human from many years ago.Tannins are a variety of secondary metabolites in plants.The main property of tannins is their stringent and this property is the base of its therapeutic effects. Phenolic compounds of pomegranate and of its peel have these properties besides strong antibacterial properties.The aim of this study was to determine the antibacterial activity of pomegranate extracts that obtained with different concentration of solvent.Pomegranate fruit were purchased from local market in shahreza- Isfahan.Fresh pomegranate fruit were peeled manually and collected peels were then washed with water. Peels pomegranate then cut into the small pieces and dried in an oven at 40oc for 48 h.dried pieces were powdered in the heavy duty kitchen grinder.Forty grams of blended peels were placed in 250-ml Erlenmeyer flasks, and then we added 100ml of solvent (ethanol). The flasks were then shaken at room temperature for 15 h prior to filtration. The filtrates were concentrated under reduced pressure with a rotary evaporator at 35 0c.These crude extracts were kept at -18oc until use.We sterilized the extract by the used of auto claw (HA3D hirayama) then we added the extract to the hamburger and make different concentration of this extract (0-500- 1000-1500-2000 ppm).By the sampled of hamburger in consecutive days we review the growth of micro-organisms at any concentration.Finding result and its comparisons with control sample, shows that by increasing the concentration of extract, growth of micro organisms in the hamburger context will be restricted.Of course use of extract at high concentrate of peel pomegranate extract doesn't show negative effect on the organoleptic properties.Furthermore, adding different concentration of peel extract of pomegranate which is the byproduct could provide health benefits to humans and may be employed in food preservation and pharmaceutical purposes.

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1211
EFFICACY OF *VIOLA ODORATA* IN TREATMENT OF CHRONIC INSOMNIA

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Insomnia as the most common sleep disorder reduces life quality. Due to side effects of hypnotic drug and the increasing demand for alternative medicine, in this study violet oil (VO) was used to treat insomnia.VO is made of Viola odorata in the basis of almond oil and is a well-known medication in Iranian traditional medicine that induces sleep.This study was conducted as a pretest-posttest evaluation on VO efficacy in 50 patients with chronic insomnia in Iranian Traditional Medicine Clinic of Mashhad University of Medical Sciences, Iran.Treatment consisted of intranasal drop of VO, two drops in each nostril nightly before sleep for one month. All patients completed an Insomnia Severity Index (ISI) questionnaire before the trial and after one month of treatment. Improvements in sleep and ISI scores were significantly greater in patients after the trial compared with before starting the treatment ($P < 0.05$). VO can be presented as a safe, well-tolerated, and effective herbal preparation in patients with chronic insomnia.

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1212
EVALUATION OF ANTIMICROBIAL PROPERTIES IN LIQUID EXTRACT OF LICORICE ROOT, AGAINST PSEUDOMONAS AERUGINOSA

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Plants are one of the oldest forms of food known to man.There are many References to plants in ancient literature.As a result of indiscriminate use of antimicrobial drugs in the treatment of infectious disease, microorganisms especially gram negative bacteria, have develop resistance to many antibiotics and there is a need to develop antimicrobial drugs.One approach is the use of local medicinal plants which represent a rich source of novel antimicrobial agents. This study was carried out due to rapid increase of antibiotics resistance, fewer side effects of chemical drugs, antibacterial properties of licorice root and similar results.Licorice, as a medical plant has been used for a long time and also has been used in many societies throughout the millennia.The extract of medicinal plant is also used as the basis of anti-ulcer medicines for treatment of peptic ulcer.The roots of licorice plant were collected in autumn from the local place in the yasuj. Roots were further cut into small pieces and dried in an air circulatory try drier at 60o c for 48 h.dried pieces were powdered in a heavy duty kitchen grinder.Fifty grams of powder were placed in 250-ml Erlenmeyer flasks, followed by adding 100 ml of solvent having an increasing polarity: acetone, 95% ethanol, and methanol. The flasks were then shaken at room temperature for 15h prior to filtration. The filtrates were concentrated under reduced pressure with rotary evaporator (Rotavapor R-3 BUCHI) at 40o c.now these extract were kept at -15oc until use.The disk diffusion assay in detail by bauer et al (1966) was used in this study.The MIC of purified substance was determined by the agar dilution method. The stock cultures of bacterial (*pseudomonas aeruginosa* ATCC 15.442) were grown in nutrient broth at 27oc for 24 h in a shaker. Amount of 40 micro liter of root extract were applied in paper disk and placed in plates containing nutrient agar that was previously inoculated with active cultures of these microorganisms with sterile swabs.Antibacterial activity was assessed by measuring the diameter of the inhibition zone around each disk after 24 hours of inoculation at 370c.The result shows that content of total phenolic compounds in licorice root extract was found to be solvent-dependent.The best extraction condition, relating to biological properties, was aceton solution.The minimum inhibitory content of root extract is around 120 µg/ml.the results show that best solvent for this extract is acetone. According to the results obtained, and other literature, licorice root extract seems to have interesting biological properties, and can be considers as a preservative and functional food.

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1215

EFFECTS OF SILYMARIN ON FORMALIN-INDUCED NOCICEPTION AND NEUROPATHIC PAIN IN SCIATIC NERVE LIGATED MICE

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Based on the previous reports, silymarin can markedly suppress nitric oxide, prostaglandin E2 (PGE2), leukotrienes, cytokines production, and neutrophils infiltration [1, 2].Regarding the fact that inflammation plays an important role in neuropathic and formalin-induced pain, it was assumed that silymarin could reduce the pain.The present study investigates the analgesic effects of silymarin in chemical nociception and model of neuropathic pain.chemical nociception caused by injection of 20 µl of formalin (0.5% formaldehyde in saline) into the plantar region of the right hind paw. A Sciatic-nerve ligated mouse was applied as a model of neuropathic pain and the antinociceptive response silymarin was examined 14 days after unilateral nerve-ligation using the hot-plate test. The intraperitoneal administration of silymarin (25, 50, and 100 mg/kg) 2 hours prior to the subcutaneous formalin injection into the right paw suppressed the nociceptive response in the late phase of the formalin test significantly, but it was not in a dose-dependent manner. Different doses of silymarin 14 days after unilateral sciatic nerve ligation in the hot-plate test did not induce obvious antinociception. The results suggest that inhibition of peripherally acting mediators may be involved in the antinociception mechanism of silymarin.

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1216
COMPARING THE EFFECT OF LECOUREX® +PROPOLIS, LECOUREX AND METRONIDAZOLE TABLET ON BACTERIAL VAGINOSIS(BV)

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Bacterial vaginosis (BV) is the most prevalent type of vaginitis in women of reproductive age[1] and metronidazole is the selective drug for its treatment [2]. Lecourex® herbal vaginal cream contains essential oils of Zataria Multiflora, which in previous studies has proven its effectiveness on bacterial vaginosis[3].Propolis may have a role as an alternative treatment for vaginal infection [4]. This study was conducted to compare the efficacy of Lecourex vaginal cream + propolis, Lecourex® and metronidazole oral tablets on bacterial vaginosis.This study was a double-blind clinical trial on 66 patients who were randomly assigned to three treatment groups: group A received placebo tablet with Lecourex® cream, group B received placebo tablet with Lecourex cream + propolis and group C received metronidazole tablets with placebo cream. The diagnosis was based on gram staining and Amsel criteria.

1223

THE EFFECT OF ACTIVATED CHARCOAL AND MULTI-WALLED CARBON NANOTUBES ON ANTIOXIDANT PARAMETERS OF *SATUREJA RECHINGERI* CALLUSES

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Satureja rechingeri was described as a new species from Iran, and its relationship to *S. khuzistanica*, *S. edmondi* and *S. macrantha* has previously been reported [1].The plant belongs to the Lamiaceae family and is native to Iran. These plant calluses produce large amounts of phenolic compounds especially rosmarinic acid. We evaluated the effect of multi-walled carbon nanotubes with a carboxyl functional group (MWCNT-COOH) and activated charcoal (AC) on rosmarinic and caffeic acid content, total phenol, total flavonoid and antioxidant activity of *Satureja rechingeri* calluses. MWCNT-COOH and AC were able to increase the amount of fresh and dry weight compared to control in a wide range (25-500 µg/ml).The maximum amount of rosmarinic acid was observed in concentrations of 100 µg/ml MWCNT-COOH and 250 µg/ml AC.In this study, a positive correlation between antioxidant activity and total phenol content was observed. Also a stronger positive correlation between the antioxidant activity and rosmarinic acid content was found. These data underline the role of rosmarinic acid as a potent antioxidant in plants.

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1231

EVALUATION OF ANTIOXIDANT AND ANTI-MELANOGENIC ACTIVITY OF DIFFERENT EXTRACTS OF AERIAL PARTS OF *N. SATUREIOIDE* AND N. GLOMERULOS BY PREVENTING TYROSINASE ACTIVITY IN MURINE MELANOMA B16F10 CELLS

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Nepeta satureioide and *N. glomerulos* (Lamiaceae) has been used in folk medicine of Iran to cure various diseases [1, 2]. We investigated the effects of n-hexane, dichloromethane, ethyl acetate, ethanol and Hydro-ethanol fractions isolated from the plant N.sintenisii on melanogenesis in B16 melanoma cells.To assess the effects of these plants on melanogenesis inhibition, various assays were used including cytotoxicity, mushroom tyrosinase inhibition, inhibition of cellular tyrosinase, melanin content, the amount of reactive oxygen species and western blot. Methanol and CH2Cl2 fractions of of *N. satureioide* and *N. glomerulos* significantly reduced both the cellular melanin content and tyrosinase activity. Reactive oxygen species was also significantly decreased following the treatment of cell with the mentioned fractions, while an AlamarBlue® assay showed no cytotoxicity. Furthermore, we have found that this plant decreased the amount of tyrosinase and microphthalmia-associated transcription factor proteins,which verify the role of suppression of microphthalmia-associated transcription factor protein in melanogenesis inhibition [3]. Taken together the data indicate that N. satureioide and N.glomerulos inhibit melanin synthesis in B16 melanoma cells with no cytotoxic effects.Therefore, it might prove a useful therapeutic agent for treating hyperpigmentation and an effective component of whitening cosmetics.

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1232

THE EFFECT OF ANTI-DRY CREAM ON HAND ECZEMA IN COMPARISON WITH FLUOCINOLONE ACETONIDE CREAM 0.025

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Hand eczema is the most common dermatitis that affects hands. The annual prevalence of hand eczema has been reported to be between 7 and 12 percent. Due to the physical and psychological effects of hand eczema, failure of existing treatment methods and corticosteroids side effects, the current study has been designed to assess the effect of a herbal cream containing Aloe vera, lavandula angustifolia and pelargonium roseum on hand eczema, compare with fluocinolone acetonide cream 0.025. Because in different studies the above mentioned medicinal herbs had beneficial effect on dermatitis[1-3]. This study is a double-blind randomized clinical trial and has been conducted on hand eczema sufferers. Random allocation using the block method was assigned to two groups; anti-dry cream and fluocinolone acetonide cream 0.025. drug is applied for two weeks, twice daily, and in each time massaging cream gently into the position. Subjects were evaluated at the baseline and two weeks after treatment in terms of clinical symptoms and possible complications.In this study, 73 patients were studied out of which 16 were male and the rest were female. Distribution in terms of gender, age, education, occupation, duration of illness, frequency of disease occurrence, medications and personal and family medical history were similar in both groups.($p>0.05$). At the end of study symptom severity score declined .In anti dry group after treatment left and right hands it was 3.94 and 5.07 and for fluocinolone group it was 4.12 and 4 respectively. So there was no significant difference between two groups ($p>0.11$). The results of this study indicate the therapeutic effects of anti- dry and fluocinolone cream. With regard to the lack of difference between the two groups, anti – dry cream can be used as an alternative treatment for hand eczema.

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1236
THE EFFECT OF ETHANOLIC EXTRACT OF *SCROPHULARIA STRIATA* AGAINST LEISHMANIA MAJOR (MRHO/IR/75/ER): IN VITRO AND IN VIVO

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Leishmaniasis is one of the 10 tropical disease which it is public health importance.Nowadayes, leishmaniasis is treated by drugs such as glucantime®, pentamidine, amphotericine B, and miltofosine whiche show some toxic effect.In addition, the resistance to these drugs has been reported. In this regard, attempts to find herbal remedies are on the rise.In this study, the effect of ethanolic extract of scrophularia striata is evaluated against Iranian strain of Leishmania major (MRHO/IR/75/ER), on promastigotes by MTT (3-(4,5-dimethyl-2-thiazolyl)-2, 5-diphenyl-2H-tetrazolium bromide) assay, and amastigotes by macrophage culture and in vivo (Balb/c mice).In the first step, Scrophularia striata ethanolic extract (10%) was reduced significantly the size of lesion of cutaneous lishmaniasis of Balb/c mice in comparison by control group ($p<0.05$). In the second step, the smear for leishman body was significantly different between Scrophularia striata ethanolic extract (10%) and glucantime® treated groups ($p<0.05$). Scrophularia striata ethanolic extract (10%) was evaluated as a EC50 by calculation of amastigote in Balb/c mice peritoneal macrophages in the chamber glass slides.Moreover,Scrophularia striata ethanolic extract (12.5% , and 2.5 %) was determined as ED50 after 24 , and 72 hour incubation by MTT assay in Temperature 25 °c for Leishmania promastigote growth in axenic culture, respectively.The results of this study show that ethanolic extract (10%) has a better therapeutic effects in comparison with aother concentrations.But it was not healed all the infected Balb/c mice, which remain to be clarified further.

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1240
INHIBITION TEST OF HEME DETOXIFICATION (ITHD) AS AN APPROACH FOR DETECTING ANTIMALARIAL COMPOUNDS

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The malaria parasite digests hemoglobin in vacuole to amino acids and heme [1]. Free heme is toxic because can induce oxidative stress leading to parasite death. Plasmodium has got several detoxification mechanisms to protect itself from toxic heme including hemozoin formation and heme binding proteins [2]. Identifying compounds that inhibit hemozoin formation is an approach for detecting antimalarial products.This work intends to develop a simple and reliable protocol for assessing inhibition activity of heme detoxification. In ITHD method based on colorimetric assay [3] with some modification, hemin chloride, tween 20 and samples were added in each well of a 96-well plate with ratio 9:9:2, and incubated.The results was calculated and expressed as percentage of heme detoxification inhibition. The value of IC50 of chloroquine diphosphate was 14.1 ± 0.2 µM. The ITHD assay performance was evaluated by using a group of forty-five plant extracts which most of them have been reported their antiplasmodial effect against Plasmodium falciparum. We have compared the results of this assay with their antiplasmodial activity; the positive predictive value and the negative predictive value of the assay were 67% and 69%, respectively. So we can conclude that, ITHD provides a reliable and simple technique for prescreening antimalarial compounds.

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1244
REDUCE CHOLESTEROL IN MICE CONSUMING SOYA

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About 50 per cent of total production of oilseeds in the world devoted to soybeans.Soybeans were first recognized in 1341 in China's soybean seed was imported. Oilseed meals because of the high protein, can be considered as a food supplement.Survivor is a solid meal after Rvghnkshy of extra oil seeds remain.The purpose of this study the effects of replacing soybean meal as a protein on blood cholesterol levels.The study of 3 diets were used for this purpose, 30 mice Balb/C, divided into three groups and were treated by the following three types of diet.1: Food with protein deficiency, 13.5 per cent protein.2: Full-protein diet with 23% protein. 3: Diet with 20% soy protein.After three months of using three diets, the animals were anesthetized and blood samples were taken directly from the heart.After the serum cholesterol levels were measured in different experimental groups.The degree of serum cholesterol in animals that received a diet with 20% soy to the diet without soy group had a significant reduction ($p<0.01$). Soybeans by 20%, while at the same time can be a good alternative to the protein needed by the body to reduce blood cholesterol levels as well.

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1245

THE EFFECT OF HOT WATER EXTRACT OF SARGASSUM CILLIFORIUM ALGAE ON TOXIC DISORDER DUE TO CARBON TETRACHLORIDE ON LIVER TISSUE AND ENZYMES IN MOLLI FISH LIVER(POECILIA SPHENOPS)

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We have examined the protective effect of Sargassum Cilliforium hot water extract against a single dose of carbon tetrachloride (Intraperitoenally 1mg/kg) induced hepatic damage in 70 Molli fishes based on the method of Fujiki et al[1].The carbon tetrachloride induction resulted a significant elevation in the levels of SGPT,SGOT,LDL, TG, Cholesterol and ALP and decreased level of HDL[2,3].The treatment with hot water extract of Sargassum Cilliforium (Intraperitoenally in 4 dose ,2,6,10,20 µg/gr for a period of 6 days) showed natural hepato protective effect against biochemical changes in the serum and liver tissue that induced by carbon tetrachloride. The treated fishes with *Sargassum cilliforium* extract , did not show any toxicity in the liver tissue which was confirmed by hysto pathological and biochemical finding [4]. These result suggests that the *Sargassum cilliforium* hot water extract may probably acted as a natural antioxidant against carbon tetrachloride induced hepatic damage.[5,6]

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1251

THE EFFECT OF TOPICAL GEL CONTAINING *ZATARIA MULTIFLORA* , PELARGONIUM GRAVEOLENS AND *ALOE VERA* GEL ON BEDSORE AND ITS COMPARISON WITH ALFA

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Bedsores or pressure sores are caused by pressure-induced ischemia.Regarding antimicrobial [1, 2], anti-inflammatory and healing properties [3] of geranium, thyme and aloe Vera essential oils this study was conducted to investigate the efficacy of herbal topical gel containing these plants for bed sore treatment and compare it with topical Alpha cream.This study was a double-blind randomized clinical trial. Participants were in stage I and II pressure ulcers after being approved by an infectious disease specialist.Patients were randomly assigned to one of the two groups (herbal topical cream or alpha cream).Evaluation of healing was done by pressure ulcer scale (PUSH).Package size and color of both creams were the same in two groups; the physician and the patient were unaware of the ingredients of the creams.After cleaning wound with normal saline, both creams were used topically with dressing, 2 times a day for 4 weeks. Data analysis was done with paired t-test and two groups were compared using t-test and the effect of other factors was estimated by repeated measurement analysis. In this study, 77 patients suffering from pressure ulcers were examined out of which 36 cases were treated with alpha cream and the other 41 were treated with herbal cream.Patients in both groups were similar in terms of demographic data, symptoms and initial severity ($p<0.05$).The effectiveness of two types of treatments on the reduction of PUSH scores, wound size, volume of exudates and type of wound tissue was statistically significant ($p<0.05$).There was no significant difference between the two types of treatment methods in the healing rate.In respect to the therapeutic effects of both creams in reducing the severity of the wound and healing after one week of treatment and no statistically significant difference between two groups selecting a natural herbal medicine without any known side effects is recommended.

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1265
STUDY OF TURMERIC EFFECT ON THE CANINE HUMERAL FRACTURE HEALING

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Fracture is one of the most common referral problems in veterinaryclinics. Different methods have been reported for fracture management. In current study, Turmeric powder applied as a herbal drug for bone healing because there are some experiments about healing osteoporosis signs by oral Turmeric powder in humans so this time we applied this powder on bone healing as local. Six mixed breed dogs from both sexes were randomly divided in to two groups.In group I (test), after surgical preparation the anaesthesia induced by Xylazine (1mg/kg) and Ketamin (5mg/kg) and maintained with Halothane (2%) in oxygen. A2 ×2 square defect was created on the right humeral shaft and filled with sterile Turmeric powder and bone wax. In group II (control), Turmeric powder the same procedure was done and the bone defect in left humorous filled with sterile bone wax.All dogs were clinically examined for 6 weeks and weekly radiographs have been taken till the end of study (day 42). In according to results two defects in group I, 30 days after operation filled with Callus Bridge and 42 days after operation defect was filled. In group II, just 42 days after operation Callus Bridge was formed. Turmeric contains anti-inflammatory substances and large amounts of mineral content that facilitate bone formation and enhance the healing process by osteoconduction.In addition, skin healing after surgery was faster in Turmeric used group and locations in comparison with the group used only suture. In conclusion, relative success in group I could be a result of positive effect of Turmeric herb that had same positive effect like our last experiment on Coral AcroporaPlamata in bone healing but needsfurther controlled study for precise determination of the effects of Turmeric herb as a herbal drug in bone healing cases.

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1271

OPTIMIZATION OF VARIOUS EXTRACTION METHODS ON TOTAL PHENOLIC COMPOUNDS OF OLIVE LEAF

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Olive leaves are rich in polyphenol compounds which have antioxidant properties. In this study, aqueous extraction of phenolic compounds from olive leaves has been done using magnetic stirring, ultrasonic bath, ultrasound and static situation. In addition, the optimal conditions to achieve the highest yield of phenolic compounds were investigated.For this purpose, five parameters including temperature, extraction time, pH, type of solvent, liquid to solid ratio were studied. The total phenol content was assessed by Folin Ciocaltue method and the amount of polyphenols was reported in "milligrams of Gallic acid per gram of olive leaf".Therefore, polyphenols compounds were extracted in the ratio of water: ethanol (30:70), temperature of 23℃, pH=2 and the liquid to solid ratio was 30:1 (ml/g).The optimal extraction time by magnetic stirrer, ultrasonic bath and ultrasound assistance were obtained in 30, 15 and 5 min, respectively, and for the each one, the total phenol content was obtained 51.6, 60.8 and 68 mg GA/g olive leaf, respectively.Results showed that more polyphenols are extracted in the less time in the extraction using ultrasound. In addition, the extraction of polyphenol compounds from olive leaves was done without mixing for 24 hours.The result showed that the total phenol content was 34.74 mg GA/g olive leaf and the mixing agent is effective on the extraction yield of polyphenols from olive leaves [1,2].

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1279

HISTOPATHOLOGICAL EVALUATION OF *SCROPHULARIA STRIATA* EXTRACT ON SKIN WOUND HEALING IN GOLD FISH

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Scrophularia striata which grows in Ilam province is used as a traditional medicine for treatment of diseases for years, this herb has anti- inflammatory, anti-microbial and anti-oxidant properties and is used in wound healing. This study carried out on 75 gold fish to pathological evaluate the healing effect of Scrophularia striata extract on induced surgical wounds in fish skin.Fish were anesthetized with ketamine and then 5 mm full thickness skin wounds in circular shape created with surgical punch biopsy in right side of each fish. The fish divided to five equal groups (15 fish in each group). Group 1 which received no treatment (control group), group 2 which received a permanent floating in 3% Scrophularia striata extract, group 3 which fed by mixed 5% Scrophularia striata extract, group 4 which received a short time bathing in 10% for 1 min) and group 5 which received a permanent floating in 6% Scrophularia striata extract.Tissue samples were taken from the skin wounds at day 7, 14 and 21 from five fish in each time, fixed in formalin 10% and then processed by routine histological paraffin embedding method.The results showed that epithelization, formation of granulation tissue, angiogenesis and formation of scales were better in group 5 than other groups at the end of the experiment. In day 21,formation of normal epidermis, dermis and scale were observed in group 5 compared to the others.On the basis of these results it can be concluded that short time bathing with Scrophularia striata and eating extract, has not effective on wound healing in fish.But it seems that permanent floating of fish in a higher concentration of the Scrophularia striata extract is effective in skin wound healing

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1285
ANTIBACTERIAL ACTIVITES OF CINNAMON OIL AND CINAMALDEHYDE FROM *CINNAMOMUM VERUM* BARK

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Cinnamomum verum, called "true cinnamon" is a small evergreen tree belonging to the family Lauraceae.Among other species, its inner bark is used to make cinnamon. Cinnamomum verum barks is called Cortex Cinnamomi for their medicinal cinnamon bark.In this investigation, Cinnamomum verum was chosen to prepare essential oils by hydrodistillation and to identify and quantify their volatile compound compositions. Cinnamomum verum extract (CBE) was determined to have the yield (1.5%) of essential oil.Gas chromatography (GC) was used to identify and quantify the volatile compound composition.An analysis of hydro-distilled cinnamon oil and pure cinnamaldehyde by gas chromatography revealed that cinnamaldehyde is the major component comprising 77% in the essential oil and the purity of cinnamaldehyde in use is high (> 98%). Both oil and pure cinnamaldehyde of CBE were equally effective in inhibiting the growth of various isolates of bacteria including Gram-positive, and Gram-negative and fungi including yeasts .Their minimum inhibition concentrations (MIC) as determined by agar dilution method varied only slightly.The antimicrobial effectiveness of CBE oil and its major constituent is comparable and almost equivalent, which suggests that the broad-spectrum antibiotic activities of CBE oil are due to cinnamaldehyde.

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1288

EVALUATION OF ANTIBACTERIAL EFFECT OF *ZATARIA MULTIFACTORIA* EXTRACT ON ESBL STRAINS OF *E. COLI* ISOLATED FROM URINARY TRACT INFECTIONS IN THE IMAM REZA HOSPITAL OF AJA

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Urinary tract infections are the most common bacterial infection is a major cause of referrals to clinics and hospitals [1-4]. Since *E. coli* is the most common urinary tract pathogens in both sexes and all ages, for a quick start to the appropriate and most effective treatment for urinary tract infections, antibiotics are selected [5-9]. Traditionally beta-lactam antibiotics are the most common treatment of bacterial infections [10]. Today, the occurrence of bacterial resistance against antibiotics and side effects, those who possess antibacterial herbs are taken more into consideration [11] . One herb that is Zataria multifactoria is a great concern [12-13].In this experimental study, the Thyme with scientific name of Zataria multifactoria has been used. Having prepared the alcoholic extract, the effect of 25 mg/ml,50 mg/ml, 100 mg/ml, 200 mg/ml and 400 mg/ml of this extract were studied using disk diffusion agar on Escherichia coli bacteria.The effect of plant extracts of thyme on the different phases of bacterial growth using a spectrophotometer and draw a large number of growth curves were measured precisely.The *Zataria multifactoria* alcoholic extract prevented the growth of Escherichia coli bacteria.The Zataria multifactoria alcoholic extract has significant inhibitory role in the growth of Escherichia coli bacteria in vitro.Meanwhile, more researches are recommended due to reaching more inclusive results.

