ABSTRACTS OF ORAL PRESENTATIONS

EFFECT OF PREIBIOTIC AND HERBAL EXTRACTS (WILD MARJORAM, WILD MINT AND CHAMOMILE) ON SERUM LIPID CONCENTRATIONS OF LAYING HENS

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The study was conducted to evaluate the effect of Prebiotic and herbal extracts wild mint, marjoram and chamomile on serum lipid concentrations (cholesterol, triglyceride, LDL and HDL) in brown TSL laying hens at 80 weeks of age. Trial was performed in a completely randomized design with 5 treatments and 4 replicates (three birds per treatment) for 8 weeks. Diets were formulated according to NRC 1994 nutrient requirements. The ethanolic herbal extracts were added to the drinking water as one to one thousand ratios. The effects of Prebiotic and herbal extracts on serum lipid concentration was significantly different ($P<0.01$). Treatments showed significant differences in terms of triglycerides ($P<0.01$). Triglyceride levels in chamomile and marjoram supplemented groups were the lowest and highest, respectively, indicating a positive effect of chamomile in reducing serum triglyceride. In terms of cholesterol, there was significant difference between chamomile and wild mint with marjoram ($P<0.01$). The birds which received wild mint and chamomile had the lowest cholesterol levels. It has been reported that chamomile extract significantly reduced the lipid levels in rats (1).The results also showed that using medicinal plants has resulted in significant effects on LDL level ($P<0.01$), as wild mint extract treatments had the lowest LDL level. Marjoram extract had significant difference in LDL compared to control and wild mint groups. Prebiotic supplemented group showed the highest HDL and control group had the lowest HDL level. It has been shown that probiotics and prebiotics have been reduced serum cholesterol in humans (2). According to results of this experiment it can be concluded that administration of the above mentioned herbal extracts and prebiotic in laying hens reduce serum cholesterol, LDL and triglyceride.

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EVALUATION OF ANTINOCICEPTIVE AND ANTI-INFLAMMATORY ACTIVITY OF TOPICAL USE OF *PLATANUS ORIENTALIS* L. LEAVES IN A RAT MODEL OF OSTEOARTHRITIS (OA)

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Platanus orientalis L. (Platanaceae) is a medicinal tree used in Iranian folklore and traditional medicine as a pain and inflammation reliever. In this study, the total hydro alcoholic extract of *P. orientalis* leaves were prepared and its antinociceptive and anti-inflammatory effects were studied in rats using the MIA (mono sodium iodo acetate) model that induced osteoarthritis. We induced OA via intra-articular mono-iodoacetate (MIA) injection, and evaluated pain and inflammation related behaviors including the volume of inflamed hind paw measured with a cylinder of mercury that is placed on a sensitive digital balance and paw withdrawal threshold in a von Frey hair test. *P. orientalis* extract and diclofenac gel topically administered to decrease MIA-induced effects. An increase in volume of the inflamed of hind paw was noted after intra-articular injection of MIA. *Platanus orientalis* significantly ($P<0.05$) decrease the volume of the inflamed paw. This extract was also effective in suppression of pain behavior by vonfrey test and it had moderately antinociceptive activity in comparison to diclofenac gel. The determination of differences in hind paw volume and paw withdrawal threshold in vonfrey test in the rat MIA model of OA showed the effects of anti-inflammatory and analgesic agents. This study may be useful for the discovery of novel pharmacologic agents in human OA.

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AUDIT OF DEVELOPMENT OF SAFFRON SCIENCE

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Saffron, as the most expensive agricultural and medicinal crop worldwide, has a special position among Iranian industrial and export products. At the present, Iran is the largest producer and exporter of saffron, with more than 80 percent of the global production of this precious crop is dedicated to Iran. Numerous and widespread usages of saffron, the special properties of this valuable medicinal plant, it's given role in the livelihoods of farmers in some provinces, as well as its high value added, all highlight the need for more attention to issues related to saffron. Despite the importance of this crop in the Iran's economy and employment, particularly in its main cultivation area, i.e. the provinces of Southern and Razavi Khorasan, It has received little attention in research and technology. Definitely, world's expectation from a country that considers itself as the master of saffron is very high, and of course, any claim in this regard is defensible only based on research approaches. Audit plan of science is one of the important proceedings performed by Vice-President of Science and Technology, which is hoped its implementation become a major source of changes in the development of science and technology in the country. In this regard, in March 2012, the auditing of the saffron science was assigned to Saffron Research Group, University of Birjand. Implementation procedures of auditing of saffron science include both quantitative and qualitative sections. In the quantitative section, in order to collect the required data, after recognizing related colleges, institutes and research centers, some questionnaires were delivered to the relevant officials. Qualitative data about saffron researches were also collected through a questionnaire. Finally, the analytical results obtained from data collected from questionnaires filled out by farmers, researchers and experts in saffron science are described in detail, and effective trends, training and research requirements, strengths and weaknesses and deficiencies in education and research, opportunities and threats, and future prospects are mentioned, and eventually some recommendations are presented to achieve the major objectives of promoting science and technology in the field of saffron. Among the important challenges ahead are the problem of low yields per unit area and the indiscriminate increase in saffron cultivation area, instability of saffron price in production sector, lack of attention to the required investment and planning to generate saffron science and expanding the frontiers of saffron knowledge, and shortage of experts and specialized, scientific research centers.

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STUDY ON CANDIDATE GENES EXPRESSION RELATED TO BIOSYNTHESIS PATHWAY OF PHENOLIC MONOTERPENES IN THYME POPULATIONS USING REAL TIME-PCR METHOD

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Medicinal plants are rich sources of natural products used for production of pharmaceutical products. Thymus genus belongs to the Lamiaceae family; it has more than 18 different species distributed in different areas of Iran. Among herbal drugs, thyme has second rank in the world after mint. Two monoterpenes that have antiherbivore, antimicrobial, pharmaceutical and antioxidant activities, thymol and carvacrol, are found in thyme. Carvacrol is the main component of five ecotype and six populations of *T. caramanicus* essential oils [1] but also thymol is the main component of *T. vulgaris* essential oils [3]. A pathway for the formation of thymol and carvacrol in thyme is proposed to start with the formation of γ-terpinene from geranyl diphosphate (GPP) by γ-terpinene synthase (*Tvtps*1). The second step is catalyzed by cytochrome P450s in a two-step oxidation. *CYP71D178*, *CYP71D179* and *CYP71D182* are proposed to be thymol synthases while *CYP71D180* and *CYP71D181* are proposed to be carvacrol synthases. The purpose of the present study is to investigate the expression levels of *Tvtps*1, *CYP71D180* and *CYP71D181* in seven population of thyme which had a much higher variation of the terpene composition. Four plant populations collected from its wild habitat in Kerman province as well as three plant populations provided from Medicinal Plant Gene Bank is located in State Forest Research Institute. Total RNA was isolated from expanding leaves and cDNA synthesized from1 µg total RNA. Then, expression levels of these genes were measured by Real time-PCR method. Results showed that *CYP71D180* and *CYP71D181*in Babgorgy population (*Thymus lancifolius* Celak) and*CYP71D181*in Thyme population of (*Thymus vulgaris* L.) were not amplified. Babzangy population had highest transcript levels for*CYP71D180* and *Tvtps*1, while Babgorgy population had reduced transcript levels of *Tvtps*1.

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BIOTRANSFORMATION OF TWO FURANOCOUMARIN COMPOUNDS BY TWO FUNGAL SPECIES *ASPERGILLUS*. SP. PTCC 5266 AND *ASPERGILLUS NIGER*

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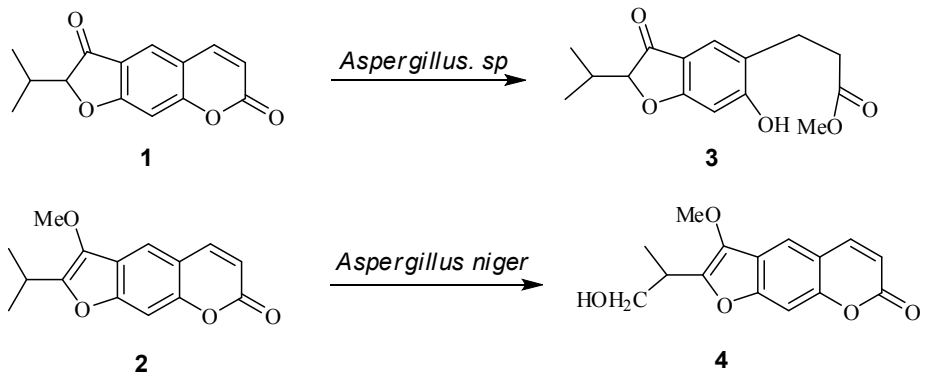
Coumarins are a very large and diverse group of biologically active compounds with widespread pharmacological properties such as anti-inflammatory, anticoagulant, antibacterial, antiviral, anticancer, and antioxidant properties [1- 2]. The linear or angular furanocoumarins are a therapeutically important subclass of coumarins as they have various clinical applications [3]. Biotransformation of two furanocoumarin compounds namely oreoselon (**1**) and pucedanin (**2**) was investigated by two fungal species *Aspergillus. sp.* PTCC 5266 and *Aspergillus niger* for the first time. Microbial transformation of oreoselon using *A. sp* afforded a new metabolite, methyl 3-(2, 3-dihydro-6-hydroxy-2-isopropyl-3-oxobenzofuran-5-yl) propanoate (**3**), with 35% yield. The metabolite produced during pucedanin biotransformation using *A. niger* was 2- (1-hydroxypropan-2-yl)-3-methoxy-7H-furo[3, 2-g] chromen-7-one (**4**) with good yield (45%).



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THE STUDY OF COLCHICINE APPLICATION ACCOMPAINED WITH IRRIGATION AND TIP MERISTEM ON AUTOTETRAPLOIDY INDUCTION ON TWO *MENTHA MOZAFFARIANII* ECOTYPES

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Ploidy manipulation is considered as a valuable tool in genetic improvement of many plants. Polyploidy often generates variants that may possess useful characteristic. The present study was conducted to polyploidy possibility induction of two Iranian endemic mint ecotypes by colchicines application with two methods. For this purpose, two experiments were done. In the first experiment, colchicine as combined with irrigation was applied. For this purpose, a factorial experiment in randomized complete design with two factors (colchicine concentrations: 0, 0.025, 0.012, 0.006% and two mint ecotypes; ecotype A: Kamarej region and ecotype B: Pirmohlat region) and three replications was conducted. In the second experiment, apical meristem was treated. The factorial experiment based on randomized completely design with two factors and five replications. The factors including different colchicine concentrations (0, 0.035, 0.07, 0.15, 0.3 and 0.7%) and two ecotypes. At the end of all experiments, survival rate and tetraploidy percentage (by morphological change, stomata traits, flow cytometery and chromosome counts) were measured. The results showed that different treatment had significant effects on survival percent on two experiments. In addition, increasing of colchicine concentration caused decreasing plants survival. Treatment of the seedlings with colchicines, combined with irrigation didn't have any effects on ploidy level of the treated plants. These treatments were impressed survival percentage in all ecotypes and increasing colchicine concentrations incur plant survival reduction. In terms of tip meristem treatment, colchicine concentrations had significant effect on damaged shoot apex (due to colchicine treatment) and survival rate on two ecotypes. In two ecotypes, the minimum damaged shoot apex (0%) were observed in control treatment (without colchicines usage) while with addition colchicine concentrations damaged shoot apex were increased and in 0.7% treatment in all ecotypes was reached to 100%. Tip meristem treatment didn't have any effects on elevation of ploidy level. Totally, the results showed that ecotype B is more sensitive than as compared with ecotype A to colchicine concentration.

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NEURO-BEHAVIORAL AND PHARMACOLOGICAL EVALUATION OF *ASPERUGO PROCUMBENS* IN USING EXPERIMENTAL MODELS

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Asperugo procumbens (German Madwort; Boraginaceae) has used in Iranian traditional medicine as tonic, sedative and diuretic. Its Persian name is Badranjbuyeh, but it should not be mistaken with *Melissa officinalis*. In this study, we evaluated the hypnotic, anti-depressant, anti-anxiety, and anti-convulsant effects of *A. procumbens*. The samples of *A. procumbens* were purchased from market in Tehran and after identification; ethanol extract (by maceration) was obtained. Pentobarbital induced loss of righting reflex was used for evaluation of hypnotic effect of the extract in mice model. Spontaneous activity in open field was used for evaluation of locomotor activity and the total distance moved by the subjects was analyzed. The extract was tested at doses of 100-800 mg/kg i.p., and diazepam was used as positive control. *A. procumbens* significantly reduced the locomotor activity of the mice in dose dependently manner, but didn't show significant hypnotic effect in pentobarbital induced loss of righting reflex test. The time spent in center of the cage by mice was significantly increased by *A. procumbens* indicating possible anti-anxiety effects of the plant. These findings show that *A. procumbens* reduce the locomotor activity and this might be because of sedative effect of the extract. Anti-depressant effect of *A. procumbens* has been assayed by use of forced swim test, on Swiss Webster male mice. The ethanolic extract of *A. procumbens* has injected intra-priotoneally to mice, have anti-depressant effect in 75, 150 and 300 mg/kg doses. Pentylentetrazole (PTZ) and maximal electroshock (MES) models were used for anticonvulsant activity of the extract. *A. procumbens* showed significant anticonvulsant activity at doses of 20-320mg/kg in MES model (ED_{50}= 173.9mg/kg), but at doses up to 320 mg/kg show no effect in PTZ model. Total extract of *A. procumbens* was fractionated by 3 solvents including petroleum ether, chloroform and ethyl acetate, and their anticonvulsant activity was evaluated. Chloroform fraction showed anticonvulsant activity in MES model (ED_{50}= 202.92 mg/kg). Two experimental methods, elevated plus maze (EPM) and light-dark box, were used to evaluate the anti-anxiety effects of the extract. The extract did not show statistically significant effect in EPM test. The extract did not show any significant anti-anxiety effect in light-dark box test. *Asperugo procumbens,* elevated plus maze, light-dark box, anti-anxiety effects, Pentylen tetrazole, maximal electroshock model, anticonvulsant activity, forced swim test, anti-depressant effect, hypnotic effect, righting reflex test, open field, locomotor activity, sedative effect, anti-anxiety.

NEW STEROIDAL SAPONINS FROM PERSIAN LEEK

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In this Study, seeds of Persian Leek (*Allium ampeloprasum* Subsp. Persicum) that is known as Tareh in persian was investigated. This plant is used as vegetables and food in Iranian dishes widely. The seeds were air dried, powdered and extracted with hexane, CHCl3, $CHCl_3$–MeOH (9:1), and MeOH. The MeOH extracts were partitioned between butanol and water phases. The $CHCl_3$–MeOH (9:1) and butanolic extracts were chromatographed by CC or MPLC on a RP18 Silica gel, using a linear gradient solvent system from H_2O to MeOH as mobile phases. Interested fractions with saponins contents were selected, base on preliminary 1H NMR analysis. The selected fractions were purified by preparative HPLC with the suitable mobile phases (mixture of MeOH–H_2O). 1H NMR, 13C NMR, 2D NMR, FABMS and IR, techniques were used to elucidate of isolated compounds. The study afforded the isolation of two new spirostane glycosides, persicosides A (1) and B (2), together with ceposides A1/A2, C1/C2 (6a/6b, 7a/7b), tropeosides A1/A2, B1/B2 (8a/8b, 9a/9b), and ascalonicosides A1/A2 (10a/10b)), previously found in the related species, white onion, red Tropea onion and shallot, respectively. Structure elucidation of the compounds was carried out by comprehensive spectroscopic analyses, including 2D NMR spectroscopy and MS spectrometry, and by chemical evidences. The chemical structure of new compounds were identified as (25S)-spirostan-2α, 3β,6 β -triol 3-O- [β -D-glucopyranosyl-(1→3)] [β -D-xylopyranosyl-(1→2)]- β -D-glucopyranosyl-(1→4)- β -D-galactopyranoside (1), (25S)-spirostan-2α,3 β,6 β -triol 3-O-[β -D-xylopyranosyl-(1→3)] [α-L-rhamnopyranosyl-(1→2)]- β -D-glucopyranosyl-(1→4)-O- β -D-galactopyranoside (2).

ANTIPLASMODIAL ACTIVITY OF SOME SELECTED MEDICINAL PLANTS FROM THE NORTHWEST OF IRAN

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The effectiveness of antimalarial drugs is declining at an ever accelerating rate, with consequent increase in malaria-related morbidity and mortality. The newest antiplasmodial drug from plants is needed to overcome this problem. The aim of this study was to assess antimalarial activity of the ethanolic extracts of 10 different medicinal plants from eight families against *Plasmodium falciparum* chloroquine-sensitive 3D7 strain. The selection of the hereby studied plants was based on the existing information on their local ethnobotanic history. Plants were dried, powdered, and macerated in a hydroalcoholic solution. Resulting extracts have been assessed for *in vitro* and *in vivo* antimalarial and brine shrimp toxicity activities. Of 10 plant species tested, four plants: *Althea officinalis* L. (Malvaceae), *Myrtus communis* Linn (Myrtaceae), *Plantago major* (Plantaginaceae), and *Glycyrrhiza glabra* L. (Papilionaceae) displayed promising antimalarial activity *in vitro* (50% inhibitory concentration values of 62.77, 42.18, 40.00, and 13.56 µg/mL, respectively) with no toxicity against brine shrimp larvae. The crude extracts of three active plants, *G. glabra*, *M. communis*, and *A. officinalis*, also significantly reduced parasitemia *in vivo* in female Swiss albino mice at a dose of 400 mg/kg compared to no treatment. Antiplasmodial activities of extracts of *A. officinalis* and *M. communis* are reported for the first time [1].

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LABELING OF COLCHICINE FROM *COLCHICUM AUTUMNALE* FOR SINGLE PHOTON IMAGING OF TUMOR

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Colchicine is an alkaloid derived from the plant of the Lily family *Colchicum autumnale*. Plant extracts containing colchicines have been used to treat gout for more than 2000 years, and pseudogout and familial Mediterranean fever (FMF) for several decades [1, 2]. Each colchicine molecule binds to a tubulin molecule, preventing it from incorporating into the polymer. Microtubule elongation stops, the mitotic spindle is disrupted, and cell division cannot proceed. This effect makes colchicines one of the oldest identified antimitotic drugs [3]. Colchicine and its analogues are of interest for tumor therapy by radiolabeling with a therapeutic radioisotope, and their conjugation to an imaging agent offer the facility to monitor their physiological distribution and effectiveness as antimitotic agents. ^{99m}Tc-based conjugates of colchicine and its derivatives are attractive due to the availability of low cost ^{99}Mo/^{99m}Tc generator, favorable physical characteristics of ^{99m}Tc ($t_{1/2}$ of 6 h, γ 140 keV 89% abundance) and high specific activity of radionuclide. Colchicine labeled with ^{99m}Tc was investigated further. Labeling with ^{99m}Tc was performed at 100 °C for 10 min and radiochemical analysis included thin layer chromatography method. The stability of labeled colchicine was checked in the presence of human serum and biodistribution studies were carried out in mice. Labeling yield of >90% was obtained corresponding to a high specific activity. Labeled colchicine showed good stability in the presence of human serum. Biodistribution studies in mice showed that labeled colchicine was accumulated in tumor and was cleaned fast from normal organs and showed clearance through urinary and hepatobiliary systems. Labeled with a gamma emitter radionuclide such as ^{99m}Tc, this natural compound extracted from medicinal plant may be useful to assess of tumor by single photon imaging.

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GENETIC AND PHYTOCHEMICAL ANALYSIS OF IMPORTANT MEDICINAL PLANT, *WITHANIA COAGULANS* (STOCKS) DUNAL ACCESSIONS GROWING WILD IN IRAN

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The genus *Withania* (fam. Solanaceae) comprises 23 species. This genus in the flora of Iran is represented by the 2 species *W. somnifera* and *W. coagulans*. They are not cultivated, but are only available in the wild. Distribution of *W. coagulans* in Iran is limited and located only in the southeastern sections of the Sistan and Baluchestan province. In this investigation, genetic diversity and phytochemical components of twenty *W. coagulans* (fam. Solanaceae) accessions were assessed. 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. On average, 56.5 polymorphic bands were amplified by each primer combination. The highest and lowest number of polymorphic bands was generated by AFLP primer combinations E-ACC+M-CAA and E-ACG+M-CAT, respectively. The mean of polymorphism information content was 0.18 and the coefficients of genetic similarity vary from 0.79 to 0.95. The results indicated high level of genetic variation in *W. coagulans* accessions. The phytochemical investigation showed the presence of Withaferin A (14.80-70.38 µg/g D.W), flavonoids (6.90-7.60 %), proteins (0.76-4.23 mg/g D.W), carotenoids (0.24-0.49 (mg/g F.W) and anthocyanins (6.07-11.21µmol/g) that varied among accessions. The evidence from this study suggests that USB019 has the highest values of withaferin A, carotenoids, and anthocyanins compared to the other accessions. Therefore, the USB019 accession can be selected as the candidate accession for breeding programs and the development of locally-suited genotypes in Iran. Also, the findings revealed that the total phenolic contents of the roots ranged from 14.9 to 23.8 µg/mg of Gallic acid equivalent and that the USB008, USB024 and USB025 have higher phenolics content. Antioxidant activity indicated that IC_{50} was 3.61-40.50 µg/ml, that USB 008, USB 024, USB 025 and USB0158 had greater DPPH scavenging ability (IC_{50}; 3.61-3.89 µg/ml) in comparison with ascorbic acid (IC_{50}; 4.85 µg/ml). This investigation clearly revealed that polyphenols in *W. coagulans* roots were largely responsible for the antioxidant activity (R^2= 0.823). The results demonstrated that *W. coagulans* possesses valuable antioxidant properties for the pharmaceutical and food industries. This finding has important implications for devising strategies for conservation and employing them in breeding programs of *W. coagulans*.

STEREOCHEMICAL CHARACTERIZATION OF TAXOIDS FROM *TAXUS BACCATA* BY COMPUTATIONAL ELECTRONIC CIRCULAR DICHROISM AND IN VITRO ANTIPROTOZOAL ACTIVITY

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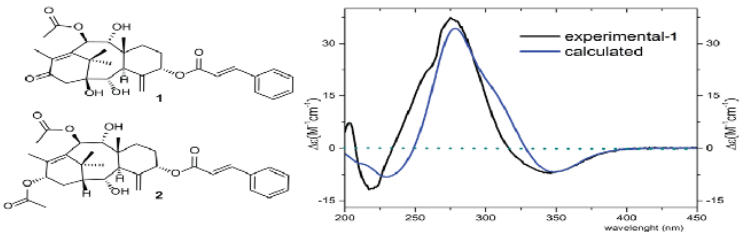
The complete structure elucidation of a new secondary metabolite involves determination of constitution, assignment of relative and, finally, absolute configuration. Chiroptical methods such as electronic circular dichroism (ECD) has been used for assignment of absolute configuration since several decades, but were limited in their applicability. Recent progress in the areas of conformational analysis and time dependent density function theory (TDTDF) calculation allows prediction of CD spectra by quantum chemical calculations [1]. This is especially valuable for the analysis of new molecular entities when chemical synthesis of the reference compound is not an alternative. Two taxanes diterpenoids namely 5-Cinnamoyl-10-acetyltaxicin-I (1) and 10-Deacethyl taxezopidine G (2) isolated from aerial parts of *Taxus baccta* L. The complete structure elucidation and relative configuration was done by combination of 1D, 2D NMR, and NOESY spectroscopy. The assignment of absolute configuration compound **1** and **2** was achieved by comparison of experimental ECD spectra with simulated ECD data, by using time dependent density function theory (TDDFT) and MeOH as solvent. The calculated ECD spectra showed excellent fit with the experimental data. *In vitro* biological activity against *Plasmodium falciparum* and *Trypanosoma bruceirhodesiense* STIB 900 strain and cytotoxicity in rat myoblast (L6) cells were determined. The IC_{50} values of the compound **1** and **2** respectively were 17.6 and 3.1 µM against *P. falciparum*, and *T. brucei rhodesiense* 10.4 and 3.6 µM. The cytotoxic IC_{50} values were 85.2 and 3.2 µM. Selectivity indices for *P. falciparum* were 4.90 to 1.04, and 8.19 to 0.89 for *T. brucei rhodesiense*.



ANTITRYPANOSOMAL ISOTHIOCYANATE AND THIOCARBAMATE GLYCOSIDES FROM *MORINGA PEREGRINA*

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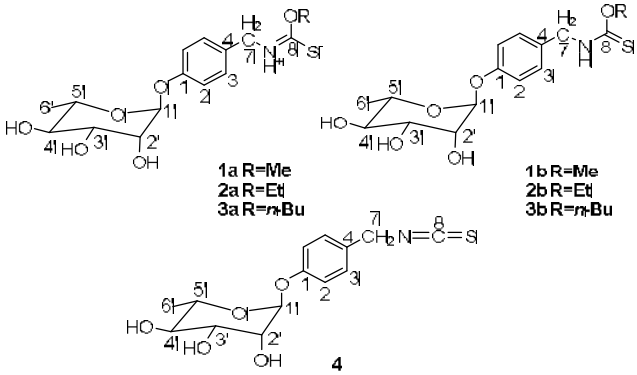
O-Methyl (**1**), *O*-ethyl (**2**), and *O*-butyl (**3**) 4-[(α-L-rhamnosyloxy) benzyl] thiocarbamate (*E*), along with 4-(α-L-rhamnosyloxy) benzyl isothiocyanate (**4**) have been isolated with preparative HPLC from the aerial parts of *Moringa peregrina* (Forssk.) Fiori. The compounds were elucidated by 1D and 2D NMR spectroscopy and HRESI mass spectrometry. The thiocarbamates are in two resonance hybrid forms. The isolated compounds were tested for *in vitro* activity against *Trypanosoma brucei rhodesiense*, and cytotoxicity in rat skeletal myoblasts (L6 cells). The most potent compound was **4** with an IC_{50} of 0.10 µM against *T. b. rhodesiense* and a selectivity index of 73, while the thiocarbamate glycosides **1**, **2,** and **3** showed only moderate activity. Intraperitoneal administration of 50 and 10 mg/kg body weight/day of **4** in the *T. b. rhodesiense* STIB 900 acute mouse model finally revealed significant *in vivo* toxicity and did not cure the animals. Because of its high *in vitro* activity and its ability to irreversibly inhibit trypanothione reductase, an attractive parasite-specific target enzyme, 4-[(α-L-rhamnosyloxy) benzyl] isothiocyanate (**4**) can be considered as a lead structure for the development and characterization of novel antitrypanosomal drugs [1].



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ISOLATION, STRUCTURE ELUCIDATION AND BIOLOGICAL ACTIVITIES OF THE CHEMICAL CONSTITUENTS OF SOME ENDEMIC *SALVIA* SPECIES

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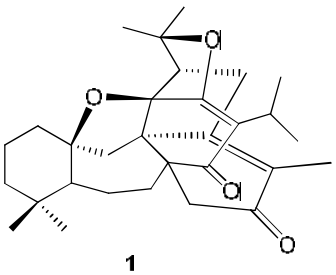
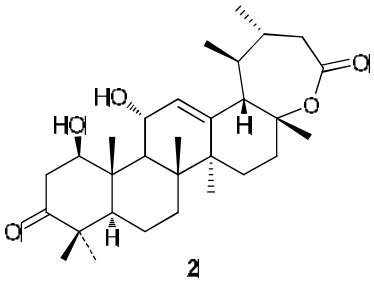
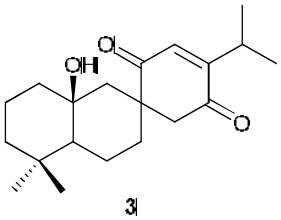
A huge diversity of molecular skeletons found in natural products enables finding better lead compounds to develop clinically useful entities. Plants of the *Salvia* genus have a rich history in traditional medicine. Indeed, the name *Salvia* is derived from the Latin "salvare" meaning "to heal or to be safe and unharmed", which sums up the folkloric belief of its "magical" therapeutic properties for many kinds of ailments and it popularity in traditional medicine. This genus is a rich source of structurally diverse terpenoids with a broad spectrum of bioactivities, such as cardiotonic, antibacterial, antioxidant, antitumor, and antimalarial properties. One of the most distinguishing features of *Salvia* species is their ability to synthesize isoprenoids with unusual scaffolds [1]. The genus *Salvia* is represented in the Iranian flora by 61 species, of which 17 are endemic [2]. Our recent studies, aimed at identifying structurally interesting and bioactive metabolites from the Iranian *Salvia* species, resulted in the isolation of several new compounds; some of them possess unusual and unique structures (**1-3**). The structures were elucidated by a combination of 1D and 2D NMR, HRESIMS, and X-ray crystallographic analyses. Plausible biosynthetic pathways toward these new skeletons were proposed. Biological properties of the new compounds were also investigated. Some of these compounds showed good *in vitro* antiplasmodial and anticancer activities at submicromolar concentrations.







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PLANT DISTRIBUTION IN IRAN WITH EMPHASIS ON ENDEMIC, THE COMMON AND TRADITIONAL MEDICINAL PLANTS

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Today with the development of human sciences in modern Botany and many investigations that have been down from 1664 to 2013 by different scientists in Iran, offer quite attributable knowledge in Botanical Science and Plant taxonomy. Iran is located in south-west Asia and is a vast country with a total area of about 1,648,000 Km^2. Because of variable, climatically condition (Considerable variation of, temperature, rainfall and edaphically conditions) Iran has the most varied and most fascinating vegetation and naturally great diversity and richness in the plant life in Southwestern Asia. According to Boissier *(Flora Orientals,* 1867-1888), and K. H. Rechinger (*Flora Iranica* 1963-2013) and tremendous efforts of Iranian botanists at recent decades have lead to recognition of around 150 spontaneous families of Angiosperms including 124 Dicotyledonous and 22 Monocotyledonous and 4 Gymnosperms families, containing about 1450 genera. Totally ca. 8000 species are recognized in Iran of which around 1700 species (excluding *Astragalus*) are Endemic. Beside of them around 36 Cultivated families grows in Iran that not mentioned in *Flora Iranica*. With a careful review of complete list of Iranian plant species and genera, listed in Dictionary of Iranian Plants Name (Mozaffarian, 1996) showed about 130 families containing 569 genus of medicinal and odorant plants. This comprises about 2300 species of spontaneous and exotic medicinal and aromatic plants which of them about 850 species are medicinal, but according to a precise research not more than 400-450 species used as common and traditionally medicinal plants. About the distribution patterns of plant species several earlier authors have considered aspects of plant distribution and phytogeography of Iran. Based on Geobotanical researches most of Iran belongs to the Holarctic kingdom; the coastal areas of the Persian Gulf and their foothills belong to Paleotropic kingdom. The present author as a botanist have tried to merge studies of earlier authors and based on endemic species given a new aspect about plant distribution in Iran and discus about each of subdivisions, beside of endemic species to show how many of the common and traditional medicinal plants grow in these geographical divisions.

1- **Holarctic Kingdom** in Iran comprises two region:

1-1. Euro – Siberian region extends into northern Iran in the Caucasian – Euxino – Hyrcanian Province (Senso lato) or Hyrcanian Province (Senso stricto). The Hyrcanian Province includes the south Caspian coastal plain and the northern slope of the Elburz Mountains up to 2500 m., the Western parts extends to Arasbaran and from Eastern boundary runs West of Bujnurd. Dominant feature of Hyrcanian province is deciduous broadleaves trees and Shrubs and many herbaceous plants that grow there, in the forests or in the higher Altitudes of forestless areas. This Province in Iran comprises ca. 251 endemic and 160 wild and cultivable medicinal species.

1-2.Irano – Turanian region includes three well known Provinces: Armeno – Iranian, Kurdo – Zagrosian and Central Iranian Province.

- Armeno –Iranian Province in Iran comprises 3 subprovince named: Atropatanian, extends from northwest of Iran to Sefidrud valley. There are at least 132 Endemic and 170 wild and cultivable medicinal plant species in this subprovince.

- Elburzian subprovince extends from Sefidrud valley in the West to Khooshyeilagh valley in the East and includes high mountains like Damavand and other high mountains in central Elburz .This subprovince comprises ca. 250 Endemic and 208 wild and cultivable medicinal plant species.

- North Khorassanian subprovince extends from West of Bujnurd to East of Khorassan and included high mountains in Khorassan like Hezarmasjed, Binalud and etc. Number of the endemic and wild and cultivable medicinal plant species reach to 75 and 162 respectively.

- Kurdo – zagrosian province includes the extensive areas of Northwest of Iran to Southeast and comprises many high mountains and Zagrosian dry resistance *Quercus brantii* forests together with *Pistacia -Amygdalus* community of southern part of Zagros. By having special features and some endemic species can be divided into 3 subprovince: North, South and East of Zagros. In this province grows at least 560 endemic and 155 wild and cultivable medicinal plant species.

- Central – Iranian Province has not any subdivisions, includes the extensive areas of desert and steppe between high mountain of Armeno-Iranian (Elburzian subprovince) and high mountain of East Zagros and South Zagros subprovince and limited in the Southeast of Iran with Nobo-Sindian province. Central-Iranian province characterized by high fluctuations between temperatures of night and day, very low precipitation which occurs mainly in winter and spring and a long dry period in summer and autumn. This province covered by vast area of sand dunes, salt marshes and salty soil together with more or less Gypsum-calcareous sterile soils ,very rare trees and shrub species and vast area covered by Goose foot family species with Artemisia spp. In this area grows about 230 endemic and 120 wild and cultivable medicinal plant species.

2- **Paleotropic Kingdom** in Iran comprises Saharo-Sindian region and Nobo-Sindian (South- Iranian) province including lowland of coastal areas on the Persian Gulf and Oman Sea. From west it reaches to Ghasre Shirin in Southwest and by the East runs to border of Pakistan in Guater sinus. The flora of Nobo-Sindian province is Xerophytic and very Thermophilous. It requires very high summer temperatures, high humidity and frost-free winter. The most characteristic species of this area is *Phoenix dactylifera*. This province in Iran can be divided into 2 subprovinces: Persian Gulf (Sino- Persian) and Omanian subprovince. It characterized by more or less evergreen trees and shrubs which grow here. Endemic and wild and cultivable medicinal plant species of this subprovince is ca.130 and 115 respectively.

CHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITY OF ESSENTIAL OIL OF *TANACETUM POLYCEPHALUM* SUBP. *AZERBAIJANICUM* (ASTERACEAE) FROM NORTHWEST OF IRAN

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Tanacetum L. belongs to the family Asteraceae and tribe Anthemideae. In Flora Iranica area, this genus was considered to have 54 species and in Iran, comprised 25 species and altogether 34 taxa. In this research, the essential oil composition of *Tanacetum polycephalum* subsp. *azerbaijanicum* collected from West Azerbaijan province of Iran was investigated for the first time. The essential oil was isolated by hydrodistillation from the aerial flowering parts and analyzed by GC and GC-MS. Sixteen compounds were characterized accounting for 96.8% of the total oil. Monoterpene hydrocarbons (32.9%) were found to be the principal compounds group, of which α-pinene (25.8%) and β-pinene (6.5%) identified as the main constituents. Oxygenated monoterpenes comprised 30.1% of the total oil with 1,8-cineole (19.7%) as the major component. Among the oxygenated sesquiterpenes (26.4%) allo-hedycaryol (26.4%) was identified as the main constituent. The essential oil exhibited moderate antibacterial activity against the *Escherichia coli* and *Staphylococcus aureus* with MIC values of 16 mg/mL.