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1292

EFFECT OF DIETARY INCLUSION OF *ZATARIA MULTIFLORA* ON HISTOLOGICAL PARAMETERS OF BURSA OF FABRICIUS IN BROILERS

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Regarding the remarkable role of bursa of Fabricius as a primary lymphoid organ in poultry, this study aimed to evaluate the effect of long term administration of Zataria multiflora as an herbal immunomodulatory agent on histological features of this organ in broiler chickens.To this end, fifty, one-day old chickens were randomly divided into five equal groups and fed with diets contained 0.5, 1, 1.5, and 2% of Z. multiflora (experimental groups) or basal diet (control group) for 45 days. On day 46, birds were slaughtered and bursa of Fabricius was dissected immediately.6µm-thick transverse sections were made and stained with H&E for measuring height of pelicae, follicular width as well as thickness of follicular cortex and medulla using a linear graticule.Number of follicles in plicae was also counted under light microscope. The results showed a dose dependent increase in all histomorphometric parameters due to Z. multiflora administration and the highest increase was in the thickness of follicular cortex of birds treated with 2% *Z. multiflora*. In conclusion, dietary inclusion of Z. multiflora during the rearing period of broilers, dose dependently affects histological structures of bursa of Fabricius in a way that may enhance its role as a lymphoid organ.

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1296
ANTIOXIDANT ACTIVITIES OF FENNEL (*FOENICULUM VULGARE*) SEED EXTRACTS

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In this paper, the antioxidant activity of ethanol extracts of *Foeniculum vulgare* seed (FS) was evaluated by in virtue antioxidant assay, as well as total antioxidant, free radical scavenging, hydrogen peroxide scavenging and reducing power. FS antioxidant activity was compared to another antioxidants which is butylated hydroxytoluene (BHT), and a-tocopherol (USP) in this study. The ethanol extract of FS showed physically powerful antioxidant activity. 100 mg of ethanol extracts exhibited 99.5% and 78.5% inhibition of peroxidation in linoleic acid, in that order, and greater than the same dose of a-tocopherol (36.1%). Extract of FS have effective reducing power, free radical scavenging and hydrogen peroxide scavenging.This antioxidant property depends on concentration and rising with increased amount of sample.Additionally, total phenolic compounds in the ethanol extracts of fennel seeds were determined as gallic acid equivalents.The results obtained in the present study indicated that the fennel (Foeniculum vulgare) seed is a potential source of natural antioxidant.

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1301

ANTI-ANXIETY EFFECT OF HYDRO-ALCOHOLIC EXTRACT OF *TANACETUM BALSAMITA* IN MICE

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Anxiety disorders are important psychological diseases and can affect normal life of patients. Although there are several effective medications for treatment or control of anxiety disorders, they have limited efficacy or may cause adverse drug reactions. Therefore, investigation for newer medication, especially natural products, could be helpful to solve the problem. In this study , the anti- anxiety affects of hydro-alcoholic extracts of aerial part of *Tanacetum balsamita*, were evaluated. Elevated plus maze (EPM) and Light-dark box test were used to evaluate the anti-anxiety effects of the extract and open field test was used for evaluation of locomotor activity. Flumazenil (a Benzodiazepines receptors selective antagonist) was used for evaluating the roll of benzodiazepine receptors in anti-anxiety effects of the extract.The extract of Tanacetum balsamita showed anti-anxiety effects in doses of 5 mg/kg i.p. in EPM test. Although it did not show any significant effect on anxiety in open field test in dose of 5 mg/kg i.p but in doses of 10 mg/kg it showed significant effect in both of experiments.Flumazenil was able to reduce the effect of the extract.The results reveal that response in Tanacetumbalsamita is dose-dependent. As well it has active component(s) with anti-anxiety properties and at least a part of this effect is produced by interaction of the component(s) with benzodiazepine receptors. For evaluation of safety and finding active component(s) of the extract, further studies are needed.

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1312

BIOCHEMICAL STUDY OF THE EFFECTS OF *CAPPARIS SPINOSA* AND DAM KEREM ON THE COETANEOUS WOUND HEALING IN RAT

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Wound and its management are the most common health problems in human and veterinary medicine. Herbal therapy is becoming increasingly popular among patients and physicians. This study was conducted to evaluate the effects of capparis spinosa and dam kerem on full thickness wounds, were assessed by biochemical methods. 36 male Sprague-Dawley rats were grouped into four groups. Excisions were created surgically on the animals' skin. Groups 1, 2 and 3 were treated with extract of C.spinosa, combination of *C. spinosa* and dam kerem and dam kerem alone, while Group 4 was untreated. Wound biopsy specimens were collected on Days 5, 10 and 16 and analyzed. Results showed that the hydroxyproline content in groups 1, 2 and 3 were significantly higher in various post wounding days. The mean of hexosamine in all treated groups was higher than that in control group.In all treated groups, group 2 showed higher biochemical parameters.The present study has demonstrated that combination of C. spinosa and dam kerem includes properties that accelerate wound healing activities, compared to control group.

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1321

DETERMINATION OF TOTAL ANTIOXIDANT CAPACITY OF THE LEAF AND STEM AND LEAF AND STEM TOGETHER OF CELERY(*APIUM GRAVEOLENS*) IN FRESH AND FROZEN STATES BY USING POTASSIUM FERRIC CYANIDE(PFC) METHOD.

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The use of medicinal plants is as old as human life and historically one of the most important sources of food and drug supply.With the rapid development of synthetic drugs in the last twenty years the use of medicinal plants was largely obsoleted. Researchers have found that free radicals causes many diseases such as heart diseases and cancer.Antioxidants blocking the action of radicals.On the other hand, fruits and vegetables such as celery1 including natural antioxidants that preventing the action of free radicals2.In this study, total capacity of antioxidant of extracts of celery(leaf , stem and total species) are determined by the fast and simple PFC(potassium ferric cyanide) method in fresh and frozen states.(ascorbic acid as a standard and in phosphate buffer, pH=6.6).According to Annova test, p-values were less than 0.05. Fresh species, and leaf in comparision with stem have more antioxidant activity.Comparision of extract ' species of leaf and stem also are determined by HPTLC method.(Rf= 0.26, 0.48, 0.53, 0.79, 0.97,..), p-value Type of extract, 0.996 Fresh stem- frized stem, 0.015 Fresh leaf- frized leaf, <0.001 Fresh leaf- fresh stem, <0.001 Frizzed leaf-frized stem. The curve of absorbtion of standard ascorbic acid.

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1340

MOLECULAR PROPERTIES OF A MACROPHAGE-STIMULATING α-GLUCAN FROM CHLORELLA VULGARIS

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Water-soluble polysaccharides obtained from Chlorella vulgaris and fractionated using anion-exchange chromatography were determined to investigate their molecular characteristics and biological activities. The crude and fractionated polysaccharides (F1, F2, and F3) mostly consisted of carbohydrates (40.0–64.7%), proteins (18.3–31.0%), ashes (4.10–16.6%) and uronic acids (1.02–7.30%). Their monosaccharide constituents were predominantly glucose (83.9–100%) with small amounts of xylose (10.8–16.1%). The crude and fractions contained one or two subfractions with average molecular weights (Mw) ranging from 19.7 to 1,145 × 103 g/mol. Fractions F1, F2, and F3 stimulated RAW264.7 cells, inducing considerable release of NO, PGE2 and inflammatory cytokines such as TNF-α, IL-6 and IL-10. The biologically active part of the immune-enhancing fraction (F3) was found to be the polysaccharide moiety with the proposed repeating unit of the molecules established as:

1364

IMMUNOMODULATORY POTENTIAL OF CYNODON DACTYLON: FROM PROMISE TO FACT

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An immunomodulator is a drug used for its effect on the immune system.Since ancient days, plants have been an exemplary source of medicine.The present study was carried out to investigate the effects of the hydroalcoholic extract of Cynodon dactylon on humoral and cellular immunity in mice immunized with sheep red blood cells (SRBC).For this purpose, 14 male mice were used.The animals were immunized with SRBC. The treatment group received 200mg/kg of Cynodon dactylon extract by gavage daily for 2 weeks. The results of this study indicated a significant decrease in the level of anti-SRBC antibody and a significant decrease in the level of DTH in treatment group compared to control-sham group.Moreover, the level of respiratory burst of macrophages was significantly decreased in the splenocytes of the treatment group, while the level of lymphocyte proliferation and spleen weight was significantly decreased in the treatment group compared to control-sham group. Cynodon dactylon is a potential source for naturally occurring immunomodulatory compounds which might be useful in the development of drugs against auto-immune disorders due to its significant effects on the immune system.Further studies are required to precisely clarify the underlying mechanisms.

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1365

NEW APPROACH TO THE IMMUNOMODULATORY BENEFITS OF *PASSIFLORA INCARNATA* IN NMRI-MOUSE

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Passionflower (as well as its harmane alkaloids) have been the subject of much scientific research.After almost 100 years of study the sedative, antispasmodic and analgesic effects of this tropical vine have been firmly established in science.The present study was set out to investigate the effects of Passiflora incarnata on immunity system in NRMI-mice after challenge with sheep red blood cells (SRBC).The study population was consist of 14 male mice that randomly allocated in two equal groups and immunized with SRBC.Mice in treatment group were intraperitoneally received 5 μg/ Kg Passiflora incarnata every other day from the beginning of the study and continued for 2 weeks.The results of the present study indicated a significant increase in the level of anti-SRBC antibody and simultaneously a significant decrease in the level of DTH in treatment group compared to control group.The level of respiratory burst in phagocytic cells of splenocytes was significantly increased in the of treatment groups, while the level of lymphocyte proliferation was significantly decreased in treatment group compared to control group.Moreover, Passiflora incarnate caused a significant reduction in production of pro-inflammatory IL-17 as well as IFN-γ. Also the level of anti-inflammatory IL-10 and TGF-β was significantly increased and conversely, the level of inflammatory IL-6 was dramatically decreased.The major immunomudlatoty effects of Passiflora incarnata may be due to a significant decrease in Th17 cells activity and concurrently a significant decrease in the expansion of Treg lymphocytes.

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1366

NEW INSIGHTS TO THE IMMUNOMODULATORY EFFECTS OF *ANETHUM GRAREOLENS* IN NMRI-MOUSE

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Pharmacological effects of *Anethum grareolens* such antimicrobial or antibacterial, antihyperlipidaemic, antihypercholesterolaemic, antioxidative and hypoglycemic activities have been shown.The present study was set out to investigate the effects of Anethum grareolens on immunity system in NRMI-mice after challenge with sheep red blood cells (SRBC). The study population was consist of 14 male mice that randomly allocated in two equal groups and immunized with SRBC.Mice in treatment group were intraperitoneally received 10 mg/ Kg *Anethum grareolens* every other day from the beginning of the study and continued for 2 weeks.The results of the present study indicated a significant increase in the level of anti- SRBC antibody and simultaneously a significant decrease in the level of DTH in treatment group compared to control group.The level of respiratory burst in phagocytic cells of splenocytes was significantly increased in the of treatment groups, while the level of lymphocyte proliferation was significantly decreased in treatment group compared to control group. Anethum grareolens may be used as a source to intervene in immunity system.

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1367

A SEARCH FOR ANTI CONVULSANT ACTIVITY OF THE ETHANOLIC EXTRACT OF *VERBENA OFFICINALIS* IN MICE AND COMPARATION TO DIAZEPAM

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To evaluate the anticonvulsant activity of the aerial parts of Verbena officinalis used traditionally by local Iranian people for the treatment of convulsion.The anticonvulsant activity of the extract (100,200,400 mg/kg, p.o.) was assessed in pentylenetetrazole - and maximal electroshock-induced seizures in mice.Diazepam (1 mg/kg, i.p.) was used as reference drug respectively.In addition, for investigating the mechanism of Vervain in PTZ model, flumazenil (2 mg/kg, i.p.) and naloxone (5 mg/kg, i.p.) were injected before Vervain.The extract showed no toxicity and significantly increased the time taken before the onset and decreased the duration of the seizures induced by PTZ (90 mg/kg). in the MES test, Vervain display significant reduction in HLTE duration in a dose-dependent manner.Flumazenil and naloxone could reversed anticonvulsant effects of Vervain. The results propose that Vervain ethanolic extract has anticonvulsant activity against grandmal and petitmal seizures.It seems that these effects may be related to potentiation of GABAergic system. Moreover, this study support s the use of this plant by local Iranian people in order to treatment of convulsion.

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1368
IMMUNOMUDULATORY POTENTIAL OF *CRATAEGUS MICROPHYLLA* EXTRACT

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Traditional drugs have become a subject of world importance, with both medicinal and economical implications. A regular and widespread use of herbs throughout the world has increased serious concerns over their quality, safety and efficacy.This study was conducted to check the immunomodulatory properties of Crataegus microphylla in mice challenged with sheep red blood cells (SRBCs). Twenty male NMRI-mice randomly allocated in two equal groups and immunized with sheep SRBCs.Mice in treatment group were orally received *Crataegus microphylla* hydroalcholic extract (0.75 g/Kg-daily) from the beginning of the study and continued for 2 weeks. Immunomodulatory potential of extract was assumed by the effect on cellular immune response, haemagglutination antibody titre, leukocyte count, spleen weight and respiratory burst intensity in phagocytic cells of splenocytes. The results indicated a significant increase in the level of cellular immune response study, an enhancement in foot pad thickness, and simultaneously a significant decrease in the level of anti-SRBC antibody in treatment group compared to control group.The level of respiratory burst in phagocytic cells of splenocytes was significantly increased in the of treatment groups, while the level of lymphocyte proliferation was significantly decreased in treatment group compared to control group.Moreover, spleen weight and leukocyte count was significantly increased in the treatment compared to control mice. extract of Crataegus microphylla may be used as a natural source to intervene in immunity system.

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1371

THE EFFECT OF THE HYDROALCOHOLIC EXTRACT OF *CINNAMOMUM ZEYLANICUM* ON THE BEHAVIORAL SYMPTOMS OF MORPHINE WITHDRAWAL IN MICE

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Today, addiction to drugs such as morphine is one of the major social problems. Chronic morphine exposure leads to physical and psychological dependence, and withdrawal symptoms encumber detoxification upon cessation [1]. In this study, we attempted to evaluate the effects of cinnamon on morphine withdrawal symptoms [2]. This experimental study was conducted at the physiology research center of Mashhad University of Medical Sciences in 2014. In total, 50 male albino mice were exposed to morphine. Drug dependence was induced by the subcutaneous injection of morphine (50, 50, and 75 mg/kg at 8:00 a.m., 12:00 p.m., and 16:00 p.m., respectively) for three days. On the fourth day, morphine was injected two hours prior to the intraperitoneal injection of naloxone [3].Then, 200, 100, and 50 mg/kg of the hydroalcoholic extract of cinnamon were randomly injected in 6, 6, and 10 mice, respectively. For positive control, 10 mice were injected 0.3 mg/kg of clonidine, simultaneously. The frequency rates of jumping, defecation, urination, itching, and writhing (30 min after the intraperitoneal injection of 2 mg/kg naloxone) were considered as the indicators of morphine withdrawal.According to the present findings, the hydroalcoholic extract of cinnamon had dose-dependent effects on muscle traction, myoclonus, and urination in mice.The frequency of defecation was significantly different between the intervention and control groups (P>0.05).There was no statistical difference in terms of myoclonus between the mice treated with clonidine and those treated with cinnamon (P>0.05); however, the control group was significantly different from other groups. Urine amount was similar in the control, clonidine, and cinnamon (200 mg/kg) groups (P>0.05).Also, no significant difference was observed in muscle traction (writhing) between cinnamon (200 and 100 mg/kg) and clonidine groups (P>0.05).Cinnamon can be used for opiate detoxification. However, further research is required to detect the effect of the hydroalcoholic extract on morphine withdrawal symptoms in white mice.

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1393

EFFECT OF TRADITIONAL OMID BAKHSH® DRUG ON MALE FERTILITY AND QUALITY AND QUANTITY OF SPERM IN PATIENTS WITH OLIGOSPERMIA

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Infertility is lack of pregnancy one year after marriage without contraception [1]. In Iranian traditional medicine, the effects of Honey, Royal jelly [2], Zingier officinal, Propolis and Pepper longum on male fertility were investigated. In this study effect of compound drug containing above mentioned herbs (OMIDBAKHSH POWDER®) on male fertility was investigated. This study is a quasi experimental that carried out on all Oligospermia men that went to ACECR center , Qom Branch for infertility treatment. After filling satisfaction letter, Patients with a diagnosis of Oligospermia in first were treated with traditional medical method.All components of this drug package include: (Taghviat Maghz & Asaab Capsules, Royal jelly capsule, Omid Bakhsh mixture and Omid Bakhsh powder) with brand of Omid Bakhsh drug were made in BooAli Daroo Pharmaceutical company. Semen test for patients such as quantity, shape and motility of sperm, before and after drug administration were measured in ACECR center for infertility treatment. From eleven patients with Oligospermia. All patients aged 26-39 years with 31.9±3.8 years. Five participants for 40 days and six participants for 80 days received compound drug. Among people who received drug for 40 days, four participants (80%) were pregnant. Of course there is one case of abortion. For this reason none of them Second step of Semen test doesn't carried out. Among other six patients there are no cases of pregnancy, but their second test showed that count average from 24.67 reached to 35.83 (P=0.116). Total count values from 58.67 reached to 93.3 (P=0.345). Motility values from 31.67 reached to 33.3 (P=N.S). But there is no many change in A-class, B-class and morphology of sperms. Administration of this traditional compound drug can increase the level of fertility in men. It is recommended that drug was administered for 40 days. It is also recommended that before using modern techniques of fertility, be used from this method under the supervision of a physician. In this study the number of samples was low, increase number of samples lead to show precise results.

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1395

COMPARABLE POTENCY POTENCY OF THE RELAXANT EFFECT OF DIFFERENT EXTRACTS, FRACTIONS AND CONSTITUENTS OF MEDICINAL PLANTS

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The maximum relaxation effect (effect of most potent concentration) of each extract, fraction and constituents of different plants was calculated for 1 mg/ml and compared between different extract, fraction and constituents of each plant as well as between different studied plant for each extract or fraction. Relaxant effects of aqueous ethanolic extract (suxhelate prepared) of *Z. multiflora* on methacholine induced contraction and C. copticum on both methacholine and KCl induced contraction were higher than other studied medicinal plant. Ethanolic extract of H. Canadensis on methacholine induced contractiojn and S. saligna on both methacholine and KCl induced contraction showed higher relaxant effect than other plants. The relaxant effect of essential oil from R. officinalis on both methacholine and KCl induced contraction of tracheal smooth muscle was higher than other studied plants. Relaxant effects of suxhelate prepared aquous extract of P. oleracea, A. vasica and O. basilicum mainly on methacholine induced contraction were higher than other studied medicinal plants. For macerated prepared aquous extract, A. vasica and P. oleracea, mainly on methacholine induced contraction, showed higher relaxant effect than other studied plants. Among studied fractions, the relaxant effect of ethylacetate fraction from R. damascene on both methacholine and KCl induced contraction of smooth muscle was higher than others. Studied constituents of different plants, showed potent relaxant effect for carvacrol on both methacholine and KCl and for safranal only on methacholine induced tracheal smooth muscle contraction. The maximum relaxation effect (effect of most potent concentration) of each extract, fraction and constituents of different plants was calculated for 1 mg/ml and compared between different extract, fraction and constituents of each plant as well as between different studied plant for each extract or fraction. It is concluded that the extracts of *Z. multiflora*, *C. copticum*, *H. Canadensis*, *S. saligna*, *R. officinalis*, *P. oleracea*, *A. vasica* and *O. basilicum* showed greater relaxant effects on tracheal smooth muscle than many other examined plants which could of clinical importance in inducing bronchodilation in obstructive pulmonary diseases.

1397

EFFECTS OF LIPECSAN® ON BLOOD LIPIDS PROFILE, IN COMPARISON TO PLACEBO IN PRESENCE OF GEMFIBROZIL

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Hyperlipidemia effected by many factors such as diet, weight, physical exercise, drug usage and genetic. There are various kind of drugs in traditional medicine that can reduce blood lipids levels such as *Allium sativum* [1], *Anethum graveolens* [2], Rhus coriaria and Morus alba. In this study effect of compound drug containing above mentioned herbs on blood lipids was investigated. In this study double-blind clinical trial on patients aged 18-75 years, cholesterol level was 250 mg/dl and triglycerides level was 200-499 mg/dl was carried out. If there are no exclusion criteria, patient filled satisfaction letter and then divided in to two groups randomly: The first group contain of patients who received two herbal drug capsules (750 mg), three times daily for six weeks. The second group received Placebo capsule with the same dose as herbal capsule. Both groups were received capsule of 300 mg Gemfibrozil once daily. Drugs were made in BOOALI DAROO pharmaceutical company with Lipecsan and Placebo brand names. For investigation of effects of each group Paired T-test was used and for comparison of two groups effects Independent T-test was used. there were 37 patients in this study, 16 patients received placebo and 21 patients received drug. 20 patients were female (54.1%). Patients aged 47.6±9.6 years. According to all demographic variables there is no statistical significance between two groups ($p>0.05$). Average of blood triglycerides levels in drug group before of treatment was 404.5 mg/dl that after treatment reached to 206.2 mg/dl($p<0.001$). These values in placebo group were 303.2 mg/dl and 239.4 mg/dl respectively ($p=0.004$).in drug group triglycerides decreased significantly in comparison to placebo group ($p=0.02$). In two groups Cholesterol and LDL levels were decreased but this decrease not statistically significant ($p>0.05$). Due to anti-triglycerides effects of compound drug, this drug can be administered to the patients who are having high blood lipids. More studies should carry out about this drug with synthetic drugs.

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1400

ANTIMICROBIAL PROPERTIES OF SOME ESSENTIAL OILS AGAINST SOME ON FOOD-BORNE PATHOGENIC BACTERIA.

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Investigations were carried out to assess the efficiency of five plant essential oils: thyme, myrtle, laurel, sage, and orange oils as natural food preservatives. The effect of the plant essential oils against Bacillus cereus, Listeria monocytogenes, Staphylococcus aureus and Yersinia enterocolitica at concentrations of 10–30 µl/disk (diameter 6 mm) and 0.5–3% (v/v) was studied in agar diffusion test medium and milk medium. The essential oils of these extracts exhibited markedly antibacterial and bacteriostatic activity, with thyme showing the highest inhibition and orange the lowest. However, with thyme extract, high inhibitory activity was observed for all tested concentrations, L. monocytogenes showed less sensitivity towards essential oil extracts.

1406
PROTECTIVE EFFECT OF TURMERIC (*CURCUMA LONGA*) ON SALINOMYCIN TOXICITY IN THE BURSA OF FABRICIUS OF BROILER CHICKEN

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Ionophores are in common use as food additives for the control of coccidiosis and for increased feed efficiency in broiler chickens. Ionophores could induce toxic syndromes as a result of overdose and misuse situations [1]. Several studies have indicated a beneficial role of turmeric in terms of antioxidant and tissue-protective activities [2]. The present study was carried out to investigate the histological protective effects of the turmeric against salinomycin induced bursa toxicity in broilers. Thirty chicks were divided into three groups. First group received salinomycin 300 mg/kg orally for days 22-35, the second group received the same dose of salinomycin but was supplemented with turmeric powder (1000 mg/kg) for days 22-35 and the third group served as the control. At the end of the period, five chicks were selected from each group and sacrificed. The specimens were stained with hematoxylin-eosin method and then analyzed under a light microscope. The results showed that lymphocytes were decreased in number in medulla of the follicles in the first group. In some follicles lymphocytes underwent degeneration. Interfollicular connective tissue became widened in the first group and there was interstitial edema. Also there were many secretory vesicles in the columnar coating epithelium. The bursae in second group showed moderate lymphocytic depletion and reticular cells proliferation. The interstitial tissue exhibited reduced edema in comparison to first group. The results of this study showed that turmeric powder prevented lesions of bursa Induced by salinomycin and histological injuries.

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1411

IN VITRO SURVEY ON ANTI BACTERIAL EFFECT OF ESSENTIAL OIL OF *CITRUS AURANTIUM* L. (BITTER ORANGE)

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Even though pharmacological industries have produced a number of new antibiotics in the last three decades, resistance to these drugs by microorganisms has increased. In general, bacteria have the genetic ability to transmit and acquire resistance to drugs, which are utilized as therapeutic agents [1]. To overcome this problem of resistance of bacteria, researchers concentrate their study to find out new drug from medicinal plants. Throughout the history of mankind, many infectious diseases have been known to be treated with herbal remedies .The natural herbal products either as pure compounds or as standardized plant extracts provided unlimited opportunities for new drug leads because of the uncompared availability of diversities of chemical [2]. Escherichia coli O157:H7 is an enterohemorrhagic serotype of the bacterium Escherichia coli and a cause of illness, typically through consumption of contaminated food. Infection may lead to hemorrhagic diarrhea and to kidney failure [3]. The peel of Citrus fruits is a rich source of flavanones and many polymethoxylated flavones, which are very rare in other plants [2]. In this study essential oil of Bitter Orange (Citrus aurantium L.) extracted by Clevenger distillation then antibacterial effect of essential oil of Bitter Orange against Escherichia coli O157:H7 studied. Prepare petri plates of sterile molten Mueller Hinton Agar (Hi-Media, Mumbai) at around 40°C and solidify the petri plates. After solidification, bacteria cultured in hole of the plates surfaces. Then 6 mm wells were prepared. In these wells essential oil were added. The plate was incubated overnight at 37°C. After incubation the zones of inhibition were measured as millimeter and recorded. These studies were performed in triplicate. Result of this study show that essential oil of Bitter Orange has inhibitory effects on bacterial growth. The current treatment regimens for Escherichia coli, which are based on chemotherapy, are limited and are not ideal because they are often associated with severe side effects and by considering an increase in drug resistance against Escherichia coli, it is possible to use the essential oil of Escherichia coli instead of chemical drugs.