CHICORY AS A POTENTIAL NEW CROP IN IRAN

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In an effort to increase agricultural diversification opportunities for small scale farmers in Iran, new alternative crops that have market demand have to be explored. One of the more promising alternative crops is chicory. Chicory (*Cichorium* sp.) is an annual, biannual or perennial herb from Asteraceae plant family. In ancient system of medicine, chicory is used as a Hepatoprotective. Chicory consists of a dietary fiber called as Inulin, which is useful in treating diabetes and constipation and it is an industrial plant and the leaves are usually consumed freshly. Recent studies have found some of the important constituents in chicory such as caffeic acid derivatives, fructooligosaccharides, flavonoids and polyphenol. On the other hand, chicory could be used as forage for livestock because it has high digestibility, low fiber and moreover, it has proper tolerance to drought stress. Study on morphological characters of 18 native races of Iranian chicory showed that in genus *Cichorium* consists of three species in Iran. Results of experiments on seeds of native dwarf chicory (*Cichorium pumilum*) showed that its optimum thermal range is 15- 25°C. The research on spring planting dates of dwarf chicory with the aim of forage production showed that in spring plantings of dwarf chicory, at least to cuts in stalking phase is possible. Delay in planting causes an increase in phenolics rate. 25 seed samples of native races of Iranian chicory along with introduced root and salad cultivars of chicory were planted in cropping year of 2012-2013 in the research farm of RIFST in Mashhad as spring and autumn plantings. Results showed that commercial pubescent native races and introduced salad cultivars are suitable for spring planting and introduced root and native dwarf chicories are planted as spring and autumn under Mashhad conditions. Industrial cultivars and native genotypes of chicory were studied in 2012-2013 in Karaj for inulin production. With respect to climatic conditions of our country and water deficiency for irrigation in Iran, potential of autumn planting of chicory as an alternative crop of sugar beet is important in some areas of Iran. However, extensive studies should be done to provide information about all the essential cultural practices under different Iran's environmental conditions.

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MACRO- AND MICRONUTRIENTS UPTAKE AND THEIR EFFECTS ON FLOWER QUANTITY AND QUALITY OF *ROSA DAMASCENA* MILL

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This research was conducted in Alborz research station, dependent of Research Institute of Forests and Rangelands, due to determine the best fertilization and feeding system and Macro- and micronutrients uptake of *Rosa damascena* Mill in 2011-12. As well as their effects on flower quantity and quality of *Rosa damascena* Mill. The research performed in two separate experiments as split plot with 3 replications based on randomized complete block design. The main-plots were NPK, Manure and combined fertilizers which were used in 2005. Sub-plots were Chelated iron fertilizer (soil application and foliar spray), sub factors of first and second experiment were foliar spray times (0, 1, 2 & 3 times) and the amount of micronutrients usagein soil (0, 8 & 12g/plant).The results showed that the max growth and number of main branches belonged to two times of foliar application (227.36cm and 58.91n/plant). Also, one and three times foliar application had the superlative height and number of sub branches with 65.05cm and 75.16n, respectively. Mean comparison of foliar spray numbers illustrates that two times foliar spray treatment had the uttermost growth & number of main branches with 55.36cm and 26.46n. As well as, the maximum growth & number of sub branches observed in one time foliar spray treatment by 20.32 Cm and 18.40n. The interaction effect of soil usage combined fertilizer exhibits that 4*8g treatment had the highest flower numbers and yield per bush & per hectare with 3.98 n/plant, 4425.11n/ha, 5.38kg/plant and 5981.84kg/ha, respectively; Furthermore, 4*12g treatment had the superlative essential oil yield (5595g/ha) and average percent (0/105%). The result of essential oil compounds analysis pointes that there was significant difference between main and sub plots on citronelol. According to the results, the highest flower number and yield were obtained by foliar spray method. The most essential oil percent and yield belonged to soil applied method.

CURRENT ISSUES IN MANUFACTURING OF HERBAL PHARMACEUTICAL PRODUCTS AND FOOD SUPPLEMENTS IN IRAN

Mahmoud Falamarzian

The most important issues in manufacturing of herbal medicinal products are clear understanding of definitions, regulations and GMP requirements governing these products." Herbal Medicine" is use of plants for medicinal purposes and the written record the use of herbs dates back to 5000 years. "Herbalism" is one of the core disciplines of traditional medicine. According to WHO "traditional medicines are based on the sum of the knowledge, skills and practices based of theories, beliefs and experiences", while modern pharmaceutical products are based on the evedeised scientific informations. Food supplement (or dietary supplements) includes vitamins, minerals, fiber, fatty acids, and are not intended to prevent or treat any disease. Documentation and licensing of modem pharmaceuticals, herbal medicines and food supplements are different and not necessarily alike in all countries. For example U.S. authorities define dietary supplement as foods, while elsewhere they may be classified as drugs or other products. Another important issue is the concept of OTC (over the counter) drugs. Regulations detailing the establishments, where drugs may be sold, who is arithorized to dispense then, and whether a prescription is required vary considerably from country to country. In Canada, in addition to prescription only medicine (POM) and OTC, an intermediate category exist: nonprescription items that must be kept behind the counter. In Netherlands there are four categories: UR (prescription only); UA (pharmacist only) and AV (can be sold in general stores). In UK, there are 3 categories: "POM", "Genal sales list" (GSL) which they can be sold anywhere and "pharmacy medicines" (P) which can be sold from a registered pharmacy but should not be available for self-selection. The most important issue is that authorization and licensing for manufacture and sales of food, drug products, and active pharmaceutical products should conform with good manufacturing practices (GMP) guidelines. These guidelines provide minimum requirements that a pharmaceutical or food manufacturer must meet while manufacturing drugs or food products, in order to assure that products are of high quality and do not risk the consumer or public. All GMP guidelines follow a few basic principles among which are: hygiene, controlled environmental conditions, defined and controlled manufacturing processes, writhen instructions and procedures , training of operators, detailed records so that the quality and quantity should be as expected and that enable the firm that the complete history of a batch to be traced, the distribution of the batch which minimizes any risk to their quality and a system of recalling. In conclusion, the regulations governing herbal medicinal products should be more clarified and harmonized with the international systems. OTC drugs need to be overviewed frequently and in regards with herbal products regulations need to be more specific. Most importantly, GMP requirements should be observed by all the manufacturers and distributors of herbal medicinal products and food supplements.

EFFECT OF DUAL INOCULATION WITH ARBUSCULAR MYCORRHIZAL FUNGI AND BACTERIA ON GROWTH, MINERAL NUTRITION, ESSENTIAL OIL YIELD AND QUALITY OF *THYMUS DAENENSIS* CELAK.

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In sustainable production of medicinal plant, the arbuscular mycorrhizal symbiosis is a crucial component for improving the biological equilibrium between microorganisms in the mycorrhizosphere and to increase nutrient uptake efficiency (Tommerup, 1992). Other important and beneficial root-interactive microbes are the plant growth promoting rhizobacteria (PGPR) (Perotto and Bonfante, 1997). Researchers have stated that PGPR can have some stimulatory effects on AM growth (Linderman, 1997). The objective of our present research was to evaluate, the effect of inoculation with a mixture of AMF and rhizosphere bacteria on root colonization, plant growth, essential oil yield and quality on *Thymus daenensis* plants. In order to study the effects of interactions between the AM fungi and PGPR on the dry matter yield, root colonization, essential oil yield and quality in organic cultivation of *T. daenensis* an experiment was conducted at semnan natural resource research greenhoue, in 2011-2012. Treatments included: A: the fungus of *Glomus moseae* (1-inoculated (AM) and 2- no inoculated) and B: PGPR inoculums (1-: *Bacillus subtilis* 2- *Pseudomonas fluorescens* 3- control). A split plot experimental design was applied in a randomized complete blocks with six treatments and three replications. Our results showed that the Co-inoculation with *G. moseae* and *B. subtilis* resulted 75% increase in shoot /root dry weight, increased (plant yield) by about 117% and stimulated essential oil yield by 93 % compared to uninoculated controls or to plants single inoculated. All microbial inoculation treatments significantly increased the concentration of Thymol in *T .daenensis* plants with respect to the control plants. Results showed that the foliar K contents and root colonisation increased significantly with the *G. moseae* inoculation and the foliar P contents increased significantly with the *B. subtilis* inoculation alone. The combination of *P. fluorescens* and *G. moseae* caused an antagonistic effect on the plant growth and essential oil in *T. daenensis*. Our findings confirm that plants Co-inoculated with *G. moseae* and *B. subtilis* during the nursery stage, can produce the highest quality transplants that have a better survival chance compare to control plants.

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CARUM COPTICUM, A HERBAL MEDICINE WITH RESPIRATORY PHARMACOLOGICAL EFFECTS

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Carum copticum (*C. copticum*) commonly known as "Ajvan" has been used traditionally in the past for various therapeutic effects including: respiratory distress. The followinf respiratory pharmacological effects were showen in a series of studies for this plant in tracheal smooth muscle: (1) a significant relaxant effect aqueous and extract ethanol as wellas essential oil extract of the plant ($p<0.001$) but the abscence of this effect for thymol the main constituent of the plant, (2) a non parallel rightward shift in methacholine concentration response curve and significantly greater EC_{50} methacholine obtained in the presence of extracts ($p<0.05$ to $p<0.001$), The extracts caused, (3) parallel right ward shifts in histamine concentration response curves and significantly greater EC_{50} histamine in the presence of extracts ($p<0.05$ to $p<0.001$) and (4) leftward shift in isoprenaline concentration response curve in the presence of ethanol extract all compared to the effect of saline. In addition (5) different extracts showed significant relaxant effect on tracheal smooth muscle incubated with atropine, chlorpheniramine and propranolol, contracted by KCl ($p<0.001$) as well as significant positive correlation between the relaxant effect of increment concentrations of essential oil of the plant with the effect of theophylline ($P<0.001$). (6) Fractions 3 and specially 2 which is suggested to be carvacrol showed concentration dependent relaxant effects of ($p<0.05$ to $p<0.002$) on tracheal smooth muscle. (7) The concentration dependemt relaxant effect of carvacrol, one of the main constituents of the plant was also observed ($p<0.05$ to $p<0.001$). Bronchodilator effect of *C. copticum* extract in presence of high K+(50 mM) and carbachol on guinea-pig tracheal preparation demonstrated a dose-dependent relaxation with a possible mechanism of calcium channel blocking effect. (9) Significant effect on cough number of various concentrations of extracts of the *C. copticum* was showed ($p<0.001$ for all cases) which were significantly greater than the effect of codeine ($p<0.05$ to $P<.001$). (10) Bronchodilatory effect of *C. copticum* boiled extract on asthmatic airways comparable with the effect of theophylline at concentrations used was also shown. The results of this study suggest that this plant could be of therapeutic value as a brochdilatory drug in patients with obstructive airway diseases. A potent relaxant effect of *C. copticom* on tracheal smooth muscle with a possible muscarinc and histamine receptor inhibitory, β-receptor stimulatory and xanthine like activity was shown. The mainn constituent of the plant responsible for its relaxant effect suggested to be carvacrol. A relatively potent anttussive effect and a bronch dilatory effect on asthmatic airways were also observed for the plant.

ASSESSING THE POTENTIAL OF MEDICINAL PLANTS- WHERE TO START

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Although there are over 350 000 plant species, fewer than 20 `major' crop species provide for most human food needs. Within the rest of the plant kingdom there remain many hundreds of underutilized crops that have been grown locally for centuries and which contribute to the food security of the world's poorest people. In poor and impoverished regions of the world there are plants that have survived despite various harsh environment conditions. This is our chance to find out what those plants would be like as crops for the future — in climates of the future. With focused scientific efforts applied to unconventional crops we can do things that will make them more valuable, more useful and more popular. Many of these crops are cultivated in hostile, tropical environments by small-scale farmers without access to irrigation or fertilizers and with little guidance on improved practices. There are few examples of a multidisciplinary research effort on an underutilized crop and no methodological framework that can be applied across a range of underutilized species. Simulation models are robust tools to guide our understanding of how a system responds to a given set of conditions. Crop simulation models are increasingly being used in agriculture to estimate production potentials, design plant ideotypes, transfer agrotechnologies, assist strategic and tactical decisions, forecast real time yields and establish research priorities. Although there are growth simulation models for a range of major crops, there have been few attempts to develop models for medicinal species for which the factors controlling growth and development are not well understood and the general literature is sparse. Identifying novel approaches require for expansion of medicinal crops. A first step can be developing a CROPBASE considering all available and subsequently required data. Such an effort can help to provide a platform for decision support knowledge.

IBN AL-BAYTÂR AL-MÂLEQI AND HIS EXPENSIVE PHARMACOPOEIA AL- JÂME LE MOFRADÂT AL-ADWIYAH WA AL-AGHZIYAH

Seyyed Ahmad Emami

Zia al-Din Abu Mohammad Abdullah ibn Ahmad ibn al-Baytâr al-Mâleqi (died in 646 A.H. /1248 A.D.) was one of the great physicians of Andalusia, who lived in the seventh century. He collected and studied botany under ibn Romiah, ibn al Hajâj Ashbili and Abdollâh ibn Sâleh Kotâmi. He traveled for many years to Morocco, Algeria, Tunisia, Egypt, and Asia Minor, Greece, Byzantium, Libya, Iran, Iraq, Shâm (Syria), during which he acquired valuble information on medicinal herbs. He was appointed master of pharmacist (Imam al-Ashâbin) of al-Malek al-Kâmel, the Ayyubi (Jobean) king. He spent the final round of his life in Egypt and Syria. He trained great students. The famous students of ibn al-Baytâr were ibn Abi Ossaybah and ibn al-Soweydi. He leaved some books in the field of medicine and pharmacology. Ibn al-Baytâr masterwork is al-Jâme le Mofradât al-Adwiyah wa al-Aghziyah (Comprehensive Book in Simple Drugs and Foods). The book contains the names, properties, indications, and contraindications of 1422 mineral, herbal, and animal medicinal substances in alphabetical order.
The book has been translated into French, Germany, and Latin. The text of the book has been also published. Ibn al-Manzoor author of Lisan al-Arab summarized the al-Jâme le Mofradât al- Adwiyah wa al-Aghziyah. Among other medical works of ibn al-Baytâr one may mention the following: Al Moghni fi al-Adwiyah al-Mofradah (The Enriched Book of Simple Drugs) in 20 chapters in which he well-arranged the disease according the various organs; al-Ebânah wa al- Elâm be Mâ fi Menhâj Men al-Khalal wa al-Awhâm (Criticism on Menhaj al-Bayân) in which he criticized the ibn Jazlah; Tafsir Ketâb Diosqorides (An Interpretation of Dioscorides' Book) which he explained 553 Greek names in the al-Maqâlât (Treatises) of Dioscorides. The later has been recently revised and published by Dr. Ibrahim ben Marad. Some of his lost books are: al-Afâl al-Ajibah wa al-Khawâs al-Gharibah (The Tremendous Actions and Wonderful Properties).

A REVIEW OF VOLATILE SULFUR-CONTAINING COMPOUNDS FROM TERRESTRIAL PLANTS: BIOSYNTHESIS, DISTRIBUTION AND ANALYTICAL METHODS

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This review includes 554 volatile sulfur-containing compounds (VSCs) that have been reported from 43 terrestrial plant families until the year and including 2010. This review deals with extraction and analytical methods for VSCs, distribution of VSCs among plants, biosynthesis and other important aspects of this class of natural products. It has been shown that some classes of VSCs, specifically those in certain plant families, may have chemotaxonomic significance. This review also presents the retention indices of VSCs in different types of GC columns, as reported to date.

DIFFERENT STRATEGIES OF BIOLOGICAL TECHNOLOGY IN INCREASING OF PRODUCTION AND PRODUCTIVITY OF MEDICINAL PLANTS

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Medicinal plants have been man's best friend for a long time. Early civilizations relied exclusively on the medicinal plants for treating their various ailments and slowly what started as primitive herbal medicine around the world evolved into full- fledged systems.Though earth has been bestowed with a rich biodiversity, over exploitation of medicinal plants has led many of them to the verge of extinction. On the other hand, medicinal plants often have to tolerate extreme milieu; they are vulnerable to bacterial- fungal- viral infections themselves and in order to survive continuously evolve and develop mechanisms to synthesize secondary metabolites. However, the yield of secondary metabolites in plants grown in the field is often low at times to be able to meet the burgeoning demand. It has been realized over the years that plant improvement is essential, especially for obtaining higher yields of high-value, low-volume medicinally useful compounds. Conventional genetic approaches have helped in a lot of ways by improving plant strains and productivity of secondary metabolites. None the less, the need has been felt for improved procedures and protocols for medicinal plant improvement and it is here that plant biotechnology has carved a niche for itself.

The cytogenetic, genetic investigation and biotechnological tools are important to select, multiply and conserve the critical genotypes of medicinal plants. Polyploidy motivation in Medicinal and aromatic plants (MAPs) whit effect on the morphological and physiological characteristics, in addition to the variation in plant populations, in many cases, improve the traits. In a lot of plant species, polyploidy motivation increases the cell size and the subsequent enhance flower size, inflorescence and leaves and the vegetative and reproductive organs and generally, organs containing effective substances larger than diploid Plants parents, and ultimately increase the production of important pharmaceutical compounds. In-vitro regeneration holds tremendous potential for the production of high-quality plant-based medicine. Cryopreservation is long-term conservation method in liquid nitrogen and provides an opportunity for conservation of endangered medicinal plants. In-vitro production of secondary metabolites in plant cell suspension cultures has been reported from various medicinal plants. Bioreactors are the key step towards commercial production of secondary metabolites by plant biotechnology. Genetic transformation may be a powerful tool for enhancing the productivity of novel secondary metabolites; especially by Agrobacterium rhizogenes induced hairy roots. DNA-based molecular markers have utility in the fields like taxonomy, physiology, embryology, genetics, etc. DNA-based techniques have been widely used for authentication of plant species of medicinal importance. DNA profiling techniques like DNA microarrays save as suitable high throughput tools for the simultaneous analysis of multiple genes and analysis of gene expression that becomes necessary for providing clues about regulatory mechanism, biochemical pathways and broader cellular functions.

SAFFRON: BASIC VERSUS APPLIED RESEARCH

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Crocus sativus L. commonly known as saffron is a perennial stemless herb of the Iridaceae family and widely cultivated in Iran. Compounds considered pharmacologically active and important in saffron are volatile agents (e.g. safranal), bitter principles (e.g. picrocrocin) and dye materials (e.g. crocetin and its glycoside, crocin). Different activities of saffron such as antidepressant, hypnotic, anti-inflammatory, hepatoprotective, bronchodilatory, aphrodisiac and anti-appetite have been reported. Unlike basic research, there are few applied research projects concerning saffron. In this review, pharmacological findings about saffron and its challenges with applied research will disscused.

NANOPARTICLES AS AN ALTERNATIVE DELIVERY SYSTEM FOR LOW WATER SOLUBLE NATURAL COMPOUNDS

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It is estimated that 40% of the new chemical entities in drug discovery stages are poorly water soluble which is a key property in dissolution, absorption and thus the in vivo efficacy. Therefore, enhancing the solubility, dissolution rate and bioavailability of a drug candidate is a very challenging task in drug development [1]. In recent years nanotechnology has provided an alternative approach for delivery of low water soluble drugs. It has many advantages for drug delivery including controllable release of drugs on target tissues and long ciculation of nanoparticle within the size range 50-200 nm [2]. The present work deals in detail about two approaches used for delivery of poorly water soluble drugs. In one approach, Paclitaxel and Curcumin-loaded HSA nanoparticles within the size range 90 and 250 nm were prepared. Surface morphology of the loaded nanoparticle were investigated by scanning electron microscopy (SEM) and average particle size and size distribution by differential light scattering (DLS) technique. The paclitaxel and curcumin-loaded nanoparticles were examined for drug loading by high performance liquid chromatography (HPLC). SEM of pictures showed that nanoparticles were spherical and mono dispersed. In another approach, nanoemulsions of essntial oils (EO), including *Salvia officinalis* EO were prepared and the impact on the antibacterial activity was investigated. The results showed that nanoemulsions with mean particle size of 200 nm could be prepared, which loaded up to 99% of the added EO. The antibacterial studies were then carried out in the liquid and vapor phase against various bacteria. Interestingly, a MBC value of 2 mg/mL for pure EO was reduced to 0.0312 mg/mL using nanoemulsified EO against *Streptococcus pneumonia*. Moreover, the MIC for the EO in vapor phase against *Streptococcus pneumonia* was 689.65 µL/L, while this value was reduced to 270.34 µL/L for nanoemulsion. A higher activity observed for the nanoemulsion could be explained by slow release of active components from the nanoemulsion droplets.

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POSSIBILITY OF SAFFRON PRODUCTION UNDER DRYLAND FARMING CONDITION

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Restriction of water available leads farmers to dryfarming systems. Medicinal plants are the suitable option for dryfarming due to their adaptability and tolerance upon water deficit, and producing economic yield. Dryland farming of saffron (*Crocus sativus*) as a medicinal plants with low water requirement, vegetative growing in autumn and winter, could be introduced in waste low fertile drylands of Iran. Performance of several treatments were carried out in dryland farming of Damavand as a semi arid climate, such as plant nutrition, weed control by plastic mulch, planting depth, corm density, plantation orient, corm size, etc... In several investigations. The results showed increasing in flower number and stigma yield (more than 1 Kg/ha) by nutrition treatments, weed control and corm size. Also the results showed that in the initial years of experiment max number of flower and stigma yield was belonged to the low depth of corm and high depth of corm produced the significant increasing in all traits in the further years. Thus it could be concluded that *Crocus sativus* successfully produced economic yield and adapted well under dryfarming condition.

MEDICINAL PLANTS USED TO TREAT DERMATOLOGIC DISEASES

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The skin is central organ of the human body, with a surface area of around 2 m^2 and weight of nearly 4 Kg. It is the largest organ systems and one of the most diverses. Phytotherapy is a welcome addition to chemical useful drugs, such as glucocosticoids, antibiotics and antimyctics. Various herbal drugs are be used successfully to treat skin diseases. The most researched and recommended herbs for dermatologic diseases are as the follow:

For Dermatitis and Eczema
Mallow, Malva silvestris
Oak Bark, Quercus Cortex
Pine Tar, Pix liquida, Beach Tar
Walnut, Juglans regia
Wild Pansy, Viola tricolor
For Atopic Eczema
Fumitory, Fumaria officinalis
Evening Primrose, Oenothera biennis
For Pesorasis
Olibanum, Boswellia serrata
Bishop,s Weed, Ammi majus
Sarsaparilla, Smilax aristolochiaefolia
For Wounds, Contusions, Sprains
Comfrey, Symphytum officinalis
Arnica, Arnica Montana
St. John's Wart, Hypericum perforatum
Marigold, Calendula officinals
Chamomile, Matricaria recutia
Echinacea, Echinacea purpurea
For Hair Loss
Birch, Betula pendula
Wormwood, Artemisia absinthium
Nettle, Urtica dioica
Tribulus, Tribulus terrestris
For Vitiligo
White Hellebore, Veratrum album
Bishop's Weed, Ammi majus

Bergamot oil, Oleum bergamottae

For Lymphoderma

Horse Chesnut, Aesculus hippocstanum

For Warts

Fig, Ficus carica

Celandine, Chelidonium majus

Garlic, Allium sativm

The most important Licensed Herbal Drugs used for Dermatologic Disease in Iran are: Calendula cream, Arnica Cream, Dermagol Lotion, Camillogol Solution, Bernagol Ointment, Golitch Lotion, Melissan Gel, Salvisan Gel, Iralvex Drop, Mycozin Vaginal Cream, Venogol Cream, Hemorro-herb Cream, Mamogol Cream, Calendit-E Cream, Mintagel Gel, Mycoderm Drop, Zexon Ointment, Dermatin Lotion.

THE CHEMICAL STRUCTURE OF HERBAL MEDICINE

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The topic of this lecture is "The chemical structure of herbal medicine". The effective ingredients in the herbal medicines, obtained from medicinal herbs, have different chemical formations. The name of a number of these materials are: Glycosides, Flavonoids , Volatile oils, Steroids, Alkaloids ,polysaccharides….The details of which are described in numerous available specialized books, and in this lecture the entity of herbal medicines, taking note of all the molecules existing in their effective ingredients, will be considered, in such a way that all the audience could gain more acquaintance of a herbal medicine and some of their questions could be responded.

EVIDENCE BASED CLINICAL TRIALS FOR SAME HERBAL DRAGS

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Boswellia is known to have anti-inflammatory properties. It blocks the chemical, that contribute to inflammation and many clinical trials show its effects in different diseases such as osteoarthritis, rheumatoid arthritis, IBD, chrohn's disease, ulcerative colitis, collagenous colitis, asthma, multiple sclerosis and Malignant glioma. Estragole drop has been evaluated in patients with angina pectoris. The results showed that this herbal compound effectively lowers, LDL, cholesterol and triglyceride in serum of the patients. Curcumin can stimulate macrophages in destruction of amyloid proteins in Alzheimer patients. Curcumin has a strong anti inflammatory effects in patients with osteoarthritis. Silymarin from silybum marianum has been shown to help the liver health and clinical trials have proved its efficacy in the treatment of fatty liver, hepatitis C and liver citrhosis. Many chinical trials have shown that ginger is active against morning sickness, and vomiting, also, it shows a good anti – inflammatory effect. Vitex (Agnus-cactus) has a dopamine agonist namely "acubin" which is very effective in alleviating menopausal symptoms, and menstrual irregularities .In conclusion the evidence based clinical trials for herbal drugs can prove the efficacy and therapeutic effects of these products.

WHO GUIDELINE ON TRACEABILITY OF HERBAL RAW MATERIAL: A CHANCE FOR THE AMELIORATION OF QUALITY AND SAFETY OF MEDICINAL PALNT RAW MATERIAL

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Nowaday herbal products are more and more present in our life. Pharmceutical, cosmetic and food industries are depending to herbal raw materials which are still harvested or wild crafted under uncontrollable conditions. The WHO guidline "Good Agricultural and Collection Practice" (GACP) should lead to total transparency of the whole chaine of herbal production, from the plant, down to the finished product.

STUDY THE EFFECTS OF DIFFERENT FERTILIZING SYSTEMS INCLUDE BIOLOGICAL, ORGANIC AND CHEMICAL ON GROWTH AND ESSENTIAL OIL IN CULTIVATION OF *THYMUS DAENENSIS* SUB SPP. DAENENSIS

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The Iranian *Thymus daenensis* Sub spp. Daenensis may be a potential thymol rich source (about 75% of oil compounds) for commercial cultivation. Availability of nutrients and providing them in soil through chemical, organic or biological sources should be considered in the cultivation of endemic species. As in a fertilizing system integrated use of different fertilizing sources include chemical, biological and organic, camper to individual, is more efficient and sustainable for providing nutrients, therefore we tried in our investigations to first study the photochemical, physiological and morphological responses of *Thymus daenensis* Sub spp. Daenensis to different biological, organic and chemical fertilizer levels in order to choose the best level of each one; and second, comparing these fertilizing sources in an integrated fertilizing system. Our studies are divided in to three parts.
In part 1, the PGPR strains were selected according to two methods. First, by conducting a laboratory study where the effects of rhizobacteria strains which isolated from rhizosphere of *Thymus daenensis* on *Thymus daenensis* seed germination rate (SGR) and seedling vigor index (VI) were determined; and second, by physiological assays include IAA (Auxin) production, phosphate solubilization, and siderophore compounds production. Then, these PGPRs (include the strain with highest SGR and VI, and strains with IAA production, phosphate solubilization, and siderophore compounds production abilities) were used individually or integrated in an one year green house study with 7 treatments and 3 replications in a complete randomized block (CRB) design where their effects on growth and essential oil of *Thymus daenensis* were investigated. The best PGPR treatment was selected as biofertilizer. In part 2, for determining the most suitable levels of chemical (N-P-K) and manure (organic) fertilizers, a two year field study was conducted in a CRB design with 6 treatments [three chemical (N-P-K) + three manure] and three replications. The treatments which produced the highest essential oil yield of *Thymus daenensis* were selected as suitable chemical and organic fertilizers. Finally In part 3, the biological, chemical and organic fertilizer treatments resulted from previous studies were used individually or integrated in a two year field study which conducted in a CRB design with 8 treatments and three replications. According to the results of part 3, the fertilizing system of biofertilizer (*Brevibacterium frigoritolerans*) + %50 chemical fertilizer (20 kg ha^{-1} P, 220 kg ha^{-1} N, 200 kg ha^{-1} K) produced the highest dry mater, essential oil, Thymol and Carvacrol yields ($p<0.01$), camper to control.

SUSTAINABLE UTILIZATION OF EXUDATE SPECIES IN KOHRASAN PROVINCE

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The worldwide use and international market of medicinal and aromatic plants and their products grows yearly and the wild collection of materials can not support the high demand and also high specifications of pharmaceutical and food industries. Also the unsustainable collection and more-harvesting of these species cause to degradation of their habitats and endangering these high valued genetic recourses. Domestication and cultivation of these species can support row materials with unique quality for industries and in the other way conserve the species and their habitats from distribution.
Exudate species play an enormous role in economy of local people in Khorasan province but the unsustainable harvesting of the materials endangered these species. Researches showed that plants like *Ferula assa foetida*, *Ferula gummosa* and *Dorema ammoniacum* can successfully cultivated and harvested in marginal lands in dryland farming systems. This manuscript review continuous researches on domestication, cultivation and sustainable harvesting methods of exudates species in Khorasan.

ABSTRACTS OF POSTERS

INVESTIGATING THE EFFECT OF CALCIUM NITRATE AND POTASSIUM NITRATE APPLICATION ON CONTENT OF ESTRAGOLE AND METHYL EUGENOL ESSENTIAL OIL OF TARRAGON IN "RAY" REGION

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Tarragon is a herbaceous plant with 0.3 to 1 m height, which belongs to the Asteraceae family. It is cultivated in most parts of Iran as an oral and aromatic vegetable. Estragole and methyleugenol, two of the main components of *A. dracunculus* essential oil, were shown to be toxic in rodents. Estragole possesses beneficial physiological effects and used as flavorings for food and beverages. Methyl eugenol is a natural constituent of a number of plants such as basil, star anise, fennel, nutmeg, pimento, lemongrass and tarragon. It is used as a food flavoring agent in non-alcoholic beverages, ice cream, chewing gum, jellies and baked goods, and as a fragrance in several cosmetic products. In order to study the effect of foliar application of $Ca(NO_3)_2$ and KNO_3 on content of estragole and methyleugenol tarragon essential oil, a field experiments was conducted in a factorial experiment based on Complete Randomized Block Design with three replications. Treatments including $Ca(NO_3)_2$ and KNO_3 fertilizers, each of them in four levels (0, 1.5, 3 and 6 gl^{-1}). Plants harvested in the stage of full flowering, dried in shade. A Clevenger-type apparatus was used for hydrodistillation. The compounds of essential oil were analyzed by combination of GC-FID and GC-MS. The results showed that application of calcium nitrate and potassium nitrate and their interaction had a significant effect on estragole and methyl eugenol essential oil of Tarragon.

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ESSENTIAL OIL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF OIL, FROM AJOWAN (*CARUM COPTICUM*) GROWN IN SISTAN-IRAN

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Plants used for traditional medicine contain a wide range of substances which can be used to treat various infectious diseases**.** In the study, essential oil was extracted from the seed of Ajowan and the resulting extracts were evaluated by gas chromatography (GC-MS). Analysis and then assayed in vitro for their capability to inhibit the growth of pathogenic bacteria. In this study, the essential oil of Ajowan (*Carum copticum*) obtained by hydro distillation was analyzed by gas chromatography coupled to mass spectrometry (GC-MS) in order to determine their chemical composition. The antimicrobial effect of essential oil was determined using broth microdiluation method. Twenty-one (21) components in the oil of Ajowan were identified. The results indicated that the major components of the essential oil were Thymol (23.3%), p-cymene (17.5%), γ-Terpinene (16.8%) were present in fairly good amounts. On the other hand, α-Fenchen (5.7%), Sabinene (4.5%), Candinol (3.9%), Terpinene-4-ol (3.8%), Hexadecanoeic acid (3.4%). In this investigation DMSO solution was control and different dilution of essential oil of *Carum copticum* were treatments. The dilution of essential of (30mg/ml, 15mg/ml, 7/5mg/ml, 3/75mg/ml, 1/87mg/ml) on *Staphylococcus aureus* and oil (3/75 percent) had MIC efficacy. Present in Ajowan, Thymol, the major phenolic compound of essential oils plays an important role in antimicrobial activity.

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EFFECT OF *PEGANUM HARMALA* L. ON CHOLESTEROL AND LDL IN HYPERCHOLESTEROLEMIA-INDUCEDMALE WISTARRAT

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Concentration of cholesterol and other lipids in human diet has been considered as an issue of public health .In the present study the effects of methanolic extract of *Peganum harmala* L. (*P. harmala*) on serum lipid profile of rat were investigated in a 28-days feeding trial. Total of 48rats (180±15) were divided into six groups :(ctrl+, ctrl_, ctrl+8mg/ml, ctrl 8mg/ml,ctrl+11mg/ml and ctrl-11mg/ml) that were 4 weeks of feeding of high lipid and oil. Feeding, water and extract of *P. harmala* were provided *ad libitum.* At the end of 28 days, the blood samples for serum lipid profile were collected and determined. Serum samples were analyzed for total cholesterol, high density (HDL), low density lipoprotein (LDL) and triglycerides. Total cholesterol and LDL showed gradual significant decrease dose levels of *P. harmala* to 8 and 11mg/ml which was significantly ($P<0.05$) reduced by methanolic extract of *P. harmala* and was the lowest in group ctrl+8and11mg/ml. The same group had the highest ($P<0.05$) gross return compared to other treatments. It is concluded that methanolic extract of *P. harmala (*11mg/ml) could be effectively used in rat to optimize serum lipid profile.

THE EFFECT OF INTERACTION HYDROALCOHOLIC EXTRACT OF GINGER RHIZOME (*ZINGIBER OFFICINALE*) AND ADRENERGIC SYSTEM ON THE MECHANICAL ACTIVITY OF ISOLATED TRACHEA OF MALE RAT

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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 ginger on the mechanical activity of isolated trachea and it's interaction with the adrenergic system. In this experimental study, 15 adult male rats after adaptation with environment, were anesthetized and theirs trachea was isolated and divided to 3 mm strips. Then the isolated tracheal strips one of rats were divided to control and experimental groups and were inserted to organ bath contained oxygenated kreb's solution and mechanical function of them was recorded with a transducer and bridge amplifier power lab system. In experimental group, hydroalcoholic extract of ginger (0.3mg/ml) was added to the tissue bath. The control group in the same conditions, solvent was added. Then, mechanical response of each of the groups in the presence of isopernaline and propranolol as agonist and antagonist of the adrenergic system was recorded. Data were analyzed with Paired sample t- test.
Results showed that in presence of Hydroalcoholic extract of ginger, mechanical activity of isolated trachea was significantly decreased compared to control group ($P<0.05$). Namely, extract was due to relaxation of isolated trachea, but after injection isopernaline and propranolol, significant differences in mechanical activity of trachea wasn't observed in experimental group then control ($P>0.05$). Probably ginger effects on the relaxation of isolated trachea with the other pathway except adrenergic system.

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EFFECT OF IRRIGATION WITHHOLDING ON SOME PHYSIOLOGICAL ATTRIBUTES OF OREGANO (*ORIGANUM VULGAR* SSP. GRACILE)

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Water deficit stress in one of the most important environmental factors that limiting plant growth and productivity in arid and semi arid regions. Oregano (*Origanum vulgare* ssp. *gracile*) is one of the important species of Lamiaceae family, which is rich in essential oil and has been used as spices and in folk medicine as diuretic, antitussive, expectorant, sedative, stimulant, carminative and antirheumatic. The present study was conducted to evaluate the effects of water deficit stress on some physiological parameters of O. *vulgare* ssp. *gracile*. Water stress was imposed by withholding irrigation for 16 days and physiological parameters (proline and total soluble sugars accumulation, leaf relative water content (RWC) and leaf temperature) were measured in 4 days intervals. The results revealed that proline and total soluble sugars accumulation and leaf temperature were increased as the soil water content decreased. Leaf proline and total soluble sugars in the Fourth and Sixteenth days were 9 µmol/grfw, 78.25 mgr/grfw and 9.66 µmol/grfw, 86.32 mgr/grfw, respectively. In contrast RWC was decreased as the soil water content decreased. RWC in the Fourth and Sixteenth days were 87.05 and 82.32%, respectively. The results of this study showed that oregano to counter of water deficit stress possibly uses osmotic adjustment mechanism by accumulation of proline and soluble sugars.

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EFFECT OF PHENYLALANINE ON TOTAL PHENOL AND FLAVONOID CONTENT IN *SCROPHULARIA STRIATA* CELL SUSPENSION CULTURES

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Plants contain a wide variety of free radical scavenging molecules such as phenolic compounds e.g. phenolic acids, flavonoids, quinones, coumarins, lignans, stilbenes, tannins and some other endogenous metabolites, which are rich in antioxidant activity. Many of these antioxidant compounds possess anti-inflammatory, antiatherosclerotic, antitumor, antimutagenic, anticarcinogenic, antibacterial, or antiviral activities to a greater or lesser extent [2]. *Scrophularia striata* (Scrophulariaceae), a traditional Iranian medicine, has been used for the treatment of allergy, rheumatics and chronic inflammatory disorders [1]. There are phenol compounds in different organ of the plant. There are many methods for improving the accumulation of secondary metabolites in plant cell cultures and feeding a precursor is an effective one [3]. Total phenolic content was determined by using the Folin-Ciocalteu assay and flavonoid content was measured also by using the aluminium chloride colorimetric assay. Total phenolic content was 0.2 mg/g cell fresh weight and total flavonoid content was 0.16 mg/g cell fresh weight. The results showed that 1 mM phenylalanine significantly increase of phenolic compound in *S. striata* cells at 7 day after treatment.

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EXAMINATION OF EFFECT OF CUTTING (LONGITUDINAL AND LATITUDINAL) ON AMOUNT OF PRODUCTION BARIJEH (CASE STUDY: RANGELAND KHOMBI VASRAII AT GARME TOWN IN NOTRH KHORASAN)

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Rangelands are natural ecosystems that are their main characteristic endemic vegetation. One of uses rangeland plant is and their Medicinal plants side. One of medicinal plants that have many uses is *Ferula gummosa Boiss. Ferula gummosa Boiss* is name of sap plant named *Erula galbaniflua.* For this this research rangland Khombi vasraii at Garme town in north Khorasane as a habitat this plant was selected. For sampling 4 plots an region establish and amount of production Barijeh was examined at two cutting of latitudinal and longitudinal. Result showed that function production Barijeh at cutting of latitudinal was more than cutting of longitudinal.

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A COMPARISON BETWEEN CONVENTIONAL AND ULTRASOUND-ASSISTED EXTRACTIONS OF OSTHOLE, ISOIMPERATORIN AND OXYPEUCEDANIN FROM *PRANGOS FERULACEA* (L.) LINDL ROOTS

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The use of ultrasound-assisted extraction (USAE) for improvement of the extraction efficiency of coumarin compounds (osthole, isoimperatorin and oxypeucedanin) from roots of *Prangos ferulacea* (L.) Lindl compared to classical solvent extraction techniques such as maceration and Soxhlet extraction has been investigated in the current study. Under the optimum conditions, 95% (v/v) ethanol as the extraction solvent, temperature of 50◦C, solvent to solid ratio of 7 mL/g, ultrasound power of 67W for 15 min with a two-step extraction, the extracted amounts of osthole, isoimperatorin and oxypeucedanin were 157.7, 172.5 and 79.3 mg/g dry herb, respectively. The extraction yields of the total coumarin compounds increased by 17% and 31% relative to those obtained with soxhlet and maceration extraction methods, respectively. Therefore, USAE was established as the most efficient technique which consumed less amount of nontoxic solvent and needed a shorter time than other conventional methods for extraction of coumarin compounds [1, 2].

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MICROPROPAGATION OF ROSA CANINA IN DIFFERENT CONCENTRATIONS OF PLANT GROWTH REGULATORS

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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. 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 practicable 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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THY STUDY OF OIL AND FATTY ACIDS 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 of kernel in date's proction workrooms . As wastage. From this kernels, we can prepare oil. In this survey, I study the characteristics of oil and 2- varieties fatty acids in Bushehr. In this survey, two kinds of current date (shekar, shahabi) in Bushehr was studied .The measure of oil was determined by sokcelea machine, Acetone and n-Hexane. And measure of fatty acids was studied by GAS Chromatography Machine. The measure of oil in kernel was 7.64% (according to dry weight) other characteristics of oil such as peroxide number , Acid Andis and light failure factor were obtained in measures under (10.6-11.44) , (1.27-1.33), (1.462-1.4622). Profile of produced fatty acids was studied by GAS Chromatography Machine and was found Oleic acids by measure of (29.65-31.79), saturated fatty acids and Luric by measures of (27.13-30.85). As saturated fatty acids in kernel .Fatty acids such as Miristic (13.87-16.93), Palmitic (11.62-13.10) Estearic (1.87- 2.605), C11 (.17- 2.88) and Linoleic (4.41-4.46) in all 2-varietis was found. In shekar variety was founded Capric and Caprilic Acid. In shahabi variety was founded C19 and Sispalmetic .
Yield outcomes shows that there are un saturated fatty acids in date's kernel that Linoleic 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 toiletry, medicine and feed production [1,2].

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AMELIORATIVE EFFECT OF *MATRICARIA CHAMOMILLA*.L ON PARAQUAT –INDUCED OXIDATIVE DAMAGE IN LUNG RATS

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Herbal medicines have been long used for antioxidant properties. The purpose of this study was to investigate the effect of hydroalcholic extract *Matricaria chamomilla.L* (*M. chamomilla)* against Paraquat (PQ)-induced pulmonary injury in association with its antioxidant activity. Effective doses of PQ (5mg/kg/day) and *M. chamomilla* (50mg/kg/day) were administered alone or in combination for 7 days. At the end of the experiment, lung tissue of the animals was separated. The activity of enzymatic scavengers such as glutathione peroxidase (GPx) and superoxide dismutase (SOD), lipid peroxidation (LPO) and total antioxidant power (TAP) were measured. In these samples, the LPO, SOD, and GPx were higher in the PQ group as compared with controls. *M. chamomilla* extract ameliorated LPO, SOD, GPx and increased TAP in plasma and lung tissue of PQ -induced changes. Co-administration of PQ with *M. chamomilla* improved LPO and SOD, and GPx. In conclusion, *M. chamomilla* as natural antioxidant may be considered beneficial for the protection oxidative lung injury in PQ poisoning.

THE PHYTOREMIDIATION POTENTIAL FOR CLEANING UP CONTAMINATED SOIL BY FENNEL (*FOENICULUM VULGARE*)

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The vast industrial waste materials and sewages from a lot factories and different chemical fertilizers and pesticides in Tehran have caused contamination of soils. Heavy metal bioaccumulation in food chain could be highly dangerous to human health and on the other hand preventing heavy metal pollution is critical because cleaning contaminated soils is extremely expensive and difficult.
The present study was undertaken in view of providing an impeccable hypothesis that *Foeniculum vulgare* may probably be employed as a potent phytoremediator of heavy metals from polluted soils. Aneth is the international name of fennel. Fennel has lots of medicinal uses and heals lots of sicknesses such as cough and rheum. Plant part of use as crude drugs is fruit [1]. In the recently study about virtue of fennel on heavy metal of this plant in India university prove that it's very useful for immune system and safe to be used in Indian system of medicine [2]. The aims of this research were to determine the relationship between the soil pH and the phytoextraction rate based on different growth stages of the plant and the potential ability of Fennel to phytoextract different metals (Zinc, Copper, Lead, Chrome, Cadmium and Nickel). Material & Methods: Different parts of Plant samples (shoots, roots and leaves) were separated and washed and digested by wet method according the standard protocol for measuring mineral contents. Mean values were calculated, and analysis of variance (ANOVA) and Student's t-test were performed. Bioaccumulation factors (BAF-s) were calculated for heavy metal content of plant parts (mg/kg) / heavy metal content of soil (mg/kg), for each metal.
Results indicated that the younger plants have more potential to uptake and concentrate the studied heavy metals than the older ones and the uptake rate is significantly affected by the plant accumulation and the soil pH. In order to assess amount of heavy metals transfer from soil to plant (shoot and root), translocation factor was determined by dividing metal concentration at shoot by its concentration at root. The heavy metals uptake rate by this plant is significantly affected by number of plant cultivated as for lead uptake ($p<0.01$) while for Cd, Ni and chrome the p-value was less than 0.005.

EVALUATION OF MORPHOLOGICAL VARIATIONS SOME POPULATIONS OF *LEONURUS CARDIACA* FROM IRAN IN CONDITIONS OF NATURE AND COMPARISON TRAITS WITH GREENHOUSE, AND FIELD CONDITIONS

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In order to evaluation morphological characters of *Leonurus cardiac* in conditions of nature, greenhouse, and field six populations growing in across Iran were studied. Natural habitats of this species were identified during travels to different regions of Kerman, North Khorasan, Alborz, Esfahan, Ardabil, Mazandaran provinces in the early of growth season. Twenty five complete plants were collected from six localities in order to study and evaluate quantitative morphological characters. To study in conditions greenhouse and field, seeds were collected at the appropriate time and from each of population, 25 samples were cultured in greenhouse and field conditions. Results indicated the subspecies cardiaca populations are closely related and differ from the subspecies persicus by pubescence stems and leaves, more number of floral cycles, higher compaction of floral cycles, lower number of lateral branches, shorter length of petioles and leaves and smaller floral leaves. A quick look at to the coefficient of variation in the three different conditions, indicates decline of variations measured traits in greenhouse and field. The results of ANOVA and comparison of means indicated that traits such as No. of floral cycles in main stem and lateral inflorescence, Length of internodes, Floral leaf length and stem color in both greenhouse and field, Length of main stem Lateral branch length and lateral inflorescences length in field and the Space between aggregate flower and Main inflorescence length in greenhouse were significant.

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THE COMPARISON OF ANTIOXIDANT ACTIVITES OF POPULATIONS OF MOTHERWORT COLLECTED FROM SIX REGIONS OF IRAN

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Motherwort (*Leonurus cardiaca*) belonging to the Lamiaceae is the only species found in Iran. In folk medicine of most countries, Motherwort is used to relieve heart and stomach complaints, amenorrhea or Painful menstruation; and also used for decreasing Hyperthyroid. The compounds were identified in the extractive solutions from aerial parts of *Leonurus cardiaca* are flavonoids, polyphenol carboxylic acids, iridoides, triterpenes, tannins, sterols, carotenoids and alkaloid leonurin. In this study, The antioxidant activities of Motherwort plants collected from six regions of Iran i.e. Sarab, Khansar, Taleghan, Sari, Kerman, Dargaz were compared by DPPH assay in natural states and greenhouse culture and Follin-Ciocalteu method was used for estimating the quantity of phenol compounds. According to results, all studied populations showed antioxidant activity. A comparison of IC50 parameter showed the range of 20 to 60 mg/ml among different samples. In terms of phenol contents, the amount of total phenol content was about 4.6 to 23.2 mg Galic acid /g. The most total phenol content was for The plants collected from natural states (23.1 ± 0.1mg Galic acid /g dry matter) and the the little was for greenhouse plants(4.6 mg Galic acid /g dry matter). The results show that the total phenol content could be responsible for antioxidant activities of extracts.

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PHENOTYPIC DIVERSITY AND MORPHOLOGICAL CHARACTERIZATION OF IRANIAN WILD *ASPARAGUS* ACCESSIONS

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Asparagus is a spring vegetable, a flowering perennial plant species in the genus *Asparagus*. Roots of *Asparagus* are a constituent of medicinal oil used for nervous and rheumatic disorders. In this paper, we report on morphological diversity of *Asparagus* accession native to Iran, following survey of *Asparagus* germplasm whereby a total of 48 accessions were collected of 3 different locations northern of Iran (Mazandaran) and characterized by twenty-four quantitative and four qualitative traits. A factor analysis using Ward's method on mean values of morphological characteristics indicated nine main factors, explained 80.35 of the total variance. The results showed that spears characters had highly effect on separation of genotypes. Cluster analysis of morphological traits using seven factors divided the genotypes into two main sub-clusters at the coefficient of similarity of 25 and divided them into six main groups at the coefficient of similarity of 10.

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ANTI-DERMATOPHYTIC ACTIVITY OF SOME MEDICINAL PLANTS BY BIOAUTOGRAPHY AGAR METHOD

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The bioautography agar overlay method is an improved version of a disc diffusion method (1). It is considered as one of the most efficient methods for the detection of antimicrobial compounds**.** In this study the bioautography agar overlay method was performed for the detection of antifungal compounds of the ethyl acetate extracts of *Hyptis suaveolens* leaf, *Pogostemon parviflorus* leaf, *Ixora brachiata* root, *Ixora brachiata* leaf, *Drynaria quercifolia* Rhizome and *Satureja khuzestanica* leaf against *Trichophyton rubrum* and *Microsporum gypseum* that those were showed *in-vitro* antidermatophytic activity. In bioauthography method, the ethyl acetate extracts were prepared by maceration and evaporating to dryness. Then R_f values of separated compounds were determined with systems ethyl acetate/methanol/water (40:5.4:5): [EMW] (polar/neutral); chloroform/ethyl acetate/for-mic acid (5:4:1): [CEF] (intermediate polarity/ acidic); benzene/ ethanol/ ammonium hydroxide (90:10:1): [BEA] (non-polar/ basic) and acetone/ ethyl acetate/ petroleum ether (0.5: 0.5:2.0) [AEP], Kotze and Eloff (2002).
In all tested plants R_f values of an active antifungal compound were 0.90-0.98 in acetone/ethyl acetate/petroleum ether (0.5:0.5:2.0) against *Trichophyton rubrum* and *Microsporum gypseum*. Among of four separation systems were used, only the solvent system of AEP gave the best resolution of spots in TLC analysis because antifungal compounds were relatively semi-polar and therefore did not separate well in the polar eluent EMW. The ethyl acetate extracts of *H. suaveolens, P. parviflorus* and *Ixora brachiata* leaf separated with AEP possess few compounds with high activity against *M. gypseum* and *T. rubrum* at R_f values of the active compounds of 0.57–0.98. The clear spots indicate present of antifungal compounds that it inhibited the growth of tested fungi. A bioautography is an important detection method for a new or unidentified compound, because it is based on the biological effects of the substances under study.

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ANTILEISHMANIAL EFFECT OF AQUEOUS *ALLIUM CEPA* AND *IXORA BRACHIATA* ROXB. ROOT EXTRACT AGAINST *LEISHMANIA MAJOR* PROMASTIGOTES

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Leishmaniasis is a major world-wide public health problem, with between two and three million humans threatened by this disease annually. *Allium cepa* (onion) is an important dietary article and has had a role of herbal medicine for centuries. The root of *Ixora brachiata* is medicinally important. The aim of this study was to investigate the antileishmania effect of the ethanolic and methanolic extracts of *Ixora brachiata* root and aqueous onion extracts against *Leishmania major* promastigotes. The parasites prepared from cutaneous Leishmaniasis were exposed with different concentrations of selected plant extracts and their inhibitory effects were considered after 24 and 48 h. Among tested plant extracts, *Ixora brachiata* root extracts revealed the best activity against *Leishmania major* promastigotes with IC_{100} value of 2.5 mg ml^{-1} and IC_{50} value of 0.078 mg ml^{-1}. This study shows that aqueous *Allium cepa* and *Ixora brachiata* root extracts as natural products could be used as alternative drugs in treatment of *Leishmaniasis*.

IDENTIFICATION OF THE COMPONENTS OF PEPPERMINT (*MENTHA PIPERITA* L.) CULTIVATED IN ISFAHAN CLIMATIC CONDITIONS

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The Lamiaceae form one of the largest and most highly devolved plant families with worldwide distribution, excluding the Arctic and Antarctic. The family contains around 200 genera and between 2000 and 5000 species of aromatic herbs and low shrubs. Peppermint's Latin name, (*Mentha piperita* L.) comes from the Greek Mintha, the name of a mythical nymph thought to have metamorphosed into the plant, and the Latin piper, meaning pepper. It is one of the world's oldest medicinal herbs, and is used in both Eastern and Western traditions. Peppermint is widely used for its medicinal properties such as anti-spasmodic, anti-sickness, anti-helminthic, carminative, stomachic and others. Peppermint cultivated in the temperate, Mediterranean and subtropical regions of the world. Peppermint (*Mentha piperita* L.) which is tetraploid ($2n=72$), is a sterile natural hybrid of *M. aquatica* L. ($2n=96$) and *M. spicata* ($2n=48$). The leaves are strongly scented due to the presence of essential oils [1-3]. The aim of this study was to identification of the components of Peppermint cultivated in Isfahan climatic conditions. The aerial parts of plants were collected in Isfahan (Mymeh) Province in 2012. The aerial parts of plants analyzed by using GC/MS in Islamic Azad University Isfahan (Khorasgan). The 29 compound were identified in aerial parts Peppermint. The results obtained in our study showed that major components Peppermint were Menthone (13.89%), Menthol (12.37%) β-Pinene (7.62%), Pulegone (6.41%), β-Cubebene (4.95%), α-Pinene (4.743%), γ-Terpinene (4.08%), Carane (3.81%) and Piperiton (3.04%). Variation in constitution can be due to both environmental and genetic factors.

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EXTRACTION AND IDENTIFICATION OF CHEMICAL COMPONENTS OF THREE ECOTYPES OF SPEARMINT (*MENTHA SPICATA* L.) IN IRAN PROVINCE

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Spearmint (*Mentha spicata* L.) is one of the members of the subfamily Nepetoideae. Grows as wild in various regions of Iran. Spearmint, is either tetraploid (2n = 48) or triploid (2n = 36) and produces monoterpene carvone as the major oil component. Spearmint is a creeping rhizomatous, glabrous and perennial herb with a strong aromatic odor. The oil of Spearmint is rich in Carvone and presents a characteristic spearmint odor. The fresh and dried plants and their essential oils are widely used in food, cosmetic, confectionary, chewing gum, toothpaste and pharmaceutical industries [1,2]. The aerial parts of Spearmint were collected from the in three ecotypes (Kashan, Mahalat and Behbahan) Iran province, in 2012. The aerial parts of plant analyzed and identified by using GC/MS in Islamic Azad University Isfahan (Khorasgan). The aim of the present work is to extraction and identification of the components of (*Mentha spicata* L.) in three ecotypes Iran province. The 16, 17 and 21 compounds were identified in aerial parts Behbahan, Kashan and Mahallat province, respectively. The major components in Behbahan province were; Carvone (54.34%), 1,8-Cineole (21.78%), Borneol (5.82%), dl-Limonene (5.2%); The major components in Kashan province were; Piperitenone oxide (58.87%), 1,8-Cineole (22.71%), Trans-Caryophyllene (4.59%); The major components in Mahallat province were; 2-Cyclohexen (42.74%), 3,8-Menthadiene (21.58%), 1,8-Cineole (8.41%), Pulegone (6.83%), 1-P-Mentha-1,8-Diene (6.1%). In general, Behbahan province contained the highest Carvone. Different medicinal plant species show a marked variation in active ingredients during different seasons; these have been widely attributed to variations in environmental variables such as temperature and rainfall.

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INVESTIGATING THE VASORELAXANT EFFECT OF HYDROALCOHOLIC EXTRACT OF *TEUCRIUM POLIUM* ON POTASSIUM CHLORIDE INDUCED CONTRACTION IN THE PRESENCE OF CALCIUM BLOCKERS IN ISOLATED AORTA

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Teucrium polium is an herbaceous plant of the Lamiaceae family, which has many pharmacological properties such as anti-diabetic, anti-inflammatory, anti-nociceptive [1]. There are some reports of hypotensive effects of TP [2,3]. The aim of this study was to investigate the vasorelaxant effect of *Teucrium polium* extract on rat isolated aorta. It was an interventional study in which 28 male Wistar rats (weighed 200-250 g) were divided randomly into 6 groups. In groups 1 and 2 the effect of the extract (1, 2, 4 and 8 mg/ml) on contracted aorta by chloride potassium in intact and denuded endothelium were investigated. In group 3 the effect of the extract on contracted aorta by chloride potassium in the presence of Ditiazem and In group 4 the effect of the extract on contracted aorta by chloride potassium in the presence of Heparin were investigated. The extract significantly relaxed the contracted aorta by chloride potassium in both intact and denuded endothelium. The extract concentrations significantly relaxed chloride potassium induced contraction in the presence of Ditiazem and Heparin.
The hydroalcoholic extract of *Teucrium polium* have the relaxation effect on vascular smooth muscle. It seems this effect at lower concentrations of the extract is dependent on endothelium. The relaxation mainly was mediated by inhibition of Ca^{+2} channels and inhibition the release of calcium from intracellular stores in vascular smooth muscle cells.

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AGROBACTERIUM RHIZOGENES MEDIATED TRANSFORMATION OF MARSHMALLOW (*ALTHAEA OFFICINALIS* L.)

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Althaea officinalis belongs to the botanical family malvaceae and is widely distributed throughout the word. It is a perennial plant well-known for its healing properties since ancient time. Aspargine, althein, flavonol glycosides, pectin, quercetin and phenolic acid are its active constituents, isolated from its roots and leaves. The previous studies showed that *A. officinalis* possessed antimicrobial, anti-inflammatory, immunomodulatory, demulcent, soothing and many other pharmacological effects [1-3].Genetic transformation of plants using the natural vector system *Agrobacterium rhizogenes*, is the most often applied technique of DNA insertion into plant material. It is well known that hairy roots produced by *Agrobacterium* infection are fast-growing and genetically stable cultures, able to grow in hormone-free media [4].
In the present study, transgenic roots were produced in *A. officinalis* using *A. rhizogenes* strains 15834 and 15834 (carrying the *gus* gene).Explants (including leaves, petioles and hypocotyls) were excised from *in vitro* grown plants and were wounded with an insulin syringe containing the overnight grown bacterial suspension. Two days after co-cultivation, explants were transferred to MS-based medium supplemented with 30 g/l sucrose and 7 g/l agar and 500 mg/l cefotaxime to remove the bacteria at 25 ± 1°C in the dark. Cefotaxime concentration was then reduced in subsequent subcultures from 500 to 100 mg /l and finally cultures free of *A. rhizogenes* were transferred to MS media plates. Hairy roots appeared approximately 3 weeks after the inoculation. In order to obtain the root lines, single roots were picked off and were cultured on hormone-free MS medium in the dark at 25°C. After several subcultures on fresh solid medium, the roots were transferred to MS liquid medium containing 30 g/l sucrose, kept in a rotary shaker at 80 rpm and 25°C in darkness, and subcultured routinely every two weeks. The transgenic nature of hairy roots was confired by PCR using a set of GUS and rolB specific primers designed to amplify regions from the *gus* gene and the *rol* B gene. The expected band sizes for the PCR amplifications were 320 bp for *gus and* 780 bp for *rol* B. This is the first report of transformation of marshmallow and the results of this study may be very useful in transfer of foreign genes to this species.

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THE EFFECTS OF HYDROALCOHOLIC EXTRACT OF *CAMELLIA JAPONICA* ON SERUM NO LEVEL IN MALE RATS

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Although there are ample reports indicating the effects of *Camellia japonica* on various body systems, few information is available about the effects of *Camellia japonicaon* physiological functions, in particular NO. The purpose of this study was to determine the effects of hydroalcoholic extract of *Camellia japonicaon* serum levels of NOin male rats. In this study, male Wistar rats were randomly divided into control, normal saline receiving, *Camellia japonica* (100 mg/kg/body weight) receiving animals of 5 rats in each group. camellia japonica extract was daily injected intraperitonealy for 7 days. Blood samples were collected using cardiac puncture method serum NO level was measured using spectrophotometry method. Data were statistically analyzed and compared between groups using ANOVA. Serum NO level was not significantly changed in normal saline receiving rats compared with control animals, however, serum NO level was significantly decreased in *Camellia japonica* receiving animals compared to control rats.

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EFFECT OF ALLELOPATHIC IMPACT OF *DRACOCEPHALUM KOTSCHYI* BOISS ETHANOLIC EXTRACT ON SOME COMMON WEEDS OF URMIA REGION

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Environmental pollutions and weed resistance to herbicides have drawn attention to the biological control methods in recent years. In this content there is a growing interest for use of plant extracts and essential oils as safe natural substances [1, 2]. For this aim the allelopathic effect of *Dracocephalum kotschyi* ethanolic extracts were investigated at pre-emergence stage on some common weed species including *Album Chenopodium, Rumex acetosa*, *Amaranthus retroflexus* and *Descurainia Sophia*. Present work was conducted in a factorial base experiment with completely randomized design during 2013 in laboratories of Horticulture department of Urmia University. The ethanolic extracts (80%) of leaf samples were obtained from plant grown in two natural habitats (Gaduk and Doab) and were used with different concentrations (0, 0.1, 0.2, 0.3 and 0.5) and three replications. Finally, germination percentage and morphological traits (root growth, shoot and seedling weight) was evaluated during seed germination among various species. Results showed that *D. kotschyi* extracts reduced germination in all concentration and species, in compare with control. *D. kotschyi* leaf extract of plant gathered from Doab region had a greater inhibitory effect than Gaduk, so that with concentration of 0.5 made a 100% inhibition on *D. Sophia* seed germination. Our results indicate that the highest percentage of germination of all four species (*C. album*, *R. acetosa*, *A. retroflexus* and *D. sophia*) occurred in the control treatments 77.2, 92, 77.2 and 86% respectively. *D. Sophia* seeds were more sensitive than other seeds in different concentrations. The greatest reduction in root length and shoot(14.91mm 16 mm respectively), occurred with plant extracts of Doab with 0.5 concentration on pigweed, and greatest reduction of root to shoot ratio obtained from *R. Acetosa* seedlings. No inhibitory effect was observed in *C. Album*, extracts with concentrations of 0.1and 0.2 in neither Doab nor Gaduk region. According to the results of this study, it seems that inhibitory effect of extracts Doab correspond to high phenolic content obtained from their extracts. Our experiment have shown that ethanolic extracts of *D. kotschyi* can be used as a useful natural herbicides, however future studies are necessary to fully understand the reason by which medicinal plant extract may affect as herbicide in order to commercial application.

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CHEMICAL COMPOSITIONS AND ANTIBACTERIAL ACTIVITY OF *ANETHUM GRAVEOLENS* L. ESSENTIAL OIL SEPARATELY AND IN THE PRESENCE OF SODIUM CHLORIDE AND LACTIC ACID: AN IN VITRO STUDY

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Essential oils of some plants due to its antimicrobial, antioxidant and flavoring properties are used widely in the food industry. In the recent years, increasing the antimicrobial effects of essential oils in combination with other natural antimicrobial agents has been studied by researchers. In this study, chemical constituents of dill (*Anethum graveolens* L.) essential oil and its antibacterial effect separately and in the presence of various concentrations of sodium chloride (NaCl) and lactic acid (0.5, 1, 2 and 4%) on *E. coli* O157 and *Staphylococcus aureus* ATCC 29213 were studied. Chemical composition of dill essential oil was analyzed by GC/MS method [1], and antimicrobial susceptibility testing was performed by disk diffusion and broth micro dilution MIC (Minimal Inhibitory Concentration) testing methods [2]. Analysis of GC/MS showed that the major constituents of dill essential oil are Carvone (36.67%), α-phellandrene (24.62%) and Apiol (16.71%). Antimicrobial susceptibility testing results showed that dill essential oil has antibacterial effect on tested bacteria, and its antibacterial activity on *Staphylococcus aureus* was higher than *E. coli* O157. The antibacterial activity of dill essential oil in the presence of 1% ≤ NaCl significantly increased ($p<0.01$). Also, the antibacterial effect of dill essential oil in the presence of 0.5% ≤ lactic acid significantly increased ($p<0.01$).It can be concluded that the dill essential oil has antibacterial activity and its antibacterial activity in the presence of 1% ≤NaCl and 0.5% ≤ lactic acid significantly increasing. Therefore, to enhance the antibacterial effect of dill essential oil in food systems, combing it with NaCl and lactic acid is recommended.

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ALLELOPATHIC EFFECTS OF BERMUDAGRASS (*CYNODON DACTYLON* (L.) PERS.) EXTRACT ON GERMINATION AND SEEDLING GROWTH OF COMMON PURSLANE (*PORTULACA OLERACEA* L.)

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Allelochemicals are metabolic by-products of certain plants that, when introduced into the environment, cause growth inhibition by affecting physiological processes such as respiration, cell division, and water and nutrient uptake. Symptoms of "allelopathic effects" include leaf wilting and yellowing, or death of part or all of a plant. In order to evaluate the allelopathic effects of Bermudagrass on germination and early growth of Common purslane, an experiment was conducted in Research Islamic Azad University of Isfahan (Khorasgan) in 2010. The experiment was arranged as a factorial in a completely randomized block design with three replications. The experiment consisted of four stubble concentrations (control, 25, 50 and 100 g/L) and Common purslane Plant. Distilled water was used as control. Statistic analysis showed that the allelopathic effects Bermuda grass extract on radicale weight, coleoptile weight and radicale length were significantly but germination percent and coleoptile length not were significantly. Decreasing in germination percent per Common purslane Plant, radicale fresh weight, coleoptile fresh weight, coleoptile length and radicale length in concentration of extract (100 g/L) were (18.23 %), (0.49 g), (0.11 g), (4.31 cm) and (2.32 cm) compared to control, respectively. Also increasing of extract concentration of Bermudagrass significantly decreased Common purslane rate and maximum germination percentage in petri dishes. Our results showed that Bermudagrass extract had strong allelopathic effects and inhibited radicale weight, coleoptile weight and radicale length of Common purslane.

EFFECT OF HARVEST TIME ON YIELD AND QUALITY OF (*THYMUS DAENENSIS* CELAK) ESSENTIAL OIL IN ISFAHAN PROVINCE

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Thyme (*Thymus daenensis* Celak) is a perennial sub shrub belonging to family Lamiaceae. *T. daenensis* bunge is one of the endemic species of this genus in Iran. Thyme essential oils have been used for many thousands of years, especially in food preservation, pharmaceuticals, alternative medicine and natural therapies [1,2]. In order to optimum of harvest time this plan was done in a random block design with three replications was conducted in field Islamic Azad University Isfahan (Khorasgan), in 2010. Plants are harvested in five stages, i.e. the before blooming, beginning of blooming, 50% blooming, full blooming and fruit set. In order to study the effects of content (%) and yield of oil, content (%) and yield of thymol were measured. The essential oils obtained from the phonological stages of thyme were analyzed by using GC/MS. The results obtained in Statistic analysis showed that effects phonological stages had very significant effect ($P < 0.01$) on fresh and dry weight & essential oil yields and Thymol percentage. Results of fresh weight/plant revealed that highest fresh weight/plant (10621.6 kg/ha) obtained fruit set stage and the lowest (5545 kg/ha) obtained before blooming stage. The highest dry herbage weight (4243.3 kg/ha) obtained fruit set stage and the lowest (2035 kg/ha) obtained before blooming stage. The highest oil percentage (1.41%) (v/w) was achieved in plants harvested at 50% blooming stage and lowest oil percentage (0.99%) (v/w) obtained before blooming stage. Analysis and identification of components showed Thymol main compounds in all samples. The highest Thymol content (84.1%) was achieved in plants harvested at before blooming stage and the lowest Thymol content (49.86%) obtained at full blooming stage. The highest Thymol yields (31.62 kg/ha) was achieved in plants harvested at fruit set stage and the lowest Thymol yields (16.98 kg/ha) obtained at before blooming stage. The highest oil yields (46.7 kg/ha) was achieved in plants harvested at fruit set stage and the lowest oil yields (20.26 kg/ha) obtained at before blooming stage. According to the results of this project at fruit set stage for for *T. daenensis* optimum of harvest time on yield and quality of essential oil in Isfahan province.

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CHEMICAL COMPOSITIONS AND ANTIBACTERIAL ACTIVITY OF *ANETHUM GRAVEOLENS* L. ESSENTIAL OIL SEPARATELY AND IN COMBINATION WITH NISIN AND SODIUM CITRATE: AN IN VITRO STUDY

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Essential oils of some plants due to its antimicrobial, antioxidant and flavoring properties are used widely in the food industry. In the recent years, increasing the antimicrobial effects of essential oils in combination with other natural antimicrobial agents has been studied by researchers. In the present research, chemical constituents of dill (*Anethum graveolens* L.) essential oil and its antibacterial effect separately and in combination with nisin and sodium citrate on E. coli O157 and *Staphylococcus aureus* ATCC 29213 were studied. Chemical composition of dill essential oil was analyzed by GC/MS method [1], and antimicrobial susceptibility testing was performed by disk diffusion and broth micro dilution MIC (Minimal Inhibitory Concentration) testing methods [2].Assessment of the interaction between the tested agents was performed with the calculation of FIC (Fractional Inhibitory Concentration) index [2]. Analysis of GC/MS showed that the major constituents of dill essential oil are Carvone (36.67%), α-Phellandrene (24.62%) and Apiol (16.71%). The antimicrobial susceptibility testing results showed that studied agents separately have antibacterial activity on tested bacteria, and its antibacterial activity on *Staphylococcus aureus* was higher than E. coli O157. The Result of FIC index calculation showed that antibacterial activity of dill essential oil on E. coli O157 in combination with nisin synergistically increases. The antibacterial effect of dill oil on E. coli O157 in combination with sodium citrate additively increases. However, the antibacterial effect of dill oil on *Staphylococcus aureus* in combination with nisin and sodium citrate was indifference. It can be concluded that antibacterial activity of dill oil on E. coilO157 in combination with nisin synergistically, and in combination with the sodium citrate additively increases. Therefore, to enhance the antimicrobial effect of dill oil on E. coli O157 in food systems, its combination with nisin and sodium citrate is recommended.