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1412

ANTIBACTERIAL EFFECT OF ESSENTIAL OIL OF *CITRUS LEMON* ON *ESCHERICHIA COLI* O157:H7

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The use of plant extracts and phytochemicals, both with known antimicrobial properties, can be of great significance in therapeutic treatments [1]. Many plants have been used because of their antimicrobial traits, which are due to compounds synthesized in the secondary metabolism of the plant [1, 2]. Essential oils are more effective in controlling biofilm cultures due to their better diffusibility and mode of contact [2]. Escherichia coli O157:H7 is an enterohemorrhagic serotype of the bacterium Escherichia coli and a cause of illness, typically through consumption of contaminated food. Infection may lead to hemorrhagic diarrhea and to kidney failure [3]. Lemon is an important medicinal plant of the family Rutaceae. It is cultivated mainly for its alkaloids, which are having anticancer activities and the antibacterial potential in crude extracts of different parts (viz., leaves, stem, root and flower) of Lemon against clinically significant bacterial strains has been reported [2]. In this study essential oil of Lemon (Citrus lemon) extracted by Clevenger distillation then antibacterial effect of essential oil of Lemon (Citrus lemon) against Escherichia coli O157:H7 studied. Different concentration of essential oil as 1:20, 1:40, 1:60, 1:80 and 1:100 were used. Prepare petri plates of sterile molten Mueller Hinton Agar (Hi-Media, Mumbai) at around 40°C and solidify the petri plates. After solidification, bacteria cultured in hole of the plates surfaces. Then 6 mm wells were prepared. In these wells essential oil were added. The plate was incubated overnight at 37°C. After incubation the zones of inhibition were measured as millimeter and recorded. These studies were performed in triplicate. Result of this study show that essential oil of lemon has inhibitory effects on bacterial growth and concentration 1:20 and 1:40 had more inhibitory zones than other concentrations. The current treatment regimens for Escherichia coli, which are based on chemotherapy, are limited and are not ideal because they are often associated with severe side effects and by considering an increase in drug resistance against Escherichia coli, it is possible to use the essential oil of Escherichia coli instead of chemical drugs.

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1413
EFFECT OF ESSENTIAL OIL OF *ROSA DAMASCENA* ON WOUND HEALING

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Skin diseases occur in all countries and about 80% of the world's populations depend upon traditional medicines for various skin diseases. Wound repair is a natural reaction to injury which results in restoration of tissue integrity. Repair process of wound will complete within 3 phases including: inflammation, proliferation and remodeling. There is a similarity between wound healing in human and certain animal species. Recently, the traditional use of plants for wound healing has received attention by the scientific community [1]. *Rosa damascena*, more commonly known as the Damask rose, or sometimes as the Rose of Castile, is a rose hybrid, derived from Rosa gallica and Rosa moschata [2]. Damascus roses are used in cooking as a flavouring ingredient or spice. It appears as one of the ingredients in the Moroccan spice mixture known as ras el hanout. Rose water and powdered roses are used in Persian, Indian, and Middle Eastern cooking. Rose water is often sprinkled on meat dishes, while rose powder is added to sauces. Chicken with rose is a popular dish in Persian cuisine. Whole flowers, or petals, are also used in the herbal tea. The most popular use, however, is in the flavoring of desserts such as ice cream, jam, Turkish delights, rice pudding, yogurt etc. The monoterpene hydrocarbons and esters are the component of essential oil of Rosa damascena [3]. In this study essential oil of Rosa damascena extracted by Clevenger distillation then effect of essential oil of Rosa damascena on wound healing in rabbits studied. Different concentrations of essential oil were used. Effect of essential oil on diameter of induced hole wounds were studied. Results obtained from this study show that essential oil of Rosa damascena in highest concentrations (20 and 25%) has promoting wound healing activity. The present study demonstrated that essential oil of *Rosa damascena* was capable of promoting wound healing activity. So we advised that effect of this essential oil on wound healing in other animals and also in humans study in future work. Also effect of this essential oil on wound healing in gastro intestinal tubes cab be study in same works.

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1414
REPELLENT ACTIVITY OF ESSENTIAL OIL OF *EUCALYPTUS GLOBULUS* AGAINST DERMANYSUSS GALLINAE

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By definition, repellents are substances that act locally or at a distance, deterring an arthropod from flying to, landing on or biting human or animal skin (or a surface in general). Usually, insect repellents work by providing a vapor barrier deterring the arthropod from coming into contact with the surface [1]. Dermanyssus gallinae is an ectoparasite of poultry and other bird species. After feeding, they hide in cracks and crevices away from daylight, where they mate and lay eggs. Young birds are most susceptible. Mites can also affect the health of the birds indirectly, as they may serve as vectors for diseases such as Salmonellosis, avian spirochaetosis and Erysipelothrix rhusiopathiae [2]. In this study essential oil of Eucalyptus globulus extracted by Clevenger distillation then repellent activity of essential oil of *Eucalyptus globulus* against Dermanysuss gallinae studied by Y-tube olfactometer bioassay. Y-tube olfactometer consists on a glass Y-tube with a main arm (the stem) and two arms containing one repellent and the control in other one, where a low rate air movement is created by sucking the air in the two arms of the Y-tube with a pump connected to the stem. The essential oil sample and control are applied on a paper attached to the arms of the tube. Insects are introduced into the tube by a hole located at the center (the joint point of the three tubes), after introduction the hole is closed with a rubber stopper and the pump is operated. After seconds of exposition, the number of insects on each of the two tubes (treated and control) are scored to assess the percentage repellency [3]. Result of this study show that essential oil of *Eucalyptus globulus* has strong effect against Dermanysuss gallinae. The current method for repellent arthropods which are based on chemotherapy, are limited and are not ideal because they are often associated with severe side effects, so it is possible to use the essential oil instead of chemical drugs.

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1419
THERAPEUTIC EFFECTS HENBANE (*HYOSCYAMUS NIGER*) SEEDS SMOKE IN PUBLIC BELIEFS OF PEOPLE KURDISTAN (WEST OF IRAN)

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Using of medicinal plants for the treatment of human diseases has a rich history, [1] the preparation and consumption of medical plants can be diverse such as eating raw fresh herbs, incense, boiling and extract the juice, combined with other herbs and drying [2]. In popular culture and traditional beliefs of the West of Iran (Kurdistan- Sanandaj) in order to relieve pain and disorders of the eye or removal of pathogens and parasites of the eyes they used smoke of henbane (*Hyoscyamus niger*). This plant grows abundantly in parts of Asia and Europe [3, 4] and has several properties including antispasmodic, sedative and analgesic [3, 5, 6] also the extracts of this plant is used to treat Parkinson. [7] The grain compositions are alkaloids, flavonoids, tyramine derivative, withanolides and lignanamides.[3, 5, 6] in this study the effects of traditional method of burning the grain and incense smoke which is believed to the exit the parasites from eyes was investigated. patients with clinical symptoms of eye pain take their head and eyes to smoke rising from burning seeds under a blanket for a few minutes then the imaginary worms are extruded in the tray of water on the ground, in this way the patient feels comfortable and eye pain is reliefs, it was clear that contrary to popular beliefs the agents isolated from the patient's eye are not pathogen they are just internal material of the seed that separated by heating. Pain relief can related to both psychological condition or from seed properties that need to be investigate in future studies.

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1433
ANTIMICROBIAL ACTIVITY AND CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *CORIANDRUM SATIVUM*

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The essential oil from leaves of *Coriandrum sativum* L. (Apiaceae), obtained by hydro distillation was analysed by gas chromatography–mass spectrometry (GC–MS) and also evaluated for in vitro antimicrobial activity. Out of 27 peaks, 24 components, which constitute 91.9%, were identified in the oil. The oil was dominated by aldehydes and alcohols which accounted for 57.2% and 46.5% of the oil, respectively. The major constituents were 2E-decenal (16.1%), decanal (14.5%), 2E-decen-1-ol (14.2%) and n-decanol (13.7%). Other constituents present in fairly good amounts are 2E-tridecen-1-al (6.56%), 2E-dodecenal (6.32%), dodecanal (4.76%), undecanol (3.47%), and undecanal (3.13%). The oil was screened for antimicrobial activity against both Gram positive (*Staphylococcus aureus*, *Bacillus* spp.) and Gram negative (*Escherichia coli*, *Salmonella typhi*, *Klebsiella pneumonia*, *Proteus mirabilis*, *Pseudomonas aeruginosae*) bacteria and a pathogenic fungus, *Candida albicans*. The oil showed pronounced antibacterial and antifungal activity against all of the microbes tested, except for P. aeruginosae, which showed resistance.

1438

A COMPARATIVE STUDY ON EFFECTS OF *MENTHA PULEGIUM* EXTRACT WITH FLORFENICOL ANTIBIOTICS ON LIVER HISTOMORPHOMETRY OF RAINBOW TROUT

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Use of antibiotics and other chemicals in pond culture is quite expensive and undesirable; because of its risk for environmental contamination as well as impairing the growth of fish. In addition, there are many reports showing that components of origanum vulgare extract, such as ursolic acid and rosmarinic acid, have potential of antioxidant activities by scavenging free radical. The aim of this study was to evaluate liver Histomorphometry of rainbow trout that fed with origanum vulgare extract and Florfenicol. This study was conducted in 3 treatments and 3 replications. Treatments consisted of; treatment I: normal control fish (basal diet without any additives), treatment II: basal diet plus antibiotics Florfenicol, treatment III: basal diet plus 1% extract of Origanum vulgare. After completing the course, the liver of the fishes were sampled. The livers were fixed in 10% neutral buffered formalin, sliced transversely, paraffin embedded, and prepared as 5 mm thick sections and then stained with Hematoxylin and Eosin for light microscopic evaluation. The results showed that in FFC-treated fishes distributed glycogen and lipids (*Hepatocellular vacuolation*) with varying degrees. Fishes were fed with extracted of origanum vulgare, demonstrating the normal histological structure of hepatocytes, sinusoidal space and central vein. These histopathological observations suggest that use of extracted oreganum vulgare in feeding the Rainbow trout, does not have any negative effect on the liver but May it is useful for liver function and improve detoxifications.

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1442

STUDY OF EFFECTS OF ALFALFA (*MEDICAGO SATIVA*) AS MEAL AND EXTRACT ON SOME HEMAROLOGICAL PARAMETERS OF COMMON CARP (*CYPRINUS CARPIO*)

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Herbal products and extracts can improve immunological parameters in aquatic animals by different mechanisms and have an important role in aquaculture as an immunestimulant. In this study, effects of different levels of Medicago sativa (as extract and meal) as a supplement in diet of juveniles of Common carp (Cyprinus carpio) on some haematological parameters have been studied. 270 common carp (with mean weight: 18±2 gr) were distributed in 27 fiberglass tanks were poured with 250 litres of dechlorinated water. After adaptation, fish were fed as satiation with different levels of alfalfa extract (1, 2, 3 and 4 per cent) and alfalfa powder (3, 6, 9 and 12 per cent) and one diet without any supplement as control group. After eight weeks of experimental trial, 5 fishes were randomly collected from each tank and anesthetized with Eugenol (clove oil extract). Blood samples were collected from caudal vein by 2 ml heparinized syringes and then transferred into heparinized micro tubes for haematological examination including haematocrit, hemoglobin concentration and differential WBC count. The results indicated that haematological parameters have been affected by increasing trend in alfalfa levels (as meal and extract) and it was statistically significant ($p<0.05$). Neutrophiles and Monocytes have been affected more than other cells by this herbal product. Also, haemoglobin concentration and haematocrit were increased specially on 12% of meal and 4% extract ($p<0.05$). Some vitamins such as Vitamin E and Vitamin K have found in Alfalfa composition which have an immune stimulatory and effects and have a important role in hematopoiesis [1, 2]. Yan et al. (2008) reported that using from alfalfa meal at the level of 5% in diet of Yellow River Carp has changed Growth Performance and Pigmentation [2]. Based on the results obtained from this study, alfalfa extract and meal may be proposed as a supplementation in diets of Cyprinus carpio.

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1456
FREE RADICAL SCAVENGING ACTIVITY AND LIPID PEROXIDATION INHIBITION OF *HYPERICUM HELIANTHEMOIDES* (SPACH) BOISS

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Antioxidants are compounds that obstruct the oxidation of macromolecules in the body. In general, there are two categories of antioxidants, natural and synthetic. Recently, interest has been increased considerably for obtaining new natural antioxidants. In this study, the scavenging of free radicals such as DPPH, NO and OH by Hypericum helianthemoides extract were evaluated. Also, the antioxidant properties of this extract were assessed by FRAP, FTC (inhibition of lipid peroxidation) methods and determination phenolic compounds. The plant was collected from north of Fars Province and plant extraction was obtained using ethanol. In DPPH radical scavenging the different concentrations of the Hypericum extract were added to DPPH radical. In hydroxyl radical scavenging, Fenton reaction mixture, TCA and TBA were mixed with Hypericum extract. In nitric radical scavenging, nitropruside was mixed with Hh extract and then sulphanilic acid, naphthylene diamine were added. In determination phenolic compounds Folin-ciocalteu and sodium carbonate were added to Hh extract. In DPPH radical scavenging, the IC50 of Hypericum extract (309.35±6.5 µg/ml) was higher than the antioxidant standards, BHT (IC50=81.9±2.6 µg/ml) and quercetin (IC50=60.04±6.48 µg/ml, $P<0.05$). The highest scavenging of hydroxyl radical was observed in Hypericum extract (70.3±0.8%, in125 µg/ml) and in gallic acid it was (73.8±3.3%). In 200 µg/ml of Hypericum, extract scavenged NO radical (85.2±2.7%). In FRAP method, the IC50 of this extract was 109.7±10.5 mg/ml. In FTC method, the inhibition of lipid peroxidation by Hypericum extract, BHT and ascorbic acid were 59.2±2.2, 66.9±0.15, 64.06±0.02 respectively. Total phenol of the plant extract was 3±0.4 mg/g.

1469
EFFECT OF (*OREGANUM VULGARE*) EXTRACT ON HISTOMORPHOMETRICAL OF GILLS IN RAINBOW TROUT (*ONCORHYNCHUS MYKISS*)

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Aromatic plants are excellent sources of bioactive compounds that can be extracted using several processes. oreganum vulgare extracts and essential oil from Portuguese origin are strong candidates to replace synthetic chemicals used by the industry. The gills, which participate in many important functions in fish, such as respiration, osmoregulation and excretion, remain in close contact with the external environment. This study aimed to evaluate histological effects of origanum vulgare extract in gills of fishes. This study was conducted in 2 treatments and 3 replications. Treatments consisted of; treatment I: normal control fish (Basal diet without any additives), Treatment II: Basal diet plus 1% extract of oreganum vulgare. After completing the course, gills of the fishes were sampled. The gills were fixed in 10% neutral buffered formalin, sliced transversely, paraffin embedded, and prepared as 5 mm thick sections that were stained with hematoxylin and eosin for light microscopic. According to the results, Gills didn't represent any abnormality in cell and tissue structure. Series of separate and regular lamellae, where gas exchanges and other physiological events occur, sited on the upper and lower surface of each filament. The entire length of the filaments and lamellae was lined by normal epithelial cells and chloride cells were large, scattered along the filaments .This study suggests that the extracted of oreganum vulgare hadn't any side effects on gills structures and may be used as phytobiotics and will be used instead of some synthetic antibiotics.

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1471
SAFETY ASSESSMENT OF CORIANDER ESSENTIAL OIL AS A FOOD ADDITIVE

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Coriander essential oil is used as a flavor ingredient, but it also has a long history as a traditional medicine. It is obtained by steam distillation of the dried fully ripe fruits (seeds) of *Coriandrum sativum* L. The oil is a colorless or pale yellow liquid with a characteristic odor and mild, sweet, warm and aromatic flavor; linalool is the major constituent (~70%). Based on the results of a 28 day oral gavage study in rats, a NOEL for coriander oil is approximately 160 mg/kg/day. In a developmental toxicity study, the maternal NOAEL of coriander oil was 250 mg/kg/day and the developmental NOAEL was 500 mg/kg/day. Coriander oil is not clastogenic, but results of mutagenicity studies for the spice and some extracts are mixed; linalool is non-mutagenic. Coriander oil has broad-spectrum, antimicrobial activity. Coriander oil is irritating to rabbits, but not humans; it is not a sensitizer, although the whole spice may be. Based on the history of consumption of coriander oil without reported adverse effects, lack of its toxicity in limited studies and lack of toxicity of its major constituent, linalool, the use of coriander oil as an added food ingredient is considered safe at present levels of use.

1472
EFFECTS OF TRIBULUS TERRESTRIS ON LONG TERM CYCLOPHOSPHAMIDE TOXICITY IN RATS

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Cyclophosphamide (CYP) is anticancer and immunosupressive drug with several important side effects. At present study, we evaluated effects of Tribulus terrestris extract (TTE) on toxicity of CYP in rats. Thirty two female rats were divided into 4 groups and treated with these drugs for 42 days twice in week intraperitoneally. Saline (in control group), CYP, CYP+ TTE and TTE were administrated in each group. At the end of study, the animals were anesthetized and the rats were scarified. Liver, spleen and kidney were removed and fixed in formalin-buffer for histopathological examination. After 6 weeks of CYP administration disintegration of liver parenchyma and hepatic architecture were seen in histopathological inspection. Also histopathological examinations of spleen revealed immunosuppression of lymphoid tissue with disruption of the normal architecture. Combined treatment with CYP and TTE showed marked improvement of the histopathological findings. These findings indicated that Tribulus terrestris play an important role in the protection against CYP toxicity in rats.

1481

ANTIBACTERIAL EFFECTS OF SILVER NANOPARTICLES PRODUCED *CAPPARIS SPINOSA* L. LEAF EXTRACTS

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Silver nanoparticles display unique physical and biological properties which have attracted intensive research interest because of their important medical applications. In this study crystalline silver nanoparticles were successfully produced from silver nitrate using *Capparis spinosa* leaf extract. This extract serves as a reducing agent. The AgNPs were characterized using UV-visible spectroscopy, scanning electron microscopy. The antibacterial activity of Ag nanoparticle produced Capparis spinosa was studied against four pathogenic bacteria, both gram positive and gram negative bacteria such as Escherichia coli (ATCC 35218), Salmonella typhimurium (ATCC 14028), Staphylococcus aureus (ATCC 29213) and Bacillus Cereus (ATCC 14579). The antimicrobial activity of pathogens was established using disk diffusion method. The AgNPs produced Capparis spinosa leaf extracts showed highly potent antibacterial activity toward Gram-negative (Escherichia coli and Salmonella typhimurium) microorganisms.

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1497

ANGIOGENIC EFFECT OF THE AQUEOUS EXTRACT OF *CYNODON DACTYLON* ON HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS AND GRANULATION TISSUE IN RAT

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Cynodon dactylon, a valuable medicinal plant, is widely used in Iranian folk medicine for the treatment of various cardiovascular diseases such as heart failure and atherosclerosis. Moreover, its anti-diabetic, anti-cancer and anti-microbial properties have been also reported. Concerning the critical role of angiogenesis in the incidence and progression of tumors and also its protective role in cardiovascular diseases, we investigated the effects of the aqueous extract prepared from the rhizomes of C. dactylon on vascular endothelial growth factor (VEGF) expressions in Human Umbilical Vein Endothelial Cells (HUVECs) and also on angiogenesis in carrageenan induced air-pouch model in rats. In the air-pouch model, carrageenan was injected into an air-pouch on the back of the rats and following an IV injection of carmine red dye on day 6, granulation tissue was processed for the assessment of the dye content. Furthermore, in an in vitro study, angiogenic property of the extract was assessed through its effect on VEGF expression in HUVECs. Oral administration of 400 mg/kg/day of the extract significantly increased angiogenesis ($p<0.05$) and markedly decreased neutrophil ($p<0.05$) and total leukocyte infiltration ($p<0.001$) into the granulation tissues. Moreover, the extract increased the expression of total VEGF in HUVECs at a concentration of (100 µl/ml). The present study showed that the aqueous extract of C. dactylon promotes angiogenesis probably through stimulating VEGF expression.

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1510
PREPARATION OF GRAPE POMACE POWDER AS ANTIOXIDANT AND DIETARY FIBER SOURCE USING CRYOGENIC GRINDING

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Polyphenols, the most abundant antioxidant in our diet, can be found either free or associated with dietary fiber. Dietary fibers (DF), defined as "edible parts of plants or analogous carbohydrates that are resistant to digestion and absorption in the human small intestine with complete or partial fermentation in the large intestine", are abundant in plant products such as fruits, vegetables, and grains [1]. Antioxidant dietary fibers are a specific type of fibers with exceptional antioxidant capacity, which combine the physiological effects of both dietary fibers and natural antioxidants in a single material. The concept of antioxidant dietary fiber (ADF) was proposed as the criteria that 1 g of ADF should have DPPH free radical scavenging capacity equivalent to at least 50 mg vitamin E and dietary fiber content higher than 50% dry matter from the natural constituents of the material [2]. Grape pomace, the residual seed and skins from juice making, contains high content of phenolic compounds and dietary fibers [3, 4]. A supplementation with grape antioxidant dietary fiber had a reducing effect on several cardiovascular disease risk factors and looks also promising for intestinal health. Grape peel and seed are increasingly being used to obtain functional food ingredients, such as natural antioxidants and dietary supplements. The major constituents' composition of grape pomace, peels and seeds, contain high polyphenolic and dietary fiber (DF) contents.The objective of this study was to investigate the effect of cryogenic grinding technology on the quality of the antioxidant and dietary fiber contents of the red grape pomace powder. This study demonstrated that cryogenic grinding of grape pomace has retained the quality of the powder which may be used as a rich source of antioxidant dietary fiber to fortify many supplementary products, not only for increasing dietary fiber and total phenolic contents but also for reducing lipid accumulation in human body which may increase atherosclerosis risks. The cryogrinded powder of grape pomace has high contents of total dietary fiber (50.5%), high protein value (15.6%) and large amounts of extractable polyphenols, expressed as pyrogallol (1.52%). These amounts were higher than the contents found in the conventional grinded powders. The free radical-scavenging capacity of the powder was determined using the DPPH method, resulting in IC50 values of 200 µg dm/mg DPPH. Therefore this variety of red grape, represent an excellent source of antioxidants that can be used as free radical-scavengers through nutritional foods, in our body.

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1524
EFFECT OF SOY PROTEIN ON BLOOD UREA LEVELS IN MICE (BALB/C)

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These days are not to be found in the grocery store where soy products are not news. Even in many foods and soy products are also used to improve the quality and increase the protein. Isoflavones Soy protein is also a good source of compounds that are known to prevent cancer, prevent osteoporosis and cardiovascular disease prevention is very important. The purpose of this study is the effect of soy Amount of urea in mice. In this study, the animals were placed 3 ingredients available. To conduct the study, 18 female mice (Balb/C), six rats were randomly divided into three groups and were fed by the following three ingredients. First food, protein deficiency (13.5% protein). Second, food, full of protein (23% protein). The third meal, complete with 40% soy protein. After three months, three types of ingredients, mice were anesthetized by chloroform. After the blood of animals, their blood serum and attractions in laboratory tests to measure cholesterol levels in groups and outcome were analyzed. BUN mice that of soybean meal (23% protein) compared with animals that received the low protein diet (13.5% protein) and a complete protein diet (23% protein) were consumed, A significant decrease was observed ($p<0.01$) (The results of this study showed that soy can significantly reduce the amount of blood urea, In addition, high-quality protein and essential to the body.

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1526
CHEMICAL COMPOSITION AND ANTIFUNGAL ACTIVITY OF THE ESSENTIAL OIL FROM *SALVIA MIRZAYANII* BY FLOWCYTOMTRIC AND XTT METHODS

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Azole-resistant Candida species are among the major pathogens responsible for nosocomial or oppertunistic infections. An alternative approach to overcome antibiotic resistance might be using natural products and phytochemicals in the medicine. The goal of this study was to investigate the chemical composition and in vitro antifungal and antibiofilm activities of essential oil (EO) of *Salvia mirzayanii* collected in the region of Fars province in Iran. The aerial parts of the *Salvia mirzayanii* were hydrodistillated using an all-glass Clevenger-type apparatus. The EO was analyzed by gas chromatography–mass spectrometry. Minimal inhibitory concentrations (MIC) of the EO and selected drug against standard and clinical species of the fungi were determined by flow cytometry. A semiquantitative measurement of biofilm formation was assayed by using XTT reduction assay. Approximately 13 compounds were identified within the EO, representing 84.02 % of Salvia mirzayanii oil composition. GC–MS analyses showed that the main constituent of the EO of Salvia mirzayanii was 1,8 Cineole (41.2%). The EO completely inhibited the biofilm formation of six standard Candida species at concentration ranging from 0.06 µL/mL to 1 µL/mL. The EO exhibited fungistatic and fungicidal activities against both standard and clinical strains of Candida at concentrations ranging from 0.03 µl/mLto 4 µL/mL, Considering wide range of antifungal activities of the examined EO, it might have potential to be used in the management of infectious agents. As the industries tends to reduce the use of chemical preservatives in their products, the examined EOs with potential active antimicrobial properties might be considered as a natural source for the maintenance or extension of the shelf life of products. As these tests have all been done invitro, the next step may be further investigations in animal models to see if infection can be inhibited by the EO.

1529

A COMPARATIVE STUDY ON MYRTLE (*MYRTUS COMMUNIS*) AND COMBINATION OF NEEM (*AZADIRACHTA INDICA*) AND HYPERICUM (*HYPERICUM PERFORATUM*) EXTRACTS ON LAMBS NATURALLY INFECTED BY CONTAGIOUS ECTHYMA

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Contagious ecthyma (CE), known as contagious postural dermatitis or Orf, is a specific skin-disease of small ruminants, caused by a Parapoxvirus of the family Poxviridae. The economical importance of CE can be considerable. The morbidity of the disease can be very high, approaching 100%, but the mortality rate in uncomplicated cases rarely exceeds 1%. Prolongation of the infection and an increase in severity are nearly associated with secondary bacterial infections The disease is common in young animals, but a few mature animals may also be affected and specific treatment has not described yet. To these reasons twenty lambs with clinical signs of contagious echtyma (Orf) were selected and randomly assigned in two groups to find the effect of receiving commercial plant extracts on healing trend and also the duration of disease. To these reasons extracts of Myrtle (Myrtus communis) and combination of Neem (Azadirachta indica) with Hypericum (Hypericum perforatum) extracts were use in groups 1 and 2, respectively. All animals were bled before the beginning of the experiment and at 1st and 7th days. Vital and clinical signs and healing process (appetence, disappearing the inflammation or lesion, proliferation ease, etc) were recorded daily. Results showed that in mild to moderate oral lesions, the rate of healing was better for Myrtle receiving extract (group 1) in compare to group 2 which receive the combination of Neem and Hypericum extracts. But in severe oral lesions all types of extracts has only limited effect which reduced the congestion and inflammation. Authors concluded that the effect of Myrtle extract on healing process and decreasing the duration of Orf was better than the combination of Neem and Hypercium extracts.