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THE EFFECTS OF HYDROALCOHOLIC EXTRACT OF *ALLIUM HIRTIFOLIUM* BOISS ON SERUM NO LEVEL IN MALE RATS

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Although there are ample reports indicating the effects of *Allium hirtifolium* boiss on various body systems, few information is available about the effects of *Allium hirtifolium* boiss on physiological functions, in particular NO. The purpose of this study was to determine the effects of hydroalcoholic extract of *Allium hirtifolium* boiss on serum levels of NO in male rats. In this study, male Wistar rats were randomly divided into control, normal saline receiving, *Allium hirtifolium* boiss (100 mg/kg/body weight) receiving animals of 5 rats in each group. *Allium hirtifolium* boiss extract was daily injected intraperitonealy for 7 days. Blood samples were collected using cardiac puncture method serum NO level was measured using spectrophotometry method. Data were statistically analyzed and compared between groups using ANOVA. Serum NO level was not significantly changed in normal saline receiving rats compared with control animals, however, serum NO level was significantly decreased in *Allium hirtifolium* boiss receiving animals compared to control rats.

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ULTRAVIOLETE EFFECTS OF SALICYLIC ACID ON MORPHOLOGICAL AND PHYSIOLOGICAL *SATUREJA HORTENSIS*

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In the increase of air polluting substances, there is a growing reduction in ozone layer around the earth that it increases the ultraviolet trays that cause damaging in biosenose and plants. *Satureja hortensis* L., a well-known medicinal plant belonging to Lamiaceae family, is used as a spice and traditional herb in Iran. It has shown antispasmodic, antidiarrheal, antioxidant, sedative and antimicrobial properties. Present research was done in order to study savory plant defense mechanisms and also to investigate the plant resistance against UV stress when salicylic acid is used. For this experiment a factorial based was done on completely randomized design with three levels of UV (control (untreated), UV-B and UV-C) and two levels of salicylic acid (SA) (0 and1 mM) in5replicates. Multiple range test of Duncan were used to mean comparetions at 5% level. The results showed that the application of UV reduced inter-nodedistance, leaf area index and but it usage increased leaf thickness, total phenolics, total antioxidant plants treated with UV radiation. Plants treated with salicylic acid (1mM) caused to reduce the UV effects; there was an increase in the growth factors in compare with plants non-treated with SA. it seems that salicylic acid can be used as effective factors to increase the resistance of plants against UV stress,. However further studies is necessary to fully understand that how SA increased *S. hortenses* plant resistance under UV radiation

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ESTABLISHMENT HAIRY ROOT CULTURE SYSTEM OF *AGASTACHE FOENICULUM*

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Agastache foeniculum (Labiatae) is one of the traditional medicines for treating heart, lung and cough diseases [1]. Hairy root is one kind of genetic transformed root tissue that induced by *Agrobacterium rhizogenes*. The highly productive growth characteristic of hairy root along with genetic stability proved that hairy root is better culture source than cell suspension for production secondary metabolites. Optimization of nutrient compounds of hairy roots culture medium, is essential in order to enhance the growth and production of secondary metabolites. Source of carbon and its concentration are some of the effective factors in hairy roots growth [2].For the first time, factors effecting growth efficiency of *A. foeniculum* hairy root culture were investigated in this study. For this purpose, we established a hairy root culture of *Agastache foeniculum* by infecting 1-month-old leaf explant with *Agrobacterium rhizogenes* A4 and effects of different culture media (MS, 1/2 MS, B5) and different concentrations of sucrose (20, 30, 40, 50g/l)were studied on the growth rate of hairy roots. The results showed that, Maximum growth (1.61 g fresh wt/50ml) was obtained when hairy roots were grown on 1/2 MS medium and 30 g/l sucrose concentrations increased the hairy roots biomass. Polymerase chain reaction (PCR) analysis with specific primers for *rolB* gene confirmed the present of *rolB* in putative transgenic hairy roots.

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CHROMOSOME NUMBERS AND STOMATAL CHARACTERISTICS IN DIPLOID AND POLYPLOID PLANTS OF *AGASTACHE FOENICULUM*

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Agastache foeniculum (Labiatae) is one of the traditional medicine for treating heart, lung and cough diseases [1]. Polyploids are organisms with multiple sets of chromosomes in excess of the diploid number. In plant breeding programs, polyploidy plants have been used to develop superior varieties. Doubling of chromosomes, increases gene activity and increase the diversity of enzymes, increase of photosynthesis, reduce transpiration and reduce plant growth rate that increase plant resistance to stress [2].The main change occurring in polyploidy series is a change in size, as ploidy increases cell size increases. Stomata and epidermal cells will increase in size at approximately the same rate. In this study, we examined the chromosome number and stomata features of strains of *Agastache foeniculum*. For the measurement of leaf stomata, three well expanded leaves of each plant were removed from both control and treated plants, clear fingernail polish was applied to the abaxial side of the leaf for a 1*1 cm square. After the polish was dried, it was removed with a pair of fine tip forceps. The polish strips were mounted on a microscopes slid and then evaluated for the density and size of leaf stomata. We examined the chromosome number by a root-tip squash technique. The diploid chromosome number was 18. In this study, ploidy levels increased size of stomata reduced stomata density. Estimation stomata counting and examination of chromosome number, is an effective method in primary screening of tetraploid plants in polyploidisation breeding.

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FURANOCOUMARINS FROM AERIAL PARTS OF *HERACLEUM RAWIANIUM*

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The specie *Heracleum rawianium* belong to apiaceae. It is one of the native species of this *Heracleum* in Iran. It is perennial and grows to a height of 150–200 cm [1].In the best of our knowledge, phytochemical studies have not been reported on this specie of genus *Heracleum*. Isolation of coumarins from this *Heracleum* has been reported [2]. Coumarins compounds have shown antitumoural, anti-HIV, anti-inflammatory, anticoagulant, antimicrobial and antioxidant effects and as CNS-active compounds [3]. In this study, the chloroform extract of this specie aerial parts was investigated. Two furanocoumarins such as angelicin and allobergapten were isolated from the leaves and stems of this plant. Structure identification of the isolated compounds has been achieved by using spectroscopic methods, FT-IR,^{1}H-NMRand ^{13}C-NMR spectra.

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DETERMINATION OF BETA CAROTENE CONTENT OF CARROT HARVESTED FROM SOME REGIONS OF IRAN

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Carrot (*Daucus carota*) is of the most vegetables which has high nutritional worth and world widely used not only as a vegetable but also as a medicine for its protective properties in prevention of some inflammatory diseases such as asthma and cancers [1]. Carrot is major source of Vit A and also is rich in β carotene which is considered as natural plant antioxidants [2, 3]. Since carrot is being widely cultivated in Iran therefore it is possible that the β carotene levels of carrots harvested from different areas will be differed. The aim of study was to evaluate of β carotene levels in some carrot cultivation places of Iran.
Khomeinishahr, Zarinshahr and Dastgerd from Isfahan province and Dezful, Andimeshk and Shoushdanial from Khuzestan province and also Astaneh in Gilan province were selected for taking the samples (n=30 in each region). The samples then were analysed for their β carotene levels based on AOAC method [4]. Briefly, the samples homogenised, extracted initially by 85% ethanol and finally the extract action using petroleum ether was completed. The petroleum ether phases collected and their absorbance were read by UV/Visible spectrophotometer at 436 nm. The ranges of β carotene concentration in carrots of the selected regions were from 9.51 to 191.76 µg/l. Carrot samples taken from Andimeshk were found to have the highest concentration of β carotene levels with average of 147.952 ± 15.11 µg/l. The least concentration of β carotene levels in carrots was related to Dastgerd region which was equalled to 11.73 ± 3.52 µg/l. There were seen a significant difference between β carotene levels of carrots placed in Andimeshk with the other places ($P<0.001$). There is not any significant different between β carotene levels of Khomeinishahr and Dezful.
From the above-mentioned results we can conclude that β carotene levels in some parts of Iran are not the same. Since the β carotene is accounted as a natural antioxidant it seems the protective role of carrots in regions where carrots holding more β carotene levels might be better, however, further studies are needed in this regard.

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DETERMINATION OF TOTAL PHENOLIC CONTENT AND FREE RADICAL SCAVENGING ACTIVITIY OF TOTAL EXTRACT FROM THE PLANT RORIPPA SYLVESTRIS

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Rorippa sylvestris (Brassicaceae) is a perennial herb with erect branches which mainly grows in northern districts of Iran. There are some glucosinolate compounds in this plant such as glucohirsutin and deoxyglucohirsutin which may have a protective a role for human being after being metabolized [1]. Our previous *in-vitro* studies on this plant showed that; R. *Sylvestris* has a high antioxidant capacity and its extract had notable cytotoxicity effects when compared to vincristine sulfate [2, 3]. Since total antioxidant activity in plants can be related to presence of total phenolic compounds in plant and in this regard may affect its free radical scavenging activity; therefore we measured the total phenolic contents and free radical scavenging of R. *sylvestris.* Briefly, the whole plant was extracted using percolation method and with alcohol 80% three times. Then, the extract was concentrated with evaporator. And it was diluted with distillated water so that different concentrations which ranged from 5- 6400 mg/l were obtained. These final concentrations were further used for measuring total phenol content which was based by Singleton and Rossi `s method. The total phenolic concentration was measured as milligram Gallic acid equivalent per liter (mgGAE/L). For free Radical scavenging assay the alcoholic extracts with concentrations ranged from 0.05 to 50 mg/l were used. Finally, the inhibition levels of free radical of DPPH were measured spectrophotometerically at 517 nm and the results compared with that of VitC. The highest concentration of total phenol was equaled to 61.92 ± 0.02 mgGAE/L whereas the least phenolic content was found to be 0.04 ± 0.005 mg GAE/L. The most inhibition percent of free radical of DPPH was obtained at concentration of 50 mg/l and determined to be 34.98 ± 1.99 %. IC_{50} value of R. *sylvestris* was equaled 67.50 mg/l, which was approximately 5 times of IC_{50} value of Vit-C. Since total phenolic content was concentration dependent; therefore the more concentration give more total phenolic content and this can impact on total antioxidant activity. Accordingly, we can conclude that R. *Sylvestris* from Iran at higher concentrations can be accounted as natural antioxidant.

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THE EFFECT OF ESTROGEN ON SEEDS GERMINATION OF FENUGREEK, FENNEL AND FLAX PLANTS

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Estrogens are synthesized in all of vertebrates and some of invertebrates such as insects [1]. Estrogens are used as part of some oral contraceptives, in estrogen replacement therapy for postmenopausal women, and also can be found in some plants as lignan compounds [2, 3]. The lignans are estrogen like chemicals and after converting into enterolignans can act as agonist and activate estrogen receptors [4]. Since the estrogens can be entered into environment as glucoronates and sulfate salts through different pathways such as animal resources and irrigation systems in farms and accordingly put effect on plant growths [5, 6]. In present study, the effects of estrogen on germination of three plants including fenugreek (*Trigonellla foenum - graecum*), fennel (*Foeniculum vulgar*) and flax (*Linum usitatissimum*) were investigated in order to be determined whether these plants, which contains notably plant estrogen, are able to increase seed germination or not .

Estrogen tablets (Stromarin®) were provided by Aburehan pharmaceutical company. Then, the tablets were milled and using distillated water a stock solution was made (0.625mg/l). This solution was further used for preparing a final concentration which was equaled to 0.312 mg/dl. The seeds were placed in Petri dishes and cultured under lab conditions. The seeds were then treated by estrogen daily and this action continued for 15 days and compared with control which was distillated water. The seedling numbers were daily registered and finally the mean of germination percent was measured. The mean of seed germination percent for Fennel, Fenugreek and flax were 90.00 ± 1.71 %, 82.00 ± 1.83 %, and 20.00 ± 2.45 %, respectively. These values were compared against controls values which were as 93.00 ± 1.63 %, 99.00 ± 0.82 %, and 85.00 ± 2.94 %, respectively. From this data it can be concluded that this hormone had no effect on the germination of seeds of fennel, while it had the reduced and inhibitory effects on the germination of Fenugreek and flax seeds, respectively. The reason for these various effects may be searched in estrogen levels for these plants.

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FREE RADICAL SCAVENGING ACTIVITIES OF CARROT (*DAUCUS CAROTA* L.) SAMPLES TAKEN FROM DIFFERENT REGIONS OF IRAN

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Carrot (*Daucus carota* L.) is grown in different regions from southern, northern and central provinces of Iran. Carrot contains of many compounds such as hydroxy cynamic acids and its derivatives, phenolic and carotenoids constituents. In addition to that because of having Vit A synthesis precursors it can be used for treatment of ocular diseases such as retina degeneration and also there are some reports in which shown carrot consumption result in the reduced incidence of some cancers in human and animal models. Our previous studies on carrots samples taken from some major regions of carrot cultivation in Iran showed that; there are some significant differences between pro vitamin A precursor's levels in these regions. Since the levels of carotenoids may impact on protective properties of carrots especially its scavenging activity; therefore the study aimed to evaluate the free radical scavenging activity of carrots which obtained from different parts of Iran.
Carrot samples taken systematically (n = 30 and as separate) from some regions of Khuzestan , Isfahan and Gilan provinces including Andimeshk, Dezful, Shoush, Zarinshahr, Dastgerd, Khomeinishahr, and Astaneh, respectively. Briefly, the samples were homogenized with acetone 60 % and centrifuged (7000g). Then, the solvents were evaporated with rotary instrument and cleaned up with petroleum ether. The free radical scavenging activities of samples were measured using DPPH free radical and in accordance with Williams ` method . Inhibition percents of free radicals by carrot samples were measured and $IC_{50}$ for extracts were obtained against Vit C`s. The highest inhibition percent for DPPH radical was in carrot samples of Zarinshahr which was equaled to 71.13 ± 3.81%. While the least inhibition of DPPH radicals were found to be 32.13 ± 2.30% and were related to carrots from Andimeshk region. There were significant difference in scavenging activity obtained from Zarinshahr and Astaneh with the other regions ($P<0.001$). The most potent radical scavenging activities were seen among the carrots taken from Zarinshahr region so that its I C_{50} value was 1.21 times of Vitc `s. From this data it can be concluded that carrots from some regions of Iran have potential to scavenge free radical under lab conditions and in this sense it seems that some regions placed in Isfahan province are more capable than the other regions and act as good terminator for free radicals.

EVALUATION OF TOTAL PHENOL AND FLAVONOIDS CONTENT OF METHANOL EXTRACT OF *SAMBUCUS EBULUS* RHIZOMES IN NORTH OF IRAN (GILAN, GOLESTAN, MAZANDARAN)

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Sambucus ebulus belongs to the caprifoliaceae family; it has been used as a folklore medicine for treatment of various diseases including: rheumatism, fever, infections, edemas and etc. beside all mention traits; it has anti-nocciceptive effect. *Sambucus ebulus* rhizomes have the most effective part as an anti-nocciceptive. As regards there is lowest research about this plant in Iran, we decide to do some investigation on it. The main purpose for this study is finding the best place with maximum rate of phenol and flavonoids in rhizomes. We chose samples from three different height in Gilan, Gorgan and Golestan (north of Iran) (1800, 700and 100meter from sea level) and based on completely randomized design method. In each height we had three replications. Then the total rate of phenol and flavonoids in rhizomes was assessed. Analysis the variance table showed that altitude had significant effects on a rate of phenol in a level of (0.01) but it hadn't any effect on rate of flavonoids. Also, ecotype significantly effects rate of flavonoids in a level of (0.05) but it hadn't any significant effects on a rate of phenol. Interaction effect of altitude and ecotype showed significant difference on rate of phenol in a level of (0.05) but they had no effect on rate of flavonoids. further more results of statistical comparison exposed maximum rate of phenol(13.33mg/gr) is related to the Mazandaran zone with a 700meter height from a sea level and the lowest content was belongs to the Gorgan with 1800 meter height from sea level.

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MORPHOLOGICAL DIVERSITY AMONG WILD POPULATIONS OF *STACHYS BYZANTINA* (LAMIACEAE) IN EAST AZARBAYJAN AND ARDEBIL

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The genus *Stachys* which belongs to the Lamiaceae family, is found in mild regions of the Mediterranean and southwest of Asia. This genus consists of 250 species widespread throughout the word. Among the 34 species present in Iran, 13 species are endemic[1].One of most important endemic species of *Stachys* is *Byzantine* which have been used as an anti-inflammatory, antitumor, anticancer, antispasmodic, sedative and diuretic agent, and in the treatment of digestive disorders, wounds, infections, asthma, rheumatic and inflammatory disorders, dysentery, epilepsy, common cold and neuropathy in traditional medicine[2].
S. byzantina is growing in the large north parts of Iran but only East Azarbaijan and Ardebil provinces population were evaluated in the present study. For this aim, morphological diversity among 54 individuals of 9 wild populations of *S. byzantine* was studied for determining valuable characteristics for future breeding programs and medicinal purposes. 30 quantitative and qualitative characteristics such as length and width of leaf, number of nodes and internodes, length of stem and inflorescence, length of stamen and pistil and leaf color and etc. were evaluated and used for cluster and principle components analysis. Cluster analysis at similarity coefficient distance of about 60 divided 21 individuals in two main groups. The main groups consisted of 31 and 23 individuals, respectively, and Cluster analysis at similarity coefficient distance of about 40 divided 21 individuals in 5 main groups. The groups consisted of 11, 14, 6, 11 and 8 individuals, respectively. Principal Component Analysis (PCA) explained of the variation related to main effective characters such as Bract length, Leaf width, Calyx length and Node number in main inflorescence.

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EFFECT OF LEAD ON MEDICARPIN ACCUMULATION IN *MEDICAGO SATIVA* L.

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Lead (Pb) is the most common heavy metal contaminant in the environment which adversely affects both plant and human life. Production and accumulation of flavonoid such as medicarpin helps plant to tolerate heavy metals. Present study was undertaken to determine Pb treatment effect on medicarpin production and accumulation in *Medicago sativa* L. To this aim, 7 and 30 days old plants were treated in parallel with 0, 120, 240, 500 or 1000 µM of Pb, and treatment was repeated 3 times during 10 days. The extent of medicarpin accumulation was determined by using High Performance Liquid Chromatography (HPLC). Results obtained from plants treated with Pb at seedling and vegetative stages indicated that medicarpin level has been reduced in the roots while, its exudation to the medium culture has been increased.

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EFFECT OF OSMOPRIMING WITH KNO_3 ON SEED GERMINATION OF *HYPERICUM PERFORATUM* L. UNDER SALINE CONDITIONS

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Salinity is one of the most limiting factors of seed germination. Salinity in arid and semi-arid regions, is one of the most important stresses, can severely limit crop production. St.John's wort (*Hypericum perforatum* L.) is an important medicinal plant used for the production of antidepressant drugs. This study was conducted to evaluate the effects of the Priming on seed germination of St. John's wort under Saline stress. Seeds were exposed to priming in aerated beakers with different solutions including (0 or distilled water, 0.3, 0.6 % of KNO3 at 25°C for 24 h), and then move to saline circumstances with four different potential (o, 2.5, 5 and 7.5ds.m-1). Germination test was performed according to methods of the International Seed Testing Association (1). Seeds were considered germinated when radicles emerged at least 2 mm. Experimental units were arranged factorial in a completely randomized design with three replications. Data were analyzed using SAS program. Probability of significant differences among treatments and interactions by Duncan test ($p<0.05$) were used to compare means within and among treatments.

The results showed that priming technique had a significant effect ($p\leq0.01$) on seedling parameters. Among pretreatment, The KNO_3 had the most positive effect on germination coefficient (GC) and mean germination time (MGT) in Salinity levels. In order hand, these seeds at the minimum time had the most germination rate. Means comparing showed that the most and least rate of germination was obtained by KNO_3 and Control priming respectively. So under different level of Salinity stress, Pretreatments of KNO_3 had useful effect on radical length and seedling dry weight, were obtain in KNO_3 pretreatments application with Salinity of 5 ds.m-1treatment. So pretreatment of 0.6 percent of KNO_3 reduced number of abnormal seedlings. The simple correlation coefficients showed that plumule length with MGT had significantly negative coefficient, with abnormal seedlings number had no significant coefficient and with other measured attribes had positive significant correlation. Overall, application of seed priming with KNO_3 during 24 hours suggested for obtain uppermost germination characters.

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THE STUDY OF WATER DEFICIT STRESS EFFECTS ON AGRONOMICAL TRIATS OF DIFFERENT ECOTYPES OF FENNEL

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The use of medicinal plants, as a source of traditional medications, has long been considered. Fennel is one of the most important medicinal plants that can be grown in a wide range of climates. Abiotic stresses, such as drought (water deficit), salinity and temperature, are the main limiting factors of crop yield production in arid and semi-arid environments. Although drought stress would reduce crop yield, it could have positive effects on herbal essential constituents. Thus more attention would be required to the application of medicinal plants than previously considered [1]. Characterization of plant growth under different irrigation treatments can lead us to select for better performing ecotypes both quantitatively and qualitatively. Therefore, the primary aim of this study was to study the response of different ecotypes of fennel to water deficit stress, that imposed during reproductive stages, in terms of grain yield and effective quality components. In this experiment, seven different ecotypes of fennel were compared in a randomized complete block design with three replications under normal and water deficit conditions. Morpho-phenological traits along with grai yield and quality characteristics of different ecotypes were extensively evaluated. The primary resultds from data analysis showed that ecotypes were significantly different in flowering time and plant hieght as major morpho-phenological trais. The further results of data analysis will be disscused in detail at the body text.

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EFFECT OF ACCELERATORS ON SEED VIGOR AND GERMINATION OF MEDICINAL PLANT (*CUMINUM CYMINUM* L.) UNDER SALT STRESS

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Salinity is one of the most important environmental factors limiting plant growth and production in the world. Identify and apply the compounds that plants are able to withstand environmental stresses such as salt stress increased from a theoretical point of view is important. This study was conducted to evaluate the effects of priming on seed germination cumin in salt stress in the laboratory of seed technology shahed university were studied. Factorial experiment was conducted in a completely randomized design with 3 replications. Treatments include salinity (0, 3, 6, 9, 12, 15 dS m) and 3 levels of pre-treatment, seed priming with potassium nitrate (0.25, 0.5% for 24 hours), and distilled water (24 h), respectively. A salt stress level was performed using sodium chloride and distilled water for priming method was used hydro priming. Cumin seeds in the first round after being treated were dried at 25 ° C and salinity was exposed to ten days. Results showed that the effect of priming treatments on germination traits such as time out, Germination percentage, germination uniformity, germination rate, vigour length and weight were significant ($p \leq 0/01$) is. Among the treatments, the most positive impact on germination and speed of germination average duration of treatment, 0.25 Kno3 at different levels of salinity. The seed within shorter time have the speed and percentage of germination was higher. The mean of the highest and lowest germination treatments 0.25 percent potassium nitrate hydro priming obtained. In addition, different levels of salinity, nitrate and distilled water treatments had a positive impact on the number of pre-germinated seed number and percentage of normal seedlings, shoot length, root length and length of plant. The mean length of vigour as well as qualitative characteristics cumin seed germination and vigour of seed weight was significantly influenced by the seed priming treatments. Overall priming applied potassium nitrate 0.25 % for 24 hours in order to achieve the highest germination characteristics is recommended.

THE EFFECT OF ALTITUDE ON PHENOLOGICAL CHARACTERISTICS AND PERFORMANCE OF THE HERB YARROW (*ACHILLEA MILLEFOLIUM*) IN MAZANDARAN PROVINCE

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Yarrow herb (*Achillea millefolium*) is from Asteraceae and herbaceous perennial plant with a height of 30-90 cm. It has corymb inflorescences with pink or white color. Their vegetative parts of the plant contains essential oil, Which is very valuable in the pharmaceutical industry. In this research, time of growing and flowering times and yield of herb yarrow in three regions of Mazandaran were studied.1.The regions included Lepasry with height of 3100 meter above sea level, Vjk Sar with an altitude of 2400 meters above sea level and Javaherdeh with an altitude of 1700 m above sea level. Results showed a significant effect of elevation over time, growing and flowering time and yield of the plant. Based on the results, growth and flowering occurred at the height of 3100 meters (Lpasry) in mid-July and early August,, respectively, at an altitude of 2400 m (Vjk Sar), Respectively, in mid-April and mid-July and at an altitude of 1,700 m (Javaherdeh) is the late March and late June. The maximum yield was observed at altitude of 2400 m (andJack) and minimum performance was obtained at altitude of 1700 m (Javaherdeh). Highest plant height and leaf yield at an altitude of 1,700 m (Javaherdeh) and the lowest plant height, leaf yield was observed at an altitude of 3100 m (Lpasry).

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SURVEY ON QUALITY AND QUANTITY OF ESSENTIAL OIL CULTIVATED ACCESSIONS OF *THYMUS FEDTSCHENKOI* IN PROVINCE YAZD

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The genus *Thymus* belonging to the family of Lamiaceae and consist over 215 different species throughout the word. Fourteen species grow naturally in Iran of which four species are endemic. Then cultivate of 5 accessions *Thymus fedtschenkoi* (in station of medicinal plants research in shahedieh Yazd. The aerial parts of plants were collected 50% flowering stage and then were dried in shadow and hydro – distilled for obtaining their essential oil. Analysis and identification of chemical composition of the oil were performed by GC and GC/MS. The highest amount of oil yield respectively were related to accession CFTNJI (4/2%), and lowest was related to accession BHUZLP (0.8%). The highest amount of oil production respectively was related to accession CFTNJI (32/8kg/ha) and lowest was related to BHULP (3kg/ha). Survey Thaken shows of the 5 samples of oil obtained in maximum composition of essential oil paracymen, 1,8 cineol, gamma-terpinene, borneol, Thymol, carvacrol, linalool,Terpineol, and *E*-caryophyllene respectively BHULP (20/2%), BHUXDR (3/6%), VGYLP (4/1%), BHUXDR (10/4%), ZSEZSE (70/1%), BHUXDR (18/1%), BHULP (3/1%), CFTNJI(4/5%), and CFTNJI (3/3%). Generally, with regard to oil yield, oil production and main composition of essential oil accession CFTNJI with 4/2% and rate of oil production 32/8kg/hectare and 66/3% Thymol was selected as superior accession.

EVALUTION OF GENETIC VARIATION, COMPATIBILITY, SELECTION AND INTRODUCTION OF SUITABLE GERMPLASM WITHIN SOME *THYMUS* SPECIES

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The genus thymus belongs to the family of lamiaceae and consists of over 215 different species throughout the word. Fourteen species grow naturally in IRAN of which four species are endemic. Different species of thymus are used in food, Healthy, cosmetic and medical industry. Present research has been carried out in to select and introduce suitable accessions within thymus accessions in which collected by Natural resources gene bank of Iran in medicinal plants research station in Yazd province with the coordinates of longitude and latitude 55 31 49 northly, 27 15 54 east to a high of 1209 meters above Sea level in the region Gerdefaramarz city of Yazd shahedial. Phonological stages, rate of plant establishment, canopy diameter, plant height, number of branches per plant, yield , seed thousands weight, seed yield, essential oil yield per hectare, percentage of essential oil, were measured and recorded. Regarding to essential oil yields, oil production, and yield and amount plant stablishment. In the first, accessions ZSEVGY (*Thymus migricus*) and QNJI (*Thymus lancifolius*) and in second phase, accessions XDRVGY (*Thymus vulgaris*), BHUVGY (*T. transcaucasicus*), XDRLP (*T. migricus*), CFT (*T. pubesens* * eriocalyx) and BHUQ (*T. kotschyanus*) were selected as superior accessions.

VARIATION IN YIELD AND YIELD COMPONENTS AND ADAPTABILITY OF *SATUREJA* SPECIES IN DIFFERENT REGION OF IRAN

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The genus *satureja* belongs to the family of lamiaceae and consists of over 235 different species throughout the word. Fourteen species grow naturally in IRAN of which nine species are endemic. Different species of *satureja* are used in food, Healthy, cosmetic and medical industry. this research has been carried due to selection and introduction of suitable Germplasm within some *satureja* species in medicinal plants research station in Yazd province with the coordinates of longitude and latitude 55 31 49 northly, 27 15 54 east to a height of 1209 meters above Sea level in the region Gerdefaramarz city of Yazd shahedial .For this purpose in the first year(2009) seeds17 accession of different species of *satureja* obtained from the research institute of forests and Rangelands, were planetend in jifypot and in the green house. Then seedling with 6 accessions obtained from the research institute of forests and Rangelands in case of randomized complete block for three replication were planted on the main floor. In spring (2010) seedling 12 accessions were planted on the main floor. Phonological stages, rate of plant establishment, canopy diameter, plant height, number of branches per plant, yield , seed thousands weight, essential oil yield per hectare, percentage of essential oil , were measured and recorded. The results showed, analysis of variance rate of plant establishment, canopy diameter, plant height, yield, essential oil yield per hectare, percentage of essential oil at the level of one percent was significant. Regarding to essential oil yields, oil production, yield and amount plant establishment. In the first phase (2011), accessions SKM (*Satureja bachtiarica*), 107 (*S. spicigera*) and 15 (*S rechingeri*) and in second phase (2012), accessions 107 (*S. spicigera*), 123-2 (*S. mutica*), 123-1 (*S. mutica*), and SKM (*S. bachtiarica*)were selected as superior accessions.

INVESTIGATION OF GENETIC VARIATION, COMPATIBILITY, SELECTION AND INTRODUCTION OF SUITABLE GERMPLASM WITHIN *THYMUS PUBESCENS*

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The genus *thymus* belonging to the family of *lamiaceae* and consist over 215 different species throughout the word. Fourteen species grow naturally in IRAN of which four species are endemic. Different species of *thymus* are used in food, Healthy, cosmetie and medical industry. In order to selection and introduction of the best accession of *thymus pubescens* an experiment was carried out during 2009 to 2012 in medicinal plants research station in yazd province with the coordinates of longitude and latitude 55 31 49 Northly, 27 15 54 East to a height of 1210 meters above sea level in the region Gerdefaramarz city of Yazd shahedial. For this purpose in the first year (2009) seeds10 accession of *thymus pubescens* were received from seed bank of natural resources of Iran. Seeds were sowed in jffipot and in the green house.seedling about 2,5 month later , when had in the 8-10 leaves, were transferred to plastic post and one month later on the main floor and one meter intervals on the row and between rows were planted. Phonological stages, percentage of plant establishment, canopy diameter, plant height, yield, seed thousands weight, seed yield, oil yield per hectare, percentage of oil, exact measurements were recorded. Generally with regard, yield, percentage of oil, oil yields per hectare, and percentage of stablishment plant accessions, CFT, MKOMKO and CFTCFT were selected as superior accessions of *Thymus pubescens*.

SURVEY ON QUALITY AND QUANTITY OF ESSENTIAL OIL OF CULTIVATED *THYMUS DAENENSIS* CELAK ACCESSIONS IN PROVINCE YAZD

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The genus *Thymus* belonging to the family of lamiaceae and consist over 350 different species throughout the word. The for fourteen species grow naturally in Iran which four species are endemic. In order to phytochemical study of various *Thymus* species, an experiment was carried out in 2008 to 2011 years. 9 accessions of *Thymus daenensis* were cultivated in experimental field of Agriculture a Natural resource Research center of Yazd province. All samples were gathered at middle of flowering time (50%). Collected plants transferred to lab and dried on shadow. Then, they are grined and essential oil extraction was done by Clevenger apparatus (Pharmacopoeia Britanica) for 2.5 hours. Essential oil compounds were identified by gas chromatography (GC) and gas chromatography-mass spectroscopy (GC/MS). The highest amount of oil yield respectively were related to accessions Q (3/7%), XDRMKO (3/5%), ZSEQ (3.4%) and lowest was related to accession QBHU (1.7%). The highest amount of oil production respectively were related to accessions XDRQ (42/9kg/ha), ZSECFT (40/9kg/ha), NJIXDR (28/6kg/ha) and lowest was related to QBHU (12/4kg/ha). The results showed of the 9 samples of oil obtained in maximum composition of essential oil paracymen, 1,8 cineol, γ - terpinene, borneol, thymol, carvacrol, limonene, linalool and E-caryophyllene respectively NJIXDR (18/6%), ZSEAW (12/8%), XDRQ (5/9%), ZSECFT (6/8%), ZSEQ (71/1%), ZSEAW (30/9%), QBHU (7/5%), ZSEAW (13%), and VGYAW (5/8%). Generally, regarding to oil yield, oil production and main composition of essential oil accessions XDRQ with 2/9% and rate of oil production 42/9kg/hectare and 61% Thymol and accession Q with 3/7% and the rate oil 25kg/hectare and percent 68% Thymol, and accession ZSECFT with 2/5% essential oil and the rate of oil production 40/9 kg/hectare and 62 % Thymol were selected as superior accessions.

MYCELIUM GROWTH INHIBITION OF ETHANOLIC EXTRACT OF *SATUREJA KHUZESTANICA* (JAMZAD) ON THREE SPECIES OF PLANT PATHOGENIC FUNGI INCLUDING PYTHIUM SP., RHIZOCTONIA SP., AND RHIZOPUS SP.

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Extracts and essential oils of medicinal plants are effective against fungal and bacterial pathogens; meanwhile they are biodegradable compounds which have high potential for using in integrated pest management programs. In this study, fungicidal and antifungal effect of ethanolic extract of *Satureja khuzestanica* (Jamzad) on three species of plant pathogenic fungi including *Pythium sp*., *Rhizoctonia sp*., and *Rhizopus sp*. on PDA culture during 3 and 6 days has been investigated. The experimens were conducted in a completely randomized design, in four replications at 24±1ºC. On *Rhizopus*, 5 concentrations (1000, 1500, 2000, 2500 and 0 µlit/250ml) and on *Pythium* and *Rhizoctonia*, 9 concentrations (200, 400, 600, 800, 1000, 1500, 2000, 2500 and 0 µlit/250ml) were experimented. The data were analysed by SPSS software. The MIC for *Pythium*, *Rhizoctonia*, and *Rhizopus* was 600, 600, 1000 (µlit/250ml) respectively and the MFC for these three mentioned fungi was 1000, 1000, 1500 (µlit/250ml) respectively.

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EVALUATION OF PLANTING PATTERNS ON GROWTH, FLOWER AND SEED YIELD OF MALLOW AS A MEDICINAL PLANT

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Among the various agronomic factors as the yield limiting, planting pattern is considered of great importance. According to soil and climatic characteristics, increase in yield can be ensured by maintaining appropriate plant population through suitable planting pattern. In order to investigate the effect of different planting patterns on growth, flower and seed yield of mallow (*Malva sylvestris* L.) as a medicinal plant, a field experiment was conducted based on a complete randomized block design with three replications at the Agricultural Research Station, College of Agriculture, Ferdowsi University of Mashhad during growing season of 2012-2013. The experimental planting patterns included: 70 and 90 cm apart single side rows and two side rows. Results of variance analysis showed that planting patterns had significant effects on leaf area, fresh and dry flower weight and seed yield of mallow. The highest leaf area, fresh and dry yields of mallow were observed in two sides. Also, the highest seed yield of mallow was observed in two side planting pattern.

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RESPONSE OF GRASS AND BROAD-LEAF WEEDS IN EARLY SEASON TO REDUCED RATE OF TRIFLURALIN IN FENNEL (*FOENICULUM VULGARE* MILL.)

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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 control methods, such as chemical control, is necessary. Field experiment was carried out in 2013 to evaluate of trifluralin as a preplant herbicide for weed control in *fennel*. In this experiment the efficacy of different rates of trifluralin (0, 720, 1080, and 1440 g a.i. ha^{-1}) for selective control of grass and broadleaf weed species, were evaluated. Sonchus oleraceus, Solanum nigrum were the dominant broadleaf weed and Echinochloa crus-galli and Setaria viridis were dominant grass in all plots. Results showed that weed biomass significantly affected by herbicide rate and increasing herbicide dose generally improved both grass and broad leaf controls. However, Grass weeds were more susceptible to given rate of the herbicide compared with broad leaf weeds. For example the rate of 1080 g a.i. ha^{-1} reduced broadleaf weed biomass by 63%, while application of the same rate of herbicide controlled 91% of grass weed. Application of herbicide at the rate of 1440 g a.i. ha^{-1} provided excellent control (>92%) of total grass weeds, however, this rate provided moderate control (<76%) of broadleaf weeds. Results from this research suggested that, greater rate of 1440 g a.i.ha-1 is required to maintain effective control of broad leaf in fennel, while, in area which grass weed are dominant weeds in fennel fields, the rate of 1080 g a.i. ha^{-1} could be sufficient to effective control of grass.

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AN IN VITRO SURVEY ON ANTIFUNGAL EFFECTS OF SOME PLANT ESSENTIAL OILS (*THYMUS VULGARIS*. L, *MENTHA PULEGIUM* L., *ROSMARINUS OFFICINALIS* L., *CUMINUM CYMINUM* L. AND *MENTHA SPICATA* L.) ON SOME FOOD SPOILAGE MOLDS.

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Due to the harmful effects of chemical preservatives, natural preservatives, such as essential oils have been used recently. Molds are of important agents of food spoilage and production of toxic compounds called mycotoxins during storage. In this survey, the effects of thyme, pennyroyal, spearmint, rosemary and cumin essential oils on mycelium growth of *Aspergillus flavus* PTCC 5004 and *Penicillium chrysogenum* PTCC 5033 was investigated. At first, concentrations of 0.25, 0.5, 1 and 2% (w/v) of the essential oils were prepared in molten potato dextrose agar (PDA) with an approximate temperature of 45-43°C. Then, mycelium of 5 to7 day's culture of molds were transferred on PDA agar containing different concentrations of the essential oils using with sterile cork borers (Ø=5mm). After that, diameter of the molds growth were measured on days 3, 5, 7 and 10 of incubation at 25°C; and inhibitory percent of different concentration of essential oils was calculated by comparing the diameter of the molds growth as a control group[1].The results showed that the essential oil of thyme and cumin in all tested concentrations inhibited the growth of *Aspergillus flavus* and *Penicillium chrysogenum* by 100 percent. Also, spearmint and pennyroyal essential oils at all concentrations inhibited the growth of *Penicillium chrysogenum* by 100 percent, while these essential olis inhibited the growth of *Aspergillus flavus* in concentrations of 0.5, 1 and 2% by 100 percent. Rosemary essential oil at concentrations of 0.5, 1 and 2% inhibited the growth of *Penicillium chrysogenum* by 100 percent, while this essential oil inhibited the growth of *Aspergillus flavus* only at concentrations of 1 and 2% to 100 percent. From the result, it can be concluded that among the tested essential oils, essential oils of thyme and cumin had the most antifungal effects, and rosemary essential oil had the least antifungal effects against tested molds. Therefore, it is recommended that thyme and cumin essential oils as alternatives to chemical preservatives used throughout the food industry.

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CHEMICAL COMPOSITIONS OF THE ESSENTIAL OILS OF *ECHINOPHORA CINEREA* (BOISS.) HEDGE ET LAMOND AND ECHINOPHORA PLATYLOBA DC

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The genus *Echinophora* is (Apiaceae, subfamily Apioideae, tribe Echinophoreae) represented in the flora of Iran by four species including two endemics such as *E. platyloba* DC. and *E. cinerea* (Boiss.) Hedge et Lamond are endemic plants that widely distributed in Zagros Mountains Range, Iran [1]. Results of previous studies showed that *Z-β*-ocimene and *α*-phellandrene are main constitutes in essential oils of *E. platyloba* DC and *E. cinerea* (Boiss.) Hedge et Lamond, respectively [2, 3]. These species have been utilized as traditional medicines for antiseptic and antimicrobial, and also as a flavouring agent and spice for foods (especially pickles) by the indigenous people of Chaharmahal va Bakhtiari, Iran [4]. The aerial parts of *E. platyloba* DC. and *E. cinerea* (Boiss.) Hedge et Lamond collected from Kiar region in Chaharmahal va Bakhtiari province. The yellow oils of *E. platyloba* DC. and *E. cinerea* (Boiss.) Hedge et Lamond were obtained by hydro-distillation in the yields of 0.3 and 1.8% based on dry weight, respectively. Gas chromatography–mass spectrometry (GC–MS) analyses revealed compounds. Major oil constituents of the essential oil of *E. platyloba* DC were *Z-β*-ocimene (56.5%) and *α*-phellandrene (5.6%) and for the essential oil of *E. cinerea* (Boiss.) Hedge et Lamond were *α*-phellandrene (55.2%), *α*-pinene (14.3%) and *β*-phellandrene (11.8%) that they were dominant among monoterpenes components.

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ANTIOXIDANT ACTIVITY AND CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *LEVISTICUM OFFICINALE* FROM SOUTHEAST OF IRAN

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Levisticum officinale is a perennial plant which grows in some regions of Iran. The tea of the plant can be applied to wounds as an antiseptic, or drunk to stimulate digestion. The plants were collected from Rabor region in Kerman province southeast of Iran and examined for chemical constituents and antioxidant activity in leaves and stem essential oil. The essential oils of *Levisticum officinale* were obtained by hydro-distillation and analyzed by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). Eighty components have been revealed in the essential oil of the plant. The major constituents of the essential oils were 3-n butyl phtalide (32.44 %), butylidene phthalide (19.98%), Carvacrol (8.48%), heptacane (2.49%), delta cadinene (1.98%), tricosane (1.77%), hexadecanoic (1.47%). It can be concluded that two main chemotypes (3-n butyl phtalide and butylidene) of essential oils of *L. officinale* may be identified by the characteristic concentrations of the major compounds. The antioxidant activity of aqueous extract was evaluated by 1,1-diphenyl-2-picrylhydrazyl (DPPH) and ferric reducing antioxidant power (FRAP) method. In DPPH method, IC50 for aqueous extract was 166.2 µg/ml and in FRAP assay, antioxidant activity of the extract was 24.56 mM Fe^{2+} / g sample. Butylated hydroxy toluene (BHT) and ascorbic acid were used as standards that showed IC50= 17.43µg/ml and 60.75 mM Fe^{2+} / g sample respectively.

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INVESTIGATING APPROPRIATE APPROACHES FOR IMPROVING ECONOMIC SITUATION AND ADDED VALUE OF SAFFRON IN SOUTH-KHORASAN PROVINCE

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Traditional agriculture in Iran is based on development of cropping systems with low water requiring crops such as saffron (*Crocus sativus* L.). Today, in addition to the use of chemical compounds in food, pharmaceutical and cosmetics and health, the use of natural plant compounds in these industries has increased. Although it seems natural materials and chemical compounds, compared with side effects and cancer birth is less, but also using of them in different industries can be accompanied by side effects and toxicity. Saffron is one of the plants in medicine traditional food and cosmetics and health products are widely used. One of the most valuable and irreplaceable medicinal plants all over the world is Saffron. Saffron is a cash crop that most of researchers believe it is indigenous crop of Iran. Saffron (*Crocus sativus* L.) is a valuable medicinal plant which has many therapeutic applications since long time ago as anti-spasmodic, carminative, and diaphoretic. However, not much research has been conducted on this crop to improve technology for its production. Saffron in the Islamic Republic of Iran is planted as a perennial crop and its yield varies in consecutive years as do fruit trees**.** Iran is leading country in saffron production with 56000 ha cultivated area and 170 tons annual production in 2013. South- Khorasan Province produces 50 tons of this valuable and important production in 2013. Nowadays, the world business is based on the competition. In this regard, the use of more efficient methods and tools has been the center of attraction. Packing is one of the effective measures in the process of selling products to count. Iran enjoys favorable climate conditions; therefore, it can produce many crops such as saffron and it also is the biggest producer of it in the world. But due to lack of proper facilities for packaging, the license of direct exports of the product is lost. In Southern Khorasan the ecological condition is that of a desert. Low precipitation, high evaporation causes very low humidity. Large Temperature fluctuations occur during days and nights. In some higher areas conditions are ecologically more favorable for plant growth, but they are not so distinct from those of the deserts. Today, trade is a global issue that definitely needs to follow world trade rules. Saffron trade in this regard can be studied as a model in the process of global trade. Iran as the world's largest producer and exporter of saffron has a major and significant proportion of the production, cultivation and the export value is allocated to this product. The process of strategic and targeted development of sustainable agriculture in the context of WTO agricultural trade can be optimized. Increasing production efficiency, knowledge transfer, and R&D spillovers depends on the expansion of agricultural trade, in addition to providing goal the WTO; the international competitiveness of products for export development will be possible. If the causes, problems and constraints affecting the export demand and supply will be identified, and then eliminate or reduce the export of actions take place, the possibility of optimizing the export market will be in the international arena. Given the name of plants such as saffron is identified with Iran so thinkers and writers on this land is and relevant information to make it available to interested. And to learn those actual and potential characteristics of this valuable plant and also its various aspects of economic, employment, medication, etc. In this paper, it has been introduced to the saffron and its properties and saffron to the historical background and its economic importance is also discussed. It also posed challenges and effective strategies for maintaining and developing world markets offered and investigating appropriate approaches for improving economic situation and added value of saffron in South-Khorasan Province.

IDENTIFICATION OF ESSENTIAL INGREDIENTS AND STUDYING THE ANTIOXIDANT EFFECT OF LEAF, *ECHINOPHORA CINEREA*

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The genus *Echinophora* are aromatic plants belonging to *Umbellifera* family.There are two species of this genus in Iran. The plants belonging to this genus have medicinal properties and use in traditional medicines. In this study, essential ingredients from leaf and also antioxidant effects of ethanolic extracts of leaf with the help of three methods of measuring the amount of phenolic compounds, flavonoids antioxidant capacity rate was evaluated. The plants were collected from "Sepiddasht" one of the region of Lorestan province and then they were surveyed and compared. *Echinophora Cinerea* plant was collected from Sepiddasht region on October, 2011 after drying in the shade, plant was extraction performed by soaking method. The result extract was concentrated using rotary machine. The oil obtained with GC/MS was analyzed. The results showed that the main constituents of essential oil that *Echinophora Cinerea* leaves include: α-Phellandrene (67/51 %), Sabinene (7/81 %) allocated essential main components to themselves. Finding of this study showed the existing synthesizes in essential oil of the sampled leaf were different and also studying antioxidant effect of this plant showed this plant has antioxidant property which is used in medicinal and food industries [1, 2].

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COMPARSION OF ANTIMICROBIAL EFFECT OF DIFFERENT PLANT INGREDIENTS OF "LAWFUL WINE" ON BACTERIA

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One of the sources of Islamic medicine is "Rsalatozahabie" written by Imam Reza (God have mercy upon him). As part of this paper, Imam Reza (God have mercy upon him) wrote about preparation, utilization and benefits of a syrup called "Lawful Wine". Lawful Wine is made from raisin juice. Next, the spices of saffron, cinnamon, ginger, valerian, chicory, clove and mastic and finally honey are added to it. The present study was aimed to compare different plant ingredients' of Lawful Wine on Bacteria. In continue, botanical aspects of each used plant in this syrup were investigated in order to introduce the best plant species and their proper alternatives. The data shows that to what extent, they are coordinated with the therapeutic properties of lawful wine that was stated by Imam Reza (God have mercy upon him)! According to this study, the most striking properties of these plants are antimicrobial effects on *Escherichia coli, Pseudomonas aeruginos, Staphylococcus and Streptococcus species.* So the present program underlies those therapeutic properties of these plants, which are compatible with properties written in "Rsalatozahabie" for the syrup. In conclusion, Lawful Wine is as potential sources of natural antimicrobial and can be daily used as an easily accessible source of natural bioactive compounds.

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EFFECT OF TEMPERATURE AND MOISTURE STRESS ON SEED GERMINATION AND GROWTH OF *THYMUS DAENENSIS*

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Effects of conditions seedling humidity and temperature stress on germination and seedling growth thyme (*Thymus daenensis*) were investigated in Institute center Emem Qumeyyni in Karaj in 2010. (Jamzad, Z.1373) The value of medicinal plants and traditional medicine in the new world. (Ghasemi pirbaloti and Associates 1384) studied the effect of different treatments on seed germination of five species of medicinal plants break dormancy and irritant contact Bakhtiari region have concluded that such drugs may vulgaris daenensis dormancy is a physiological dormancy to break the dormancy seeds of medicinal plant species *Thymus daenensis*, Anissum, hyssopus chemical stimuli such as gibberellin KNO_3 can be used. (Samsam shariat1372) The amount of thymol and plant growth depends on local climatic conditions and each other 1 to 5/2 percent. The growing body of essential non-essential compounds such as tannins (8 to 10%), flavonoids, saponins and bitter substances there. The shoot is consists of volatile oil thymol, carvacrol, Parasymol, Terpnoids of borneol, linalo and pinen. The treatments included -4, +4, +40, +75 C^0 and treatment with out of strees as control. Each of the treatments were comparisoned on seedling dry and wet, that carried out in factorial design based in randomized complete block design with four replications. In the ptri dish condition, germination, root and shoot length, seedling wet and dry weight, vigor investigated. The results showed that, the effects of conditions seedling humidity and temperature stress and interactions on the characteristics level one percent were significant. Also the effect of stratification -4 temperature and intractions -4 temperature and dry seed on germination, root and shoot length, seedling wet and dry weight, vigor investigated level one percent were significant. The effect of seedling dry were more pastive than seedling wet on characteristics measure.

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THE PROTECTIVE EFFECT OF IRANIAN PROPOLIS ON LIVER DAMAGE IN STREPTOZOTOCIN - INDUCED DIABETIC RATS

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Propolis is resinous mixture collected by honey bees from plants. It was found to contain many polyphenolic compounds, flavones, flavonones, phenolic acid and esters. [1] It is known that propolis possesses antioxidant activity. Due to biological and pharmacological activities; it has been extensively used in folk medicine. [2] Abnormal liver function is one of the most important consequences of the diabetes mellitus. [3] In this study, the effect of hydro alcoholic extract of Iranian propolis was investigated on the liver functions in streptozotocin - induced diabetic rat. In this experimental study, 40 male Wistar rats weighing 200 ± 20gr were randomly selected and divided into five equal groups: Control, diabetic, diabetic vehicle and two groups propolis-treated diabetic. Using intraperitoneal injection of streptozotocin (STZ) in single dose of 55 mg/kg bwt 3 successive days, diabetes mellitus was induced in rats. Hydroalecolic extracts of Propolis was administered gavages at doses of 100 and 200 mg/kg bwt after diabetes induction for 6 weeks. At the end of experiment, levels of functional liver markers (AST, ALT and ALP) were assessed in the serum. Amount of malondialdehyde (MDA) resulting from lipid peroxidation and total antioxidant capacity (TAC) were also measured in serum. The results indicated a significant increase in the liver enzymes (ALT, AST, ALP) and MDA, significant decrease in TAC in the diabetic group compared with the other groups. Treatments with Propolis in diabetic rats caused a significant decrease in levels of enzymes, compared with the diabetic groups ($P<0.05$). Furthermore, Propolis extract significantly decreased the lipid peroxidation and elevated the levels of TAC in the diabetic rats ($P<0.05$). The results showed that propolis can improve liver damages due to diabetes. These effects may partly be due to their antioxidant ability.

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ANTIINFLAMMATORY EFFECT OF *ALTHEA OFFICINALIS* ROOT EXTRACT IN MALE RACE VISTAR RATS

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Regarding side effects of acute and especially chronic inflammation and incomplete treatment of patients who suffering from these side effects, *malva sylvestris* has potential use as a medicinal plant. This study is to determine Anti-Inflammatory effect of Althea officinalis root extract in male race vistar rats. The analgesic effect of the extract was studied using formalin test on 30 male rats with an average weight of 200-180 g were divided into 5 groups consist of 6 rats in each group. Groups, including were assigned into five groups: negative control morphine, positive control in xylene test (received dexamethason 15 mg/kg), and experimental groups. Experimental groups were intraperitoneally injected by 50, 100 and 200 mg/kg of hydroalcoholic *Althea officinalis* root extract. Data were analyzed using SPSS software using ANOVA and post hoc Tukey test.

Our results indicated that cinnamon extract in high dose (200mg/kg) of xylene test, all doses of extracts significantly inhibited (particularly the extracts at dose of 200 mg/kg) the xylene-induced ear edema. There was no significant difference with positive control group in this dose. but the lower doses (50,100mg/kg) of cinnamon extract show less effect on Inflammatory in xylene Test. Data from this study confirms the analgesic effect of high doses of cinnamon extract on Anti-Inflammatory in xylene Test which may be due for drug produce in the control of officinalis consists of natural and synthetic substances :antocianine and flavenoid. Antocianine protect endothelial cells by inhibiting of nitiite proxy which cause to injury of oxidative acid [2], and flavonoid decrease the production of nitric acid and it control the degranulation of neutrophil which lead to decrease the progreeive enzyme activity of inflammatory, extract their anti-inflammatory effect.

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COMPARISON OF THEHYDROALCOLIC EFFECT OF *ALTHEA OFFICINALIS* ROOT EXTRACT AND DICLOFENACON FORMALIN INDUCED PAIN IN MALE RATS

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One of the important objectives of biological investigations is to find substances which are involved in relieving pain. The application of herbal plants instead of synthetic drugs is increasing in recent years because of their lower side-effects and high varieties of efficient components. This study is to determine the effects of marshmallow root extract on Formalin Induced pain in male rats. The analgesic effect of the extract was studied using formalin test on 30 male rats with an average weight of 200-180 g were divided into 5 groups consist of 6 rats in each group. Ecoction extracts of the leaves with 50, 100, 200 (mg/kg) concentration were prepared and used. The reaction of the extracts against pain were assessed in comparison to a routine non-steroid anti–inflammatory and pain drug (Diclofenac 5 mg/kgw/hp). Indices of sing of pain were licking and foot elevating after formalin 2/5 %(0/02 µl) in the right paw. Our results indicated that cinnamon extract in high dose (200mg/kg) of formalin test. There was no significant difference with positive control group in this dose. but the lower diclofenac on Formalin doses (50,100mg/kg) of cinnamon extract show less effect on pain in Formalin Test. Data from this study confirms the analgesic effect of high doses of cinnamon extract on chronic pain in Formalin Test which may be due for drug produce in the control of *officinalis* consists of natural and synthetic substances: antocianine ,pectin and flavenoid. Pectin presenting In *Althea officinalis* which control the cyclooxygenase enzyme 1 and cyclooxygenase enzyme 2 and stop the synthesis of prostaglandin and thromboxane of arachidonic acid, antocianine which control cyclooxygenase [4] and flavonoid which reduce the floating lipid gathering which is important for signaling pain phenomenon [5] ,extract their painkiller effect.

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PROJECT OF EXPLOITATION OF MEDICINAL PLANTS CASE STUDY: *BERBERIS* SPP SPECIE GHAREH JAGHE AT FAROJ CITY IN NORTH KHORASAN PROVINCE

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Various plant products in traditional societies create a degree of food security that as well as resistant in the face of environmental constraints such as drought, economic uncertainty and market volatility. *Berberis spp mainly was known as a wild* shrubs and a medicinal plant [1]. The study area in the North West of Quchan city part of Bajgiran to settle the Nagorno Jghh QUCHAN, the tax collectors and the distance of 106 kilometers Faroj and 136 kilometers Quchan and geography condition in longitude 58° 14′ 16″ to58 ° 13′38″ And58 ° 17′23″ to 58 ° 17′6″ east and latitude 37 ° 39′53″ to37 ° 38′55″ and37 °39′1″To37 ° 38′4″west was located [2]. Based on the results total habitat useful area is about 36 hectares. The average number of exploitable trees after deducting 10 percent drop, 59 trees per hectar and the amount of product per barberry shrubs were estimated 3 kg. At result total amount of recoverable production average of 6372 kg, at the total useful surface area was estimated. The most appropriate time for removal of barberry is early Mehr to late Aban month. Total collection of gross income equal 254880000 Rials and total collection of payment of project equal 97155520 Rials and total income project after deducting enforcer benefit equal 19431104 Rials , almost was estimated 138293356 Rials.

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EFFECTS OF SILICON IN THE DEFICIENCY CONDITION OF PHOSPHORUS AND BORON ON GROWTH IN *BORAGO OFFICINALIS*

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Silicon is not considered an essential nutrient for plants growth, but it can be absorb in large amounts by plant roots (3). Silicic acid is the form of silicon in soils that is available to plants (1). Silicon is known to have beneficial effects on the growth, development and yield of plants and protection them against biotic and abiotic stresses (2). In this research the effects of different concentrations silicon (0, 1.5 and 2.5 mM as sodium silicat (Na_2O_3 SiO_2)) on growth and biomas of *Borago officinalis* L in the deficiency condition of phosphorus and boron were investigated. The results indicated that concentration of silicon (1.5 mM) stimulated growth and plant biomass as compared with control, however, these factors all decreased at nutrient solution to quarter of phosphorus and boron. It seem that silicon plays an effective role in improve growth plant in the deficiency condition of phosphorus and boron.

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EFFECT OF LASER RADIATION TREATMENTS ON GROWTH, YIELD AND ROSMARINIC ACID CONTENT OF SWEET BASIL

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Sweet basil (*Ocimum basilicum* L., Lamiaceae) is one of the most common herbs that consumed as a seasoning in dry and fresh form. Rosmarinic acid (RA), a phenolic compound, is a well-known constituent of oil in members of the Lamiaceae and Boraginaceae (Hakkimet al. 2007). RA has antioxidant activity and has pharmacological properties such as the ability to reduce pollinosis and allergies (Sanbongi et al. 2004). RA is also insect-repellent and antimicrobial, which protects the plant (Bais et al. 2002). Thus far, RA accumulation has been intensively investigated using root cultures (Tada et al. 1996), additional elicitor preparations, and methyl jasmonate treatment. However, the RA content of basil is lower than that of other Labiatae herbs such as lemon balm and rosemary (Wang et al. 2003). Therefore, it may be possible to increase the RA content of sweet basil by manipulating light conditions. The present work was carried out to evaluate the effect of some helium-neon laser treatments on basil plants. The basil seeds were exposed to helium-neon laser treatments and planted in pots. In most cases, the tallest plants, the highest number of branches per plant, essential oil percentage, RA content and antioxidant activity were obtained from helium-neon (He-Ne) laser exposure treatments in compared to control. Our results showed that using soft laser exposure (He-Ne) could enhance the efficiency of the growth and the active constituents of basil.

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ASSESSING THE RELATIONSHIP BETWEEN ECOLOGICAL FACTORS AND THE DISTRIBUTION AND ABUNDANCE OF MEDICINAL PLANT *ANTHEMIS HUSSKENCHTII* IN ILAM PROVINCE

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Since ancient times, chamomile plant has been introduced as a miraculous plant. This plant is used in traditional medicine to treat diseases including migraines, eczema pain relief, arthritis, bacteria and static, and indigestion. This plant has Anthemine essential oil, tannins, phytosterols and Anthemique Acid. To study the relationship between ecological factors and distribution and abundance of this species (*Anthemis husskenchtii*) and mass production and cultivate due to its situation in the pharmaceutical industry and prevent the extinction of species and destruction of habitat, this study was conducted in Ilam 1390. In this research in addition to prepare distribution map, climatic conditions and canopy cover growth parameters, density and canopy cover percentage were also measured. The species grow appropriately in mountainous areas with an average rainfall of 500 mm, a height of 850 to 1900m, soils with clay loam and light sandy texture containing lime compounds and pH=4-7. The minimum and maximum temperature tolerated by these species 8 to 40.6°C, respectively.

THE EFFECT OF SALINITY STRESS FROM NACL ON SEEDLING GROWTH OF MYTRUS COMMUNIS HERB IN HYDROPONIC IRRIGATION CONDITION AND DETERMINATION ITS SALINITY TOLERANCE THRESHOLD

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Soil and water salinity, as environmental stressors, are factors which reduce water absorption by roots and also cause trouble nutritional and metabolic processes of the plants. An experiment was carried out in a complete randomized design with three replications to investigate the effect of salinity stress from NaCl on seedling growth stage of *Mytrus communis* in hydroponic irrigation condition and its salinity tolerance threshold. For this purpose, germinated seeds were transferred to hydroponic culture and were imposed on them salt concentrations: zero (control), 50, 100, 150 and 200 mM and were calculated 7different parameters of growth. With increasing salinity between control and other four treatments, only shoot length parameter showed significant decrease (at level 0.05 percent) at the highest concentration (200 Mm). Also, shoot/root ratio difference was significant between all treatments and control and between individual treatments. But other treatments such as root shoot, weight of fresh and dry shoot and root, against apply different treatments, showed no significant difference. Totally, *Mytrus communis* herb in the seedling growth stage is rather-resistant to salinity and with increasing salinity (especially quantities 150 mM and under) show no reduction significantly in indicators of growth. Salt tolerance threshold was determined 150 mM in this experiment, so recommend that this plant irrigate in the seedling growth stage with water that its salinity is below 150 mM.

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EVALUATION OF THE EFFECT OF KINDS AND AMOUNTS OF NITROGEN FERTILIZER ON GROWTH AND YIELD COMPONENTS OF *NIGELLA SATIVA*

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Nigella (*Nigella sativa* L.) is an annual herbaceous plant belonging to the Ranuculaceae family. Mature seeds are consumed for edible and medical purposes. This plant indicated capsule fruit with lots of black, edible and aromatic seeds. Nigella seeds are used as carminatives, diuretics, and for delayed menses and lactation, while their oil has protective action against histamine induced bronchospasm, cough and bronchal asthma. Nitrogen is one of most important macro nutrients in plants that its fertilizers affect strikingly in increasing crop productivity. Nitrogen deficiency reduces plants growth and led to dwarf and premature plants that may drastically decrease yield components of crop. In this study the effects of 3 kinds (urea, ammonium nitrate and ammonium sulfate) and amounts (50, 100 and 150 kg /ha) of nitrogen fertilizer on the growth, grain yield and grain yield components of *Nigella sativa* L. were investigated. The experiment was conducted on completely randomized block design with three replications at Gorgan city, Iranian Research Organization for Science and Technology farm. Plants fertilized with urea indicated the highest number of main branches, capsule numbers, and number of seeds in capsule and grain yield in compared to other nitrogen fertilizers. On the contrary, plants fed with ammonium sulfate showed the lowest growth based on above parameters. Fertilizer kind did not affect growth yield parameters such as plant height and weight of 1000 seeds. The growth and yield components of plants significantly increased due to 50 kg /ha fertilizer compared to control (without any fertilizer) and additional increment in the amounts of fertilizers did not significantly change growth and yield components. The results indicated 50 kg /haurea was the best fertilizer treatment for *Nigella sativa* cultivation at Gorgan city climatic condition.

STUDY OF MEDICINAL PLANTS ON THE TREATMENT OF PEPTIC ULCER DISEASE

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Peptic ulcer is one of the most common diseases in the human society. A peptic ulcer, also known as peptic ulcer disease (PUD), is the most common ulcer of an area of the gastrointestinal tract that is usually acidic and thus extremely painful. Ulcers can also be caused or worsened by drugs such as aspirin, ibuprofen, and other NSAIDs. Gastric ulcer is a deep lesion penetrating through theentire thickness of the gastrointestinal mucosa and muscularis mucosa. Ulcer disease whatever in the esophagus, stomach and or in the duodenum is one of the main prevalent stillunresolved medical problems that faces many patientsin a wide rang of age of both sexes worldwide. Helicobacter pylori previously named Campylobacter pyloridis, is a Gram-negative, microaerophilic bacterium found in the stomach. Who found that it was present in patients with chronic gastritis and gastric ulcers. More than 50% of the world's population harbor H. pylori in their upper gastrointestinal tract. The use of herbs to treat disease is almost universal among non-industrialized societies, and is often more affordable than purchasing expensive modern pharmaceuticals. The World Health Organization (WHO) estimates that 80 percent of the population of some Asian and African countries presently use herbal medicine for some aspect of primary health care. Secondary metabolites are present in all higher plants, usually in high structural diversity. Many secondary metabolities such as cyanogenic glycosides, glucosinolates, terpenes, saponins, tannins, anthraquinones, and polyacetylenes. Studied showed that flavonoids main plant extract of Dill (*Anethum graveolens L.*) seed such as (isorhamnetin 3-0-β- D-glucuronide & quercetin 3-0-β-D-glucoronide) for suitable preparation in treatment of gastric ulcer. According to numerous sources, the plant Milfoil (*Achillea millefolium* L.) is used for healing and anti-inflammatory the treatment of indomethacin- induced gastric ulcer. The consumption of plant extract of (*Carum Copticum* L.) seed was effective in treating ulcers and its therapeutic effect is as of the drug known as omeprazole are comparable. The gastro protective effect of tannin extract from Duhat (*Syzygium cumini* skeels) bark on Hcl/ ethanol induced gastric mucosal injury in rat and ethanolic extract of parsley (*petroselium crispum*) had great anti gastric ulcer effect. Studied showed that herbal extracts (*Thymus vulgaris* L.), (*Ferula assa – foetida* L.), (*petroselium crispum*), (*Ocimum sanctum* L.), (*Piper betle* L.), (*Nigella sativa* L.), (*Alhagi pseoudoalhagi*), (*Glycyrrhiza glabra*), (*Falcaria vulgaris*) and (*Curcuma longa* L.) had great anti gastric ulcer effect.

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STUDY OF SEASONAL CHANGES AND LEAF POSITION ON PHENOL AND FLAVONOIDS CONTENT OF NATIVE OLIVE GENOTYPES OF GOLESTAN PROVINCE

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Olive is an ever green tree. Due to its medicinal properties, the leaves and fruit are used in traditional and modern medicine. The main goal of this research is to assess the total amount of phenol and flavonoids of feral olives of two ecotypes of Ouzineh and Livan in Golestan and to compare those amounts between the two seasons of spring and fall. This research was done using randomized block method in three replications. Phenol and flavonoid were extracted by methanol and measured by absorbance at 415 nm. The highest amount of phenol (36.31 mg/100 g) was measured from vegetative leaves in Livan in spring, whereas the lowest amount (12.7 mg/100 g) was recorded from reproductive leaves in Livan in fall. The highest amount of flavonoid (5.99 mg/100 g) was measured from vegetative leaves in Ouzineh in fall, whereas the lowest amount (3.23 mg/100 g) was recorded from reproductive leaves in Ouzineh in spring. ANOVA showed that the group means were significantly different (1%).

DESIGN AND FORMULATION AN ANTI-DANDRUFF DRUG CONTAIN BEET (BETA VULGARIS) EXTRACT BASED ON IRANIAN TRADITIONAL MEDICINE

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Dandruff is the result of scaling the abnormal skin layers. Dander are tiny pieces, that is removed almost dust-like scales, which are usually assembled on the scalp. It can be a localized infection (forehead, temples or neck) or in the spread. Dandruff is caused by many different reasons such as improper nutrition, excitement and anxiety, hot and humid or cold and dry weather, oily skin, excessive sweating, imbalance of hormones, especially androgens, excessive use of hair cosmetics and hair appearing lack of cleanliness. And the cause of dandruff can be fungal microorganisms [3]. Dandruff is searched in Iranian Traditional medicine text books as Nokhale or Hozaz [2]. Based on etiology and review in traditional remedies and by observing the successful results of applying of decoction of this plant in treatment of dandruff [1], we decided to design the formula base on beet extract and do clinical trial studies about it. In comparison with traditional use as decoction, we prepared aqueous extract of beet and designed this formula. Then we reviewed stability and expiry date, microbial control tests and physico-chemical control tests about it. We have standard it base on anthocyanin, too. We are currently doing clinical trial studies [4].

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INVESTIGATION OF PHYTOCHEMICAL SOME OF THE AROMATIC PLANTS (15 SPECIES) FROM LAMIACEAE FAMILY IN PROVINCE OF MAZANDARAN

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The family Lamiaceae has an important role as a source of medicinal and aromatic plants of commercial importance. In this study the species *Teucrium scordium*, *Hymenocrater elegans, Dracocephalum kotschyi, Betonica nivea subsp. Mazandarana,Clinopodium vulgare, Calamintha officinalis ,Stachys pubescens, St.byzanthina. St. inflata, St. lavandulifolia, St. laxa ,Mentha aquatica , , Teucrium chamaedrys , Phlomis cancellate, Salvia multicaulis* were collected from the suburb of, Mazandaran Province, North of Iran and identified by Department of Botany, Research Center of Agriculture and Natural Resources of Mazandaran. The dried aerial parts (100 g) were subjected to hydrodistillation using a Clevenger-type apparatus for 3 h. The oil was dried over anhydrous sodium sulfate and kept at 4°C in a sealed brown vial until required. The oil was submitted to GC and GC-MS analysis. The result showed that the major constituents of the oil were including: *Betonica nivea subsp.mazandarana* (Cis-sesquisabinene hydrate 9.1 %), *Hymenocrater elegans* (Manoyl oxide (22.7%) , *Ballota nigra* (Caryophyllen oxide 7.9).*Teucrium scordium* (Caryophyllene 22.8%), *Mentha aquatic (*1,8-Cineole 27.2%), Menthofuran 23.2%), *Stachys pubescens (*Camphor 5.5%), Borneol (6.3%). *Phlomis cancellata (*Germacrene 25.6%), *Calamintha officinalis (*α-Pinene 7.4%), β-Pinene (16.3%), *p*-Cymene (7.5%), *Prunella vulgaris (*Selin-11-en-4-a-ol 14.9%). *Salvia multicaulis* (α -Pinene 7.5%) , *Ballota nigra (*Caryophyllene oxide 7.9%), *Stachys byzantine (*epi-13-Manoyl oxide (4.5%), *Stachys inflate (*Hexadecanoic acid 9.1%) , *Stachys lavandulifolia (*4-Hydroxy-4-Methyl-2-pentanone 9. %3), *Stachys laxa (*4-Hydroxy-4-Methyl-2-pentanone 12.3%), Germacrene D 17.1%).

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INTRODUCING THE FLORA AND CHOROLOGY MEDICINAL PLANTS IN SUMMER RANGELANDS OF SARI

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These area is situated 125 km to the south of Sari. It covers an area of 2413 hectars. The lowest altitude is 1700m and the highest altitude is 2600m. The aim of this research was to identify the plant species, introducing the flora, determination of life forms and geographical distribution in summer rangelands area. For this purpose, plant samples were collected from different parts of the area during two growing seasons between 2003-2004 years .The biological spectrum of the area was plotted by means of life forms results. The position of summer rangelands area within Irans phytogeography classification was studied based on geographical distribution data and references. From a total of 167 species, 3 fern, 3 gymnosperms, 139 dicotyledones and 33 monocotyledones were identified. Among the 48 families represented in the area, the following had the highest number of species: Asteraceae, Lamiaceae, Rosaceae, Poaceae and Fabaceae. The distribution of 66 species (39.52) are restricted to Irano-Turanian region. Of these, 15 species (8.92) are endemics of Iran. 80 percent of the endemics restricted to Irano-Turanian region and 20 percent restricted to Euro-Siberian region. Hemicrytophytes with 76 species (45.5) are the most frequent life form of the area.