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1530
HISTOPATHOLOGIC EVALUATION OF THE APPLICATION OF 3% ETHANOLIC EXTRACT OF *ADONIS VERNALIS* IN A FULL THICKNESS WOUND IN RAT.

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Adonis vernalis, known variously as pheasant's eye, spring pheasant's eye and false hellebore, is a perennial flowering plant found in dry meadows and steppes in Eurasia. Also Adonis vernalis grow in different area of Iran such as around Tehran, Karaj, Isfahan, Lorestan, Bushehr, Khuzestan, Gilan and Qazvin. The leaves and tops contain a number of biologically active compounds, including cardioactive glycosides that benefit the heart. It dilates the coronary vessels. They are similar to those found in foxglove but gentler. These substances increase the heart's efficiency by increasing its output while slowing its rate. It is an ingredient of several commercial German preparations for heart complaints and low blood pressure. It is also found in Bechterew's Mixture, a Russian formulation for heart conditions of nervous origin. 36 adult male Wistar rats were used in this evaluation in 3groups (negative control, positive control and Test). Eucerin ointment used in positive group. Excisional Wound was created with biopsy punch between shoulders in anesthetic rats. Histologic evaluation was done on days 7, 14 and 21. Evaluation of healing was done with counting of effective cells in healing (neutrophil, Macrophage and fibroblast), vascularization and the volume of collagen and collagen bundle regularity. cross section from the skin after 7days in negative control group: remarkable new vessels and less collagen in granulation tissue was producted. In Eucerin group: vascularization was much more than in test group. Remarkable collagen production, epithelial regeneration, inflammatory cell and fibroblast were seen. In test group: granulation tissue with new vessels and moderate collagen production were seen. Cross section from the skin after 14 days in negative control group: moderate epithelial regeneration and collagen bundles regularity were seen. In Eucerin group: vascularization was more than control negative group. Production of collagen was more than last sample and remarkable epithelial regeneration. In test group: well epithelial regeneration and remarkable collagen bundles regularity and vascularization. Cross section from the skin after 21 days in negative control group: moderate epithelial regeneration and collagen bundles regularity. In Eucerin group: remarkable collagen bundles regularity and stratum corneum was thick. In test group: well epithelial regeneration and remarkable collagen bundles regularity and stratum corneum was thick. The Adonis plant has anti-inflammatory effect and on the basis of histopathologic results, the effect of Adonis Vernalis on wound healing is remarkable.

1533
EFECT OF BIOTIC ELICITOR (*PIRIFORMOSPORA INDICA*) ON ANTIOXIDANT ENZYMES ACTIVITY IN MEDICINAL PLANT *ATROPA BELLADONNA* L. UNDER IN VITRO CONDITION

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Atropa belladonna is the most important commercial source for obtaining pharmaceutical tropane alkaloids such as scopolamine and hyoscyamine [1]. Scopolamine and its precursor hyoscyamine are used as parasympatholytics that competitively antagonize acetylcholine [2]. Piriformospora indica is a wide-host root-colonizing endophytic fungus which allows the plants to grow under extreme physical and nutrient stresses. The fungus promotes nutrient uptake, allows plants to survive under water, temperature and salt stresses, and confers systemic resistance to toxins, heavy metal ions, insects and pathogenic organisms [3]. The aim of this study was to evaluate the effects of the mutualistic symbiont *P. Indica* on some biochemical parameters such as total protein concentration and three antioxidant enzymes activity (catalase, guaiacol peroxidase and ascorbate peroxidase) of belladonna explants under in vitro culture conditions. This study was conducted in a factorial experiment with completely randomized design with four replications. Our results showed that, total soluble protein, CAT, APX and GPX enzymes activity were found to be higher in A. belladonna plants colonized with P. indica in comparison to noncolonized plants. Increased activity of antioxidant enzymes minimizes the chances of oxidative burst (excessive production of reactive oxygen species), and therefore *A. belladonna* might be protected from the oxidative defense system during colonization.

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1542

THE EFFECTS OF *VALERIANA OFFICINALIS* EXTRACT, VALERIC ACID AND VALPROATE IN RAT MODEL OF SCHIZOPHRENIA

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Valproic acid (VPA, valproate) has found clinical use as an anticonvulsant and mood-stabilizing drug, primarily in the treatment of epilepsy, bipolar disorder and prevention of migraine headaches. Valeric acid, or pentanoic acid like other low molecular weight carboxylic acids has a very unpleasant odor. It is found naturally in perennial flowering plant valerian[1, 3]. We have studied the effects of these three materials in the rat wistar model of schizophrenia induced by isolation after lactivorous time for 8 weeks. Rats treated by materials in three dosage (60, 30 ,6 mg/kg/day for 14 days) with using Estereotaxia in comparison by normal rats. Treatments effects of materials have been studied by behavioural test called Prepulse inhibition. Also after killing of rats and sampling from three region of brain (Prefrontal cortex, Striatum and Nucleus Accumbens, Parieto-occipital cortex), gene expression analysis (COMT, 5-HTR2A, GRIN1) has been operated. Results showed that all of tested materials improved the behavioural situation of schizophrenic rats including cognitive, memory, negative and positive symptoms. Behavioral results confirmed by gene expression. Valproate showed the best improvement in dosage of 60 mg/kg/day for 14 days. Valeric acid and Valerian extract got the second and third places overall. These results can potentially present Valproate as a new drug for schizophrenia as well as a mood stabilizer. Also valeric acid and Valerian extract could be a part of schizophrenia treatment in future just after more studies about efficiency, biosafety , side effects and accurate dosage of these drugs. Also Quantitative trait loci studies could help us to select the more appropriate Valeriana officinalis plants for anti-psychotic usages [2,3].

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1544

CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITY OF THE ESSENTIAL OIL OF *MENTHA MOZAFFARIANII* JAMZAD AT FLOWERING STAGE

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Essential oils obtained by hydrodistillation from of Mentha mozaffarianii at flowering stage were analysed by GC-FID and GC-MS. Twenty six compounds were identified and quantified [1]. The main constituents of the oil were piperitone oxide (35.3±1.2), linalool (17.1±0.6%), 1,8-cineole (9.5±0.3) and piperitenone oxide (8.1±0.3). The essential oil of Mentha mozaffarianii exhibited the activity against three human cancer cell lines namely, human T lymphoblast; acute lymphoblastic leukemia (Molt 4), human breast adenocarcinoma cells (MCF 7) and human acute promyelocytic leukemia cells (HL60) using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) colorimetric assay. The cell lines of MOLT-4 (IC50: 26.5± 2.3 µg/mL) were the most susceptible lines followed by HL-60 and MCF-7 toward the essential oils of M. mozafarriani. The results of the present study indicate that the essential oils obtained from flowering stage of the plant showed relatively high cytotoxic activity which can be attributed to the presence of the oxygenated monoterpens with highest amounts of piperitone oxide and its derivatives.

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1553

COMPARING BETWEEN TWO METHODS FOR TREATMENT OF CLINICAL ENDOMETRITIS IN DAIRY CATTLE

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Postpartum uterine infections are common disorders in dairy cattle that lead to decrease in reproductive performance in dairy cattle. Clinical endometritis is described as presence of purulent or mucopurulent discharges in uterus, detectable in vagina 26 days postpartum. Between several methods for treatment of clinical endometritis, intrauterine treatments with chemical antibiotics are more common and effective. Oxytetracyclin is the most frequent antibiotic in this field. Intrauterine antibiotic treatment cause antibiotic secetion in milk (without a known and certain withdrawal time), producers have to discard milk because of this. Considering high prevalence of clinical endometritis in dairy cattle, finding an ulternative herbal treatment for this disorder in dairy cattle can be very useful and practical in dairy industry. One hundred dairy cattle with postpartum clinical endometritis were randomly treated in to two groups: 50 with 50 ml of 5% oxytetracyclin (50 mg/ml) and 50 with 50 ml of an herbal extract (a mix of Thymus vulgaris, Artemisia sieberi, Rheum ribes). One week after treatment, cows were checked for quality of uterine discharges. Statistical analysis showed no significant difference ($p>0.05$) between these two treatment groups that shows this herbal extract can be an effective alternative for treatment of clinical endometritis in dairy cattle.

1560
ANTIMICROBIAL ACTIVITIES OF ALKALOIDS FROM *PEGANUM HARMALA* L. ON ORAL BACTERIA AND FUNGUS

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Peganum harmala L. is one of the most well-known medicinal herbs used as traditional medicine in Iran. Alkaloids with allelopathic activity are not as well-known as other allelochemicals. Our study revealed that total alkaloids from seeds of the medicinal plant Peganum harmala L. possessed significant growth inhibitory effect on oral bacteria and fungus. The sample from seed of *Peganum harmala* was extracted in ethanol. Total alkaloids isolated from extracts with a novel process for antimicrobial investigation and Harmalin and Harmin was identified as main alkaloids of *Peganum harmala*. Antimicrobial properties of total alkaloids were assessed by disc diffusion method. Antimicrobial activity of single band isolated was tested against standard ATCC (American Type Culture Collection) strain of *E. coli*, Staphylococcus aureus, Pseudomonas aeruginosa, Streptococcus pneumoniae and candida albicans using Disc diffusion method and Punch Plate technique. The Purified fraction of alkaloid show zone of growth inhibition with 10mm on ATCC Streptococcus pneumoniae. The sensitivity test of water extract was showing effect mostly against Staphylococcus aureus and E.coli.

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1568
STANDARDIZATION QUANTITATIVE AND QUALITATIVE CONTROLS OF 4TOKHM TRADITIONAL PRODUCT

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4tokhm herbal blend from old times as effective compounds to treat cough have used. There are various combinations of 4tokhm in differents of groceries and books.therefore this study present 4 herbal by studying and controlling the quantity of active substances each of herbs.This combination can be prescribed by doctors and it is more accessible for people. selective herbal: *Alyssum homolucarpum*, *Citrus medica*, *Macrosiphon saliva,Ocimum basiliom.*

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1573
ANTIBACTERIAL ACTIVITY OF FOUR ARTEMISIA SPECIES EXTRACTS AGAINST PATHOGENIC BACTERIA

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Artemisia is one of the most diverse genera of Asteraceae family containing different types of medicinally important and valuable secondary metabolites such as artemsinin, a clinically used antimalarial agent. Various species of *Artemisia* have been characterized for their biological activities among which several interesting studies using *Artemisia* spp. extracts showed antimicrobial activities (1,2). The aim of the present study was to evaluate the antibacterial effects of four *Artemisia* species extracts collected from different parts of Iran. The antimicrobial activities of methanol (MeOH) and dichloromethane (DCM) extracts from the aerial parts of *A. marschalliana*, *A. absinthium*, *A. austriaca* and *A.annua*. were tested against *Sodomonas aeroginosa, Klebsiella pneumomia, Staph aureus, Staph epidermidis and Salmonella typhi* in agar disc diffusion (ADD), nutrient broth micro dilution (NBM) and TLC bioautography methods. In the ADD method the antibacterial activity of all extracts were screened against the above bacterial strains. Among the tested samples, the DCM extracts of the plants were more active than the MeOH extracts, and among the tested plant extracts *Artemisia austrica* and *A.annua* were the most active ones against *Sodomonas aeroginosa* and *Staph aureus* respectively. The NBC test was performed to determine the minimum inhibitory concentration (MIC) of the active extracts. The DCM extracts of *Aretmisia austrica* and Artemisia annua with (MIC=2.5mg/ml), inhibited the growth of *Sodomonas aeroginosa* and *Staph aureus* (3). Finally, the DCM crude extracts of the plant material were analyzed by TLC on silicagel and after obtaining the best analytical conditions they were subjected to TLC bioautography using *Staph aureus* bacteria (4). The active substances were detected as pale inhibition spots in a purple background obtaining after spraying the TLC plats with iodonitrotetrazolium ion solution (INT). On the other hand, the active substances were separated on preparative TLCs and subjected to mass spectrometry for identification.

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1574
CHEMICAL COMPOSITION OF COMMERCIALLY AVAILABLE HYDROSOLS PRODUCED IN FARS PROVINCE, IRAN

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Mentha species have been used for centuries as tonics, carminative, digestive, stomachic, antispasmodic, and anti-inflammatory agents in Iranian traditional medicine. The many biologic activities of these plants are in relation with the chemical composition of their volatile oils. During hydro-distillation of the plants, the oxygenated terpene parts of the essential oil enter the water phase to produce an aromatic product called hydrosol. Mint hydrosols are a common beverage among people of Iran. Unfortunately, the increase in market demand has led to production of inferior products mainly because of using synthetic essences or essential oils of other plants, or dilution of the product with water. Inferior product sometimes may be distinguished via its color changes and weak odor. However, details need to be determined by chemical analysis. The current study evaluated the composition and quality of 10 mint hydrosol samples purchased from local markets of Fars province in Iran. The essential oil of the samples were extracted by petroleum-ether separately and analyzed by using gas chromatography-mass spectrometry. Identification of compounds was based on their mass spectra and kovats retention indices compared with Adams libraries as a reference and also previous literature. According to table 1, identification was determined for 91.3–100% of the essential oil components. Based on the major compound, samples can be divided into three groups; Carvotanacetone (M1, M2, M3, M6, M9) , Piperitenone (M4, M5, M8) and Iso menthol group (M7, M10). Toxic pulegone is the second major compound in most samples with amounts from 2.34% to a notable percentage of 20.53%. High amounts of thymol, carvacrol and p-cymene in M4 suggest contamination with Thymus or Trachyspermum ammi. Small amounts of Dibutyl phthalate was also detected in two samples (M7, M10). This substance may have been released into the samples from their plastic containers. Based on the data acquired from GC/Mass, a diversity of mint species are used in different companies to obtain hydrosols, which result in different major compounds and different effects of the product. Some samples contain high amounts of toxic pulegone which should be considered because of the toxic effects that consumption of this compound causes. Contamination seen in one sample indicates that the hydro-distillation containers are not washed properly before each process. Trace amount of dibutyl phthalate indicate that plastic containers are not proper for storage of this kind of product.

1581
GC-MS ANALYSIS OF DCM AND N-HEXANE EXTRACT OF *SCROPHULARIA UMBROSA*

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Scrophularia is a genus of the family Scrophulariaceae. This genus includes about 3000 species and 220 genera which are widely distributed in the all regions of the world, especially in the Mediterranean area [1]. DCM and n-Hexane extract of this plant were analyzed by GC-MS. These extracts from *S. umbrosa* obtained by klevenger, then analyzed by the GC-MS. About 4 compounds in DCM extract and 7 compounds in n-Hexane extract of *S. umbrosa* were identified. The main components of these extracts were phytol and vitamin E.

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1585
WESTERN DIET ABROGATE THE ATHEROPROTECTIVE EFFECT OF FRESH GARLIC

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Numerous trials have reported that garlic can beneficial effects on hypercholesterolemia associated with cardiovascular disease [1]. However, a number of studies do not support this effect of garlic on blood lipids . These conflicting data may be result from the kind of animal models, different garlic preparations, variety of garlic-derived materials, normolipidemic and hyperlipidemic subjects, cholesterol feeding, and probably dietary pattern. In this survey, the effect of fresh garlic intake on serum lipids, lipoproteins profiles and low density lipoprotein oxidation of male rats fed western diet was investigated. A total 32 male Wistar rats were randomly divided into four groups as group receiving chow diet (as normal control group, C), or western diet (as western diet control group, WDC), western diet contain 5% garlic (WD-5G), and western diet contain 10% garlic (WD-10G) for fourteen weeks. Serum lipids profile and LDL oxidation were measured. Energy intake, body weight gain recorded and feeding efficiency was calculated. Liver, heart and fat pad weighed. The results demonstrated that western diet significantly increased total cholesterol, LDL cholesterol, non-HDL cholesterol, atherogenic index, LDL/HDL ratio in comparison with normal control group. The HDL level was significantly lowered in WDC, WD-5G and WD-10G groups. LDL oxidation was amplified by western diet and greater raise observed in WD-5G vs. the normal control rats. Total cholesterol, LDL cholesterol and non-HDL cholesterol were significantly higher in WD-10G group in comparison with WDC animals. Body weight gain reduced significantly by garlic supplementation. In conclusion this data do not support beneficial effect of fresh garlic on serum LDL oxidation and lipids profile in rat fed western diet. Consequently dietary pattern was important factor for appear atheroprtective properties of garlic.

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1589
STUDY OF THE EFFECT OF N-HEXAN- DICHLOROMETHAN(1:1) EXTRACT OF *ONOSMA BULBOTRICHUM* TO HEALING BURN WOUNDS OF DEGREE II IN RABBIT

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In this study, the effect of n-hexan-dichloromethan(1:1) extract of Onosma bulbotrichum roots known as Tashnehdary on burn wounds was investigated. The extract was prepared via Soxhlet method and creams with 0.5%, 1% and 2% concentrations in cold cream base were prepared. In this experimental study, rabbits of either sex were randomly divided into 6 groups of 6 animals in each group. Groups were nominated as: control, negative control, positive control (silver sulfadiazine) and test groups of 0.5%, 1% and 2% Tashnehdary extract cream. After shaving the dorsal area of animal and disinfection with ethanol, local anesthesia was performed using lidocaine 2%. Then a metal circle with a diameter of 2.5cm was heated to 150° C was placed on the desired area 20 seconds to create second degree burn. Creams were applied topically with 1 mm thickness, 2 times a day, until full treatment attained. The wound surface was traced on a transparent sheet 3 times a day and the area was determined based on mm2. In order to survey the histopathological investigations tissue sample was prepared on 7th and 14th days of treatment and stained with Hematoxylin and Eosin. Also tissue samples were obtained from each group for Collagen determination and the tissue traction resistance. The results showed that the final healing period with Silver sulfadiazine cream was 16 days, with 0.5% extract cream 17 days, 1% cream 21 days, 2% cream 23 days, the Cold cream 24 days and no treatment group 26 days. The highest amount of Collagen was observed in 0.5% extract and Silver sulfadiazine groups and Treated groups with 1% and 2% of extract were after these groups. The negative control group and the control were having lowest amount of collagen. The tissue traction resistance 0.5% extract and silver sulfadiazine groups were higher than the other treated groups and then the groups 1% and 2% extract, Cold cream and untreated. Histopathological studies showed that restoration of silver sulfadiazine and 0.5% root extract groups has been done more complete.

1596
IDENTIFICATION OF VOLATILE COMPONENTS IN TWO *THYMUS* SPECIES FROM IRAN AND THEIR ANTIOXIDANT PROPERTIES

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Thymus is an important genus of the Lamiaceae family, originated from the Mediterranean region. Among 300 to 400 species of this genus grown in the World, 14 species are distributed in the Iranian flora. Leaves and flowering part of *Thymus* species are commonly used in traditional medicine, as tonic and herbal tea, antiseptic, antitussive and carminative. In addition, *Thymus* essential oils are widely used in pharmaceutical, cosmetic and perfume industry, also for flavoring and preservation of several food products [1]. Indeed, many species of this genus are well known for their health-benefit effects, including antioxidant, anti-inflammatory, antimicrobial, analgesic, neuro protective and carcinogenic. In turn, these properties have been associated to poly phenolic composition of these plants [2]. This study was designed to analyse the essential oils of two Iranian Thymus species, (including T. Kotschyanus and T. Pubescense) obtained by hydrodistillation of aerial part of this plants, using GC and GC/MS and evaluate the in-vitro antioxidant activities in two quantitative methods (namely DPPH. and ABTS.+ assay) to determine the total phenolic content of the species (assayed by colorimetric techniques) and to study the possible composition-antioxidant activity relationship. The major aroma constitutes in the essential oil of T. Pubescense were found to be carvacrol (38.67%), γ-terpinene (7.46%), p-cymene (5.54%), α-terpenyl acetate (3.78%) and β-bisabolene (3.71%) while in the essential oil of T. kotschyanus, γ-terpineol (16.94%), 1,8-cineol (14.37%), linalool (9.65%), thymol (7.16%) and geranyl acetate (5.36%). All examined essences, exhibited concentration-dependent antioxidant activity. In comparison to T. kotschyanus, T. Pubescense showed more activity in both DPPH. [IC50= 285.2 (236.5 to 344.0) µg/mL] and ABTS. + methods [IC50= 1.956 (1.810 to 2.113) µg/mL], as well as total phenolic content of T. Pubescence [70254 ± 0.0049 µg/mg] was found to be slightly higher than T. kotschyanus [62933 ± 0.0026 µg/mg]. In addition, a correlation were found between the total phenolic content of essential oils and antioxidant activities.

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1597

EVALUATION OF ANALGESIC EFFECTS OF *HYPERICUM PERFORATOM* ETHANOLIC EXTRACT IN ANIMAL MODEL OF SOMATIC PAIN

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The aim of present study was to investigate the analgesic effects of ethanolic extract of Hypericum perforatom (EHP) on somatic pain in rat. For induction of somatic pain used formalin test in rats. EHP at doses 5, 10 and 20 mg/kg injected intraperitoneally (i.p.) 30 min before induction of pain. The results of present study showed that formalin pain produced biphasic pain response (first phase: 0-5 min; second phase: 15-45 min after injection) in rat. Moreover, EHP (10 mg/kg) significantly ($p < 0.05$) reduced second phase but not first phase of formalin test. In conclusion, the results suggest that EHP exert analgesic effect in somatic pain. Further studies are in progress in order for enable us to understand the action mechanisms of analgesic activity of *Hypericum perforatom*.

1598
STUDY OF HISTAMINERGIC SYSTEM ROLE ON ANTINOCICEPTIVE ACTIVITY OF *PISTACIA VERA* HYDROALCOHOLIC EXTRAXT IN RATS

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Medicinal plants are widely employed in many countries specially, Iran. Therefore, we investigated the peripheral effect of histaminergic system on analgesic activity of Pistacia vera hydro alcoholic extract in rats. Nociception was induced by intraplantar injection of formalin (50µL, 1%) in right hind paw in rat. The Pistacia extract administered at the doses of 20, 40 and 80 mg/kg by intraperitoneally (i.p.) injection 30 min before formalin pain. Also, Chlorpheniramine (H1receptor antagonist, 20 mg/kg) alone and before extract were administered intraperitoneally. The results of present study indicated that Pistacia vera hydro alcoholic extract at doses 40and 80 mg/kg produced analgesic effect in both phases of formalin pain in rats. On the other hand pretreatment with chlorpheniramine (20 mg/kg) potentiated antinociceptive activity of extract. Therefore, this result showed that may be the participation of the histaminergic system in analgesic effect of Pistacia vera.

1599

STUDY OF HYPOALGESIC EFFECTS OF ETHANOLIC EXTRACT OF *OLEA EUROPAEA* L. ON FORMALIN TEST IN RATS

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We investigated the hypoalgesic effects of ethanolic extract of Olea europoaea L. (EEO) in rats submitted to formalin pain. EEO from leaves were obtained and administered at doses of 75, 150 and 300 mg/kg by gavage rout 30 min before the induction of pain. EEO at dose 300 mg/kg significantly ($p<0.05$) reduced second phase (inflammatory phase) of formalin pain but had no effect on first phase. In conclusion, this result suggests that EEO have a hypoalgesic effect and this effect may be participate in reduced of inflammatory mediators of formalin pain.

1600
INVESTIGATION OF RELATIONSHIP BETWEEN HYPERICIN CONTENTS AND BIOLOGICAL ACTIVITY OF AERIAL PARTS OF *HYPERICUM PERFORATUM* L. FROM DIFFERENT REGIONS OF IRAN

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Hypericin, a naphtodiantron with a beautiful red color, is a valuable medicinal compound which is found in different species of *Hypericum* genus, as the most important active compound. Via many medicinal properties of this valuable compound, reported in the literature, antimicrobial, antiviral, antidepressant, nonspecific kinas inhibition and dopamin β-hydroxilase inhibitoring could be reffered. Hypericum perforatumL. has been known as an important medicinal plant used in traditional Iranian medicin. In this research work, hypericin content of methanol extract from aerial parts of Hypericum perforatum from Kurdistan, Golestan and Qom province of Iran was evaluated and its relationship with antioxidant and antimicrobial activity of the extract was investigated. After removing chlorophyll via extraction using chloroform, methanol extract of the plant samples was isolated using soxhlet apparatus and hypericin contents were evaluated using UV-Vis spectrometric method. Antioxidant activity was evaluated using DPPH and β-carotene bleaching assays. Antimicrobial activity was studied using evaluation of inhibition zone diameter via disc diffusion method for 2 gram positive, 2 gram negative and one fungi strain. Hypericin content of the samples were in the order of: Kurdestan > Golestan > Qom; this order was also observed for antioxidant activity. About antimicrobial activity, for 5 studied microorganisms, as far as the number of sensitive microorganisms were considered, the order of Golestan>Kurdestan>Qom was exhibited; however the extract of the plant from Kurdestan has highest zone diameters for two staphylococcus species(S. aureus and S. epidermidis) and the observed activity for these bacteria has the same order of hypericin content and antioxidant activity.