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EFFECT OF DIFFERENT COW MANURE RATES ON QUALITATIVE AND QUANTITATIVE YIELD OF BLACK ZIRA AS A MEDICINAL PLANT

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Black zira is a perennial aromatic and medicinal plant from the Apiaceae family with persistent tuberous roots that its seeds are regarded as stimulants, carminatives and found to be useful in diarrhea and dyspepsia. In order to study the quantitative and qualitative criteria of black zira as an important medicinal plant affected by different rates of cow manure, a field experiment was performed as based on a randomized complete block design with three replications at Agricultural Research Station, College of Agriculture, Ferdowsi University of Mashhad, Iran during growing season of 2012-2013. Treatments were cow manure rates such as zero, 10, 20, 30 and 40 $t.ha^{-1}$. The results indicated that the impact of different cow manure levels was significant ($p \leq 0.01$) on biological, seed and essential oil yield of black zira. The highest seed yield was recorded in 20 $t.ha^{-1}$ cow manure with 62.21 $g.m^{-2}$ and the lowest was for control with 49.43 $g.m^{-2}$. The maximum and the minimum essential oil yield were achieved in 20 $t.ha^{-1}$ and control with 364.14 and 247.68 $g.m^{-2}$, respectively.

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EFFECT OF DIFFERENT SOIL FERTILIZERS ON QUALITATIVE AND QUANTITATIVE YIELD OF MARSHMALLOW AS A MEDICINAL PLANT

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Marshmallow is a traditional medicinal plant that use as a treatment for the irritation of mucous membranes, including use as a gargle for mouth and throat ulcers, and gastric ulcers. In order to evaluate the biological, seed, flower and mucilage yield of marshmallow as a medicinal plant affected by chemical and organic fertilizers, a field experiment was performed as based on a randomized complete block design with three replications at Agricultural Research Station, College of Agriculture, Ferdowsi University of Mashhad, Iran during growing season of 2012-2013. Treatments were cow manure, urban compost, chemical fertilizer (N, P and K) and control. The results showed that the effect of different fertilizers was significant ($p \leq 0.01$) on biological, seed, flower and mucilage yield of marshmallow. The highest flower and seed yield were observed in chemical fertilizer with 122.62 and 72.78 $g.m^{-2}$ and these lowest were in control with 31.11 and 20.69 $g.m^{-2}$, respectively. The maximum and the minimum mucilage yield were recorded in cow manure and control with 82.69 and 4.59 $g.m^{-2}$, respectively.

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DOCUMENTING THE APPLICATION OF DIFFERENT PARTS OF *CHELIDONIUM MAJUS* L. IN TRADITIONAL MEDICINE IN IN VITRO MODEL

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Chelidonium majus L. belongs to Papaveraceae family with locally known as "Mamiran", is one of the most important medicinal plants in north of Iran, Its latex has been used by the rural healers as singular for sedative, liver disorders, gastric ulcer, skin eruptions and oral infections, pain edema and as combination with other plants to treat the burns wound healing [1, 2]. In this study we want to application documentation of different parts *of Chelidonium majus L.* in traditional medicine in in vitro model. The different parts of plant were collected in Alang Dareh in Gorgan province, then dried and extracted by solvent, total phenol, flavonoid and antioxidant activity (Total antioxidant capacity and reducing power assay) were measured. Our result show that the highest contents of secondary metabolites were found in leaf and flower in comparing with other parts of plant, also in antioxidant tests, these parts showed a high potency in scavenging of free radical which may be related to the high amount of flavonoid and phenolic compounds in them. This finding may be compliant with the general believe in application of these parts in traditional medicine in north of Iran.

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SURVEY OF *ONOSMA DICHROANTHUM* BOISS. APPLICATION IN TRADITIONAL MEDICINE IN IN VITRO AND IN VIVO MODELS

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Onosma dichroanthum Boiss. (Boraginaceae) with locally known as" Hava Chobeh", is one of the most important medicinal plants in mountainous areas of Mazandaran province, Its red roots have been used by the rural healers as either singular or combination with other plants as antiseptic and anti-inflammatory to treat the burns wound healing [1, 2]. In this study we want to survey of application of *O. dichroanthum* Boiss. Root in traditional medicine in in vitro and in vivo models. The roots were collected in Kiasar Mountain (1800 m) in Mazandaran province, then dried and extracted by different extracts and total phenol, flavonoid and antioxidant activity were measured, in animal model, burn induced in Wistar rats and subsequently they were divided into five groups were treated with (traditional ointment, silver sulphadiazine, ointment containing of extract 2%). The assessment the burn area healing was carried out within 14 days. In this study demonstrate that the total phenol varied from 4.5 ± 0.7 to 125.6 ± 3.01 mgGAE g -1 in the extracts and flavonoid contents were between 9.8 ± 3 to 41 ± 2.3 mgQUE g-1 . The highest radical scavenging effect was observed in acetone extract of plant with EC50 4.08 mg dry weight in DPPH method. The treated rats with oinment containing acetone extract of plant root increase in the wound region. Acetone extract showed a high potency in scavenging of DPPH free radical which may be related to the high amount of flavonoid and phenolic compounds in this extract. Result of animal model showed that the treated rats with ointment containing acetone extract of *O. Dichroanthum* root in spite of significant increase in the wound region, it did not has any effect on healing, this finding is against with the general believe in traditional medicine in North of Iran.

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EVALUATION OF ANTI-HYPERGLYCEMIC EFFECT OF TINOSPORA *CRISPA* IN TRADITIONAL MEDICINE IN IN VIVO MODEL

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Tinospora crispa belongs to Menispermaceae family, is one of the most important medicinal plants in Malaysia, Its stem has been used by the rural healers for the treatment of fever, soothing agent in prurigo, eczema, impetigo, hypertension, rheumatism, intestinal worms, and skin infections [1,2]. Its aqueous extract was capable of lowering blood sugar and insulin levels. In this study we want to survey of *Tinospora crispa* anti-hyperglycemic effect in traditional medicine in animal model. The stems of *T. crispa* were collected from Herbagus Naturaly Healthier, penang island (Pulau Pinang) Malaysia, the stems powder extracted using different solvent and dried. We selected groups of healthy and Diabetic rats, then we studied hypoglycaemic effect of *T. crispa* stem extracts on healthy rats and anti-hyperglycemic effect in diabetic rats. Our result showed that the highest effect was found in water and methanol in comparing with other extracts and we saw high blood sugar after day eight of experiment, lowest effect was related to petroleum ether extract. Our findings showed this plant was effective on treatment diabetes and it can be replacement appropriate instead of chemical compounds in medical science. This results may be compliant with the general believe in application of *T. crispa* in traditional medicine in Malaysia. We recommend to research in other aspect on *T. crispa* in future studies.

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ALLELOPATHIC EFFECTS OF FIVE WEED SPECIES ON GERMINATION CHARACTERISTICS OF BLACK CUMIN (*NIGELLA SATIVA* L.)

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The allelopathic effects of Redroot pigweed, Lambs quarters, Bermuda grass, Nut grass and Black nightshade were investigated on seed germination characteristics of Black cumin (*Nigella sativa* L) in a growth chamber experiment in 2010. Experimental treatments were extracted by distillation from dried leaves of five species of weeds that applied by four concentrations included: zero (distilled water), 2.5, 5.0 and 7.5 volume percent (w / v) was applied on the seeds of Marigold plants. Experimental design was factorial experiment in a completely randomized design with four replications. The aqueous extracts applied to seed, significantly inhibited seed germination, germination rate, radicle and hypocotyl length of Black cumin with increasing of extract concentration. Bermuda grass extract showed the most inhibition effect on seed germination of Black cumin. The inhibitory effect of, Nut grass and Black nightshade extracts was less than Bermuda grass. Bermuda grass and Nut grass extract showed the most negative effect on germination rate of Black cumin. All weeds extracts significantly decreased the length of Black cumin radicle and hypocotyl. These results suggest that extracts from shoot of weeds had potentially allelopathic effect. However the activity differed depending on weed species and extract concentration.

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THE EFFECTS OF IRRIGATION INTERVALS AND FOLIAR APPLICATION OF MICRONUTRIENTS ON GROWTH AND FLOWER YIELD OF MARIGOLD (*CALENDULA OFFICINALIS*)

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In order to survey the effects of Irrigation intervals and foliar application of micronutrients on vegetative growth and flower yield of Marigold (*Calendula officinalis* L.), an experimental design was conducted in research farm of North khorasan agricultural and natural resources research center in Bojnourd in 2010. Experimental design was a split plot based on randomized complete block design with three replications. The main factors were irrigation intervals in three levels (I_1=7, I_2=14, I_3=21 days) and the sub factors were foliar application micronutrients included M_1 = control (no foliar application), M_2 = foliar application with the Zinc (concentration of two parts per thousand), M_3 = foliar application with the Boron (concentration of two parts per thousand), M_4 = foliar application with the Iron (concentration of three parts per thousand) and M_5 = foliar application with the mixture of above elements. Experiment results showed that the impact of irrigation intervals on plant height, leaf area index (LAI), number of flower per plant, biological yield, flower yield and flower harvest index were significant and decreased with increasing irrigation intervals. The effects of foliar application of micronutrients on plant height, number of flower per plant, biological yield, flowers yield and flower harvest index were significant but on leaf area index was not significant. Foliar application of micronutrients caused increased plant growth characteristics and flowers yield. Foliar application of micronutrient and irrigation interaction on plant height, leaf area index and flower yield were significant but on flower per plant, biological yield and flower harvest index were not significant Seven days irrigation intervals and foliar application the mixture of micronutrients treatment caused the most flower yield production in Marigold.

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THE EFFECTS OF PLANTING DENSITY AND NITROGEN FERTILIZER APPLICATION ON FLOWER PRODUCTION AND CHANGE IN THE AMOUNT OF ACTIVE INGREDIENTS DURING FLOERRING SEASON IN MARIGOLD

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In order to investigate the effects of planting density and nitrogen fertilizer application on flower production and change in the amount of active ingredients during flowering season in Marigold, a field study was conducted in Mashhad region (36, 10° N,59.33° E and 1300 m altitude) of Iran. The levels of nitrogen fertilizer were 0, 50, 100 and 150 kg ha^{-1} and levels of density were 20, 40, 60 and 80 plant m^{-2}. The experimental design was a split plot (split-plot) based on randomized complete block design with three replications. To evaluate the changes in the amount of active ingredients during flowering season and total flower production per unit area Sampling rate up to produce a weekly or biweekly (depending on flower production rate) was done. In the laboratory, the samples dried in a ventilated oven at 40° C for 72 h then were weighed. The essential oils were extracted by steam distillation using Clevenger and the extracts were extracted with 70% ethanol. Experimental results showed that the levels of nitrogen treatments and the effect of density on flower production per unit area, there was a statistically significant difference. The most amount of dried Flowers (1310.3 $kg.ha^{-1}$) obtained in the treatment of 150 kg nitrogen per hectare. At densities of 60 and 80 plants per square meter, dry flower yield were 866.5 and 981.2 $kg.ha^{-1}$ respectively. The results showed the production of extracts and essential oils during the flowering season were ranged. The higher amount of essential oil and extract obtained at early flowering season and in the mid to late flowering, its value has declined over.

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CHEMOPREVETTIVE EFFECTS OF FERULA *ASSA-FOETIDA* L. HYDROALCOHOLIC EXTRA ON RAT COLON CARCINOGENESIS INDUCED BY DIMETHYLHYDRAZIN

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Colorectal cancer is one of the most important and most common fatal types of cancer in the world. Identifying new agents which individually or in combination with other agents induce apoptosis in tumor cells is surely of great significance in treatment of colon cancer [6]. The application of herbal plants instead of synthetic drugs is increasing in recent years because of their lower side-effects and high varieties of efficient components [1]. *Ferula assa - foetida* L., commonly known as Asafetida is an herbaceous, monocarpic, perennial medicinal plant of the Apiaceae family [3]. This study is to determine chemoprevettive effects of *Ferula assa-foetida* hydroalcoholic extra on rat colon carcinogenesis induced by dimethylhydrazin In this project the experiment rats were divided into five groups, group Control, group Control DMH (30 mg/kg Hypodermic) Prevention and self-contained groups extract at a dose of 6/5 mg / kg and 12/5mg / kg and 25 mg / kg (by ip) which extracts into the DMH by Hypodermic received divided. In order to induce colon cancer, dose 20 mg/ kg bw of intraperitoneally for 5 weeks, once a week 1 is Bartz Ryq. After 16 weeks of treatment, rats were killed and the experiment, plasma and tissues were collected. The data showed that the number of (ACF) aberrant crypt foci and aberrant crypt (AC) induced by DMH significantly inhibited in colon of rats treated with *Ferula assa-foetida* L hydroalcoholic extract in diet. The results of this project showed that acetone extract is probably due to the anti-cancer properties The important Vjvdtrkybat such as resins, pinene is more and terpenoids from This leads to dimethyl hydrazine induced Drrt has been treated. Mjvd resin in acetone extracts with enzymes Mharfalyt Mtalvprvtynaz [4] More Trpnvyydhay Bvsvlya serrata, which is under the more Pnvyyd Vmhar growth of apoptotic cells HL-60 [5] Pinene and beta-pinene under the Lha treat cancer by inhibiting the growth of cells involved [2].

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MORPHOMETRIC STUDY ON FOUR POPULATIONS OF SOME *VIOLA* SP. NATIVE TO IRAN

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Viola L., is one of the most important genus in field of ornamental and medicinal plants belongs to the Violaceae family which containing more than 500 taxa at the specific or subspecific level [1]. There are 19 endemic species of this plant in Iran; however, about 30 known species grow wild in northern and northwestern regions [2].In this study, 30 morphological characters were measured on 4 wild populations of *Viola spp* collected from north and western areas of Iran. Analysis of variance showed traits of these populations are significantly different, indicating different populations in terms of traits. Correlation analysis show some positive and negative correlations between characters such as positive correlation between lamina sinus angle and colors corolla(r=0.854), the lamina dentations has positive correlation with posterior petal length(r=0.736) too, and lamina sinus depth is negative correlated with stipule length(r=0.847). So that the lamina sinus angle increases colors corolla become pale and with increase the lamina dentations posterior petal length reduced, while some traits such as lamina sinus depth and stipule length are positively correlated. Factors analysis of the characteristics set the traits to six operating groups that justify 89.62% of total variance. Four populations in the were divided in to two groups, the first cluster included populations with large palepurple flowers and long sharp apex leaves with longstolons; second group includes one population with short stolons, small dark purple flowers and broad leaves and short stipule with the relatively high number of fimbriae along both stipule margins.

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APOTENTIALITY OF *GLYCYRRHIZA GLABRA* EXTRACT ON HAIR LOSS TREATMENT VIA INHIBITION OF 5- A-REDUCTASE ACTIVITY

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Glycyrrhiza glabra is known to have hair growth promoting property in traditional medicine. Glycyrrhizic Acid is the major bioactive triterpene glycoside of licorice root extracts possessing anti-inflammatory and anti-oxidant effects. Androgenic alopecia the most common type of hair loss represents a quantitative phenotype with an underlying genetic nature. Reduction of the cellular hair matrix volume as well as shortening of the anagen phase is occurred in this type of hair loss pattern. The aim of this research was to determine the anti inflammatory and 5-α-reductase inhibitory effects of anti hair loss lotion with formulation containing *Glycyrrhza glabra* extract on hair loss treatment. 60 patients suffering hair loss were chosen for this experiment. Patients were divided into 3 groups, Placebo group, Minoxidil 5% treated group and anti hair loss lotion treated group. Each group received the treatments twice daily for a period of four months. The hair pull test was performed for determining ongoing activity and severity of any kind of hair loss. The pull test should be performed 5 days after washing hair because it can be normally negative on the day of application as all the telogen hairs rinsed away. For determination of 5-α-reductase activity Rabbit Steroid 5-α-reductase, SRD5a1 ELISA kit was used.

The results of pull test indicated that less than 10% of grasped hairs were pulled away from the scalp. This constituted a negative pull test and did not imply hair loss. Compared to anti hair loss lotion treated group, the placebo group had more than 10% of grasped hairs or six hairs, which constituted a positive pull test. By the increasing of herbal extract the inhibition of 5 Alpha Reductase was increased compared to placebo group ($P<0.05$), although this increasing was time dependent. Licorice extract has a very powerful effect on inhibition of 5-α-reductase, which is closely linked to intense hair loss. Thus, by using this natural remedy in anti hair loss formulations it is possible to slow down the conversion of testosterone to DHT. This way improves the condition of your hair growth and preventing hair loss. This article was supported by Cepigène brand.

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THE EFFECT OF FORMULATION CONTAINING *ROSMARINUS OFFICINALIS* ON HAIR REGROWTH COMPARED TO MINOXIDIL 5% APPLICATION

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Rosemary (*Rosmarinous officinalis L.*) has important medicinal properties in cosmetics since ancient times such as anti inflammation, antioxidative effects. It is the most effective and natural solution for hair loss treatment. One of the anti hair loss lotion active ingredients is rosemary oil. Over production of inflammatory factors and radicals are the main causes of hair loss. The aim of this study was to determine the effect of formulation containing rosemary in anti hair loss lotion on hair growth promoting compared with other anti hair loss medicines. 60 volunteers suffering androgenic alopecia were participated in the prospective study. Patients were devided in to 3 groups, Placebo group, Minoxidil 5% treated group and anti hair loss lotion treated group. Each group received the treatments twice daily for a period of four months. A clinical study was done using a professional Trichoscan for the measurement of human hair after 4 months treatment. Following daily topical application of anti hair loss lotion on the scalp, clinical efficacy was obtained using Trichoscan for the measurement of anagen and telogen hair density. The hair follicle growth was stimulated 74% in comparison with Minoxidil (46%) after 8 weeks of treatment. Our Results elucidated by colored photographs before and after treatment and revealed cessation of hair loss. Results showed that those participants who had used formulation of rosemary in anti hair loss lotion were meaningfully satisfied about their hair regrowth.
These pharmaceutical achievements concluded that anti hair loss lotion can provide the essential nutrients for matrix and cortex cells which lead to hair regrowth. At the end of treatment the hormones profile was not affected so this lotion has no side effects on hormones. Rosemary essential oil stimulates circulation to the scalp and destroys any bacteria that could clog hair follicles. Rosmarinic acid as the main ingredient of rosemary can have useful effects on hair loss treatment by regulation of inflammatory factors and inhibition of free radicals. This article was supported by Cepigène brand.

EFFECT OF BRASSINOSTEROID (24-EPI-BRASSINOLIDE) ON ANTIOXIDANT CAPACITY AND FLAVONOID COMPOUNDS OF POT MARIGOLDS IN GREENHOUSE CONDITIONS

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Brassinosteroids (BR) as steroidal hormones have important roles in different physiological and morphological traits of plants [2]. This compounds are stimulate growth and cell division [1,3]. This study was conducted to evaluate the effects of different concentrations of 24-epibrassinolide (0, 0.5 and 1 µM) on antioxidant capacity, flavonoid compounds, hydrogen peroxidase and total phenol content of pot marigold based on the completely randomized design with three replications in soilless culture conditions. Results showed the significant effect on hydrogen peroxide, total phenol and flavonoid content; so that, in compared with control plants (without BR treatment), the highest total phenol and flavonoid content were observed in 0.5 and 1 µM concentrations, respectively. Also, foliar application of 24-epibrassinolide at 1 µM concentration led to remarkable increasing of flavonoids compounds such as α-Cadinol, δ-Cadinene and σ-Cadinene, which were about 18, 4 and 2.5 times higher than control plants. The results of the present study led to conclusion that BRs as steroidal phyto-hormones play crucial roles in production of plant secondary metabolites.

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EFFECT OF ELECTRICAL CONDUCTIVITIES OF NUTRIENT SOLUTION ON PHOTOSYNTHETIC CAPACITY AND GROWTH PARAMETERS OF POT MARIGOLD IN HYDROPONIC SYSTEM

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Determination of electrical conductivity (EC) of the nutrition solutions which caused by macro and micronutrients is the main nutritional factor in production of medicinal plants, especially in soilless culture systems [1, 2]. Therefore, this experiment was conducted to assessment the effects of different EC levels of the nutrition solutions on growth and physiological traits of pot marigold. The experimental design was a completely randomized design with three EC levels (1.5, 3 and 4.5 dSm^{-1}) and four replicates. Based on the results, EC levels showed significantly effects on root fresh and dry weight, root bulk, leaf number, flower number, flower diameter and total chlorophyll content. The optimum growth and physiological reaction were EC dependent; so that the maximum root fresh and dry weight, root bulk, leaf number and total chlorophyll content were observed at EC 1.5 dSm^{-1}; while the highest flower number and diameter were observed in EC 3 dSm^{-1}. These results suggest that appropriate management of electrical conductivity of the nutrition solution is essential for production of higher yield and productivity.

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PHYTOCHEMICAL ANALYSIS OF THE AERIAL PARTS OF *ARTEMISIA SPLENDENS* GROWING IN IRAN

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Plants of genus *Artemisia* (family Asteraceae, tribe Anthemidae) are important medicinal plants which are receiving phytochemical attention due to chemical and biological diversities. Extensive studies of the chemical components of *Artemisia* have proven that this genus is rich in coumarins, flavonoids, phenylpropanoids, acetylenes and terpenoids. *Artemisia splendens*, known as Asia Minor wormwood which only two phytochemical studies have been carried out. These studies are concerned with the elucidation of terpenoids and also on its essential oil contents. In the present study, the components of the methanol extract of *A. splendens* were analyzed and identified. The aerial parts of *A. splendens* were collected from Kaleibar (gharedagh) at Eastern Azerbaijan province (Iran) during June 2010. Air-dried and ground aerial parts of *A. splendens* (100g) were individually Soxhlet-extracted successively, with *n*-hexane, dichloromethane (DCM) and methanol (MeOH) (1.1 L each). All these extracts were separately concentrated using a rotary evaporator at a maximum temperature of 45 °. Methanol extract (2 g) was fractionated into 6 fraction by passing the extract through a C_{18} SEP-PAK cartridges (10 g, Waters, Ireland), using a step gradient of methanol – water mixture as eluent. The structure of the purified compounds were elucidated by direct comparison of their UV, HR-ESI-MS, ^{1}H and ^{13}C NMR data with literature data and by comprehensive 1D and 2D NMR analyses including COSY, HMQC and HMBC.Phytochemical study of methanolic extract of *A. splendens* yielded five melilotoside derivatives, seven flavonoids, two amino acids, two sugars and a new oxazolan-2-one derivative. Presences of flavonoids derivatives seems to be an important feature in *Artemisia* species and the presence of melilotoside derivatives is reported from this genus for the first time.

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EFFECT OF ALUMINUM OXIDE ON SULFORAPHANE CONTENT IN *LEPIDIUM DRABA* SEEDLINGS

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Glucosinolates are a group of secondary metabolites containing sulfur and nitrogen which can be abundantly found in brassicaceae family. Until now, more than 100 kinds of these phytochemical have been identified. It is believed that these metabolites have defensive role in plant. This compound is accumulated in plant cell vacuoles and any damage leads to release them and hydrolyzed after exposed to myrosinase enzyme. Sulforaphane is one of the most important isothiyocynate which can be produced after glucoraphanin hydrolysis via myrosinase activity. It is an interesting and amazing chemotraputic agent for researchers because of its chemoprotective against several cancers. *Lepidium draba* is a species of Brassicaceae. In this research, 7 days old *Lepidium draba* seedlings were treated with concentrations 0, 1, 5, 10, 20, and 40 mg/L of aluminum oxide (alumina) for 32 hours to investigate the induction effect exerted by this combination on sulforaphane (SFN) production level. Our results indicated that alumina has positive effect on SFN content, and the optimal concentration was 10mg/L of this matter which thereafter decrease by the increase alumina. It seems that Al stress leads to synthesis of glucoraphanin as a defensive agent against abiotic stresses and subsequently the SFN content increased.

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EFFECTS OF ACTIVATED CARBON ON FLAVONOIDAND CARTENOID CONTENTS IN *LEPIDIUM DRABA* SEEDLINGS

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Flavonoids and carotenoids are nonenzymatic antioxidant metabolites. Antioxidants are compounds that effectively inhibit the oxidation of macromolecules including lipids, nucleic acids and proteins. Flavonoids are the most common of plant secondary metabolites that have various pharmaceutical properties including anti-oxidants, anti-inflammatory, antimicrobial, anti-bacterial and antiallergenic. Carotenoids are a group of plant metabolites that play an important role in preventing human diseases such as cardio vascular diseases, cancer, osteoporosis and they are also important dietary sources of vitamin A [1,2]. In this research, flavonoid and carotenoid contents were investigated in *lepidium draba* seedlings which grown for 7 days in presence of different concentration (0, 5, 25, 50, 100, 200,400 mg/L) of activated carbon. *L. draba*, a perennial weed plant is a member of the Brassicaceae family [3]. Results showed while the flavonoids content slightly decrease the contents of carotenoid drastically declined as compared to that of the control. The negative and positive effects of this matter have been previously reported on growth of several plant species. These observations may be related to induce of others antioxidant system including enzymatic antioxidant system and/or nonenzymatic antioxidant including glucosinolats system. Overall, it may be purposed, in this condition activated carbon is not suitable stimulator for inducing of these valuable metabolites.

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COMPARATIVE EVALUATION OF CYTOTOXIC AND APOPTOGENIC EFFECTS OF THE COUMARINES ISOLATED FROM THE ROOTS OF *PRANGOS FERULEA* (L) LINDLE ON HUMAN CANCER CELL LINES: OSTHOLE INDUCES APOPTOSIS IN P53-DEFICIENT H1299

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Natural products are playing a rapidly increasing role in the lead-finding of candidates for the development of chemotherapeutic agents. Coumarins comprise such a group of natural compounds found in a variety of plant sources [1-2]. In this study, we evaluated cytotoxic potential of coumarines isolated from *Prangos ferulacea* (L.) Lindl against PC3, SKNMC and H1299(p53 null) human carcinoma cell lines. Osthole proved to be an outstanding potent cytotoxic agent especially against PC3 cells. Isoimperatorin possessed moderate inhibitory effect against SKNMC and PC3 cell lines . Oxypeucedanin and braylin did not display any cytotoxic activity on any of the cell lines. In the next set of experiments, the apoptotic potentials of the osthole and isoimperatprin were investigated. Induction of apoptosis by isoimperatorin was accompanied by increase in activation of caspase-3, 8 and 9 in SKNMC cells and caspase 3 and 9 in PC3 cells. Moreover, isoimperatorin induced apoptosis by up regulating Bax and Smac/DIABLO genes in PC3 and SKNMC cells. Osthole induced apoptosis by down-regulating anti apoptotic Bcl-2 in only PC3 cells and upregulating – proapototic genes Bax and Smac/DIABLO in PC3, SKNMC and H1299 cells. The effects of osthole on H1299 cells are important as regards the loss of p53 has been associated with poor clinical prognosis in cancer treatment.

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PHYTOCHEMICAL STUDY OF ARIAL PARTS OF *ARTEMISIA SPICIGERA* C. KOCH

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The genus Artemisia is one of the large and wide spread genera in the world. 34 species of *Artemisia* has been found in different parts of Iran (1) and Wide range of secondary metabolites with biological activities has been isolated from different species of that. Since *Artemisia* species are source of phenolic compounds (2) and none of them has been reported from *A. spicigera*, this study aimed to isolate and identify phenolic secondary metabolites from this plant. Methanolic extract, obtained by soxhlet-extracting of air dried and ground arial parts of *A. spicigera*, was fractionated by the aid of solid phase extraction (sep-pak) using a step gradient of methanol-water mixture. For isolation of phenolic compounds, 20 and 40 and 60% methanol-water fractions were subjected to repeated preparative reversed phase HPLC. Mobile phase consisted of methanol and water. Photodiode array (PDA) detector was used to monitor the chromatograms. The structures of the compounds were determined by spectroscopic means including UV, ^{1}HNMR and ^{13}CNMR. Phytochemical study of sep-pak fractions, afforded one acetophenon (2-hydroxy- 4, 6-dimethoxyacetophenone) from 20% fraction and 4 flavonoids which were 5-methoxy-7-O-beta-D-glucoside loteolin, loteolin and chrysoeriol 7-*O*-beta-D-glucoside from 40% and 5-methoxy loteolin from 60% fractions. It can be concluded that *A. spicigera* like other studied species of *Artemisia* contains phenolic compounds. Further investigations will reveal other phenolic compounds in methanolic extract of this plant.

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HEAT-INDUCED GELS OF WHEY PROTEIN ISOLATE AND WILD SAGE SEED GUM MIXTURES: EFFECT OF PH AND GUM CONCENTRATION

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Mucilaginous gum from wild sage seed (*Salvia macrosiphon*), as a new food hydrocolloid, shows promising applications in the food industry. It has located in the seed coat and can be easily extracted by soaking the seeds in water at any temperature. At present study, mechanical and microstructural properties of heat–induced gels (85°C/30 min) of 6% (w/w) whey protein isolate (WPI) samples mixed with different wild sage seed gum (WSSG) concentrations (0, 0.1, 0.5 and 1% (w/w)) were investigated at three pHs (4.5, 5.8, 6.7), constant ionic strength (50 mM NaCl) at 20°C. Heat–induced gels of pure WPI at pH6.7 was fine–stranded with translucent appearance, while at near the isoelectric point (pHs of 4.5 and 5.8) white opaque particulate gels were formed. The appearance of mixed gels was changed into more turbid state with increasing the concentration of WSSG. Visually, none of mixed gels prepared at different pHs showed macroscopic phase separation. Apparently, the lowest water exudation was observed at pH6.7. Fracture properties of gels showed that the gel strength as compared to pure WPI gel was significantly ($P<0.05$) decreased when the concentration of WSSG increased. Maximum value of stress at fracture (1.512 kPa) was obtained for pure WPI gel at pH5.8. For texture property of fracture strain there was no specific trend amongst all samples, suggesting that there is no relationship between the type of structure formed and its deformability behavior. Micrographs of mixed gels revealed the synergistic interactions of protein–polysaccharide with addition of wild sage seed gum such that in obtained mixed gels the relationship between whey protein clusters or strands was weakened with spun fibril strands of the gum. Micrographs of pure WPI gels at pHs of 4.5 and 5.8 showed less continuous network structure with more pores relative to gel formed at pH6.7. The presence of wild sage seed gum in the mixed gels promoted the size of protein aggregates and denser gel networks with more heterogeneous microstructures that had smaller pores were formed.

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DETERMINATION OF CHICORIC ACID AND METALS CONCENTRATIONS IN *ECHINACEA PURPUREA* ROOT AND EXTRACT

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Echinacea purpurea is well established tradition of medicinal use in North America, Europe and Australia. In modern cultures, *E. purpurea* is used for medicinal purposes, in treating acute upper respiratory infections, urinary tract infections, burns and disorders such as viral infections, cutaneous affections and chronic disease due to a deficiency of immunological responses [1]. Chemical compounds such as carbohydrates, fatty acids, derivatives of caffeic and tartaric acids, flavonoids, isobutylamides, polysaccharides, poliacetylenes and essential oils were detected in fresh raw materials. Chicoric and caftaric acids are the main phenolic compound (marker) in *Echinacea purpurea* [2]. Effectiveness of Echinacea extract is highly dependent on the species of Echinacea, part of the plant used (root, stem or leaves), the age of the plant, its location and the method of extraction [3]. In this work, the concentration of chicoric acid from *E.purpurea* root has been investigated by ultrasonic extraction method and the results were compared with maceration method. The effects of experimental parameters on extraction of chicoric acid were studied. The concentrations of chicoric acid as marker component in extracts were determined by High Performance liquid Chromatography (HPLC). The experimental parameters were; solvent types, extraction temperature, solid to solvent ratio and extraction time. The optimum conditions were 50:50 aqueous- ethanol solution as solvent, 30 min sonication time, 10:1 solvent to solute ratio and the temprature of 60˚C. The contents of cichoric acid in roots were analyzed and their concentrations were 8.7 mg/g. The extracts and root samples were analyzed by ICP-AES for metals contents. Root sample treated with 4 acid digestion include HNO_3, H_2SO_4, HF and HCl solution with composition of 5:4:2:5 respectively but extracts analyzed directly without digestion. The results showed the concentration of some elements in root and extract was significant (Al, Ca, Cu, Fe, K, Mg, Mn, Na, P, Zn) and other elements quantities were less than LOD.

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INHIBITORY EFFECTS OF *FICUS CARICA* LINN. LEAVES EXTRACT ON THE VASCULAR ENDOTHELIAL GROWTH FACTOR (VEGF) AND ANGIOGENESIS IN THE RAT AIR POUCH MODEL OF INFLAMMATION

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Angiogenesis plays a major role not only in cancer but also in inflammatory diseases such as rheumatoid arthritis. Despite reports indicating beneficial effects of *Ficus carica* leave in several disorders, its anti-angiogenic effect has not yet been studied. In this study, anti-angiogenic and VEGF inhibitory properties of methanolic extract of *Ficus carica* leaves in a rat model for rheumatoid arthritis, namely air pouch model of inflammation was evaluated [1-3]. The methanolic extract of *Ficus Carica Linn*. Leaves were prepared. Male Wistar rats were anesthetized; 20 ml and 10 ml of sterile air were injected subcutaneously on the back on day 0 and day 3, respectively. On day 6, inflammation was induced by injection of carrageenan into pouches. The extract (5, 25 and 50 mg/rat) was administered intra pouch at the same time as the carrageenan and then for 2 consecutive days. After 72 hr. pouches were opened, its fluid was collected in order to determine VEGF level. The granulation tissues formed were dissected, washed in PBS and cut into small pieces before being homogenized in Drabkin reagent. The tissue homogenates were centrifuged and the supernatants were filtered through a 0.22 µm filter. The hemoglobin concentration in the supernatant was then determined spectrophotometrically using a hemoglobin assay kit. The methanolic extract of *Ficus Carica* Leaves with doses of 25 and 50 mg/rat significantly decreased the production of VEGF in the pouch fluid. In addition, there was a significant reduction in the hemoglobin content in extract-treated rats versus control value by all three doses of *Ficus Carica* Leaves extract dose dependently. The observed VEGF inhibitory property of *Ficus Carica Linn*. Leaves may be responsible for its beneficial anti-angiogenic effect.

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EVALUATION OF THE ANTIFUNGAL ACTIVITY OF AMARYLLIDACEAE TO INHIBIT THE GROWTH OF *CANDIDA ALBICANS*

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Recently, the incidence of systemic candidiasis which is caused by *Candida albicans* has increased. Usually, for treatment of systemic fungal infections, azoles such as fluconazole are used, but one of the biggest problems faced in clinical practice is the emergence of resistance due to mutation for most of these azole drugs currently used. One of the best strategies to decrease the resistance phenomenon is finding the new derivatives originated from plants instead of chemical antifungals. In the present study the potential of Garlic, Shallot and Onion to inhibit the growth of *Candida albicans* was evaluated using determination of inhibition zone (Disk Diffusion Agar test) and relative MIC (Broth Microdilution test). Time kill study was also performed to indicate the rate of anti-*Candida* activity of plant-extracts tested in different time intervals. The favorable results shown the significant potential of those plants to inhibit *Candida albicans* in vitro which is need further investigations to find the main mechanisms of these strong potential.

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EFFECTS OF MYCORRHIZA, PHOSPHATE BIOFERTILIZER AND MANURE APPLICATION ON CONCENTRATION OF P IN SEED, PHOTOSYNTHETIC PIGMENTS AND FLOWERIN SHOOT YIELD ON CORIANDER (*CORIANDER SATIVUM*)

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In order to invetigation the effects of mycorrhizal fungi, phosphatic biofertilizer and manure application on concentration of P in seed, leaf total chlorophyll and leaf total carotenoid and flowering shoot yield of coriander (*Coriander sativum*), an experiment was conducted at khoramabad in 2013. the factors were mycorrhizal inoculation (inoculated and non- inoculated), phosphatic biofertilizer (0, 35 and 70 kg ha^{-1}) and manure (0, 10 and 20 ton ha^{-1}). The experiment design was factorial experiment in the base of randomized complete blocks design with eighteen treatments and three replications. Mean comparison was carried out using tukey multiple range test (at 5% level). These treatments together with a chemical fertilizer control treatment (NPK: 90, 60 and 90 Kg ha^{-1}) were also evaluated using a randomized complete blocks design with nineteen treatments and three replications. Results showed that the highest concentration of P in seed, leaf total chlorophyll and leaf total carotenoid and flowering shoot yield were obtained between factors with mycorrhiza treatment. Phosphate biofertilizer also showed significant effect on these traits (α=1%). Mean comparison showed that the highest concentration of P in seed (3.61%), leaf total chlorophyll (0.17 $\mu g\ ml^{-1}$) and leaf total carotenoid (2.39 $\mu g\ ml^{-1}$) flowering shoot yield (1902.67 Kg ha^{-1}) were obtained with mycorrhiza inoculums and application of 70 kg ha^{-1} Phosphate biofertilizer of and application of 20 ton ha^{-1} manure. There were positive and synergistic interactions between mycorrhizal inoculation×Phosphate biofertilizer on flowering shoot yield. Finding many researchers confirm that present Phosphate biofertilizera and manure in steably agriculture different systems produced specially the effects progression among their.

IMPACT OF *CALENDULA OFFICINALIS* SEED EXTRACT ON *TRIALEURODES VAPORARIORUM* PUPARIUM AND ITS PARASITOID *ENCARSIA FORMOSA*

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Trialeurodes vaporariorum (Westwood) is a polyphagous insect pest responsible for high economic damages in many crops [1]. In addition to environmental and health problems; using chemical pesticides as the control agent of the whiteflies cause resistance in this pest. Plant may provide an alternative to currently used pesticides for the control of plant pests, as they constitute a rich source of bioactive chemicals [2]. *Encarsia formosa* Gahan (Hymenoptera: Aphelinidae) is considered important natural enemies to be used as biological control agents against *T. vaporariorum* [3]. The mortality effect of ethanolic seed extract of *Calendula officinalis* on puparium stage of *T. vaporariorum* and *E. formosa* were tested in laboratory condition. The leaf discs of bean plants with maximal amount of pupae (*ca.* 90%) and the leaves with the parasitized puparium were placed individually in the round plastic Petri dishes (5 cm diameter) that filled with agar gel (0.7%). The leaves were separately sprayed with the plant derived chemical (at 60 $mg.mL^{-1}$). In the control treatments, ethanol (96%) was used. The results showed that the mortality of whitefly's puparium was significantly increased after exposed with *C. officinalis* (90.00%) as compared with control treatment ($P<0.0001$). Also, the results revealed that the mortality of wasp's pupae was low (36.74%) but there is a significant difference between control and treatment ($P<0.0001$). Nevertheless, our research revealed that this plant in the spraying bioassay may successfully control this aggressive pest and this plant derived chemical is an approximately safe agent for this natural enemy.

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INFLUENCE OF THE ETHANOLIC PLANT EXTRACT OF *ANETHUM GRAVEOLENS* L. ON THE MORTALITY OF *APHIS FABAE* SCOPOLI

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The black bean aphid, *Aphis fabae* Scopoli (Hemiptera: Aphididae), is one of the most important pests of several cultivated crops throughout the world [1]. The widespread use of synthetic pesticides has led to several adverse effects such as food, soil, ground water, and air contamination with toxic residues, which have side effects on non-target insects and other organisms [2]. Botanical pesticides are generally regarded as more eco- friendly than synthetic pesticides. Botanicals are characterized by low mammalian toxicity, reduced on non target organisms and short persistence in the environment [3]. In this study, the ethanolic plant extract of *Anethum graveolens* L. (dill) with 50 $\mu l.mL^{-1}$ concentration, were sprayed on the broad bean leaf discs with the black bean aphid (1- 2 or 5- 6 days old) and control leaf discs of broad bean were treated with ethanol (96%) in the laboratory conditions. Mortality percentage of *Aphis fabae* was recorded after 24 and 48 hours. The results indicated that the ethanolic extract of dill was very toxic for these aphids. The most mortality percentage of the bio- test was calculated in 1- 2 days-old treatments, after 48 hours (100%), also the mortality percentage of these aphids (1-2 days-old) was 93.33% after 24 hours. The least mortality (%) was recorded in aphids of 5- 6 days-old treatment after 24 hours (34.44%), and after 48 hours, mortality (%) of this bio- test was 83.89%.

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EFFECTS OF DIFFERENT TREATMENTS ON SEED DORMANCY AND GERMINATION OF *ALLIUM ALTISSIMUM* REGEL.

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In this study different experiments were conducted in laboratory conditions to determine the effects of different treatments on seed dormancy of *A. Altissimum* Regel when produced in years of 2002, 2004, 2006 and 2007. In the first experiment potassium nitrate (KNO_3, 2g/litre), GA_3 (150mg/litre) and scarification were applied. In the second experiment effect of pre-chilling (5°C) with four levels (0, 30, 60 and 90 days), effect of scarification with soft sand paper (P360) and rough sand paper (P100) at three levels (5, 10 and 15times) were examined only on the seeds collected in 2006. A factorial experiment based on completely randomized design with four replicates of 25 seeds was used. Results of experiments showed that KNO_3 and GA_3 had no effect on the seed germination of *A. altissimum* Regel., while scarification resulted 11, 56, 64 and 24% germination for seed collected in years of 2002, 2004, 2006 and 2007 respectively. In the third experiment the maximum germination of 69% achieved when scarification with rough sand paper (15 times) were applied on the seeds. The pre-chilling for 90 days was most effective treatment on breaking seed dormancy when maximum 99% germination achieved. This indicated that the main reason of seed dormancy in *A. altissimum* Regel. may be the hardseedness which inhibits water and gases absorption so called physical dormancy (PY) and embryo rest which caused seed dormancy and called deep complex morphophysiological dormancy (MPD).

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CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *LEUTEA KURDISTANICA* ISOLATED BY SOLVENT FREE MICROWAVE ASSISTED EXTRACTION AND HYDRODISTILLATION

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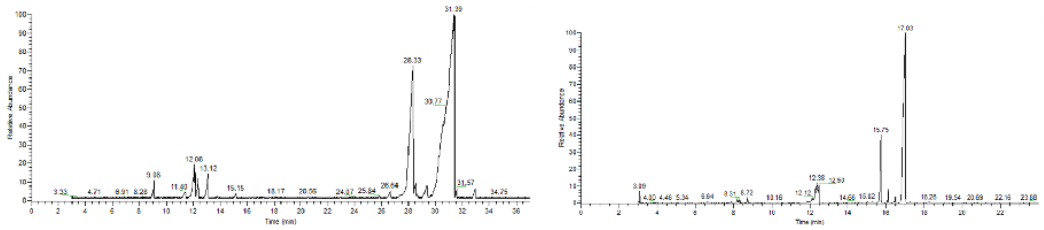
Essential oil from the aerial parts of *Leutea Kurdistanica* was isolated and identified by GC-MS under solvent-free microwave irradiation. The essential oil obtained by Clevenger apparatus with hydrodistillation (HD) under conventional heating conditions, were analysed too. The chemical composition from two methods has been compared with each other. The influences of extraction time, irradiation power and humidity on the composition of essential oil using solvent-free microwave extraction (SFME) was evaluated. It was found that the best conditions for extraction of essential oil of *L. kur* is the power of 500w and the time of 30 min. the main components were Asarone (E), Elemicin and OsimenZ (beta).



(b)

Figure 1. (a). Chromatogram by Clevenger apparatus with hydrodistilation (HD). (b) Chromatogram of essential oil by solvent-free microwave irradiation (SFME).

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POLAR SECONDARY METABOLITES FROM AERIAL PARTS OF *LEUTEA KURDISTANICA*

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The first phytochemical investigation of the ethyl acetate extraction of the dried aerial part of *Leutea kurdistanica* through chromatographic separation is described. In the best of our knowledge there is no report about the chemical composition of this genus. Extraction was carried out by maceration in room temperature. One of the important compounds which was isolated and characterized by spectroscopic methods is sterol glycoside (daucosterol). The structure of isolated compound have been elucidated using FT-IR, MS , ^{1}H-NMR, ^{13}C-NMR spectra.

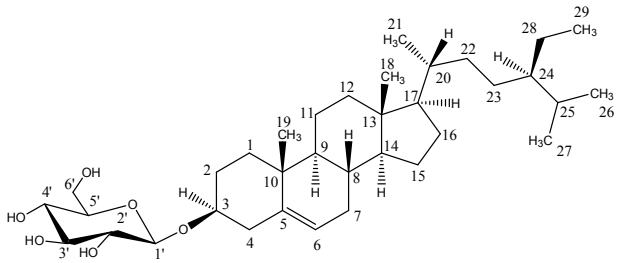

Figure 1. The chemical structures of daucosterol.

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THE PROTECTIVE EFFECT OF SILYMARIN ON DNA INTEGRITY AND NUCLEAR CONDENSATION OF RAM SPERM TREATED WITH SODIUM ARSENITE

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Sodium arsenite as an environmental pollutant exerts it´s effects through oxidative stress on the reproductive system as well as sperm [1]. Due to the antioxidant role of silymarin (an effective substance extracted from the seed of Silybum marianum or milk thistle)[2], this study was performed to investigate if silymarin can prevent the adverse effect of sodium arsenite on DNA integrity and nuclear condensation in ram sperm. Farahani´s ram spermatozoa obtained from epididymis were divided into three groups: 1. control 2. spermatoza treated with sodium arsenite (10 micromolar) 3. spermatoza treated with silymarin (20 micromolar) + sodium arsenite (10 micromolar) and incubated at 37°C for three hours. To evaluate ram´s sperm DNA integrity two tests were performed, SCD (Sperm Chromatine Dispersion) test to study DNA fragmentation and Acridine orange staining to estimate DNA denaturation (double strand DNA versus single strand DNA). Whereas Diff-quick staining was used to study nuclear condensation in the sperm. Data were analyzed with one way ANOVA and $P<0.05$ was considered significant. A significant DNA fragmentation and nuclear condensation was found in spermatozoa exposed with sodium arsenite while this toxicant had no effect on sperm DNA denaturation. In silymarin + sodium arsenite group, silymarin could significantly compensate both DNA fragmentation and nuclear condensation in the spermatozoa compared to sodium arsenite group. Sodium arsenite induces DNA fragmentation and nuclear condensation in ram sperm and silymarin is able to compensate the adverse effects of sodium arsenite on the nucleus and DNA.

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EFFECT OF DIFFERENT DRYING METHODS ON DRYING TIME AND HYPERICIN CONTENT IN ST JOHN'S WORT (*HYPERICUM PERFORATUM* L.)

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Hypericin and pseudohypericin are bioactive constituents in *Hypericum perforatum* that widely used to production of antiviral and anti-burn drugs. Drying is one of the important processes of post-harvesting that play a key role in the quantity and quality of these components. In order to study the effect of different drying methods on the drying rate and the amount of hypericin, an experiment take place in a completely randomized design with three replications. Drying methods included: 1-Artificial shade 2-Oven (50°C and 70°C) 3- Hybrid Solar Dryer 4-Microwave (180, 360, 540, 720 and 900 w). Drying continued until the moisture content approached to 10 percent based on fresh weightor0.1 based on the dry weight. Results showed a significant effect of treatments on the measured parameters. So that the minimum and maximum drying time related to microwave 900w (7 minutes and 56 seconds) and artificial shade treatment (100 hours and 24 minutes) respectively. The highest level of hypericin content found in treatment of solar dryer (0.25) and its lowest content in microwave900w (0.12) treatment.

QUALI-QUANTITATIVE STUDIES OF CORNELIAN CHERRY FRUIT AND *JUNCUS* L. SPECIES ROOT FLAVONOIDS

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Cornelian cherry (*Cornus mas* L.) fruit consumed fresh and also used to produce some foods and drinks [2, 3]. Cornelian cherry fruit and *Juncus* L. species (rush) from Juncaceae are rich in antioxidants: i.e. flavonoids [4, 5]. Many flavonoids are active principles of medicinal plants, exhibit pharmacological effects and contribute to human health [6]. Eight flavonoids have been isolated from the methanolic extract of *C. mas* fruit. These include aromadendrin 7-*O*-*β*-D-glucoside, quercetin 3-*O*-*β*-D-xyloside, quercetin 3-*O*-*α*-L-rhamnoside, quercetin 3-O-rutinoside, quercetin 3-*O*-*β*-D galactoside, quercetin 3-*O*-*β*-D-glucose, quercetin 3-*O*-*β*-D-glucoside, and kaempferol 3-*O*-galactoside [5]. Also eight kinds of compounds were identified in *J. effuses* which included four flavonoids, luteolin, eriodictyol, 2', 5', 5, 7-tetrahydroxyflavone, glucoluteolin and four others [7]. In this study, fruit flavonoids of *C. mass* and root flavonoids of two *Juncus* species (*J. articulatus* L. and *J. inflexus* L.) are reported using 2-dimentional paper (2-DPC) and thin layer chromatography (TLC). Results showed fruit flavonoids content of *C. Mass* is 32gr/kgdw consisting of flavonoid sulphates and flavones *C* and *C-/O* glycosides. Chrysin, isorhamnetin, kaempferol, myercetin, quercetin and rutin were found in the species fruit. Also root of the *juncus* species contain flavones *C* and *C-/O* glycosides and aglycones. But flavonoid sulphates was just found in *J. articulatus*. Both *juncus* species roots had Chrysin, Apigenin, Loteulin and Isorhamnetin. Myricetin was found in *J. inflexus* but *J. articulatus* lacked this flavonoid.

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INVESTIGATION OF ANTI-OXIDANT ENZYMES ACTIVITY AND ANTHOCYANIN CONTENT IN TREATED *LEMON BALM* SEEDLING WITH CU IONS

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Lemon balm (*Melissa Officinalis*) is a perennial herb from the Lamiaceae family[1]. This plant have many beneficial effects such as anti-bacterial, sedative, spasmolytic, mnemonic improvement, and could reduce excitability, anxiety, stress, gastrointestinal disorders and sleep disturbance[2]. In this research, we assayed the effects of various Cu concentrations (0, 5, 10, 20 and 30 µM) on anti-oxidant enzymes activity and anthocyanin contetnt at different times (8 and 16 hours) in *M offisinalis* 45-day seedling. The results showed that the activities of peroxidase (POD) and superoxide dismutase (SOD) were higher than control but in the case of catalase (CAT) activity, all investigated treatments exhibited lower activity as control sample. Also treatment of *M. officinalis* 45-day plantlets with Cu ions causes a significant loss in anthocyanin content in comparison with control treatments, whether for 8 or 16 hours, while for 8-hour treatment, the loss is more considerable than 16-hour treatment

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EFFECTS OF DIFFERENT IRON AND COPPER ELICITORS ON PROTEIN CONTENT IN LEMON BALM (*MELISSA OFFICINALIS* L.)

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Lemon balm *(Melissa officinalis* L.) belonging to the Lamiaceae family, is one of the most well-known medicinal plants, especially for two of its medicinal compounds (the essential oil and the phenylpropanoid derivatives) [1]. This plant entails various biologic activities such as anti-viral, antibacterial, antioxidant, anti-inflammatory, anti-cancer and antiallergic activities [2]. In current study, effects of different concentrations of iron elicitor (0, 10, 20, 30 and 40 µM) and copper elicitor (0, 5, 10, 20 and 30 µM) were investigated for different treatment durations (8 and 16 hours) on protein content in *M. officinalis* 45-day plantlets. Results show that treatment of *M. officinalis* 45-day plantlets with iron ions causes a significant loss in soluble protein content for both 8 and 16-hour treatments, while the loss was not observed for copper ion treatments but for 8-hour treatments with 20 and 30 µM copper ions.

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THE EFFECT OF TURMERIC ON LIVER ENZYMES AST, ALT, ALP, AND TOTAL BILIRUBIN IN MALE RATS TREATED WITH THIOACETAMIDE

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Turmeric is antioxidant rich agents and could be repaired liver. In this study, the effect of turmeric on liver enzymes in rats treated with thioacetamide is determined. 32 male rats into 4 groups including control, sham, without any interference received thioacetamide (100 mg/kg), turmeric (4 mg/kg) thioacetamide were combined. Blood was done in two stages, the levels of ALT and AST and ALP of total bilirubin was measured. The mean ALT and AST and total bilirubin thioacetamide without the intervention group received a mean ALP was reduced in order to decrease and increase. Turmeric could decrease the ALT, AST, ALP and total bilirubin levels. Turmeric can be used as a traditional medicine, also it is recommended in the prevention and treatment of liver enzymes.

INHIBITORY EFFECTS OF *FICUS CARICA* LINN. LEAVES EXTRACT AGAINST ISCHEMIA/REPERFUSION-INDUCED MYOCARDIAL INFARCTION IN ISOLATED HEART

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Ficus carica Linn. has been traditionally used for its medicinal benefits as metabolic, cardiovascular, respiratory, antispasmodic and antiinflammatory remedy [1]. This study was aimed at providing pharmacologic basis for its folkloric use in cardiovascular disorders by evaluating the effects of methanolic extract of *Ficus carica* leaves on ischemia/reperfusion-induced myocardial infarction. The methanolic extract of *Ficus Carica* Linn. Leaves were prepared. Male Wistar rats (270-330 g) were pretreated with intraperitoneal injection of 300 IU/kg heparin then anaesthetized by sodium pentobarbital. The rat hearts were excised rapidly, mounted on a non-recirculating Langendorff apparatus, perfused under constant pressure and allowed to equilibrate for 30 min. Then the hearts were subjected to 30 min global ischemia followed by 120 min reperfusion. In the control group, the hearts were perfused by normal Krebs-Henseleit (K/H) solution throughout the experiment. In the three treatment groups, they were perfused with K/H solution containing the extract (0.04, 0.2 and 1 mg/ml, respectively). At the end of reperfusion, infarct size was determined by triphenyltetrazolium chloride method and computerized planimetry [2, 3].
The results showed that perfusion of methanolic extract of *Ficus carica* leaves produced significant reduction in myocardial infarction size. The value was 57±5% in the control group, however administration of the extract (0.04, 0.2 and 1 mg/ml) reduced infarct size to 13±5, 13±3 and 16±3 % ($P<0.001$ for all treated groups), respectively. There was no statistical difference between the effects of various concentrations of the extract in treated groups. Similar to the infarct size results, administration of the extract significantly decreased the infarcted volume of ischemic hearts in comparison with the control group by all used concentrations. Results of this study showed that administration of methanolic extract of *Ficus carica* leaves produces protective effects against ischemia/reperfusion-induced myocardial infarction in isolated rat heart. The mechanisms for this protection are probably due to antioxidant capacity and the existence of phenolic compounds in the extract.

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EFFECT OF SEED PRIMING WITH CARBON NANOTUBES ON GERMINATION AND SOME MORPHOLOGICAL CHARACTERISTICS SEEDS OF PARSLEY (*PETROSELINUM SATIVUM* L.) AND PEPPER (*CAPSICUM ANNUUM* L.)

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Now, it's time to take advantage of new techniques such as nanotechnology as a new approach for seed priming and seed germination improvement. The effect of 5 levels of carbon nanotubes (0, 10, 20, 30 and 40 mg per liter) in a randomized complete design with three replications was studied on seed germination characteristics of parsley seeds at Ferdowsi University of Mashhad, 2013. The Comparison of means for parsley was shown that concentration of 10 ppm was better on the most of traits, especially on germination percentage, root length, seedling dry weight than to the other concentrations. The lowest of germination percentage rate, seedling fresh and dry weight, shoot and root length was obtained in application of 40 ppm, thus, it seems that this concentration lead to toxicity. The results are said to be increasing carbon nanotube concentration of 20 mg/l in most cases will lead to improvement Germination but not recommended concentration greater than that due to toxicity crafted to among concentration of 10 mg/l is used to improve the germination of seeds of parsley is recommended. About pepper The highest germination percentage and rate, seedling fresh and dry weight, shoot and root length was observed at concentration of 20 ppm. Mean germination time and germination index was better in concentrations of 20 and 30 ppm as compared to the other concentrations. There was no significant improvement in germination traits in the application of higher (40ppm) and lower (10ppm) concentrations of carbon nanotubes. The most effective concentration was 20ppm, because an increasing over 4/83, 43/47, 27/75, 23/07, 20, 23/03 and 38/45 % in germination percentage, germination rate, germination index, seedling fresh and dry weight, shoot length and root length, respectively, as compared to the control (0 ppm).

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STUDY TO IDENTIFY THE ECOLOGICAL CHARACTERISTIS OF *ECHINOPS QUERCETORUM* IN ILAM.

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Echinops quercetorum from Asteraceae family is one of the most valuable plants in the treatment of diseases because of its manna. It has distributed in different areas of natural habitats in Ilam. Interdiction medicine it is used the for treatment of many diseases such as: strengthening the muscles, increase the flexibility of the spine, lifter- resolver or relieve caugh, irritation of the esophagus, drying throat and reduction in heart attack. This paper is written in 2014 to identify the ecological characteristics of this species to introduce it to farmer for mass cultivation. Use it in pharmaceutical industries, prevent the destruction of natural habitats and prevent of the extinction of this species. We measured vegetative variables, identify geological characteristics and habitat type and perform physical and chemical analysis in the habitat. This species grows with suitable distribution in mountain temperate climate and rocky terrain with the average annual rainfall of 500 mm and the annual average temperature of 16.8 ◦C and found in the height of 1400-6900 meter. Suitable soil for germination is loam-clay in low. It is average of canopy is 0.152 and plant density is 450 bush in one hectare.

THE EFFECTS OF HYDRO ALCOHOLIC EXTRACT OF ALOE VERA ON SPERMATOGENESIS IN ADULT MALE RATS

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Aloe Vera is a durable plant which has been used extensively for wound healing, digestive disorders, cosmetic and food industries. The purpose of this experimental study was to evaluate *Aloe vera* hydroalcoholic extract on spermatogenesis and sexual hormones in adult male Wistar rats. 24 adult male Wistar rats were randomly divided into four groups including control, Intervention groups I, II, and III. The control group received placebo and Intervention groups were given 100, 150 and 200 mg/ kg, hydroalcholic *Aloe vera* gel extract orally for 54 days, respectively. Finally, blood samples were taken from their ventricles and serums were collected using a centrifuge 1500 rpm for 10 minutes and stored at -80$^{\circ C}$.Testosterone, LH and FSH concentrations of the serums were measured using ELISA assay. Epidydymalsperm count and sperm mobility were also examined.
The results showed that serum concentrations of testosterone and LH in Intervention groups I, II and III increased significantly compared to control group. There were no significant differences were observed in FSH Serum concentrations of Intervention group I compare to control group but there is a significant increase in the second and third Intervention groups. Sperm count and mobility in the Intervention groups significantly increased compare to control group. In conclusion, hydroalcholic extract of *Aloe vera* has significant effects on spermatogenesis and fertility in adult male Wistar rats. This plant would be a valuable candidate in the treatment of male infertility.

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NEUROPROTECTIVE EFFECTS OF AQUATIC EXTRACT OF *ACHILLEA WILLHELMSII* ON SPINAL CORD MOTONEURONS AFTER SCIATIC NERVE COMPRESSION IN MALE RATS

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Peripheral nerve injuries trigger a consequence of morphological and biochemical changes in neurons which are not only localized at the site of injury but also occur in neuronal cell bodies in the spinal cord or ganglia. The purpose of this study was to investigate the effect of aquatic extract of *Achillea wilhelmsii*, on alpha neuronal density regeneration after sciatic nerve compression in rats. this experimental study was carried out on 30 male wistar rats which were divided randomly into 5 groups consisting of: group I control, group II compression, group III compression and treatment with 25 mg/kg aquatic extract, group IV compression and treatment with 50 mg/kg aquatic extract and group V compression and treatment with 75 mg/kg aquatic extract. Rats were anesthetized, thigh muscle of right legs removed and sciatic nerve was compressed using a surgical forceps for 60 seconds, and then thigh muscle and skin were sutured. Group I and II were injected normal saline, while group III, IV and V were injected aquatic extract of *Achillea wilhelmsii* 25, 50 and 75 mg/kg by intra peritoneal route weekly. 28 days after compression, samples were dissected from lumbar spinal cord under perfusion method and histological slides were prepared serially. Slides staining were performed by toluidin blue and erythrosine. Neuronal density of alpha motoneurons of the anterior horn of the spinal cord was calculated by dissector method. Statistical analysis was done by student t-test and one way anova, using SPSS19 software. The results showed that neuronal density in the compression group decreased significantly compare to control group (943±59 vs 1620±51.1, $p<0.001$). Neuronal density in group III (1032±40.8), group IV (1207±131.3) and group V (1527±46.4) increased significantly in comparison to compression group. In conclusion, our results indicate that aquatic extract of *Achillea wilhelmsii* could protect sciatic nerve against pathological alterations of compression in male rats.

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STRATIFICATION AND SEED GERMINATION OF SEVEN NATIVE SPECIES OF APIACEA FAMILY FROM IRAN

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Because of possible no side effect, use of the natural products have been on rise in these decades. Apiacea family has many species that have medicinal potentiality. For example *Ferulago bernardi, Ferulago angulata* and *Ferula gumosa* are antibacterial [2, 4,7] and *Heracleum persicum* is used as an Antioxidant & anti-inflammatory agents[3]. *Ferula pseudalliacea*, *Astrodaucus orientalis* and *Diptaema cachrydifolia*, have essential oil [1, 5] and *Ferula pseudalliacea* is used as spicy [6]. Most of these species have problem in seed germination. Already has been documented that stratification is the most effective method for seed germination. In this research seed germination of seven native species of apiacea family were conducted using stratification treatment. The species includes: *Diptaema cachrydifolia, Ferulago bernardi, F. angulata, Ferula gumosa, F. pseudalliacea, Astrodaucus orientalis* and *Heracleum persicum*. The experiment was carried out as a completely randomized design with three replications that each replication contains 25 seeds. The germination percent, germination rate and germination index of these species were evaluated. Results indicate that Stratification was effective on all species. Among all these species, *Ferula gumosa* with 65.33% has the highest percentage of germination with stratification treatment. The classification of three factors of seed germination was conduct by Duncan's multiple range tests.

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EVALUATION OF THE EFFECT OF ORAL ADMINISTRATION OF HAB-O SHEFA ON MORPHINE WITHDRAWAL SYNDROME IN RATS: A BEHAVIORAL STUDY

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Traditional Iranian Medicine (TIM) has a long history in the field of diagnosis and treatment of various diseases, particularly addiction. Different therapeutic methods have been recommended in this respect. One of these methods is the replacement of natural narcotics instead of opium. Hab-o Shefa is a natural product of TIM which has been used as an alternative for opium in the treatment of addiction since centuries ago. In this study, the effect of Hab-o Shefa was investigated on behavioral quantities of morphine withdrawal syndrome. A total of 30 rats were divided into three groups of ten cases each. The control group received solely morphine at a dosage of 10 mg/kg daily for 8 days by the intraperitoneal route. In the second group, in addition to morphin with the same dosage, methadone at the dosage of 25 mg/kg was daily administered by gavage. Hab-o Shefa at a dosage of 2000 mg/kg through gavage was administered in addition to 10 mg/kg of morphine daily for the third group. Finally and 4 to 24 hours after the last injection of morphine, naloxone was injected i.p. at a dosage of 2.5 mg/kg and the desired withdrawal parameters were evaluated. Considering uncountable parameters, a significant difference was seen when comparing methadone and Hab-o Shefa with placebo in regarding diarrhea symptoms ($p<0.05$). Regarding jumping between Hab-o Shefa and placebo and also between methadone and placebo, the difference was also statistically significant ($p<0.05$). In summary, Hab-o Shefa better controlled the withdrawal symptoms in comparison with placebo and it also better improved the symptoms of diarrhea and salivation as compared to methadone.

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STUDY ON SEED GERMINATION OF SOME NATIVE ETHNO-MEDICINAL SPECIES OF COMPOSITAE AND LAMIACEAE FAMILIES

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Traditional medicine has been used by people for many centuries in Iran. Lamiaceae and compositae families have useable members in ethnomedicinal [1-3]. Some species in these families have problem in seed germination; therefore seed germination of six species was conducted using stratification treatment. These Species include; *Thymus daenensis, Phlomis elliptica, Inula helenium, Centaurea balsamita, Reichardia glaucea* and *Salvia spinosa*. To evaluate the germination, experiment were carried out as a completely randomized design with three replications that each replication contains 25 seeds. The germination percentage, germination rate and germination index of these species were studied. With considering germination responses to treatment, there is no statistical significant difference between two studied families. Results indicated that Stratification was effective on all species. Among species *Salvia spinosa* with 62.66% has the highest percentage of germination under stratification treatment. The classification of three factors of seed germination was conduct by Duncan's multiple range tests.

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THE FLAVONOID VARIATION PATTERNS AND FLAVONOID COMPOUNDS AMONG THE ACCESSIONS OF THREE SUBSPECIES AND FIVE SPECIES FROM *STACHYS* L. (LAMIACEAE) IN IRAN

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Stachys L. genus is one of the most important medicinal genera of Lamiaceae which has high morphological diversity in Iran [1]. In order to study the flavonoid diversity in this genus, 22 accessions belonging to four sections namely as *Setifolia*: *St. setifera* subsp. *setifera*, *St. setifera* subsp. *Iranica, St. setifera* subsp. *daenesis*, *Erioistomum*: *St. cretica, St. spectabilis*, *Ambelia*: *St. inflata* and *Zietenia*: *St. lavandulifolia* were collected from natural habitats in Iran from of Zagros regions. The flavonoid solution was extracted from air-dried leaves (10.5 g) from each *Stachys* species using crude MeOH. The flavonoid patterns of these species were provided using Methanol extracts on Silica gel thin layer chromatography. Spots' detection with natural product identifiers (H_2SO_4 in MeOH) was performed under UV-366 nm. The purification of the flavonoid compounds of each species was carried out using column chromatography with sephadex LH20 [2, 3]. Identification of flavonoid class was confirmed by spectral data. The presence / absence of spots was taken as data and used in each accession of these species. Using statistical analysis such as cluster analysis with Ward Method, factor analysis and SPSS V.20 was estimated the diversification among species and accessions. Based on the results of this study, spot colors such as yellow, blue and violet spots were common in *Stachys* species. Orange, dark yellow, green and brown were found in some of these species. The results of cluster analysis showed that the highest variations were found in *St. spectabilis* and *St. inflata* accessions. Moreover, the subspecies of *St. setifera* as *St. setifera* subsp. *daenesis* was strongly separated from two other subspecies. The results of factor analysis were confirmed the clustering results. In this research, a total of six flavonoid classes were first reported for *Stachys* species in Iran. The flavonoid classes were isoflavones, flavonoes, dihydroflavonols, flavonols and flavones. The highest flavonoid compounds were flavones and the lowest were dihydroflavonols. From the findings on the final fraction and the UV absorption spectra, it appears a tendency towards hydroxylation, methoxylation and glycosylation. In conclusion, flavonoid constituents in the *Stachys* species show excessive diversity in Iran; Zagros region, and they are often differentially distributed.

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EFFECT OF SALINE STRESS ON MORPHOLOGICAL CHARACTERISTICS OF MINT (*MENTHA SPICATA* L.).

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Mint (*Mentha spicata* L.) is an important medicinal herb that is cultivated in different places of the world. In order to investigate effects of salinity stress on morphological characteristics of (*Mentha spicata* L.) a greenhouse experiment was conducted based on complete randomized in hydroponic condition with 5 treatments and 4 replications at Ferdowsi University of Mashhad in 2013. The salinity levels were (0, 30, 60, 90 and 120 mML^{-1}) sodium chloride. The results showed that salinity stress had significant effects on plant height, branch number, node number, fourth internode length, spike length, leaf area and leaf, stem and root fresh and dry weight. The highest plant height, branch number, leaf area and leaf dry weight were observed in control. The lowest leaf area and leaf dry weight were obtained in salinity level of 120 mML^{-1}, and lowest plant height and branch number were observed in salinity level of 90 mML^{-1} and 120 mML^{-1}. Salinity had no significant effect on the number of stem and stem diameter. According to the results, it appears that mint (*Mentha spicata* L.) is sensitive to salinity stress and it can't tolerate salinity levels more than 30 mML^{-1} sodium chloride.

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EFFECT OF CROCETIN ON P27 EXPRESSION IN THE NMU-INDUCED BREAST CANCER TUMORS IN FEMALE RATS

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Saffron, the dry stigma of the *Crocus sativus*L. has been known not only as a spice also as a highly valuable medicinal plant. Among the saffron various medicinal properties, the anticancer effect has been more considered [1, 2]. Crocetin is one of the important bioactive compounds in saffron and as a natural carotenoid with adicarboxylic acid group at each end of the molecule [3]. Breast cancer is the second leading cause of cancer death and the most common malignancy among women [4]. P27 is one of the cyclin dependent kinase inhibitors that its function leads to cell cycle arrest. Low expression of p27 gene in most of breast cancers has been observed [5]. According to our recent studies, Crocetin suppressed tumor growth in the NMU-induced breast cancer in rats. To investigate on the molecular mechanism of this effect, we studied p27 expression in the tumor tissues. The processes of crocetin extraction and purification from saffron; induction of breast cancer in rats by NMU injection and their treatment with crocetin were done according to our previous established methods [6]. Then, expression of p27 gene was checked by the RT - PCR in the tumor tissues. The results indicated, there is no significant changes in the expression of p27 gene in tumors of the rats after treatment with crocetin in comparison to the group without treatment. Although a decrease in the expression of p27 gene in tumors of the rats without crocetin treatment in comparison to the normal breast tissue was observed. It indicated that crocetin probably did not act through p27 pathway. In addition after investigating on p53 gene expression in these samples we observed over expression of p53 gene in tumors of the rats which were treated by crocetin in comparison to the group without treatment. It suggested the possible involvement of p53 in the antitumor action of crocetin.