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1605
THE EFFECT OF ALKALOID EXTRACT OF *SOPHOREA ALOPECUROIDES* ON THE *ESCHERICHIA COLI* RESISTANCE TO CIPROFLOXACIN

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The rapid spread of multidrug resistante (MDR) bacteria, such as Escherichia coli which has become a serious threat to public health worldwide, has necessitated the discovery of new antibacterials and resistance-modifying agents[1, 2]. One approach is to screen for natural products from plants[3]. The aim of this study was to eliminate resistance to ciprofloxacin(CIP) in three MDR isolates of E. coli, using alkaloid extract of Sophorea alopecuroides. Alkaloid extraction was carried out by acid and base method. Minimum inhibitory concentrations (MICs) of CIP and alkaloid extract determined by a microbroth dilution method. The combined effect of alkaloid extract and CIP was ascertained by determining the MIC in combination. Resistant bacterial isolates were pre-treated in a subinhibitory concentration of alkaloid extract and cultured at 37˚C for different time periods. The susceptibilities of cultured isolates to CIP were ascertained. The MICs of CIP and alkaloid extract was 100 µg/ml and 12.5 mg/ml respectively. In combination with alkaloid extract, significant synergistic effects on CIP against the MRD isolates were observed. In pre-treated for 36 h a significant enhancement of susceptibility against CIP was observed in all three isolates. The results showed that alkaloid extract has an antibacterial activity against the MDR isolates and it can be used for elimination of resistance to CIP in MDR isolates of E. coli.

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1608
ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF *VIOLA ELATIOR* EXTRACT

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Viola elatior, a member of the Violaceae family, has a long history as a medicinal plant. It is used in sinusitis, skin and blood disorders, pharyngitis [1], kidney diseases, pneumonia and bronchitis. Flowers are used in lung complications, cough and boil [2]. The plant materials were collected in may 2013 from Kelardasht area. The plants were identified at the Department of Biology, University of shiraz, Iran. The aerial parts were air-dried at ambient temperature in shadow and the methanolic extract of the plant was obtained by maceration method. Antimicrobial activity of the extract: the disc diffusion method was used for the determination of the antibacterial activity. Minimum inhibitory concentration (MIC) was evaluated by the macro dilution test method. Antioxidant activity and total phenolic content: The total phenolic content and the antioxidant activity of plant extract were determined by folin-ciocalteau, the 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay and FRAP method, respectively.The plant extract showed good antibacterial and antifungal effects on Veticillium chlamydosporium, Aspergillus ficcum, Penicillium citrinum and Penicillium chrysogenum, respectively. The antioxidant and total phenolic efficiency of Viola elatior was effect.

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1619
INVESTIGATION OF ANTHOCYANIN CONTENT AND CYTOTOXIC ACTIVITY IN DIFFERENT EXTRACTS OF FRUIT PEALS OF *SOLANUM MELONGENA* L.

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Anthocyanins are an important group of secondary metabolites. They are well known because of having high antioxidant activities, inhibition of mutagenic effects and cancers and also anti-aging properties. On the other hands, these compounds are also very usable natural pigments in food and drug industries. The purpose of this research is to evaluate anthocyanin content and study of cytotoxic activity for fruit peel of Solanummelongena, harvested in Kashan, and comparing the effect of extraction solvent on them. In this study, anthocyanin contents of fruit peel of Solanum melongena with the common name "egg plant" was evaluated via UV-Vis absorbtion measuring. To select the best extraction solvent, water, methanol and ethanol were used to extract these valuable compounds.The three extracts also were investigated to evaluate cytotoxic activity for screening anticancer effects via brine shrimp lethality assay. Amounts of extracted anthocyanins using water, methanol and ethanol, were 412, 354, 293 mg/100g and cytotoxic activities (LC50) were 750, 525 and 1000 µg/mL for each extract respectively.

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1659
ANTIBACTERIAL AND ANTIFUNGAL EFFECTS OF *SATUREJA HORTENSIS* ESSENTIAL OIL ON FOODBORNE PATHOGEN BACTERIA AND CANDIDAL SPECIES

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The aim of this study was to investigate antibacterial and antifungal activities of Satureja hortensis essential oil which grows in Sabalan mountain (Ardebil province, Iran). *Satureja* is a genus belonging to the aromatic plants of Lamiaceae family. The genus *Satureja* L. (Lamiaceae) comprises more than 30 species of aromatic herbs and shrubs, widely distributed over the Mediterranean region. Many species of the genus Satureja are reported to have aromatic and medicinal properties [1].Plant was extracted via distillation by water for 3 h using a Clevenger unit. the EO was dried over anhydrous sodium sulfate (NA2SO4) and stored at 4 °C until further evaluations [2].This EO was tested in vitro against 2 bacterial species by disk and agar well difusion methods, 4 bacterial species and 3 candidal strains by broth microdilution method [3]. MIC of Satureja EO against S. thyphimurium, L. monocytogenes, E. coli and B. cereus was respectively 2.5%, 2.5%, 5% and 2.5%. The inhibition zone of S. hortensis EO in disk and agar well diffusion method was measured and showed that inhibitory zone on B. cereus was higher than S. thyphimurium in both methods and B. cereus was more sensitive to oil. MIC/MFC of *S. hortensis* EO against *C. albicans*, *C. parapesilosis* and C. crusei in broth microdilution method were respectively (0.048%/0.048%), (0.024%/0.024%) and (0.012%/0.012%). The data of the study clearly indicated that the EO of Satureja hortensis has a strong antibacterial and antifungal activities

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1661
EVALUATION PHYTOCHEMICAL AND ANTIFUNGAL EFFECT OF EUCALYPTUS AND CUMINUM CYMINUM ESSENTIAL OILS

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The aim of present study was the in vitro evaluation of phytochemical and antifungal effects of Cuminum cyminum and Eucalyptus EOs on candida species. candida species was selected because these species are the most common cause of fungal infections in human especially in immunosuppressed patients. Essential oils of Cuminum cyminum seeds and aerial parts of Eucalyptus were prepared using a Clevenger type apparatus for 3 h [1]. Analysis of essential oil constituents by GC- MS was performed [2]. Minimum inhibitory concentration of essential oils was determined against C.albicans ATCC10231, C. tropicalis ATCC 750, C.paraprsilosis ATCC 22019 and C. dublinensis CD 36 [3]. The main components of cuminum cyminum essential oil was cumin aldehyde (29.02%). In Eucalyptus EO, Twenty two components, which represented 83.63% of Eucalyptus EO was identified by high amounts of isopentyl-isovalerate (19.12%) and α-pinene (12.6%). MIC of cuminum cyminum EO was 0.39% against C.albicans and C.tropicalis and 0.19% against C. dublinensis and C.parapesilosis. The MIC value of Eucalyptus EO against C. albicans, C. tropicalis, C. dubliniensis and C. parapsilosis was respectively 0.2%, 0.1%, 0.4% and 0.4%. Results of this study express high antifungal activity of Cuminum cyminum and Eucalyptus essential oils. This survey suggests use of these essential oils as a suitable antimicrobial compound specially in drug resistance and treatment of candidal disease.

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1663
COMPARISON HISTOPATHOLOGIC EVALUATION OF CELECOXIB & ALOEVERA'S EFFECTS ON REPAIR OF GASTRIC SURGERY CAUSES TRAUMA IN RATS

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Drugs with different mechanisms have effect on the Wound and Wound healing phenomena and reconstruction of defects created especially after surgical injury in order to prevent infections after it and rapid return to physiological function of damaged tissue. Today, due to adverse effects and toxicity of chemical agents and extensive use of these medications and the importance clinically role of them in various cases, including pain, edema and inflammation after surgery and similar cases is trying to use of alternative herbal medications that have a minimum of side effects like osteoporosis, gastrointestinal and kidney disorders. [1, 2]. 24 male Wistar rats that randomly assigned to 4 groups: control, positive control, experiments 1 and 2 were distributed, were used. A gastrotomy incision was made in greater curvature of the stomach of the rats, thereafter, sutured in two layers. Experimental group 1 was treated with Celecoxib daily for 15 days orally. Experimental group 2 orally received 150 mg/kg Aloe Vera Gel daily, for 15 days. Positive control group and control group received DMSO 5% and normal saline (10 ml/kg), respectively, in the same manner. Histopathological studies for evaluation of healing were carried out in euthanized rats using H&E staining method. All the values were expressed as mean±SEM. Significant differences among the groups were determined by ANOVA using the SPSS program. Statistical significance was considered at $p<0.05$. The numbers of fibroblasts and capillary buds in experimental group 2 were significantly more than those of were in control, positive control and experiments 1 groups ($p<0.05$). The epithelial gap in experimental group 2 was smaller than three other groups ($p<0.05$). Taking the total aloe vera gel and celecoxib has accelerated epithelium regeneration, angiogenesis, proliferation and tissue formation scar in wound healing of rat gastric surgery and with acceleration of natural factors affecting the process of healing, wound healing is accelerated. The results of this survey show that aloe vera is useful than celecoxib in surgical wound healing in the stomach in rats [3].

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1671

ANTIBACTERIAL EFFECT OF *SATUREJA HORTENSIS* ESSENTIAL OIL ON *SALMONELLA THYPHIMURIUM*

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Satureja is a genus belonging to the aromatic plants of Lamiaceae family. *satureja* is a herbaceous plant with the scientific name Satureia hortensis Herbaceous plant, a year and has branched stems, dull green color of plants during the months of July to September in the Iran settles.The aim of this study was to investigate antibacterial activity of Satureja hortensis essential oil on salmonella thyphimurium. Plant was extracted via distillation by water for 3 h using a Clevenger unit. the EO was dried over anhydrous sodium sulfate (NA2SO4) and stored at 4 °C until further evaluations. constituents of the EO were analyzed by gas chromatograghy. Essential oil antimicrobial activity was evaluated in vitro against salmonella typhimurium PTCC 1730. Antibacterial effect of Satureja essential oil with disk diffusion and broth micro dilution methods was determined. Satureja hortensis contains about one percent of the essential oil that contains objects such as carvacrol, thymol, Parasymn, limonene and camphene. Inhibition zone diameter of Savory essential oil was 40 ± 2 mm and the minimum inhibitory concentration (MIC) was obtained 1/25 mg/ ml. The data of the study clearly indicated that the EO of Satureja hortensis has strong antibacterial activity.

1683

COMPOSITION OF THE ESSENTIAL OILS FROM LEAVES AND SEEDS, AND FIXED OIL FROM SEEDS OF *ALLIUM AMPELOPRASUM*

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The essential oils from leaves and seeds of Allium ampeloprasum (Alliaceae) from Iran were obtained by hydrodistillation-solvent extraction in a clevenger-type apparatus for 3h. The species was purchased from Tehran market in 2014, 27 and 22 compounds of the oils were identified, respectively. The fixed oil of A. ampeloprasum seeds wax extracted by n-hexane and was esterified in methanol/BF3, 29 compounds in this were identified. These oils and methyl esters have been examined by GC and GC/MS. The components of them were identified by comparison of their fragmentation patterns of mass spectra and retention indices with those published in the literature and presented in the MS computer library. The main constituents in the essential oil of seeds of A. ampeloprasum were hexahy drofarnesyl acetone (24.9 %) and heptacosane (10.2 %). In the leaves oil, dipropyl disulphide (10.4%) and 2, 2-dithiobis ethanol (12.9%) were main components. In the fixed oil, methyl linoleate (76.9%) and methyl palmiate (11.4%) were main constituents.

1689
ANTIOXIDANT ACTIVITIES AND ESSENTIAL OIL ANALYSIS OF TWO *MENTHA* SPECIES

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Mentha genus is One of the most important members in Lamiaceae family; The genus Mentha includes 25–30 species. This genus is of high importance; both medicinal and commercial. Indeed, leaves, flowers and stems of *Mentha* species are frequently used in herbal teas or as additives in commercial spice mixtures. In addition, They have been used as a folk remedy for treatment of nausea, bronchitis and flatulence due to their anti inflammatory, carminative, antispasmodic and antiemetic activities [1]. The most widespread species of Mentha genus are Mentha. spicata and Mentha. piperita. Mentha. spicata is considered as stimulant, carminative, antispasmodic and stomachic [2] and *Mentha piperita* is widely used as analgesic, antiseptic, carminative, decongestant, expectorant and stimulant [3]. This study is designed to identify the volatile constituents and to evaluate the antioxidant activities of the essential oils of M. spicata and M. piperita by $DPPH^{\cdot}$ and $ABTS^{\cdot}+$ tests, using BHT as a positive control.
The volatile oils were obtained by hydrodistillation and analyzed by GC-FID and GC-MS. The major constituents of M. spicata oil were carvone (72.97%), limonene (6.49%), β-caryophyllene (5.28%), germacrene-D (2.40%) and β-bourbonene (2.00%). On the other hand, the main compounds of M. piperita oil were menthone (33.13%), menthol (29.33%), 1, 8-cineole (7.97%), iso-menthone (7.00%), Pulegone (6.32%), β-caryophyllene (3.85%) and germacrene-D (2.27%). Both of the examined essential oils exhibited antioxidant activities in both $DPPH^{\cdot}$ and $ABTS^{\cdot}+$ methods, and they didn't show any significant difference in none of the assays; Also their antioxidant activities were comparable to those of the known antioxidants, Vit C and butylated hydroxy toluene (BHT).

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1692
THE MOST EFFECTIVE FRACTION OF *AVENA SATIVA* AS ANTIDEPRESSANT IN MOUSE MODEL OF DEPRESSION

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Avena sativa (AS) is a plant with long history of use in Iranian traditional medicine. Traditional medical manuscripts have also mentioned the effect of AS on reduction of cholesterol and as a pain reliever as well as depression. Our previous study confirmed antidepressant effect of AS in comparison with fluoxetine by two mouse models of forced swimming test and tail suspension test. The purpose of this study was to investigate the most active fraction of AS extract on depression in forced swimming test and tail suspension test. Dried methanol extract of AS was fractioned by solvent fractionation using methanol. These fractions were concentrated by vacuum evaporator and dried under laminar flow hood. Then, the fractions were dissolved/ suspended in normal saline with 10% tween80 for injection. Mice received a single Intraperitoneal dose of 200,400 and 100mg/kg of AS, or normal saline, 32mg/kg of fluoxetine (as negative and positive controls) 30 min before test. To separate antidepressant activity from neurostimulation, locomotor activity of the effective dose was determined using open field test. The results showed that 200 and 400 mg/kg of extract decreased the immobility time while 100mg/kg doesn't have effect. The effect of 400 mg/kg of the extract was nearly as same as flouxetine. Dried mehanol extract contains active antidepressant components. More purification is recommended to find a probable antidepressant lead compound.

1693
PARSLEY AND SODIUM ILLNESSES

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Kinetic properties and diuretic effect of parsley is investigated in folk medicine & has shown significant results. A study on rats , shows elimination of a significantly larger volume of urine per 24 h.* Furthermore, polyphenol oxidase from parsley was investigated for kinetic properties of the enzyme such as V_max ,〖 K〗_M and K_cat.** *It can be concluded that action of parsley is mediated through an inhibition of the Na^+- K^+ pump that would lead to a reduction in Na^+ and K^+ absorption . therefore , the osmotic water flows into the lumen. **The inhibitors inhibited the enzyme noncompetitively and the most effective of them was sodium aside. It can finally be concluded that parsley is an effective solution to sodium- based illnesses.

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1706
EVALUATION OF ANXIOLYTIC EFFECT IN *SALVIA HYPOLEUCA* IN MICE

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Salvia Hypoleuca is a large genus of plant in the mint family Lamiaceae. The genus is distributed throughout the word , with the center of diversity . the plant has been reported as an antioxidant and analgesic . In a spectrophotometric method based on the reduction of the stable DPPH free radical , it was suggested the SH can be considered as a natural source of radical scavenger . Oxidative stress may be a common pathogenic mechanism underlying many major psychiatric disorders such as anxiety . The aim of the present study was to evaluated the effect of SH on anxiety and evaluated the toxicity on nervous system using well-defined pharmacological models in mice Mice were randomly divided into control (saline) , SH-treated(10,100,300 mg/ml) and standard treatment groups. The SH-treated groups received oral administration of various doses of SH . As standard treatment , diazepam was used orally anxiety test , respectively . also we had an other group of mice for toxicity test which mice were randomly divided into control (saline) and SH treatment. The result of the study revealed that the plant extract showed anxiolytic effects in doses:30 mg/kg (Elevated plus maze & Light/Dark) and 100 mg/kg (EPM test). [1, 2] the extract did not show any toxicity effect in nervous system of mice in open field and Rota-Rod in any doses. Conclusion: This results suggest that administration of SH produce anxiolytic effect in EPM and LDT in mice and do not have any toxic effect in open field and rota -rod.

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1707

QUANTITATIVE STUDY OF PHENOL CONTENT AND TOTAL FLAVONOID, ANTIOXIDANT POTENTIAL AND ANTIMICROBIAL ACTIVITY OF *CUSCUTA EPITHYMUM* MURR. (CUSCUTACEAE)

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The genus *Cuscuta* L. (Cuscutaceae) is widely distributed throughout the world. Members of the species have many secondary metabolites such as essential oils and phenolic compounds representing pharmaceutical properties and physiological functions against herbivores and pathogens.The aim of this study is in vitro assessment of total phenols, flavonoides, antioxidant and antibacterial activity of the methanolic extract of CuscutaepithymumMurr. in Iran. The antioxidant activity of the methanol extracts of C. epithymumMurr. was assessment by DPPH free radical scavenging assay. Total phenol and flavonoid content were measured by Folin-Ciocalteu and AlCl3 methods respectively. In addition antibacterial activity of the studied methanol extract was assessed by disk diffusion method against six Gram positive and negative bacteria and compared with positive andnegative controls. Results showed that total phenol content was 11.77 ± 0.27 mg/g dry weight and total flavonoid content 38 ± 5.01 mg/g dry weight. Also studied methanolic extract showed excellent antioxidant activity but was not observed the difference ($P< 0.05$) between the amounting maximal inhibitory concentration 50 % (IC50). The species studied showed good antibacterial activity against bacterial studied. Extract from C. epithymum has been effective against S. enterica, C. amatonaticus. S. saprophyticus and especially S. marcescens and P. vulgaris bacteria.

1717

A COMPARATIVE STUDY ON THE EFFECTS OF *SALIX AEGYPTIACA* AND *MELISSA OFFICINALIS* DISTILLATES ON THE BLOOD LIPID PROFILE IN RABBITS

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After oral administration of *Salix aegyptica* distillate (SAD) and *Melissa officinalis* distillate (MOD) in rabbits, their effects were studied on the blood lipid profile. In this regard, 30 male New Zealand rabbits of 2 years old with the body weight range of 2-2.5 kg were divided into 6 groups of 5 each. Five groups of animals received commercial chow containing 20% oil; the oil itself contained 2.5% cholesterol, 17.5% ethyl alcohol and 80% sunflower oil for 28 successive days; the controls were fed with ordinary feed only. During the period, animals received drinking water ad lib which in 4 treatment groups contained either 1% or 3% of SAD or MOD 6 hours a day. Venous blood samples were taken on days 1, 8, 15, 22 and 29 for lipoprotein profile detection. Lipid assessment showed that the blood lipoproteins in the SAD treated groups were almost similar to those of the positive control group. However, in the MOD treated groups, a decrease in the levels of HDL, LDL, TGs, VLDL and cholesterol was observed; the effect with 3% concentration was more prominent than 1% concentration. It was concluded that administration of MOD, but not SAD, may exert a prophylactic effect agains hyperlipidemia in the rabbit.

1718

THE EFFECTS OF BENTONITE AND CALENDULA ON THE IMPROVEMENT OF INFANTILE DIAPER DERMATITIS

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Diaper dermatitis is one of the most common skin disorders of infancy and childhood. The present study aimed to compare the effects of Bentonite and Calendula on the improvement of diaper dermatitis in infants. A double-blind randomized controlled trial, which was conducted on 60 out-patient infants referred to health care centers or pediatric clinics in Khomein city and diagnosed with diaper dermatitis. Data were collected by checklist and observation, and analyzed using t-test, Chi-square, and Fisher's exact test. Mean (standard error) age of the total sample was 6.55 ± 0.69 months. Totally, 93.3% of s: lesions in the Bentonite group started its recovery in the first 6 h, while this rate was 40% in Calendula group (P< 0.001). Furthermore, 90% of infants in the Bentonite group and 36.7% in the Calendula group were improved completely in the first 3 days (P< 0.001). Bentonite was effective on the improvement of diaper dermatitis, and also had faster effects compared with Calendula.

1723
CHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITY OF *CARUM COPTICUM* L. ESSENTIAL OIL

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In order to evaluate antibacterial effects of the essential oil of Carum copticum L. on human pathogenic bacteria by disc diffusion method via average inhibition zone, chemical composition of essential oil of the fruits of Carum copticum (Apiaceae) were obtained by hydrodistillation method and analyzed by gas chromatography (GC) and gas chromatography mass spectrometry (GC/MS) [1]. Eighteen compounds, accounting for 98.56% of the total oil with 2.35% oil yield were identified in the essential oil of the fruits. The main constituents of the essential oil were Thymol (37.69%), P-cymene (25.42%) and γ-terpinene (21.68%). For study of antibacterial effects of the oil sample, the essential oil tested against 9 bacteria strains such as three gram positive bacteria Staphylococcus areous (PTCC=1431), Staphylococcus epidermidis (PTCC=1436) and Streptococcus faecalis (PTCC=1237) and six gram negative bacteria Pseudomonas aeroginosa (PTCC=11430), Shigella flexneri (PTCC=1716), Kellebsiella pnuomonae (PTCC=1053), Salmonella typhi (PTCC=1609), Serratia marcescens (1187) and Escherichia coli (PTCC=1533) has been tested [2]. Effect of the essential oil of Carum copticum on bacteria tested over than tetracycline antibiotic [3]. The results showed the essential oil of Carum copticum had strong antibacterial effects. Large percentage antibacterial activities of Carum copticum oil are related with thymol of a natural monoterpene phenol compound as the main compound.

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1724

EVALUATION THE ANTIBACTERIAL EFFECTS OF ESSENTIAL OIL FROM THE ROOTS OF *VALERIANA OFFICINALIS* L.

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Valerian has potent antimicrobial properties, against bacteria and fungi [1, 2]. The essential oil analyses of the roots of *Valeriana officinalis* L. (Valerianaceae) collected from Kerman were obtained using gas chromatography and gas chromatography mass spectrometry. Thirty six compounds, accounting for 99.60% of the total oil with 1.65% oil yield were identified in the essential oil of the roots. The main constituents of the essential oil were α-pinene (24.35%), Borneol (12.37%), viridiflorol (9.53%), Bornyl acetate (5.33%), and allo-aromadendrene-epoxide (4.67%). For study of antibacterial activity of the oil sample, the essential oil tested against 6 bacteria by disc diffusion method. The antibacterial effects of this essential oil was determined against gram positive bacteria Staphylococcus epidermidis (PTCC=1436) and Streptococcus faecalis (PTCC=1237) and gram negative bacteria Pseudomonas aeroginosa (PTCC=11430), Shigella flexneri (PTCC=1716), Kellebsiella pnuomonae (PTCC=1053) and Escherichia coli (PTCC=1533). Effect of the essential oil of Valeriana officinalis on Gram positive bacteria Staphylococcus epidermidis and gram negative bacteria Kellebsiella pnuomonae and Escherichia coli tested over a tetracycline antibiotic [3]. The results showed the essential oil of Valeriana officinalis had antibacterial effects. The relatively high amount of α-pinene in the essential oil of Valeriana officinalis showed that could have the medicinal uses [4].

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1725
CHEMICAL COMPOSITION AND ANTIFUNGAL EFFECTS OF *MELISSA OFFICINALIS* L. ESSENTIAL OIL ON THE GROWTH OF ASPERGILLUS FLAVUS

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Research shows that citronellal has strong antifungal qualities [1]. The essential oil of Melissa officinalis has antimicrobial properties, including antifungal properties. In order to identify chemical composition and antifungal activity of essential oil of Melissa officinalis, the leaves of this plant which grows in a village in Kerman Province in May 2014 were collected. The samples were cleaned and then drying in the shade, making essential oil hydrodistillation method was performed. Essential oil was analyzed by capillary gas chromatography (GC) using flame ionization (FID) and capillary gas chromatography coupled mass spectrometry (GC/MS) for detection [2]. Also antifungal activity of essential oil this plant sample tested against Aspergillus flavus (PTCC=5004) fungi by disc diffusion method [3, 4]. The main oil content from the plants of Melissa officinalis was 0.48%. The twenty seven compounds were identified in the essential oil of Melissa officinalis that concluded 98.97% of the total oil. The major components were Citronellal (38.56%), Carvacrol (15.03%), iso-Menthone (12.45%), Citronellol (8.97%), and Geraniol (6.75%). The results showed that the essential oil from Melissa officinalis at 1, 1/2, 1/4 and 1/8 oil dilutions exhibited strong antifungal activity than gentamycin (8 mg/ml) antibiotics on Aspergillus flavus [5]. Large percentage antifungal activities of Melissa officinalis oil are related with Citronellal of a natural monoterpenoid compound as the main compound. Melissa officinalis oil could have the medicinal uses against Aspergillus flavus considerable high antifungal activity.

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1745
CYTOTOXICITY PROPERTIES OF *TANACETUM ZAHLBRUCKNERI* ON MCF-7 AND HELA CANCER CELLS

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The aim of this study was to evaluate the cytotoxicity effect of the ethanol crude extract of tanacetume zahlbruckneri on cancer cells. In vitro cytotoxicity was evaluated by MTT assay. Cell morphological changes were observed through light microscope. The MTT assay indicated that ethanol extract of the plant exhibited significant cytotoxic effects on MCF-7 and Hela cells. Morphological alterations of the cell lines after exposure with Ethanol extract were observed under phase contrast microscope in the dose dependent manner. Our results showed that, the plant has moderate cytotoxic activity with IC50 value of 71.80 and 78.01 µg/ml in Hela and MCF-7, respectively. Based on these findings, the ethanol extract of the plant may be a potential source of cytotoxic compounds. The next step would be to isolate the individual compounds responsible for the observed activity and the probable mechanism of action.

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42

EFFECTS OF GIBBERELLIC ACID AND OIL OF MENTHA ON PASS AND MARKET CUT FLOWERS ROSES

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Aimedto investigatethe effect of gibberellic acid and oil of Mentha on market ability cut flowers rose tentatively as a completely randomized design with 6 treatments and 3 replications was done, the test chemical treatments gibberellic acid concentrations (20 and 30 mgliter) and peppermint oil concentrations ppm 25, 50 and 75 were studied. Analysis of variance showed that the effect of different treatments on all traits evaluated at the1% level of significance has been sotreated peppermint oil viscosity ppm75 have the greatest impact on Abazar popular with an average of 9 days compared to the other treatments, also check attribute anthocyanins, GAtreatmentalsoresultsina concentration of 20 mghada better effect than other treatments.

754

NEGLECTED HERBAL PLANET *CISTANCHE TUBULOSA*

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Cistanche is a worldwide genus of holoparasitic desert plants in the family Orobanchaceae. Cistanche has about 18 species which are distributed in the arid and semi -arid regions of the world, which seven of them can be found in Iran [1]. CistancheTubulosa (Schenk) R. Wight is a plant that parasitizes the roots of Tamarix.In China, CistancheTubulosa is known as a rare panax ginseng and used as a pharmaceutical agent to cure Alzheimer's disease and it is proven nowadays [2]. According to the Chinese Comprehensive Pharmaceutical Dictionary, it supplements renal function, aphrodisiac, and smoothes the intestines. The dictionary stated that it treats impotence, infertility, menstrual disorder, and psychroalgia of the back and knees. Also it improve brain functions (Improvement of learning and memory, Anti-apoptosis activity and Prevent aging of the brain), anti-aging effects,Anti-fatigue, Aphrodisiaceffect, Immune boosting effect,Metabolism enhancing effect, sever anti-oxidant activity [3]. In many part of the word this rare planet is used as herbal planet (ex.“Nutrilite® Memory Builder With Ginkgo” in order to Improve your memory, recall, and focus; “Memory Fortifier” as a natural brain support) but here in Iran it is neglected. Thus, in order to found more information about this herbal plant an experiment were performed in 7 days by using 42 adult-male-mice in 7 groups and 6 replicate in a completely randomize design (plant species was confirmed by department of Pharmacognosy at Tehran University of Medical Sciences, Iran). Animals received aquatic and ethanolicCistancheTubulosa extract in 3 different doses by Gavage. At the end of the experimentliver enzymes, kidney enzyme and seven Behavioural test (plus-maze, floating, Bar fix, hot plate, spontaneous motor activity, inclined plane test and grooming test)had been evaluated. Approximately all treatment groups indicated a statistical significant difference in comparison with control group ($P<0.05$), thus,is strictly proposed to be process and produced as a useful and remedial medication in Iran.

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996

CONTRIBUTION TO THE RURAL SUSTAINABLE DEVELOPMENT THROUGH EXTENTION ACTIVITIES RELATED TO MEDICINAL PLANTS IN NORTH KHORASAN PROVINCE

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Provide stable employment conditions of the villagers in order to prevent migration to cities from rural areas be important in the country's development priorities. Development activities related to the production and processing of medicinal plants in this area would be very useful because it also provides employment opportunities for farmers and rural women and villagers are consistent with current agricultural practices. The cultivation of medicinal plants be used and are familiar with the culture of villagers. Although in many areas over time for various reasons cultivation of these plants has been neglected. Rural development activities in the areas of collection, cultivation and processing of medicinal plants should be planned in such a way that complements the activities of the rural agricultural crops and it does not interfere with their agricultural activities. Although the relative advantages of medicinal plants, planting and processing of medicinal plants as the main agricultural activities in a certain area. Now also in many areas of agricultural activities related to the production and processing of medicinal plants is a priority. For example, the production of saffron and related activities in many rural areas of North Khorasan cited. Planting and harvesting and processing of medicinal product known as the main activity of rural farmers. Guidelines and principles for the development of activities related to the production and processing of medicinal plants in North Khorasan province in this article are examined.

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1213
CULTIVATION AND PROCESSING OF GUAR GUM, A PHARMACEUTICAL, INDUSTRIAL AND COMERCIAL PLANT FOR THE FIRST TIME BY GIAH ESSENCE PHYTOPHARM COMPANY (IRAN- GOLESTAN)

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Guar gum is a galactomannan polysaccharide obtained from the seed endosperms of *Cyamopsis tetragonolobus* L. belong to Fabaceae. Guar gum and its derivatives are widely used as a thickening, gelling, drilling, clouding, bodying, viscosifying, suspending, stabilizing and emulsifying agents in food, pharmaceutical, paper, textile, oil and gas field, cosmetic, metallurgical and mining industries [1, 3].For the first time, this plant has become endemic and cultivated by Giah Essence Phytopharm Company in Golestan province of Iran (Nearly 14 years). During this time, cultivation method was optimized and cultivated area was increased. Also, the seed have been invested to one of the agricultural researchers, cultivated in Yazd and Ilam, according to the preliminary results, yield was remarkable. Currently, cultivated area of guar gum plant is about 5 hectare in Tooskestan region of Golestan Province-Gorgan.The main purpose of this research was achievement to technical knowledge, optimization of extraction and purification guar gum powder in industrial scale. Various methods are discussed such as wet, dry, enzymetic and chemical digestion methods for processing of this product which are challenged in industrialization path. Now, research and development department of Giah Essence Phytopharm Company have been succeeded to remove industrial scale barriers, and to achieve the capability of processing and manufactureing guar gum powder and galactomannan as raw materials for pharmaceuticals, foodstuffs, cosmetics, paper, textile, oil and gas field, metallurgical and mining industries. Therefore, this technology could save large quantities of currency to achieve economic development and provided the requirement of our country internal industries.

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1610
EFFECT OF EXTRACTION TIME ON THE QUALITY OF ESSENTIAL OIL OF *ZATARIA MULTIFLORA* IN PILOT SCALE BY HYDRO DISTILLATION

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Zataria multiflora Boiss is a thyme-like plant belonging to the Labiatae family that grows wild only in Iran, Pakistan and Afghanistan [1]. The main components of *Z. multiflora* essential oil were Carvacrol, Thymol, *p*–cymene and γ-terpinen [2]. It has several traditional uses as an antiseptic, carminative, stimulant, diaphoretic, diuretic, anesthetic, anti-spasmodic and analgesic. It is used in traditional folk remedies for its antiseptic, analgesic (pain-relieving) and carminative (anti-flatulence and intestine-soothing) properties [1, 3, 4]. The objective of this research was to extraction and separation of *Z. multiflora* essential oil using hydrodistillation in pilot scale in order to achieve the maximum amount of Thymol and Carvacrol in essential oil. The separation and identification of the components were carried out by gas chromatrography-mass spectrometry (GC-MS). An 8 gr of Shirazi thyme that was collected from Southern Fars was extracted for 350 min, and in each 50-min period (7 times), the extracted essential oil was analyzed. The results showed that the volatile compounds were the most essential oil component in the first 150 min of extraction. After the fourth time period, the percent of volatile compounds were decreased, and then the amount of Carvacrol and Thymol were increased in essential oil. The higher amounts of Thymol and Carvacrol was obtained between 200 to 250 min, 31.41 and 58.61 %, respectively. It should be noted that 42 compounds were identified in extracted essential oil.

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443, 446
ESSENTIAL OIL COMPOSITION, ANTIDIABET AND ANTIMICROBIAL POTENTIAL OF *SALVIA SPINOSA* AND *SALVIA NEMOROSA*

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Salvia species are used traditionally for medicinal purposes all around the world, possessing antibacterial, antioxidant, antidiabetic, antiplasmodial, antifungal, antiprotozoal, cytotoxic and HIV inhibitory activities [1]. Genus *Salvia* comprises over 1000 species, being the largest genus of the Lamiaceae family. 61 *Salvia* species are found in Iran, of which 17 are endemic [2]. In the present study, *Salvia spinosa*, collected from Kerman, and *Salvia nemorosa* from Urmiya have been phytochemically investigated and the essential oil of the aerial parts of the plants were analyzed. The essential oils were extracted by hydrodistillation method using a Clevenger apparatus. The components were identified and quantified by GC and GC-MS. 19 compounds which comprised 98.5% of the total oil were identified in *S. spinosa*. The main constituents were Caryophyllen oxide (63.0%), Spathulenol (23.0%) and Linalool (3.9%). The oil of *S. nemorosa* has Caryophyllen oxide (45%), Spathulenol (23%) and leden oxide (9.2%) as major compounds. Essential oil, *n*-hexane, dichloromethane and methanolic extracts of both species were screened for α-glucosidase inhibitory effect, antimicrobial and antioxidant properties.

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SYNTHESIS AND CYTOTOXICITY OF METAL COMPLEXES OF 3-HYDROXYFLAVONE

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Flavonoids are natural components which are present in many plants known to be constituents of animal and human food. These compounds have been shown to have different biological properties, such as anti-viral, anti-inflammatory, anti-mutagenic and anti-carcinogenic activities. 3-Hydroxyflavone (3HF) is a chemical compound that it is the backbone of all flavonols, a type of flavonoid [1]. Coordination and organometallic chemistry offers additional options for the design and synthesis of chemotherapeutics when compared to organic chemistry [2]. The success of cisplatin has triggered intensive work for discovery of new metal-based anticancer drugs [3]. Ruthenium compounds appear to penetrate tumors well and bind to cellular DNA [4]. In this study, we evaluated the cytotoxicity and apoptotic effects of ruthenium, copper, and cobalt complexes including 3-Hydroxyflavone against human cervix epithelial carcinoma (HeLa) cell line and using cisplatin as a comparative standard by MTT assay. Our results presented herein provide experimental evidence that these complexes induce apoptosis in cancer cell lines. Our flow cytometry results confirm that, these complexes showed a high population of apoptotic cell and could induce apoptosis of Hela cancer cells.

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1278-576
IN VITRO ANTIMICROBIAL ACTIVITY AND ANTIOXIDANT ACTIVITY OF METHANOLIC EXTRACTS OF *ANETHUM GRAVEOLENS* L. FROM TONEKABON-IRAN

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Today we know well that radicals cause molecular transformations and gene mutations in many types of organisms. Oxidative stress is well-known to cause many diseases, and scientists in many different disciplines became more interested in natural sources which could provide active compounds to prevent or reduce its impacts on cells. Antioxidants, which can inhibit or delay the oxidation of an oxidizable substrate in a chain reaction, therefore, appear to be very important in the prevention of many diseases. The number of antioxidant compounds synthesized by plants as secondary products. *Anethum graveolens* L. belong to the family Umbelliferae, is indigenous to southern Europe. It is an annual herb growing in the Mediterranean region, central and southern Asia**.** Now it is cultivated widely throughout the world [1]. This study was designed to evaluate antioxidant activity methanolic extract of Iranian *Anethum graveloens* L. from Tonekabon. In this research antioxidant activities of the sample were determined by test system namely 2, 2-diphenyl-1-picrylhydrazyl (DPPH) assays [2]. Medicinal plants represent a rich source of antimicrobial agents. Plants are used medicinally in different countries and are a source of many potent and powerful drugs. [3]. The purpose of this study is to evaluate the antimicrobial effects of methanolic extracts of *Anethum graveolens* L. against *Staphylococcus aureus* PTCC 1113, *Escherichia coli* PTCC 1399 and *Candida albicans* PTCC 5027. In this experimental study, after collecting plant from the of Tonekabon province, the extraction was carried out by the soxhlet method. The Minimum Inhibitory Concentrations (MIC) and Minimum Bactericidal Concentration (MBC) and Minimum fungicidal concentration (MFC) were determined by using the dilution method. The received consequences of antioxidant in the way of preventing free radical DPPH shows this fact by increasing concentrations of methanol extract up to 200 µg/ ml was added to the percent inhibition of free radicals. So methanol extract of the *Anethum graveolens* L. had high antioxidant property. Furthermore, the gained result from microbial tests (MIC) , (MBC) & (MFC) shows that *Staphylococcus aureus* bacteria had the highest sensitivity and after that *Candida albicans* fungus had the most sensitivity and finally the less sensitivity is related to *Escherichia coli* bacteria.

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1571
EVALUATION OF REOLOGICAL AND SENSORY CHARACTERISTICS OF MAYONNAISE FORMULATED WITH SESAME OIL

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Mayonnaise is one of the oldest and most widely used sauces in the world. It is a kind of oil-in-water emulsion which typically contains 70–80% fat [1]. Fat has an important role in creating viscosity, color and texture. However, it might cause several diseases such as obesity, some type of cancer, high blood cholesterol, gallbladder, hypertension and cardiovascular diseases [2]. There is an increase demand in reduction of the amount of fat in the diet or use unsaturated fat. Sesame oil can be named as one of the best edible oils because of its nutrition value including nearly 85% unsaturated fatty acids and high amount of lignan compounds. These components particularly resulted to inhibition of lipid oxidation [3]. In the present study, mayonnaise was formulated with sesame oil as a valuable nutrient component. Mayonnaise samples containing different amounts of sesame oil were produced. These samples were: $S.O_1$ (100% sunflower oil), $S.O_2$ (20% sesame oil and 80% sunflower oil), $S.O_3$ (40% sesame oil and 60% sunflower oil), $S.O_4$ (50% sesame oil and 50% sunflower oil), $S.O_5$ (60% sesame oil and 40% sunflower oil), $S.O_6$ (80% sesame oil and 20% sunflower oil), $S.O_7$ (100% sesame oil). Acidity and pH measurement, storage stability, color measurement, viscosity measurement and rhoeological and sensory characteristics were carried out on the samples. All experimental tests were conducted at 7 and 30 days of storage. For all samples, only a little increase or decrease of pH value was observed. In addition, the results of color measurements depicted that after 30 days a significant difference on L*, a*and b* parameters was observed. The rheological analysis showed that all the mayonnaise samples exhibited non-Newtonian, shear thinning and pseudoplastic behavior. Results represented that an increase in amount of sesame oil (from 20% to 100%) resulted to a decrease in viscosity and consistency coefficient values. The sensory result also revealed that mayonnaise sample with 20% sesame oil was acceptable. Briefly, this research demonstrated good potential of sesame oil to be used in mayonnaise.

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1758
ESSENTIAL OIL COMPARISON OF TWO VARIETY OF *FERULA PERSICA* FROM IRAN

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The Genus of *Ferula* L. belonging to Apiaceae which are containing c. 32 species are growing in Iran. The Essential oils were obtained by hydrodistillation from aerial parts of 2 Iranian variety of Ferula persica (F. persica var. Persica & F. persica var. latisecta) have been studied by GC/MS. Variation of essential oil components in var. persica (33 components)was more than var. latisecta (12 components). In both of them α-pinene with 33.5% and 62.1% were the main constituents respectively. Spathulneol (8.2%) dodecanal (5.3%), β-elemene (5.1%), aromadendrene (4.6%), β-gurjunene (4.1%), Z-α-bisabolene (3.7%), bicyclogermacrene (3.2%), E-nerolidol (2.7%) and 10-epi-r-eudesmol (2%) as main component (%≥2)observed only in var. persica.

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1759
CHEMICAL VARIATION IN ESSENTIAL OIL COMPONENTS OF FOUR POPULATIONS OF *FERULA OVINA* FROM IRAN

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Ferula L. belonging to Apiaceae consists of c. 170 species which are containing c. 32 (16 endemic) species are growing in Iran. The Essential oils were obtained by hydrodistillation from aerial parts of 4 Iranian populations of *Ferula ovina* (Boiss.) Boiss. have been studied by GC/MS. Totally, 34 components identified. The Main constituents (11 components %≥2) identified and compared together. Variations on the chemical composition of all populations depending on the place of collection have been detected. The main constituents of the oil in all samples (Tehran, Fars, Ghazvin and Khorasan province) α-pinene 87.13%, 63.18%, 61.03% and 50.24% were respectively. Spathulneol (8.1%) and Sabinene (2.1%) had seen only in Fars and Ghazvin populations respectively.

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1751
ACCELERATION OF FLOWERING TIME AND BIOMASS BY OVEREXPRESSION OF PURPLE ACID PHOSPHATASE GENES

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Active substances of plant origin as one of the most important natural sources of biomedical production make up less than one percent of plants dry weight. These substances are found in plant different organelles such as flowers as an active substance source in some medicinal plants; *Matricaria chamomilla*, *Calendula officinalis*, *Crocus sativus* and *Hypericum perforatum* for instance [1]. Therefore, to quick access to these substances, acceleration of flowering time in these plants is inevitable. Phosphorus as a key macronutrient plays an important role in flowering time and speeding up the transition from vegetative to reproductive growth phases [2]. Hence, improving bioavailability and acquisition of phosphate by plants is effective approach in active substance quality and organic plant production through genetic engineering without using chemical fertilizers. For the reason that purple acid phosphatases (PAPs) play important role in phosphate uptake, these enzymes are also effective in active substance production. In the present study, *AtPAP17* and *AtPAP26* cDNA sequences under CaMV-35S promoter was introduced by *Agrobacterium*-mediated transformation into Col-0 *Arabidopsis thaliana* and flowering time changes of overexpressed (OE) plants was investigated in phosphate sufficient condition (1.2 mM KH_2PO_4). Our results indicated 2.18 and 1.9 fold increases in OE17 and OE26 flowering time compared to WT plants, respectively. In addition, improvement of studied plants biomass followed by overexpression of *AtPAP26* gene and 2.61 fold increases was observed in OE26 biomass compared to WT plants. This study therefore reports that *AtPAP17* and *AtPAP26* would be constructive and effective on markedly acceleration of flowering time via facilitation of plants phosphate acquisition and release, and consequently, active substance production will be increased in medicinal plants.

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1753
QUANTIFICATION OF SEVEN PHENOLIC COMPOUNDS IN *CRATAEGUS AZAROLUS* VAR. *ARONIA* FRUITS, LEAVES AND FLOWERS BY HPLC

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Iran is one of the genetic centres of *Crataegus* (Hawthorn) in the world, but there are few studies describing the Iranian *Crataegus* species. Due to its positive effects on the cardiovascular system, hawthorn has recently become quite a popular herbal medicine in phytotherapy. In this study, determination of seven phenolic compounds (chlorogenic acid, vitexin-2"-*O*-rhamnoside, vitexin, rutin, hyperoside, isoquercitrin and quercetin) of *Crataegus azarlous* var. *aronia* different organs (leaves, flower and fruit) has been carried out. After extraction with 80% aqueous methanol, the phenolics of various organs were separated and quantified by high performance liquid chromatography (HPLC). The study revealed that there were differences in terms of the aforementioned phenolics compounds among organs. Leaves and flowers organs had higher levels of these phenolic compounds than fruits. Chlorogenic acid (1.34, 4.88 and 0.35 mg/g DW), vitexin-2"-*O*-rhamnoside (0.8, 0.14 and tr mg/g DW), vitexin (2.2, 0.4 and 0.12 mg/g DW), rutin (0.3, 1.09 and 0.16 mg/g DW), hyperoside (1.28, 1.39 and 0.96 mg/g DW), isoquercitrin (0.51, 0.3 and 0.4 mg/g DW) and quercetin (tr, 0.04 and 0.03 mg/g DW) were detected in leaves, flower and fruits, respectively. Vitexin-2"-*O*-rhamnoside and quercetin was not detected in fruit and leaves. To the best of our knowledge, this is the first report of seven phenolic compounds quantification in *C. azarlous* var. *aronia* leaves, flower and fruits from Iran [1, 2].

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1754
α- GLUCOSIDE INHIBITORY AND METABOLITE PROFILING OF ETHYL ACETATE EXTRACT OF *PARROTIA PERSICA*

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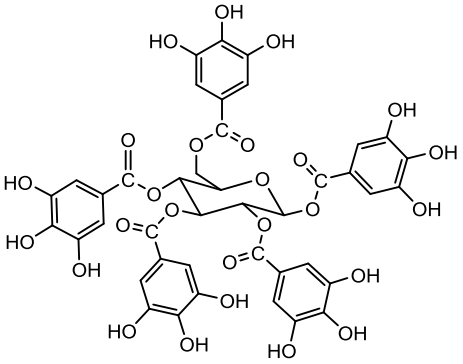
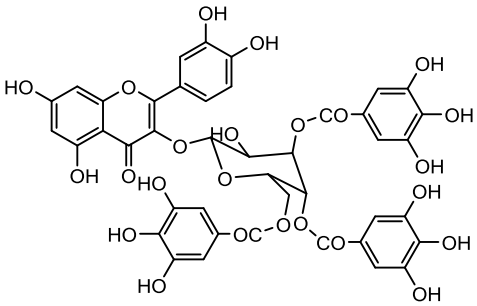
Diabetes mellitus which results from defects in insulin secretion or reduced sensitivity of the tissue to insulin is characterized by hyperglycemia. Due to adverse effect of chemical anti-diabetic agents, the demands for new drugs from natural sources have been increased [1]. In this regard we screen Iranian medicinal plants selected by ethnobotanical uses and taxonomical consideration for enzyme inhibition assay. One of most active extract was EtOAc extract of leaves of *Parrotia persica* (DC) CA. Mey (Persian Ironwood). This plant is a member of Parrotia genus belongs to Hamamelidaceae family is a endemic tree to Alborz mountains and Hyrcanian forests in the northern part of Iran. This plant has been used for food flavouring and coloring purpose as well as treatment of respiratory infections and various fevers [2]. The bioguided isolation of EtOAc extract of *P. persica* for *α*-glucosidase inhibitory led to identification and separtion of twenty three compounds including polyphenolic derivatives, flavonoids and hydrolysable gallotannins that were identified online or after targeted isolation by different spectral techniques such as HPLC-PDA-ESI-MS and HPLC-TOF-HRMS and 1D and 2D NMR techniques were used for structure elucidation and identification of compounds. The biocativity of isolated compounds evaluated, the most active compounds were tetra and penta galloyl glucose with IC_{50} values of 22.9, 23.8 μg/mL, where acarbose and positive control showed IC_{50} = 62.0 μg/mL.





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1762
FORMULATION OF 1,8-CINEOLE AND PACLITAXEL NANOEMULSION AND ITS ANTITUMORAL EFFECTS ON MCF-7 (BREAST CANCER CELL LINE)

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Cancer is affecting many people all over the world. It has drawn the attention of many researchers because of its impact on the health and the economy of different societies. Many new drugs have introduced to the health market using different approaches to treat cancer. Over the last few decades, natural compounds and herbal medicines have been broadly investigated for anticancer drug development. Paclitaxel is an example of a successful natural compound, which has been used over the past two decades. This compound was first extracted from the bark of yew trees (Taxaceae family). Paclitaxel like many other natural compounds has a high molecular weight and thus a low solubility in water. This compound creates other side effects such as inflammatory mechanisms through Nuclear Factor-κB activation and thus increasing the risk of recurrence of cancer [1,2]. Different approaches have been used to solve the solubility problem, including cosolvency and surfactants. In this research, a nanoemulsion carrier systems was used to increase the solubility and hence bioavailability of paclitaxel. The oil phase, 1,8-cineole (or Eucalyptol) was applied as a carrier organic solvent. 1,8-cineole is one the main components of the plants in the genous *Eucalyptus* (Myrtaceae family) with known anti inflammatory activity thorugh suppressing NF-κB activity and thus preventing inflammation [3]. To evaluate the efficacy of the nanoemulsified formulation, the studies of cytotoxicity test against MCF-7 breast cancer cells were performed. The results showed that nanoemulsification of paclitaxel could highly improve the biological activity of paclitaxel in DMSO from 36 µM with 50% killing capacity to 87% killing capacity for 23 nM paclitaxel emulsified in 1,8-cineole.

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142-143
INVESTIGATION OF SALINE STRESS ON PROLINE, CARBOHYDRATES AND PROTEIN CONTENTS AND ANTIOXIDANT ENZYMES ACTIVITIES IN *HYSSOPUS OFFICINALIS* PLANTS IN GROWTH PHASE

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Salinity is considered as a major environmental stress that can affect the plant growth directly through its interaction with metabolic rates and pathways within the plants. Hyssop (*Hyssopus officinalis* L.) is a medicinal plant belonging to the Labiatae family. This plant is widely cultivated in south and middle parts of Europe and also in France, Russia, Italy, Iran and Spain. Although *Hyssopus officinalis* is one of valuable medicinal plants and its cultivation is continuously being extended in the world, no information is available on the responses of this plant to salinity. In the present research, the effects of saline water (Hose-sultan) on proline, carbohydrates and protein contents, Superoxide dismutase (SOD, EC 1.15.1.1), guaiacol peroxidase (GPX, EC1.11.1.7) and catalase (CAT, EC1.11.1.6) in *Hyssopus officinalis* L. at growth stage were studied. The treatments were six levels (0, 2, 4, 6, 8 and 10 dSm^{-1}) of saline water (hoze-Sultan). With increasing EC, proline content was significantly increased. Also, increasing of shoot and root carbohydrates contents were significantly synchronized with increasing salinity. These results showed that accumulation of proline and soluble carbohydrates in roots and shoots enhance the tolerance of plants against salinity. Plant material (500 mg, leaves and roots) was homogenized in 100 mM potassium phosphate buffer (pH 6.8) at 4 °C. Homogenate centrifuged at 15,000 × g for 15 min at 4 °C. Supernatant was used to measure the activities of enzymes. The protein content in the supernatant was measured according to Bradford 1976. The activity of SOD was assayed by measuring its ability to inhibit the photochemical reduction of nitrobluetetrazolium according to the method of Beauchamp and Fridovich. GPX and CAT activities were assayed according to the method of Dazy *et al* (2008). With increasing salinity, total protein root and leaves inecreased. POD, CAT and SOD activities in the shoot and radicles increased in EC of $10dsm^{-1}$. The results showed *Hyssopus officinalis* with the ability to scavenge or control of ROS [1-3].

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266-267

THE STUDY OF GERMINATION STAGE IN *SILYBUM MARIANUM* AND *MELLISA OFFICINALIS* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Silybum marianum* and *Melissa officinalis*, this experiment was conducted in the University of Nahavand, using a completely randomized design with three replications. Treatments included 5 levels of salinity (control, 20 mM, 40 mM, 60 mM and 80 mM). The results showed that salinity levels had very significant effect ($P \leq 0.01$) on germination percentage, dry and fresh weight and radical and plumule length of *Silybum marianum* and *Melissa officinalis*. In *Silybum marianum*, the increase of salinity didn't reduce the germination percentage, dry and fresh weight and radical and plumule length up to 60 mM but more salinity increase, caused less germination percentage, dry and fresh weight and radical and plumule length of *Silybum marianum*. Since the classification of saline soils begins from 40 mM [1], it can be concluded that *Silybum marianum* is a tolerant plant under salinity stress. In the case of *Melissa officinalis*, the results showed that the increase of salinity didn't reduce the germination percentage up to 20 mM but more salinity levels, caused less germination percentage. The dry and fresh weight and radical and plumule length reduced with increasing salinity too, so *Melissa officinalis* can be known as a sensitive plant to salinity in germination stage. As a conclusion, *Melissa officinalis* is more sensitive to salinity in comparison with *Silybum marianum*.

49

ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY OF ESSENTIAL OIL OF THE *HERACLEUM RAWIANUM*

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In the present work, the *in vitro* antibacterial and antioxidant activity of the essential oil (EsO) of *Heracleum rawianum*, a widely used medicinal plant in Iran, as well as the composition of its essential oil were studied [1]. A total of Fourty-three compounds representing 97.7% of the oil has been identified. Butanoic acid hexyl ester (54.28%), acetic acid octyl ester (17.73%) and 3-octenyl acetate (5.12%) were characterized as the main components. Antibacterial activity of the essential oil was studied against three Gram-positive and one Gram-negative bacteria (*Staphylococcus aureus* ATCC 25923, *Enterococcus faecium* TX100, *Enterococcus faecalis* ATCC 29212, *Escherichia coli* ATCC 25922) using micro broth dilution method for determination of minimum inhibitory concentration (MIC). The results of the bioassays showed that the oil exhibited moderate antimicrobial activity against *Enterococcus faecium* (MIC value of 8 mg/ml). Also, antioxidant capacities of this plant EsO was evaluated by determiniation of its ability for scavengering of DPPH radicals comparing to butylated hydroxyltuloene (BHT) as standard antioxidant. Result showed IC50 of 32.11 mg/ml and 56 µg/ml for the assessed EsO and BHT respectively [1].

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1766
EVALUATION OF ANTIMICROBIAL ACTIVITY OF SALVIOL AND LUPEOL ISOLATED FROM *SALVIA MULTICAULIS*

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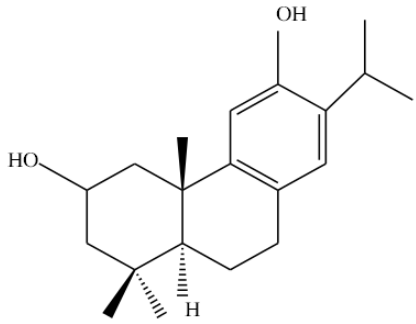
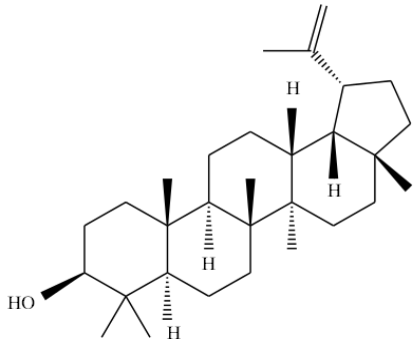
Salvia multicaulis is a native species which grows in the regions of northwestern, west and center of Iran. In order to study the potential bioactive secondary metabolites of *S. multicaulis*, the acetone extract of its aerial parts was investigated. Finally one abietane diterpenoid (salviol) and a lupane-type triterpenoid (lupeol) were identified by different chromatographic methods. *In vitro* antimicrobial activities of purified samples were assessed against vancomycin resistant strain of *Enterococcus faecium*, *Streptococcus pneumoniae*, *Pseudomonas aeruginosa* and *Candida albicans*. Broth micro-dilution method was used according to the standard protocols described in Manual of Clinical Microbiology to determine the minimum concentration of each antimicrobial agent required for inhibition (MIC) of visible growth of mentioned bacteria [1]. The best untibacterial activity was observed for salviol against *Streptococcus pneumoniae* with MIC equal to 31.25 microg/mL.



Salviol



Lupeol

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82

EFFECT OF HERBALS ON ENDOTHELIAL FUNCTION AND BLOOD PRESSURE IN TYPE 2 DIABETES MELLITUS PATIENTS: A RANDOMIZED CONTROLLED CLINICAL TRIAL

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Type 2 diabetes mellitus (T2DM) is a metabolic disorder that is characterized by hyperglycemia in the following of insulin resistance and relative lack of insulin. Some plants and herbal medicine with high amount of phytochemicals have beneficial effects on the therapy of diabetes's risk factors. The present study aimed at determining the effect of herbal treatment on endothelial function and blood pressure in T2DM patients. This single-blind placebo-controlled randomised clinical trial included 204 T2DM subjects randomly assigned to five groups, Group 1 consumed 3 tea glasses contain 3 gr cinnamon, Group 2 consumed 3 tea glasses contain 3 gr cardamom, Group 3 consumed 3 tea glasses contain 1gr saffron, Group 4 consume 3 tea glasses contain 3 gr ginger and Group 5 was placebo group which consume only 3 tea glasses without these medicine spices, daily for 8 weeks. Intercellular Adhesion Molecule-1 (ICAM-1) indicator of endothelial function, systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured at baseline and 8 weeks after treatment. Two hundred four patients completed the study. The treatment effect was statistically significant in the saffron and ginger groups (p-value = 0.01 and 0.009 respectively) as compared with other groups in diminution of ICAM-1. SBP were significantly decreased after 8 weeks in ginger group as compared with baseline values (p-value= 0.02). We found that after 8 weeks of intervention, cinnamon can marginally reduce weight and cardamom and ginger can marginally decreased waist circumferences. Administration of cinnamon, cardamom, saffron and ginger for 8 weeks in T2DM subjects had favorable effects on endothelial function and blood pressure, as risk factors for cardiovascular disease.

87, 88

THE EFFECT OF DROUGHT STRESS ON CONCENTRATION OF PROTRINS AND PLANT PIGMENTS A, B CHLOROPHYLLS OF SARVORY(*SATUREJA HORTENSIS* L.)

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The drought stress is an important factor on plant growth. On other hand, *Satureja hortensis* belong to lamiaceae family and is used as spice and drug. In this research, the effects in water stress on metabolites protein and chlorophyll a,b were studied.Complete randomized design with 5 treatments and 3 replications used in 2011. Water deficit levels included control (100% field capacity), mild stress (80% field capacity), medium stress (60% field capacity), severe stress (40% field capacity) and ultra-severe (20% field capacity). The statistical analysis showed that deficit had significant effect on growth parameters. Decreasing of the protein is due to decrease of protein synthesis and high activity protease is caused of degradation of proteins. Water stress decreased concentration of plant pigments a, b chlorophylls. Decreasing of the plant pigment is due to the chlorophyll decomposer enzymes. [1,2].

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113, 114

EFFECT OF SATUREJA HORTENSIS POWDER SUPPLEMENTATION ON PAIN AND PRO-INFLAMMATORY CYTOKINES IN PATIENTS WITH KNEE OSTEOARTHRITIS: A DOUBLE-BLIND RANDOMIZED CLINICAL TRIAL

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The most prevalent type of arthritis is osteoarthritis which is known with the degenerative knee disease. Limited pieces of evidence have indicated that satureja with special phenol compounds is effective in inflammation reduction and pain alleviation. the aim of this study was to investigate the effect of Satureja Hortensis powder supplement on pain improvement and pro-inflammatory cytokines in patients with knee osteoarthritis. The present study was conducted as a placebo-controlled double-blind randomized clinical trial. 39 patients with OA with medium pain were randomly divided into two groups which received Satureja Hortensis powder and placebo. These groups consumed three 200 mg capsules with the same size and form for two months which contained Satureja Hortensis powder and starch, respectively. Pain intensity was determined using visual analogue scale (VAS) at the beginning and end of the eighth week. Response to the treatment was defined as pain reduction by more than 1.5 scores. Serum sample were collected befor and after the intervention. The concentration of TNF-α and IL1-β (pro-inflammatory cytokines) were measured with ELISA kit. To distribute pain intensity before the intervention, there was no significant difference between the two groups. Before the intervention, all people had a pain score between 4 and 7. After the intervention, 95% of the Satureja group and 84% of the placebo group were in this scope. These changes were not statistically different (p=0.12). Median of the pain intensity was not statistically different before and after the intervention. There was no significant difference between the two groups in concentration of pro-inflammatory cytokines before and after intervention. Results of this study showed that Satureja Hortensis powder supplement with dose of 600 mg per day for 60 days was not effective on pain alleviation and concentration of pro-inflammatory cytokines in patients with knee osteoarthritis. Thus, more studies are required.

146, 147
EFFECT OF DIFFERENT CONCENTRATIONS AND COMBINATIONS OF GROWTH REGULATORS ON DIRECT SHOOT REGENERATION FROM SOOT TIP AND NODAL EXPLANTS OF *HYOSCYAMUS RETICULATUS* L.

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Hyoscyamusreticulatus L. is herbaceous plant, annual or biennial. *Hyoscyamus* genus belongs to the Solanaceae family and is Hyoscyameae order [1]. This Species is known from past times and used in treatment of neurological diseases as medicinal plant. Tropane alkaloids in this plant have anti-spasmodic, anticlorigenic, sedation and analgesic properties. The dominant alkaloid in *H. reticulatus* is hyoscyamine [2]. Study effect of different growth regulators (BA, Kin and TDZ) in combination with IAA in *H. reticulatus* revealed in the node explants that maximum average bud induction (37.313 bud per explants) was obtained in MS medium fortified with Kin (1 mg/l) in combination with IAA (0.1mg/l), as well as maximum average shoot regeneration (149.25 per treatment) was observed in MS medium containing Kin (1 mg/l) in combination with IAA (0.1mg/l), the highest percentage of regeneration (100 percent),was obtained in MS medium containing Kin (1 mg/l) without IAA. In the shoot tipe explants that maximum average bud induction (41.06 bud per explants) was obtained in MS medium fortified with Kin (5 mg/l) in combination with IAA (0.5mg/l), maximum average shoot regeneration (164.25 per treatment) was observed in MS medium containing Kin (5 mg/l) in combination with IAA (0.5mg/l), the highest percentage of regeneration (100 percent),was obtained in MS medium containing BA (1 mg/l) in combination with IAA (0.1 mg/l). Minimum bud induction (2.063), shoot regenerated (10.75) was observed in control and media containing TDZ (3mg/l). Lowest percentage of regeneration (31.25 percent) was reported in cytokinin-free media, In both explant.

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258, 273

THE VOLATILE COMPOSITION, ANTIOXIDANT ACTIVITY AND POLYPLENOL CONTENT OF THE EXTRACT OF *TRIGONELLA ELLIPTICA* BOISS. FROM IRAN

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The volatile components at different organs of *Trigonella elliptica* Bois. were identified and analyzed by HS (headspace)-GC-MS on the Combi PAL System technique. The numbers of volatile compound identified in the flowering shoot, flowers and leaves were 11, 15 and 20 , respectively. The main components of the flowering shoot were n-nonadecane (89.0 %), coumarin (5.1 %) and heptanal (1.6 %); in flowers were 5-methyl-heneicosane (43.5 %), p-cymen-9-ol (40.2 %) and p-cymen-8-ol (9.5%); also in leaves were 4-methylene-Isophorone (45.3%), coumarin (25.5%) and p-cymen-9-ol (11.3%). coumarin as a main compound was found in the flowering shoot and leaves. Another main compound, p-cymen-9-ol, was found in leaves and floweres. The volatile components isolated by hydrodistillation were identified and analyzed by GC and GC-MS. Seventeen compounds were identified in the oil. The major volatile compounds of *T. elliptica* essential oils were coumarin (21.1%), <3Z>-hexenyl benzoate (9.6%), <3Z>-hexenol (9.2%), α-trpinyl acetate (8.0%), <3Z>-hexenyl isovalerate and myristicine (6.9%). The antioxidant activity of the extract of *T. elliptica* was found to be 320 µg/ml. From 6 investigated polyphenols by High Performance Liquid Chromatography (HPLC), the highest amount were caffeic acid (2.7 mg/g), cumarin (0.44 mg/g) and gallic acid (0.16 mg/g), respectively. Catechin, chlorogenic acid, and quercetin were not detected in *T. elliptica* extract. *T. elliptica* could be a potent medicinal plant because of variability of chemical compounds at different organs.

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294, 296

THE IDENTIFICATION OF MEDICINAL PLANTS IN FOREST AND PLAIN AREAS OF GILAN PROVINCE

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The use of medicinal plants have always been important since the birth of mankind . thus,The first step for accurate using of therapeutic effects is the appropriate identify and accurate gathering of plants species. Guilan Province, due to the diversity and inrichment of appropriate species is full of medicinal plants. The survey was conducted by using the navigation field and documentary studies. Then identify, categorize and identify the plants were in the forest and plain range of Gilan. Results showed that 238 plant species among 88 family are known as the medicinal plants.. The most widely used herbal family are include of 5 plant species. Respectively, the maximum variation in the plant family, Rosaceae with 14 species of medicinal plants, Labiatae with 14 species of medicinal plants and solanaceae with 10 species and cruciferaceae with 9 species and polygonaceae with 8 species are contains most species of medicinal plants in the forest range of gilan province.

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438, 484

THE EFFECT OF CHITOSAN ON SOME PHYSIOLOGICAL AND BIOCHEMICTRY CHARACTERIZATION IN MELISSA (*MELISSA OFFICINALIS* L.)

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Melissa (*Melissa officinalis* L.) is one of the oldest and still most popular medicinal plants. It is a representative of the Lamiaceae family that is known for many aromatic and medicinal plants commonly used in Europe's traditional medicine and gastronomy. Chitosan, a polycationic polysaccharide, has been confirmed as an effective biotic elicitor for improving biosynthesis of secondary metabolites in cell cultures of several medicinal species [1, 2]. In order to study the effect of chitosan on antioxidant enzymes activity such as peroxidase (POX),gayacol peroxidase (GPX) and poly phenol oxidase (PPO), chlorophyl a, b, carotenoid, proline and carbohydrate in Mlissa, this study was done as randomized complete block (RCB) whit three replication in biocenter of Zabol university. Chitosan was in four level (0, 100, 150 and 200 ppm). In comparison with control, the results showed antioxidant enzymes activity such as peroxidase (POX), gayacol peroxidase (GPX) and poly phenol oxidase (PPO), chlorophyl a, b, carotenoid, proline and carbohydrate increased in all levels. It seems chitosan, as a biotic elicitor, increases some physiological and biochemictry characterization in four stage of Mlissa.

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87, 88

THE EFFECT OF DROUGHT STRESS ON CONCENTRATION OF PROTRINS AND PLANT PIGMENTS A, B CHLOROPHYLLS OF SARVORY(*SATUREJA HORTENSIS* L.)

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The drought stress is an important factor on plant growth. On other hand, *Satureja hortensis* belong to lamiaceae family and is used as spice and drug. In this research, the effects in water stress on metabolites protein and chlorophyll a,b were studied.Complete randomized design with 5 treatments and 3 replications used in 2011. Water deficit levels included control (100% field capacity), mild stress (80% field capacity), medium stress (60% field capacity), severe stress (40% field capacity) and ultra-severe (20% field capacity). The statistical analysis showed that deficit had significant effect on growth parameters. Decreasing of the protein is due to decrease of protein synthesis and high activity protease is caused of degradation of proteins. Water stress decreased concentration of plant pigments a, b chlorophylls. Decreasing of the plant pigment is due to the chlorophyll decomposer enzymes. [1,2].

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113, 114

EFFECT OF SATUREJA HORTENSIS POWDER SUPPLEMENTATION ON PAIN AND PRO-INFLAMMATORY CYTOKINES IN PATIENTS WITH KNEE OSTEOARTHRITIS: A DOUBLE-BLIND RANDOMIZED CLINICAL TRIAL

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The most prevalent type of arthritis is osteoarthritis which is known with the degenerative knee disease. Limited pieces of evidence have indicated that satureja with special phenol compounds is effective in inflammation reduction and pain alleviation. the aim of this study was to investigate the effect of Satureja Hortensis powder supplement on pain improvement and pro-inflammatory cytokines in patients with knee osteoarthritis. The present study was conducted as a placebo-controlled double-blind randomized clinical trial. 39 patients with OA with medium pain were randomly divided into two groups which received Satureja Hortensis powder and placebo. These groups consumed three 200 mg capsules with the same size and form for two months which contained Satureja Hortensis powder and starch, respectively. Pain intensity was determined using visual analogue scale (VAS) at the beginning and end of the eighth week. Response to the treatment was defined as pain reduction by more than 1.5 scores. Serum sample were collected befor and after the intervention. The concentration of TNF-α and IL1-β (pro-inflammatory cytokines) were measured with ELISA kit. To distribute pain intensity before the intervention, there was no significant difference between the two groups. Before the intervention, all people had a pain score between 4 and 7. After the intervention, 95% of the Satureja group and 84% of the placebo group were in this scope. These changes were not statistically different (p=0.12). Median of the pain intensity was not statistically different before and after the intervention. There was no significant difference between the two groups in concentration of pro-inflammatory cytokines before and after intervention. Results of this study showed that Satureja Hortensis powder supplement with dose of 600 mg per day for 60 days was not effective on pain alleviation and concentration of pro-inflammatory cytokines in patients with knee osteoarthritis. Thus, more studies are required.

146, 147
EFFECT OF DIFFERENT CONCENTRATIONS AND COMBINATIONS OF GROWTH REGULATORS ON DIRECT SHOOT REGENERATION FROM SOOT TIP AND NODAL EXPLANTS OF *HYOSCYAMUS RETICULATUS* L.

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Hyoscyamusreticulatus L. is herbaceous plant, annual or biennial. *Hyoscyamus* genus belongs to the Solanaceae family and is Hyoscyameae order [1]. This Species is known from past times and used in treatment of neurological diseases as medicinal plant. Tropane alkaloids in this plant have anti-spasmodic, anticlorigenic, sedation and analgesic properties. The dominant alkaloid in *H. reticulatus* is hyoscyamine [2]. Study effect of different growth regulators (BA, Kin and TDZ) in combination with IAA in *H. reticulatus* revealed in the node explants that maximum average bud induction (37.313 bud per explants) was obtained in MS medium fortified with Kin (1 mg/l) in combination with IAA (0.1mg/l), as well as maximum average shoot regeneration (149.25 per treatment) was observed in MS medium containing Kin (1 mg/l) in combination with IAA (0.1mg/l), the highest percentage of regeneration (100 percent),was obtained in MS medium containing Kin (1 mg/l) without IAA. In the shoot tipe explants that maximum average bud induction (41.06 bud per explants) was obtained in MS medium fortified with Kin (5 mg/l) in combination with IAA (0.5mg/l), maximum average shoot regeneration (164.25 per treatment) was observed in MS medium containing Kin (5 mg/l) in combination with IAA (0.5mg/l), the highest percentage of regeneration (100 percent),was obtained in MS medium containing BA (1 mg/l) in combination with IAA (0.1 mg/l). Minimum bud induction (2.063), shoot regenerated (10.75) was observed in control and media containing TDZ (3mg/l). Lowest percentage of regeneration (31.25 percent) was reported in cytokinin-free media, In both explant.

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258, 273

THE VOLATILE COMPOSITION, ANTIOXIDANT ACTIVITY AND POLYPLENOL CONTENT OF THE EXTRACT OF *TRIGONELLA ELLIPTICA* BOISS. FROM IRAN

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The volatile components at different organs of *Trigonella elliptica* Bois. were identified and analyzed by HS (headspace)-GC-MS on the Combi PAL System technique. The numbers of volatile compound identified in the flowering shoot, flowers and leaves were 11, 15 and 20 , respectively. The main components of the flowering shoot were n-nonadecane (89.0 %), coumarin (5.1 %) and heptanal (1.6 %); in flowers were 5-methyl-heneicosane (43.5 %), p-cymen-9-ol (40.2 %) and p-cymen-8-ol (9.5%); also in leaves were 4-methylene-Isophorone (45.3%), coumarin (25.5%) and p-cymen-9-ol (11.3%). coumarin as a main compound was found in the flowering shoot and leaves. Another main compound, p-cymen-9-ol, was found in leaves and floweres. The volatile components isolated by hydrodistillation were identified and analyzed by GC and GC-MS. Seventeen compounds were identified in the oil. The major volatile compounds of *T. elliptica* essential oils were coumarin (21.1%), <3Z>-hexenyl benzoate (9.6%), <3Z>-hexenol (9.2%), α-trpinyl acetate (8.0%), <3Z>-hexenyl isovalerate and myristicine (6.9%). The antioxidant activity of the extract of *T. elliptica* was found to be 320 µg/ml. From 6 investigated polyphenols by High Performance Liquid Chromatography (HPLC), the highest amount were caffeic acid (2.7 mg/g), cumarin (0.44 mg/g) and gallic acid (0.16 mg/g), respectively. Catechin, chlorogenic acid, and quercetin were not detected in *T. elliptica* extract. *T. elliptica* could be a potent medicinal plant because of variability of chemical compounds at different organs.

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294, 296

THE IDENTIFICATION OF MEDICINAL PLANTS IN FOREST AND PLAIN AREAS OF GILAN PROVINCE

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The use of medicinal plants have always been important since the birth of mankind . thus,The first step for accurate using of therapeutic effects is the appropriate identify and accurate gathering of plants species. Guilan Province, due to the diversity and inrichment of appropriate species is full of medicinal plants. The survey was conducted by using the navigation field and documentary studies. Then identify, categorize and identify the plants were in the forest and plain range of Gilan. Results showed that 238 plant species among 88 family are known as the medicinal plants.. The most widely used herbal family are include of 5 plant species. Respectively, the maximum variation in the plant family, Rosaceae with 14 species of medicinal plants, Labiatae with 14 species of medicinal plants and solanaceae with 10 species and cruciferaceae with 9 species and polygonaceae with 8 species are contains most species of medicinal plants in the forest range of gilan province.

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438, 484

THE EFFECT OF CHITOSAN ON SOME PHYSIOLOGICAL AND BIOCHEMICTRY CHARACTERIZATION IN MELISSA (MELISSA OFFICINALIS L.)

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Melissa (*Melissa officinalis* L.) is one of the oldest and still most popular medicinal plants. It is a representative of the Lamiaceae family that is known for many aromatic and medicinal plants commonly used in Europe's traditional medicine and gastronomy. Chitosan, a polycationic polysaccharide, has been confirmed as an effective biotic elicitor for improving biosynthesis of secondary metabolites in cell cultures of several medicinal species [1, 2]. In order to study the effect of chitosan on antioxidant enzymes activity such as peroxidase (POX),gayacol peroxidase (GPX) and poly phenol oxidase (PPO), chlorophyl a, b, carotenoid, proline and carbohydrate in Mlissa, this study was done as randomized complete block (RCB) whit three replication in biocenter of Zabol university. Chitosan was in four level (0, 100, 150 and 200 ppm). In comparison with control, the results showed antioxidant enzymes activity such as peroxidase (POX), gayacol peroxidase (GPX) and poly phenol oxidase (PPO), chlorophyl a, b, carotenoid, proline and carbohydrate increased in all levels. It seems chitosan, as a biotic elicitor, increases some physiological and biochemictry characterization in four stage of Mlissa.

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552

SCREENING OF SOME MEDICINAL PLANTS FROM SOLANACEAE AND LAMIACEA FAMILIES FOR CYTOTOXIC ACTIVITY BY MTT ASSAY

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Cytotoxic compounds isolated from medicinal plants have played a key role in development of clinically useful anticancer agents. In this experiment, 15 species from Solanaceae and Lamiacea families were collected from different area of Iran for evaluation their cytotoxic potential. Authenticated plant materials were subjected to extraction with methanol, dichloromethane and methanol/water (80:20) by maceration method. All extracts were subjected to cytotoxicity screening by MTT bioassay against MOLT-4 cell line. *Thymus trautvetteri*, *Lycium shawii* (stem) and *Solanum luteum* (methanol extract), *Salvia verticillata* (stem), *Thymus kotschymus*, *Salvia perspolitana*, *Ballota aucheri*, *Nepeta glomerulosa*, *Hyoscyamus tenuicaulis*, *Salvia lachnocalyx* (shoot), *Salvia lachnocalyx* (root) and *Scutellaria multicaulis* (root) (dichloromethane extract) and *Thymus trautvetteri* and *Lycium shawii* (stem) (methanol/water (80:20) extract) have shown significant cytotoxicity (The half maximal inhibitory concentration (IC50) < 50 µgr/ml) compared with other extracts. Our results indicated that some of evaluated species could be a good choice for further study to isolation and structure elucidation of pure compounds as novel anticancer medicinal agents.

667

ANTIMICROBIAL EFFECT OF METHANOL EXTRACT THREE LICHEN SPECIES (ACAROSPORA CERVINA, CALOPLACA AURANTI, DIPLOSCHISLES CUVPSRIS) ON ESCHERICHIA COLI ISOLATED FROM URINARY TRACT INFECTIONS IN CITY ILAM

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The use of lichens in the traditional medicine of it was customary in many countries and in the treating of diseases such as yellow fever, gout, convulsions،bacterial infections. Escherichia coli urinary tract infection is one of the most common cause are widespread antibiotic consumption increased antibiotic resistance in this bacterium [1،2]. The purpose of the Antimicrobial effect of methanol extract 3 lichen species on Escherichia coli isolated from urinary tract infections in City Ilam. Lichens collected from different parts of Ilam Province methanol extract which were prepared using the Soxhlet device. Escherichia coli urinary tract infection was isolated in hospitals ilam. After preparing various concentrations of extracts the method agar diffusion and disk diffusion effect on E. coli. MIC and MBC determined For them Gentamicin and Amoxilin seen as a positive control were compared. 10% of dimethyl sulfoxide(DMSO) was used as a negative Control. Disk diffusion test results show. Average Diagonal zone of growth inhibition dilution to 100mg/ml ،200mg/ml ، 400mg/ml and 800mg/ml for lichens Acarospora cervina respectively 11±0/57mm ، 13/33±0/57mm ،14/66±0/57 ،17/66±0/57 mm and for lichen Caloplacaauranti respectively 19±0/57mm ،20/13±0/57mm ،23/46±0/57mm ،24±0/57mm and for lichen Diploschislescuvpsris respectively. 7±0/57mm ،10±0/57mm ،11/33±0/57mm 14/66±0/57mm ،and antibiotic Gentamicin 13±0/57mm. and Amoxilin 11±0/57mm. The results showed an increased concentration, the Diagonal zone of growth inhibition increased. The methanol extract was observed between 3 Lichens Lichen Caloplaca auranti inhibition zone diameter 24±0/57 mm have the greatest impact on E. coli and lichens Diploschisles cuvpsris had the least impact on E. coli .25922 ATCC strains and was used to control .determine the MIC and MBC of dilution series were used in Mueller Hinton Broth The results showed MIC for lichens Acarospora cervina100mg/ml MIC for lichens Caloplaca auranti 100mg/ml for lichens Diploschisles cuvpsris 200mg/ml and MBC for lichens Acarospora cervina 800 mg/ml MBC for lichens Caloplaca auranti 400mg/ml and MBC for lichens Diploschisles cuvpsris800mg/ml.extract the lichens used in the treatment of infections caused by Escherichia coli**.**

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677, 679

SYSTEMATIC STUDY ON MEDICINAL SPECIES OF *AVENA* (POACEAE)

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Avena (Poaceae) comprised 7 species in Iran from which two are cultivated. Some of these species are used to reduce blood cholesterol, as appetizer, to treat anxiety and insomnia. Caryopsis morphological features are of diagnostic value in different grass genera. In this project caryopsis morphology of 12 accessions of four *Avena* species as *A.fatua*، *A.barbata*, *A.westii* and *A.ludoviciana* from different localities and stem anatomical studies of 10 accessions from the above mentioned species are considered for the first time. Digital stereomicroscope (Dinolite) was used to evaluate the caryopsis features. Qualitative and quantitative features as caryopsis length and width, length to width, scar shape, general outline of caryopsis were considered. In order to study the stem anatomical structure double coloration was used and cross sections were studied by use of Olympus light microcopy with different magnitude. Qualitative and quantitative features as vascular bundle length and width, cortex diameter from epidermis to pith, epidermis thickness, and presence of bilateral phloem and size of vascular bundle were studied. Statistical analysis of result of present study revealed that by use of selected set of features studied species are separated clearly. Multivariate statistical analyses of results show diagnostic value of caryopsis features have illustrated. Species relationships are discussed.

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800

DETERMINATION OF ANTIOXIDANT PROPERTY AND AMOUNT OF TOTAL PHENOL OF FRUIT EXTRACTS OF THE *PISTSCIA ATLANTICA L.* FROM SISTAN AND BALUCHESTAN

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Many human diseases are caused by free radicals. Antioxidants neutralize free radicals and reduce the risk of cardiovascular disease and stroke, In some cases, prevent cancer. The genus Pistacia L. (family: Anacardiaceae alt. Pistaciaceae) consists of ca. 11 species, most of which are known to produce oleoresin growing in different regions of Iran, is a popular naturally occurring chewing gum and has been used traditionally in the treatment of peptic ulcer [1]. The present study was carried out to evaluate the amount of total phenols (Matta and Giai,1969) [2]and antioxidant property of the fruit extracts of P.atlantica by DPPH scavenging[3]and Ferric reducing antioxidant power (FRAP) methods[4]. Measurements of antioxidant property have been done in methanolic, ethanolic and aqueous extracts. In DPPH and FRAP tests for methanolic, ethanolic and aqueous extracts the antioxidant property were (IC_{50}=1.57,654.96) , (IC_{50} =3.08, 278.31) and (IC_{50} = 3.02 ppm, 338.37 mMFe^{2+}/mg sample) respectively. Ascorbic acid was used as standard. The amount of phenolic compounds in P.atlantica was found to be 13.51×10^3 mgphenol/g D.w and Gallic acid was used as standard. Therefore according to amount of phenolic component and antioxidant outcomes, the pistacia atlantica could be considered as a significant natural powerful antioxidant source, which might be helpful in preventing the progress of various oxidative stresses.

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802

ANTIMICROBIAL EFFECTS OF METHANOL EXTRACT THREE LICHEN SPECIES (ACAROSPORA CERVINA, CALOPLACA AURANTI, DIPLOSCHISLES CUVPSRIS) ON FUNGUS FUSARIUM MONILIFORME VERTICILLIUM DOHLIA ISOLATED FROM PLANTS

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The use of lichens in the traditional medicine of old day s it was customary in many countries and in thetreatingof diseasessuch as yellow fever, gout ،convulsions،bacterialinfections[1].One of the problems is that the agricultural sector of the plant pathogenic fungi is the main cause of The purpose of the the antimicrobial effect of methanol extract three lichens on Fusarium moniliforme Verticillium dohlia isolated from plants of Ilam Province.Lichens collected from different parts of Ilam Province methanol extract which were prepared using the Soxhlet devic. fungus from plant samples withered Septic to the lab fungal plant diseases in, Ilam University were separate identity confirmation. After preparing different concentrations of the extracts published in the disk diffusion method was The effect on fungus and with nystatin was seen positive control was compared. 10% of dimethyl sulfoxide(DMSO) was used as a negative control. after 48 hours of incubation disk diffusion test results Showed. Zone of growth inhibition in The lichen extract Acarospora cervina on Fusarium moniliforme dilution 100mg/ml (7mm) 200mg/ml (9/41mm) ،400mg/ml (14mm) 800mg/ml (18/15mm) ،Diagonal Zone of growth inhibition in The lichen extract Caloplaca auranti on Fusarium moniliforme Dilution 100 mg/ml (4mm) ،200 mg/ml,(5mm) ،400 mg/ml (10/34mm) ،800mg/ml(12/12mm) Diagonal Zone of growth inhibition in The lichen extract Diploschisles cuvpsris on Fusarium moniliforme Dilution 100 mg/ml (2mm) ، 200mg/ml (5mm) ،400mg/ml (11/66mm) ،800mg/ml (16mm) ،Zone of growth inhibition in The lichen extract Acarospora cervina on Verticillium dohlia Dilution 100 mg/ml (2mm) ،200 mg/ml (6mm) ،400 mg/ml (9mm) ،800mg/ml (14/31mm) ،Diagonal Zone of growth inhibition in The lichen extract Caloplaca auranti on Verticillium dohlia Dilution 100mg/ml (5mm) ،200 mg/ml (6mm) ،400 mg/ml (11/64mm) ،800mg/ml (16/12mm) ،Diagonal Zone of growth inhibition in The lichen extract Diploschisles cuvpsris on Verticillium dohlia Dilution 100mg/ml (9mm) ،200 mg/ml (12/441mm) ، 400mg/ml (19/34mm) ،800mg/ml (21/11mm) The mean diameter of inhibition zone of influence That was of the nystatin on fungus Fusarium moniliforme equal 12 mm and the nystatin on fungus Verticillium dohlia equal 9mm.The extract lichens Acarospora cervina the greatest impact on Fusarium moniliforme ،Of the extract lichens Diploschisles cuvpsris the greatest impact extract on Verticillium dohlia .

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1027, 1028
PHENOLIC COMPOUNDS AND ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF METHANOL EXCTRACT OF *ECHIUM AMOENUM* FISCH.& MEY

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Plants are the main source of phenolic compounds; it seems that the plants with higher phenolic compounds like flavonoids and flavonols contain more antioxidant power. *Echium Amoenum* Fisch & Mey is used as tranquilizer and high nutrition in traditional medicine [3,5].In this study, *Echium Amoenum* Fisch & Mey was gathered from Tonekabon and Royan zones and extracted by methanol solution. Phenolic and flavonoid compounds were determined by aluminum chloride and *Folin*-Ciocalteu and antioxidant activity by DPPH free radical scavenging and Fe^{3+} reduce ability [1,2,4].The results indicate that there is a significant difference between gathering sample zone and phenolic and flavonoid compounds in 1% level. The gathered samples from Tonekabon zone contain more flavonoid and total phenol content. In addition, there is a significant difference between the applied methods in 1% level. The samples from Tonekabon zone contain more antioxidant activity in both methods.

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1322, 1387

ANTIMICROBIAL POTENTIAL ETHANOLIC EXTRACT FROM STEMS OF *DAPHNE MUCRONATA* AGAINST CLINICAL METHICILLIN RESISTANT ISOLATES OF *STAPHYLOCOCCUS AUREUS*

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The aim of the study was assess the antibacterial effect of ethanolic extract *Daphne mucronata* plant extracts and compartive with curd solvent against clinical Methicillin Resistant isolates of *Staphylococcus aureus*. The minimal inhibitory concentration (MIC) of the plant extracts clinical isolates of *S. aureus* were assessed using microdilution method on Mueller-Hinton broth media. Also, The antibacterial activities of extracts were evaluated using the disk diffusion method and well diffusion method in agar media; the inhibitory zones were recorded in millimeters.[1, 2] The results of this study showed that there is a decrease in MIC in case of ethanolic extract of Daphne mucronata against *S. aureus* (7.03 mg/ml) in some cases and maximum average of diameter was (18mm) in some cases. Our results indicate the possibility of using these extracts in the treatment of bacterial infections, and the results of this study was encouraging, despite the need for clinical studies to determine of the real effectiveness and potential toxic effects in vivo.

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1562

GENETIC DIVERSITY OF MORPHOLOGICAL TRAITS IN 2 POPULATIONS OF MEDICINAL PLANTS MOLDAVIAN BALM (*DRACOCEPHALUM MOLDAVICA* L.)

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Moldavian balm medicinal plants that contains active ingredients are abundant. This plant has several properties, including its impact on the treatment of cardiovascular disease. Medicinal plants are great importance because of secondary metabolites. Genetic diversity in primary population is very important for having a successful breeding program. Detection of genetic diversity and morphological traits relationships between two populations Moldavian balm was conducted experiment in a randomized complete block design in research greenhouse in faculty of agriculture Shahed University. Traits were such as plant height, root length, number of lateral branches. The results of data didnot showed differences among populations are for traits under study. The correlation of plant height with number of lateral branches was positively significant at 5% probability level. Highest plant height (60 centimeter) and number of lateral branches (18) was obtained in Mashhad population., and highest root length (13 centimeter) were found in the Mashhad population. As a result of Neishaboor in Moldavian Balm were suitable for breeding programs.

1656, 1658
THE ANTIOXIDANT ACTIVITIES IN TWO *ELAEAGNUS ANGUSTIFOLIA* L. VARIANTS

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Elaeagnus angustifolia (E. *angustifolia*) is a plant belonging to the family Elaeagnaceae with various medicinal properties including analgesic and anti-inflammatory effects [1]. The leaves of this plant contain significant amounts of flavonoids, terpenoides, cardiac glycosides, cytosterols and caroserole [2]. Also, *E. angustifolia* flowers have antipyretic effect [3]. In the present study, antioxidant and antiradical capacity of flowers and leaves in two variants of *E. angustifolia* was examined using ethanol solvent. Mixed with ethanol, samples were extracted on a magnetic stirrer separately [4]. The experiments were carried out to measure the 2,2-diphenyl-1-picrylhydrazyl (DPPH), chain breaking activity (CBA), superoxide(O2-) radical inhibition, hydrogen peroxide (H2O2) and ferric reducing antioxidant power (FRAP). Data were analyzed using Instat-N software. Results showed that the Fariman variant leaves had the highest radical inhibition percentage DPPH (%58.85±0.71) and CBA (0.79±0.01 - Abs^{-3}/min/mg FW) while Mashhad variant flowers had the lowest (%28.2±0.77 , 0.27±0.03 - Abs^{-3}/min/mg FW respectively). Furthermore, the highest superoxide and H2O2 radical scavenging percentage were seen in Mashhad variant flowers (%48.89±0.71 and 50.7±0.092 respectively). In FRAP assay Fariman variant leave and Mashhad variant flower had the maximum (5.36±0.05) and the minimum reduction potential, respectively. In both varieties, radical scavenging DPPH , CBA and FRAP were higher in leaves than the flowers But superoxide (O2-) and H2O2 radical scavenging percentage in flowers more than leaves.In general, the antioxidant activities were higher in Fariman variant compared to the one of Mashhad.

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1660, 1677

EFFECT OF PACLOBUTRAZOL ON MORPHOLOGICAL, PHYSIOLOGICAL CHARACTERISTICS AND ANTIOXIDANT ENZYMES ACTIVITY IN DROUGHT STRESS IN PEPPERMINT (*MENTHA PIPERITA* L)

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The effects of paclobutrazol (PBZ) on enzymatic and growth parameters of peppermint were studied on drought tolerant. Fenugreek seedlings grown in pots and subjected to four levels of PBZ (0, 25, 50, and 75 mgl-1) and two levels each of drought (moderate drought (25% soil saturation capacity) and intense drought (15% soil saturation capacity). Analysis of variance indicated that the foliar application of Paclobutrazol had significantly effect on all treatments($p<0.005$). Besides that, Paclobutrazol application had a significant effect on levels of antioxidant enzymes activities include Catalase (CAT), Ascorbat Peroxidase (APX), Superoxide Dismutase (SOD), Peroxid Hidrogen (H2O2), total height of the plant, root length, shoot length, total leaf area, total chlorophyll contents and prolin in leaf of Fenugreek were evaluated. Result showed that drought stress caused a remarkable increase of prolin content which is a clear indication of oxidative stress. All Paclobutrazol concentration resulted higher proline content. Batlang (2006) resulted higher proline content in drought stress with Paclobutrazol. Plants can partly protect themselves against mild drought stress by accumulating osmolytes (5, 4). The total height of the plant increased with the raising of Paclobutrazol but the highest amount of root and shoot length observed in 50 mgl Paclobutrazol using. The more increase in total leaf area was prominent in 50 mgl treatment and it was 47.00 per cent over control on 90 DAP ($P<0.01$). The total chlorophyll contents of the leaves increased with the applying paclobutrazul. The maximum increase was found on 90 DAP in 50 mgl treatment and it was 98.91 per cent over control. Spraying with Paclobutrazol on the other hand, prevented the accumulation of H2O2 in drought stressed plants which was due to the up regulation of H2O2 scavenging enzymes such as CAT, SOD, APX and This result is well agreed with Kadioglu et al. (2011). This clearly suggests the role of Paclobutrazol in increasing the level of CAT activity under both moderate and intense conditions. CAT enzyme is an important antioxidant system that catabolises hydrogen peroxide, a precursor of reactive oxidants (3). Spray of 50 mgl PBZ in all levels of drought stress caused increasing of antioxidant enzymes activity in moderate and intense drought levels ($p<0.001$). Spray of PBZ in different concentration caused increasing of proline and antioxidant enzymes activity in drought stress ($p<0.001$). According to the results, Increasing enzymes activity under drought stress conditions with using Paclobutrazol spraying improved. We therefore conclude that Paclobutrazol could be used as a potential growth regulator for improving plant growth under drought stress.

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1661

EVALUATION PHYTOCHEMICAL AND ANTIFUNGAL EFFECT OF EUCALYPTUS AND CUMINUM CYMINUM ESSENTIAL OILS

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The aim of present study was the in vitro evaluation of phytochemical and antifungal effects of Cuminum cyminum and Eucalyptus EOs on candida species. candida species was selected because these species are the most common cause of fungal infections in human especially in immunosuppressed patients. Essential oils of Cuminum cyminum seeds and aerial parts of Eucalyptus were prepared using a Clevenger type apparatus for 3 h(1). Analysis of essential oil constituents by GC- MS was performed(2). Minimum inhibitory concentration of essential oils was determined against *C.albicans ATCC10231, C.tropicalis ATCC 750, C.paraprsilosis ATCC 22019* and *C.dublinensis CD 36*(3). The main components of cuminum cyminum essential oil was cumin aldehyde (29.02%). In Eucalyptus EO, Twenty two components, which represented 83.63% of Eucalyptus EO was identified by high amounts of isopentyl-isovalerate (19.12%) and α-pinene (12.6%). MIC of cuminum cyminum EO was 0.39% against *C.albicans* and *C.tropicalis* and 0.19% against *C. dublinensis* and *C.parapesilosis*. The MIC value of *Eucalyptus* EO against *C. albicans*, *C. tropicalis*, *C. dubliniensis* and *C. parapsilosis* was respectively 0.2%, 0.1%, 0.4% and 0.4%. Results of this study express high antifungal activity of Cuminum cyminum and Eucalyptus essential oils. This survey suggests use of these essential oils as a suitable antimicrobial compound specially in drug resistance and treatment of candidal disease.

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1731, 1733

THE EFFECT OF MYCORRHIZAL (*GLOMUS MOSSEAE* AND *G.INTRARADICES*), PIRIFORMOSPORA *INDICA* AND VERMICOMPOST ON SHOOT AND ESSENTIAL OIL YIELD OF LEMON BALM (*MELISSA OFFICINALIS* L.)

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Lemon balm is a medicinal herb that its essential oil used to the pharmaceutical, health and food industries. It also contains rosmarinic acid (RA) which is presently utilized against HIV1 viruses and treatment of AIDS disease [1, 2]. In order to investigate effect of vermicompost, mycorrhiza and piriformospora indica (semi-mycorrhiza) on some morpho-physiological traits and yield of balm (Melissa officinalis), this experiment was conducted in Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. in 2012. The experiment was conducted in factorial in the form of a randomized complete block design with three replications. Factors were vermicompost in three levels (0, 5 and 10 t/ha), inoculation with biofertilizers in four levels (control, inoculation with *Glomus mosseae + G. intraradices*, *Piriformospora indica*, and *Glomus mosseae + G. intraradices + Piriformospora indica*). Results indicated that vermicompost significantly affected essential oil yield ($p<0.01$). Moreover vermicompost significantly affected leaf yield and shoot yield, essential oil percentage ($p<0.05$). Inoculation with fungi and intraction vermicompost * fungi non-significantly affected stem yield, leaf yield, shoot yield, essential oil and essential perecentage. Mean comparison indicated application of 10 ton/ha vermicompost resulted in the highest leaf yield (1468 kg/ha).application of 10 ton/ha had the highest shoot yield (1803 kg/ha). Application of 5 t/ha vermicompost had the highest essential oil yield (0.3%). 5 ton/ha vermicompost (5535 g/ha) and control (2328 g/ha) were produced maximum and minimum essential oil yield respectively. The results showed that the use of vermicompost 5 ton/ha due to increased leaf yield and essential oil percentage in the first year is the best treatment. The highest root area (70 cm) was obtain from combination of 10 t/ha vermicompost * Mycorrhiza. The highest long of root (39 cm) was from combination of 5 t/ha vermicompost * non inoculation. The highest weight of root (909.3 kg/ha) was from mycorrhiza + semi mycorrhiza. In this study the highest root area (64.55) was achieved in mycorrhiza and the weight of root (767.90 kg/ha) was maximum in mycorrhiza + semi mycorrhiza.

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1750

PHYTOCHEMICAL STUDY OF THE ETHYL ACETATE EXTRACT OF *GRAMMOSCIADIUM PLATYCARPUM* FROM IRAN

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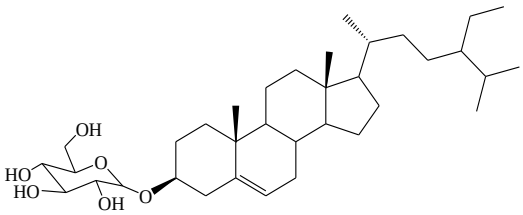
Grammosciadium platycarpum is one of the three endemic species of *Grammosciadium* genus (Apiaceae) in Iran, that grows in the western areas of Iran. This genus is represented in the Iranian flora by 8 species [1]. In this paper, the phytochemical analysis of ethyl acetate extract of *G. platycarpum* is reported. Thus 2 kg of the dried aerial parts of the plant was grind and subjected to extraction by ethyl acetate. 58 gr crude extract was obtained and the constituents were isolated and purified by different chromatographic methods. Our studies led to the isolation of two steroidal compounds daucosterol and β-sitostrol, a polyacetylene compound (**1**), a sesquiterpene (**2**), which their structures were elucidated by means of 1D&2D NMR spectroscopic methods.



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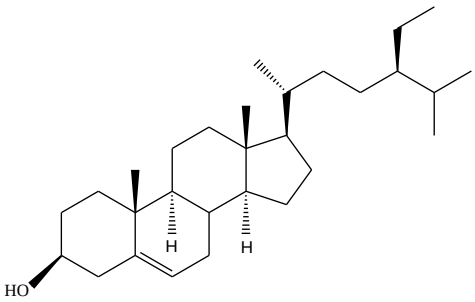

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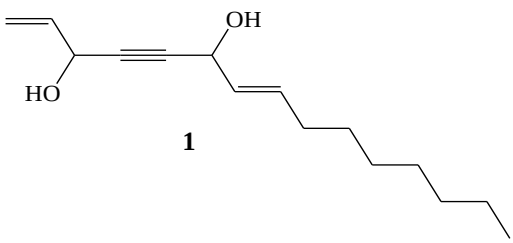

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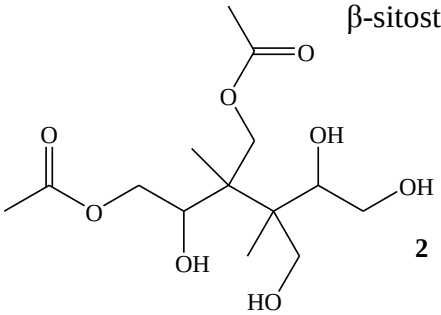

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1347

EFFECT OF GENISTEIN ISOFLAVONE ON PERFORMANCE AND ANTIBODY RESPONSES IN BROILER CHICKS

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The plant isoflavones have been shown to strongly affect immune responses in animal models. The study presented here was conducted to investigate the effect of genistein isoflavone on performance and immunological responses of Ross broiler chick. A total of 192 day-old Ross 308 broiler chicks were randomly distributed among 4 dietary treatments including 4 replicates of 12 birds each. Experimental diets consisted of different levels of genistein (0, 20, 80, and 320 mg/kg of diet), which fed during a 28 days feeding trial. Performance parameters were recorded at biweekly intervals. The sera samples were obtained from two chicks per pen after immunizations against Newcastle (NDV) and infectious bursal (IBD) disease viruses. Results showed that body weight gain was influenced ($P < 0.05$) by dietary treatments, so that the best weight gains allotted to the birds fed on diets supplemented with 80 mg/kg of genistein, followed by those on 320 mg/kg of genistein. Although feed intake was not affected by dietary treatments, however, dietary supplementation with 80 mg/kg of genistein improved ($P < 0.01$) feed conversion efficiency. Dietary inclusion of 20 and 80 mg/kg genistein caused an increase ($P < 0.05$) in antibody production titer against NDV, and tended ($P = 0.07$) to improve IBD antibody titer. The present findings indicate that dietary inclusion of genistein up to 80 mg/kg of diet could improve performance parameters including weight gain and feed efficiency. Moreover, genistein at the levels of 20-80 mg/kg of diet considerably promote immune functions of broiler chicks as measured by humoral immunological responses against viral antigens.

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1228-1230

SYNTHESIS AND IN VITRO ANTICANCER ACTIVITYOF A NOVEL RUTHENIUM AND COPPER(II) COMPLEXS WITH CURCUMIN

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Curcumin, a natural diphenolic compound derived from turmeric *Curcuma longa*, (Fig.1) has proven to be a modulator of intracellular signaling pathways that control cancer cell growth, inflammation, invasion and has gained much attention in recent years for its anticancer activities against various cancers[1,2]. Since the serendipitous discovery of the cisplatin anti proliferative activity, many efforts have focused on the design of potent metal-based drugs for oncology therapies. Over the last four decades, a large number of metal complexes have been extensively investigated and evaluated *in vitro* and *in vivo*, and some of them were at different stages of clinical studies [3]. In this study, we evaluated the anti-proliferative and apoptotic effects of copper complexes including curcumin and ruthenium-curcumin complex against human cervix epithelial carcinoma (HeLa), cell line and using cisplatin as a comparative standard by MTT assay. Our studies on the anticancer activity of the complex indicate thise the complex can inhibit the cellular proliferation in cervix epithelial cancer.

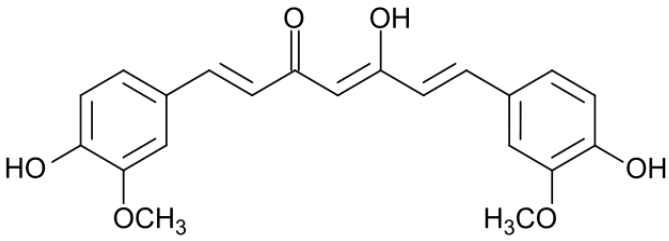

Fig. 1: the structure of curcumin

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1767
UHPLC/-HESI-MS/MS ANALYSIS OF TARGETED PHENOLIC COMPOUNDS IN 29 ACCESSIONS OF SELECTED *NEPETA* SPECIES FROM IRAN

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The genus *Nepeta* is one of the largest genera of the Lamiaceae family, and Iran is one of the main origins of this genus. Nepetalactones and phenolic compounds, including phenolic acids and flavonoids, were reported as major secondary metabolites of various *Nepeta* species and they show a wide range of biological effects. Quantitative analysis of ten targeted phenolic compounds (five phenolic acids and five flavonoids) was performed using UHPLC/-HESI-MS/MS method, in 29 wild accessions of four Iranian species, *N. kotschyi*, *N. menthoides*, *N. crassifolia* and *N. cataria*. In order to diminish most of the environmental variables, all accessions were planted under the same field and climate conditions in West of Tehran, Iran. The study was aimed at finding the most promising populations and species for introducing into the domestication and cultivation applications based on medicinally important phenolic compounds. The results showed the valuable germplasm of *Nepeta* species in Iran, with *N. kotschyi* and *N. menthoides* showing unique phenolic profiles and containing the highest levels of phenolic acids or flavonoids, respectively. Totally, *N. kotschyi* was considered as a high productive species in words of phenolics content, especially populations "K16" and "K17". Chlorogenic acids 1 (5-*O*-Caffeoylquinic acid) and 2 (4-*O*-Caffeoylquinic acid) were determined as species specific for *N. kotschyi*, and unidentified caffeic acid derivative was recognized as variety specific for *N. kotschyi* var. *kotschyi*.

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