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COMPARISON THE EFFECTS OF ROSEMARY EXTRACT, THYME, PROPOLIS, ANTIBIOTIC AND PROBIOTIC ON SERUM LIPID CONCENTRATIONS OF BROILERS CHALLENGED WITH *SALMONELLA ENTERITIDIS*

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To compare the effects of two herbal extracts, antibiotic, probiotic, and ethanolic extract of propolis on broiler serum lipid concentrations, a trial was performed based on completely randomized design. Four hundred and twenty day old male broiler chicks including 7 treatments with 4 replicates of 15 birds per replicate were distributed to the basal diet (control) or the basal diet with150 ppm of antibiotic virginiamycin, basal diet with 1000 ppm probiotic, 1000 ppm ethanol extract of rosemary, 1000 ppm ethanol extract of thyme and 500 ppm ethanol extract of propolis, respectively. On day10, except negative control group, the broilers in other groups were challenged with 1 mL of *Salmonella enteritidis* culture ($1*10^7$ cfu/mL) by oral gavag. The serum HDL levels were significantly different between treatments ($P<0.05$). Thyme, rosemary and negative control groups showed significant difference with the other groups. Among these treatments, thyme supplemented group had the highest HDL but the positive control group had the lowest HDL levels. In terms of triglyceride there was significant difference between treatments ($P<0.05$), the positive control group and propolis were significantly different with thyme and rosemary groups. There was no significant difference ($P>0.05$) in cholesterol levels between the treatments. Rosemary supplemented group showed the best and positive control group showed the worst performance. Serum LDL level was not significantly different between treatments ($P>0.05$). The positive control group showed the highest LDL and thyme group showed the lowest LDL levels. It has been reported that serum cholesterol and triglyceride concentrations were decreased in laying hens by using essential oils of thyme, rosemary and salviain in the diet [1]. Basic constituents of thyme are thymol, carvacrol, parasymol, linalool and cineol. Carvacrol lowered plasma triglyceride concentrations, but did not affect plasma cholesterol in broiler chickens [2]. The results of this experiment indicate that administration of above mentioned compounds can reduce blood lipids in broiler chickens.

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COMPARISON THE EFFECT OF *ROSMARINUS*, *SALVIA*, PROPOLIS, COCCIDIOSTAT AND ANTIBIOTICS ON SERUM LIPID CONCENTRATIONS OF BROILER CHICKENS CHALLENGED WITH *E. COLI*

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The present study was conducted in a completely randomized design to evaluate the effects of two commercial herbal extracts, Propolis, coccidiostat and antibiotic virginiamycin on serum lipid concentrations of broiler chickens. A total of 470 one day old female broiler chicks with 7 treatments and 4 replicates of 17 chicks per replicate were housed in floor pens. The groups were assigned to the basal diet (control) and basal diet supplemented with 150 ppm virginiamycin, 1000 ppm extract of S*alvia officinalis*, *Rosmarinus officinalis L*, 500 ppm propolis and 200 ppm Phytmax cox. At day 21, except negative control group, chicks in the other groups were inoculated with 1 mL of *Escherichia coli* culture (1×10^{7} cfu/ mL) through mouth (gavag).The highest level of HDL was seen in *Salvia* treatment ($P<0.05$) and the lowest HDL in positive control group, respectively. Herbal extract supplemented groups had higher HDL than the control group. The triglyceride level was significantly different between treatments. Propolis treatment was associated with lowest triglyceride level but the control group showed the highest triglyceride level. There was a significant difference ($P<0.05$) in serum cholesterol levels between treatments, the control group had the highest and *Salvia* treatment the lowest level of cholesterol, respectively. Significant differences were observed between treatments in terms of LDL ($P<0.05$), the control group had the highest LDL and *Salvia* group had the lowest, respectively. It has been reported that serum cholesterol and triglyceride concentrations decreased in serum of laying hens by using essential oils of thyme, rosemary and sage in the diet, but there was no significant difference in yolk cholesterol and triglyceride between treatments [2]. Cineol in *Teucrium polium* compounds which inhibit the enzyme HMG-COA (regulator of cholesterol synthesis) reduce the amount of cholesterol synthesis and LDL [1], therefore, rosemary cineol, also lowers cholesterol and LDL. As a result, the plant extracts reduce levels cholesterol, LDL and triglyceride levels in broilers serum.

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CARDINAL TEMPERATURE FOR SEED GERMINATION OF ROSELLE (*HIBISCUS SABDARIFFA*.L)

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Roselle is one of the important medicinal plants of Malvaceae family which is planting in a vast area of Iranshahr region in Iran. Cardinal temperatures, base (T_b), optimum (T_o) and maximum (T_{max}) temperatures, requirements were defined for germination of Roselle specie. Knowledge and studies of plant biology and germination behavior can lead to the development of its cultivation in the farms. This experiment was conducted to evaluate Roselle seeds germination on the response to different temperature at Seed Technology and Agricultural Research Laboratories of Zahedan University in 2013.For this experiment using a completely randomized design with 10 treatments consisting of 5, 10, 15, 20, 25, 30, 35, 40, 45 and 50 degree of Celsius in four replications. Traits measured were germination percentage, germination rate and mean germination time. The cardinal temperatures including base temperature (T_b), optimum temperature (T_o) and maximum temperature (T_{max}) for roselle were obtained 12.5, 29.5 and 42, respectively.

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EFFECT OF RED CABBAGE HYDROALCOHOLIC EXTRACT ON WOUND HEALING IN MICE

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Delayed wound healing is one of the major therapeutic and economic issues in medicine today. Natural products studies are developed instead of chemical drugs because of their less side effects [3]. Red cabbage *(Brassica oleracea L. var)* that is used on human nutrition has wound regeneration effect in traditional medicine. It contains flavonoids, antioxidant, A, B, C and E vitamins that probably have anti-inflammatory, anti-microbial and wound healing effects [1, 2]. The aim of this research was hydroalcoholic extract of red cabbage effects on skin epithelium regeneration of mice. 60 male mice were divided randomly in to negative control group treated by normal saline and positive control group by phenytoin. 2 experimental groups treated by red cabbage hydroalcoholic extract prepared by soxhlet method (10% & 20%). 6mm skin wound on the back of the mice treated locally twice a day (5drops). For microscopic studies sampling at 1st, 4th, 7th, 12th and 15th days were done and for macroscopic studies measuring were done by using graph paper at those days. Data were analyzed by tukey test and SPSS software ($p<0/05$). Results showed that in experimental groups the rate of epithelium regeneration were faster than control group treated by normal saline and it was like phenytoin but the wound area did not change significantly at those days. Probably we can say that red cabbage hydroalcoholic extract due to faster regeneration on skin wound in mice.

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INVESTIGATE THE POSSIBILITY OF REPLACING CONVENTIONAL FERTILIZERS WITH MANURE IN THE CULTIVATION OF MEDICINAL PLANT BLACK CUMIN (*NIGELLA SATIVA*)

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In order to investigate the possibility of replacing conventional fertilizer with manure in the black cumin (*Nigella Sativa*) and effects of manur fertilizer on grain yield and yield components,a randomized complete block experiment with three replicationswas conducted in the research farm of Islamic Azad University of Maragheh. Experiment had five treatments. The treatments were different amounts of manure (0, 20, 30 and 40 tonnes per hectare) and compound fertilizer (triple superphosphate and potassium oxide, 100 and 50 kg/ha before sowing respectively, and urea 150 kg/ha which two-thirds before planting and one-third in thinning time used on soil analysis and application of fertilizers in conventional farming black cumin.The results showed that the highest number of capsules per plant and number of seeds per capsule were obtained in fertilizers treatments.However fertilizer and using 30 t/ha of manure was statistically similar. The minimum number of capsules per plant and seed number per capsule was obtained in control treatment (without fertilize and manur).Fertilizer produced more, butsmallergrains per plant campared with other treatments. However, 20 t/ha manure treatment produced largest grains. The highest grain yield was obtained in chemical fertilizer and 30 t/ha of manure, due to maximum capsule number and seed number per capsule.The results of this study showed thatinstead of using chemical fertilizers usually used in the black cumin cultivation, can be apply manure amount of 30 /ha.

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EVALUATION OF FOLIAR APPLICATIONS OF IRON AND MANGANESE ON CORM AND LEAF YIELD OF SAFFRON (*CROCUS SATIVUS* L.)

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Foliar application is one of the most effective methods to rectify the nutritional needs of plants to microelements [1]. In order to investigate the suitable concentration of foliar applications of iron and manganese on corm and leaf yield of saffron (*Crocus sativus L.*) on 9-11 g maternal corms weights, a pot experiment was conducted in Qom conditions during years of 2012- 2013. For this purpose a factorial experiment based on completely randomized design with three replications and 9 treatments was used. Treatments included three levels of foliar iron and manganese applications (0, 0.05% and 0.1% solutions) with 2% Fe and 0.1% Mn chelates. Results of variance analysis showed that the total replacement corm number and weight per maternal corm, mean replacement corm weight and fresh and dry leaf weight were not insignificant ($P \leq 0.05$) as affected by foliar applications of iron and manganese. In spite of widespread use of foliar, foliar applying micronutrients such as iron and manganese did not have significant effects on corm yield of saffron. Results of this experiment in contrast with other researches on foliar applications showed that total replacement corm number and weight per maternal corm, mean replacement corm weight and fresh and dry leaf weight were not affected by micronutrients foliar applications. Hasanzadeh and Mahlouji Rad showed the same results [2].

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CHEMICAL COMPOSITIONS OF METANOL EXTRACT OF STEM OF *ARTEMISIA KOPETDAGHENSIS* FROM IRAN

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The genus *Artemisia (Asteraceae)* is the largest and most widely distributed one of the approximately 60 genera belonging to the tribe Anthemideae. This genus comprises a variable number of species, ranging from 200 to 800, which are predominantly distributed in the northern temperature region of the world in the 0-50 cm precipitation area [1]. Thirty four genera of them are reported in Iran of which two are endemic [2, 3]. *Artemisia kopetdaghensis* is a common perennial herb growing wild in Iran. In this study *Artemisia kopetdaghensis* were collected from Sabzevar area in Khorasan-e-Razavi province, Iran. Chemical constituents of essential oil of flower of *Artemisia kopetdaghensis* were determined. Dried stem of plant were subjected to hydrodistillation in a Clevenger–type apparatus until there was no significant increase in the volume of the oil collected. The yield of the oil was 0.11% (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 [4]. Thirty-eight compounds were identified constituting more than 99.9% of the oil. Camphor (11.2%), linalool (4.6%), (Z)-citral (22.0%) and geranyl acetate (24.6%) were major components in essential oil of flower of *Artemisia kopetdaghensis*. Amongst them oxygenated monoterpenes and Oxygenated sesquiterpenes were predominant components.

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COMPARISON OF ESSENTIAL OIL CONTENT AND CONSTITTUENTS OF *NEPETA GLOMERULOSA* DURING THREE DEVELOPMENTAL STAGES

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The genus *Nepeta* with the common Persian name "Pune-Sa" is one of the most important genera of *Lamiaceae* family. More than 250 species in the world and 67 annual or perennial species in Iran have been reported [1]. Some of these species are valuable in medicine and they used for medicinal purposes. The aim of this study is to identify essential oil content and its chemical composition in pre-flowering, flowering and seed set steps. The samples of *N. glomerulosa* in these three mentioned steps were collected from Abade region of Fars Province. The essential oils were separately obtained by hydrodistillation and analyzed by GC and GC/MS. Essential oils of the plants in pre-flowering, flowering and seed set stage including 55, 53 and 53 components respectively, that geranyl acetate (16.644%, 18.182% and 24.441%), geraniol (10.797%, 11.372% and 12.389%), caryophyllene oxide (8.302%, 10.515% and 6.661%), humulene epoxide II (7.974%, 7.112% and 2.587%), α-pinene (4.743%, 4.126% and 6.724%), limonene (4.086%, 3.848% and 4.711%) and 1,8-cineol (3.397%, 4.609% and 3.759%) were the major components of the essential oil. The results confirmed that phenological stages have a significant effect on essential oils constituents and geranyl acetate and geraniol increased by development of plant from vegetative to seed set stage and geranyl acetate is the main essential oils constituent of the plants during three phonological stages.

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ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS OF MAMASSANI IN FARS PROVINCE, IRAN

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In treatment and prevention of disease, medicinal plants are very important. The use of herbs is as old as human history. Due to side effect drugs, the application of medicinal plants has increased in recent years [1]. The aims of this study was to identify the most important medicinal plants that widely used by native people in the treatment of disease in the area Mamassani in Fars province of Iran. A survey of Mamassani area ethnobotany was conducted during 2012-2013.At the beginning, native people were interviewed about their region's medicinal plants and applications. Then these plants were collected and identified scientifically using, identification keys. Twenty nine families, and 70 species belonged to medicinal plants were collected. Among them, Lamiaceae was the largest medicinal plant family. These plants are used in traditional medicine for lowering fat and blood pressure, stomach tonic, treatment of common cold, kidney stones, anemia and other types of pains. With careful planning and management, medicinal plants can be used correctly and accurately.

THE EFFECT OF IRRIGATION TIME AND N FERTILIZER AND HAND WEEDING ON QUANTITATIVE AND QUALITATIVE TRAITS OF *CROCUS SATIVUS* L.

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Saffron (*Crocus sativus* L.) as valuable and medical crops has a necessary role in the social and economic conditions in Arid and semi-arid regions, so improvement in quantitative and qualitative traits and attention to farmers' problems has helped the economy of this product. To study the effect of irrigation time, N fertilizer and weeding on quantitative and qualitative traits of this plant, the experiment has done on the year of 2011 and 2012 in the agricultural research station in Esfahan. This experiment has done in split factorial design by completely randomized block with using 3 levels of fertilizer (0, 90, 180 kg/ ha) and 3 levels of irrigation time (6 and 26 Oct., 15 Nov.) and 2 levels of weeding (weeding and nonweeding) with 6 replications. Agronomic and phonological traits was including, number of flower, length of stigma, chlorophyll and carotenoids content, crocin and picrocrocin percent were measured in this experiment. According to the results of the analysis of variance, number of flower, length of stigma, chlorophyll and carotenoids content were significant differences under levels of irrigation time. The best result irrigation time has observed in 6 Oct. Picrocrocin, carotenoids, number of flower also were significantly different under different levels of urea fertilizer and the best result were observed by using180 kg/ ha and the maximum number of flower were observed in weeding treatment. The result of this investigation showed agricultural management is effectively suitable in improvement of saffron plant.

EFFECT OF ZINC AND IRON FOLIAR APPLICATION ON BIOLOGICAL YIELD, HARVEST INDEX AND QUANTITATIVE AND QUALITATIVE YIELD OF ESSENTIAL OIL OF CUMIN (*CUMINUM CYMINUM*) UNDER DRY FARMING CONDITION

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In order to determine the effect of zinc and iron foliar application on quantitative and qualitative yield of essential oil of Cumin (*Cuminum cyminum*) under dry farming condition, an experiment was carried out at agricultural Research Center of Mahan, Kerman during 2011-2012. Field Experiment was conducted in split plot design based on randomized completely block (RCB) at three replications. Main plots included dry farming and normal irrigation and sub plots were treatments of zinc, iron, zinc+iron foliar application and non-foliar application (water). Results showed that maximum BM and HI were 1069.82 kg/hec and 54.6% in dry farming and normal irrigation with Zn+Fe foliar application respectively. Means comparisons effects showed that zinc and iron foliar application had significant effect (a>0.05) on essential oil and its components. Maximum essential oil percentage and essential oil yield were 1.89% and 9.45 kg/hec in dry farming with Zn+Fe foliar application. Foliar application significantly enhanced cumin aldehyde and ρ-cymene and decrease β- pinene, ϒ-terpinene and α-pinene in cumin oil. This study showed that Zn and Fe foliar application is effective under dry farming conditions [1,2].

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GENETIC DIVERSITY AND MORPHOLOGICAL VARIABILITY AMONG THE ACCESSIONS OF TEN *STACHYS* L. (LAMIACEAE) SPECIES IN IRAN USING MORPHOLOGICAL AND ISSR MOLECULAR MARKERS

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Stachys L. genus with over 300 species throughout the world and 35 species in Iran is one of the largest medicinal genera in Lamiaceae. Due to high morphological similarity and specific hybridization in this genus, morphological variations and genetic diversity of 60 accessions from ten *Stachys* species belonging to two sections namely as *Aucheriana*: *St. pilifera, St. aucheri, St. multicaulis*, *St. acerosa*, and *Fragilicaules*: *St. benthamiana, St. ballotiformis, St. megalodonta, St. asterocalyx, St. kurdica, St. kermanshahensis* were studied in Zagros regions of Iran. All of the specimens were collected from natural habitats of these areas. In order to morphological studies, 35 qualitative characters were used. Nine ISSR primers were applied to assess the genetic variations within and among *Stachys* accessions. PCR was carried out in the reaction mixture 25 µl [1]. The morphological variations and genetic diversity were studied using cluster analysis as UPGMA method, Jaccard similarity coefficient with NTSYS-PC (2.0) [1]. The results of this study showed that out of 136 bands generated from eight selected primers, 93.2% were polymorphic. Based on the morphological studies, the characters such as leaf form, leaf margin, stem, leaf, calyx and bract indumentum displayed high variations in *St. benthamiana* and *St. pilifera* accessions. Based on the molecular studies, the UPGMA analysis showed that *St. benthamiana, St. ballotiformis, St. pilifera* and *St. aucheri* contained different clusters. Also, the genetic diversity within accessions was high and varied according the different zones. It is noted that these variations display high gene flow within accessions and hybridization between *Stachys* species. Based on the findings, the germplasm diversity was due to wealth genetic resources in Zagros regions which are important in plant breeding. In addition, morphological and ISSR molecular markers are appropriate indicators to display the diversity in *Stachys* genus.

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CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF TEN SPECIES OF LABIATAE FROM RESEARCH FARM OF MEDICINAL PLANTS INSTITUTE IN KARAJ PROVINCE

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Aerial parts of *Mentha piperita* L., *Rosmarinus officinalis* L., *Salvia officinalis* L., *Oreganum vulgare* L., *Origanum majorana* L., *Hyssopus officinalis* L., *Thymus vulgaris* L., *Lavandula angustifolia* Mill., *Melissa officinalis* L. and *Nepeta cataria* L. were collected at flowering stage from research farm of Medicinal Plants Institute (MPI). Dry ground plant materials were subjected to hydrodistillation using a modified clevenger-type apparatus [**1**] and the chemical composition of the volatile oil was studied by GC-MS [**2**]. Forty components were identified in the oil of *M. piperita* with menthol (44.79%), menthone (8.21%) and 1,8-cineole (7.01%), as main constituents. Forty-one compounds were identified in the oil of *R. officinalis* with α-pinene (23.38%), 1, 8-cineole (8.51%) and camphor (7.93%) as the main components. Forty compounds were characterized in the oil of *S. officinalis* with cis-thujanol (36.66%), camphor (15.74%) and 1, 8-cineole (11.83%) as the main constituent. Sixty-nine compounds were characterized in the oil of *O. vulgare* with orto-cymene (15.2%), trans-caryophyllene (9.03%) and germacrene (7.29%) as the main constituents. Forty components were identified in the oil of O. majorana with terpinen-4-ol (32.66%), γ-terpinene (16.43%) and α-terpinene (10.25%) as the main constituents. Fifty-two compounds were identified in the oil of *H. officinalis* with cis-pinocamphine (23.39%), trans-pinocamphone (17.78%) and β-pinene (9.64%) as the main constituents. Forty-four compounds were identified in the oil of T. vulgaris with thymol (38.85%), ortho-cymene (24.1%) and γ-terpinene (11.73%) as the main constituents. Fifty compounds were identified in the oil of *L. angustifolia* with 1,8-cineol (40.86%), camphor (13.98%) and borneol (13.36%) as the main constituents. Forty-eight compounds were identified in the oil of *M. officinalis* with geranial (32.72%), neral (25.54%) and citronella (6.84%) as the main constituents and twenty-two compounds were characterized in the oil of *N. cataria* with nepetalactone(4α-α-7-β-7a-α) (79.53%) and nepetalactone (4α-7-α-7a-β) (7.15%) as the main constituents. The results showed that the major compounds were belonged to the oxygenated monoterpenes.

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THE EFFECT OF SILICON ON SOME MORPHOLOGICAL CHARACTERISTIC AND SECONDARY METABOLITES IN IRANIAN BORAGE UNDER SALT STRESS (*ECHIUM AMOENUM* FISCH. & C. A. MEY)

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Secondary metabolites are important in plants and are important the factors that affect the quality and quantity of these metabolites Iranian borage (*Echium amoenum* Fisch. & C. A. Mey.) belonging to Boraginaceae family is a long day biennial herbaceous plant with a lot of trichome and is found in northern Iran. In the present work, the effects of silicon on some physiological characteristic and secondary metabolites of this plant were investigated. For this purpose, borage plants cultivated in hydroponic greenhouse was treated with silicon (as sodium silicate) in three level concentrations: zero, 0.2, and 0.7mM. Some characteristics, such as physiological and secondary metabolites were evaluated. Based on the results wet and dry weigh was increased. Anthocyanin and flavonoids compared to controls under salt stress was significantly increased.

TOTAL PHENOLIC CONTENTS AND ANTIOXIDANT ACTIVITIES OF DIFFERENT EXTRACTS AND FRACTIONS FROM THE AERIAL PARTS OF *ARTEMISIA TURANICA*

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Members of the genus *Artemisia* (Asteraceae) are important medicinal plants, with about 400 species wildly distributed in the northern hemisphere and represented in Iranian flora by 34 species. Extensive studies of the biological activities of *Artemisia* genus have shown that this genus possess anti-malarial, antioxidant, anti-inflammatory, antibacterial and antitumor activities. *A. turanica* with the common Persian name "Dermaneye ghermez" grows wildly in northeastern Iran. The objectives of this study were to investigate the antioxidant activity of different extracts of this plant with different assays. The aerial parts of *A. turanica* were collected from Torbat- e Jam, Razavi Khorasan province, Iran. Air-dried and ground aerial parts (200 g) of plant were extracted with petroleum ether (40-60), dichloromethane, ethyl acetate, ethanol and ethanol-water (1:1 v/v), respectively (Sequential maceration**).** Total phenolic content (TPC) and antioxidant capacity of five different extracts of *A. turanica* were determined by Folin–Ciocalteu method, 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging test, β-carotene bleaching method and ferrous ion chelating assay. Potent extracts was fractionated into 7 fractions by vacuum liquid chromatography system, using a step gradient of methanol – water mixture as eluent. Fractions were subjected to all antecedent experiments. Among all the extracts analyzed, the hydroethanolic extract exhibited the highest phenolic content and antioxidant activity. Fractionation of this extract yielded seven fractions (A to G) which Fraction D (40% methanol/water) showed the highest total phenolic content and free radical scavenging activity but the only statistically significant correlation between TPC and EC_{50} values was observed for β-carotene bleaching method. Notable free radical scavenging activities of *A. turanica* hydroethanolic extract and some of its derived fractions in comparison with other samples could be ascribed to their higher content of phenolic compounds.

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EVALUATION OF CARDINAL TEMPERATURE FOR *CYNARA SCOLYMUS* L., *MATRICARIA AUREA* (LOEFL.) SCHULTZ-BIP, *ACHILLEA MILLEFOLIUM* L.

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In order to evaluate cardinal temperatures and optimum thermal range of germination of *Cynara scolymus* L., *Matricaria aurea* (Loefl.) Schultz-Bip, *Achillea millefolium* L. medicinal plant, an experiment was conducted in a Completely Randomized Design with three replications. Temperatures considered for this study were 5, 10, 15, 20, 25, 30, 35 and 40 ºC. Results indicated that temperature affected germination rate and percentage of this crops. Optimum thermal range for seeds was determined as 15-35. No germination observed in 5 and 40 ºC. Based on beta model between germination rate (1/T50) and temperature, the cardinal temperatures minimum (T_{min}), optimum (T_o) and maximum (T_{max}) were determined: 5, 26.09 and 40.33 ºC., 5, 23.88 and 40.05 ºC and 10.07, 22.72 and 35.12 ºC.

ESSENTIAL OIL EVALUATION OF *PIMPINELLA AUREA* DC. IN DIFFERENT GROWTH STAGE: CASE STUDY OF NATURAL HABITAT OF TEHRAN PROVINCE

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Pimpinella aurea DC. is one of the most abundant aromatic species of *Pimpinella* in Iran, which has grown in north west, west, north east and south east of Iran [1]. In order to study essential oil quantity and quality of different parts and growth stages. Plant parts were collected from three natural habitats in Tehran Province (Vardavard, Tochal and Lavasanat) and dried. The essential oils were extracted with water distillation method. GC and GC/MS were used for detection of oil composition and determining component quantity. Results showed that the oil yields of stem/leaf were the lowest and seeds oil were the highest amount in three habitats. The seed oil yield of Vardavard sample was higher than the other samples. The main compounds of stem/leaf oil in Vardavard were citronellyl acetate and geranyl acetate in three stages of plant growth (vegetative, beginning of seed formation, seeding). The major components of stem/leaf oil of Tochal sample in the beginning of seed formation were β-bisabolene, limonene, geranyl acetate, longipinanole and citronellyl acetate, while the main compound of stem/inflorescence oil was β-bisabolene. The main components of stem/leaf oil in complete seeding in Tochal region were β-bisabolene, limonene, epoxy-allo aromadendrene and α-pinene. The stem/leaf oil of Lavasanat sample contained α-cuperene, germacrene- D and limonene as main components. The major compounds of seed oils of three habitats were β-bisabolene and epoxy-allo aromadendrene.

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PHYTOCHEMICAL INVESTIGATION AND ANTIOXIDANT ACTIVITY OF THE RHIZOME EXTRACTS OF THE *ZINGIBER OFFICINALE* L. AND THE PETAL EXTRACTS OF THE *CROCUS SATIVUS* L.

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Crocus sativus L., commonly known as saffron, is a perennial stemless herb of the *Iridaceae* family, widely cultivated in Iran and other countries, such as Spain and Greece [1]. *Zingiber officinale* L. is the botanical name for ginger, atropical herbal plant found in abundance in Asia. It belongs to the family of *Zingiberaceae* [2]. The present study was carried out to investigate of some phytochemical parameters on aqueous and ethanolic extracts of the rhizome of the *Z. officinale* and the petal of the *C. sativus*. The ethanolic extract showed higher antioxidant activity than the aqueous extract in both 2,2-diphenyl-2-picryl hydrazyl (DPPH) [3] and Ferric reducing antioxidant power (FRAP) [4] tests in these plants. In DPPH test, the antioxidant activity for ethanolic extract of the *Z. officinal* was IC_{50}=14.74±0.59 µg/mL and for *C. sativus* was IC_{50}=35.58±1.29 µg/mL. On the other hand, for FRAP test the antioxidant activity for ethanolic extract of the *Z. officinale* was showed to be 60.24 mMFe^{2+}/mg sample whereas for *C.sativus*36.65 mMFe^{2+}/mg sample was obtained. Butylated hydroxyl toluene (BHT) and Ascorbic acid were used as standards for this purpose which showed IC_{50}=4.85±0.68 µg/mL and 60.75 mMFe^{2+}/mg sample respectively. The content of flavonoids, anthocyanin and total phenols showed significant difference between the *Z. officinale* and *C. sativus*. *Z. officinale* contain the higher amounts of total phenols (68.72±1.03 mg/g D. w) in Compared with *C. sativus* (59.75±1.35 mg/g D. w) however the amount of flavonoids and anthocyaninin *C. sativus*(38.5% and 770 µmol/ D. w) are higher than *Z. officinale* (20.3% and 77.3 µmol/g D. w).Therefore according to amount of natural component and antioxidant outcomes, the *Z. officinale* and *C. sativus* 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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TRADITIONAL DETOXIFICATION REDUCES THE TOXICITY OF *NUX-VOMICA* SEEDS REGARDING STRYCHNINE AND BRUCINE LEVELS

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Strychnos nux-vomica (*Azaragi*) is a toxic plant with some therapeutic effects. The main compositions of *Azaragi* seed are alkaloids mainly strychnine and brucine [1]. Iranian traditional medicine (ITM) has been aware of *Azaraghi* toxicity and has even mentioned a toxic dose for it [2]. ITM has also presented some guidelines for people who overdose the herb [2]. But the most important solution of ITM to prevent *Azaraghi* toxicity is a process called *Eslāh* (detoxification) of *Azaraghi*. This process is divided into three different subdivisions: 1) boiling the seeds in water until all of water evaporates; 2) soaking the seeds for 7 days in cow milk and then peeling the seeds; 3) soaking the seeds for 7 days in milk, peeling the seeds and then boiling them in milk. Each method has been utilized to prepare the seeds for especial kinds of diseases: No. 1 used to prepare Azaraghi for a kind of diarrhea called *Zarab*; No. 2 for addiction treatment; and No. 3 for paralysis and debility. The aim of this study was to compare these three methods based on determination of strychnine and brucine. Azaraghi seeds were obtained from Tehran botanical market and divided into 4 groups: 3 groups were detoxified via the aforementioned methods, and 1 group kept intact as control. All samples were then powdered, their alkaloids were extracted by methanol, and strychnine and brucine were determined by HPLC. The results showed that all methods reduce both strychnine and brucine. The first method reduced strychnine level from 1.083 to 0.577 and brucinefrom 0.739 to 0.361. For second and third methods, the level of strychnine became 0.838 and 0.812, and third the level of brucinereached 0.522 and 0.568, respectively. According to the results, first method reduces the alkaloids to half. The results of second and third methods are nearly the same but their reductions are lesser than the first method. Therapeutically, these results are logical because the required dose of alkaloids for treatment of diarrhea is lesser than the needed doses to treat addiction or paralysis.

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RESPONSE OF *CUCURBITA PEPO* VAR. STYRIACA POLLEN GERMINATION TO DIFFERENT TEMPERATURE CONDITION IN COMPARISON WITH OTHER PEPO ACCESSIONS

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In order to study the response of pollen grains of naked seed pepo to different temperature and comparison with other cucurbits an experiment was conducted as factorial in completely randomized design in studied field and laboratory of horticultural department of university of Tehran. Pollen grains of four accessions including Khomein, Gorgan, Rasht and Hashem Abad. Were collected and were cultured in MS culture media and were placed in four different temperatures. Results showed pollen germination affected by accession type and temperature. Khomein accession showed more germination percent in 35 ^{0}C condition and also Rasht accession revealed lowest germination in different temperature. Conditions based on this study we demonstrated that response of accession were more different that showed different and adaptively of accessions to environmental condition.

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IN VITRO STUDY OF STORED POLLEN GERMINATION OF NAKED SEED PEPO AND COMPARISON WITH OTHER CURCURBITS UNDER DIFFERENT STORAGE CONDITION

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The evaluation of the germination capacity (viability) during the storage of pollen grains from the male parent is crucial in the process of artificial hybridization. In cucurbitaceae family pollination is more important to ensure the fruit and seed production. In order to evaluate the storage viability of *Cucurbita pepeo* var. *styriaca* pollen and compare with other pepo accessions some accessions were collected and planted in research field station of horticultural science department of university of Tehran. In this study pollens of the cucurbits accessions including: Khomein, Gorgan, Hashemabad and Rasht was evaluated for viability following storage over 12 months at 4 and –20°C. Fresh pollen viability recorded around 92% at first day and pollens were dried to decline moisture content then packed and moved to storage condition. Every two months pollen germination was tested in MS media culture. The proportion of viable pollen exceeded 70% for all cultivars in temperatures–20 evaluated after 3 months of storage while pollen stored at 4°C germination rate decreased to around 20%. Following 12 months of storage 'Khomein' showed more viability than other accessions in booth temperatures condition. The minimum germination rate was for 'Rasht'at 4°C following 'Gorgan'and'Hashemabad'. Storage at -20°C sub-freezing temperature maintained pollen viability above 33% at -20°C. Cultivars differed significantly in their tolerance to low temperature pollen of storage. These results illustrated that Successful pollen storage for longer periods of up to 1 year required temperatures below 0°C.

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THE EVALUATION OF CHANGES IN ANTIOXIDANT AT DIFFERENT STAGES OF GROWTH IN *HIBISCUS SABDARIFFA* LINN.

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Hibiscus sabdariffa is a plant from Malvaceae family, *Hibiscus* genus and *sabdariffa* species. *sabdariffa* species has red sepals that are edible and has such medical various like antioxidant reservation against liver toxicity, antifungal and antibacterial effect and blood pressure reduction. Antioxidant term in plants contains a big group of phenolic compound that can be very simple compound like simple Phenolic acid or tannin polymerized compound [1]. In this research the antioxidant changes in *Hibiscus sabdariffa* have been studied with DPPH method, by Micro plate reader in two wave length, 490 and 515 nm on three stages(before flowering, flowering and after flowering). Results due to antioxidant changes in three stages of *Hibiscus sabdariffa* growth showed that the amount of IC_{50} was 1004 µg/ ml in before flowering stage. In flowering and after flowering stages the amount of IC_{50} were 2256.25 µg/ ml and 2109.23 µg/ml respectively, also Gallic acid standard index was 22.648 µg/ ml. The comparison of antioxidant activity in different growth stages showed that the maximum and minimum antioxidant activity was related to before flowering and flowering stage respectively.

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THE EFFECT OF RHEUM RIBES. LHYDROALCHOLIC EXTRACT ON LEARNING AND MEMORY, IN ALZHEIMERICRATS

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Alzheimer's disease (AD) is the most common cause of dementia in the elderly and is responsible for 60 to 80 percent of the cases (1). AD is a neurodegenerative & prevalent central nervous system disease with no definitive treatment till now Degeneration and loss of basal forebrain cholinergic innervation is accepted as a major cause of cognitive impairment and memory loss for the disease (2).So in this study the effect of hydroalcholic Rheum ribes extract was investigated on speed of learning and consolidation of memory in rats with Alzheimer`s. Alzheimer's was induced by NBM bilateral electrical lesion.32 adult male Wistar rats were divided in 4 groups: control, lesion, lesion experimental, experimental, each group consisting of eight rats. The experimental group received interpleurally 250, 500 mg/kg of Rheum. Ribes hydroalcholic extract for 20 days .The lesion and control group received distilled water interpleurally. The behavioral assessment was measured, after treatment by Morris water maze; the collected data was analyzed by the SPSS software using ANOVA and Repeated Measures of Analysis Variance tests. Results: NBM bilateral electrical lesion decrease the, spatial memory. ($p<0.01$) The lesion experimental animals compared to the lesion groups were increased significantly in all behavioral assessment ($p<0.05$). The Rheum ribes improve the memory and learning in a rat model of Alzheimer's disease by acetylcholinesterase inhibitory and antioxidant effect.

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EFFECTS OF VARIOUS LEVELS OF *MALLVA SYLVESTERIS* EXTRACT ON SOME BLOOD PARAMETERS OF BROILER CHICKENS

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This experiment was conducted to investigate the effect of different levels of *Malva sylvestris* extract on blood parameters of broiler chickens with 176 one-day-old male Ross with 16 experimental units, 4 treatments, 4 replicates and 11 broilers in each replicate in completely randomized design for 42 days. The dietary treatments consisted of basal diet (control), and different levels of extract of *Malva sylvestris* (0.1, 0.2 and 0.3 percentage of diet). At the end of the experiment, one bird of each replicate was slaughtered and blood samples were taken for measurement of some blood parameters. The results of this experiment showed that the addition of extract to the diet significantly decreased cholesterol, triglyceride, HDL and LDL concentrations ($P<0.05$) but glucose concentration had not significantly affected by the treatments ($P>0.05$).

PHYTOCHEMICAL, NUTRITIONAL AND MINERAL ELEMENTAL ANALYSIS, AND PHYSICOCHEMICAL STUDIES OF *PISTACIA ATLANTICA* SUBSP. *KURDIKA* LEAVES: A NATIVE OF BIRJAND

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The *Pistacia atlantica* subsp. *kurdica* belongs to the Anacardiaceae is widely distributed in Iran [1]. Its leaves have been selected for phytochemical investigation and identification of the different classes of secondary metabolites [2]. Also physicochemical parameters and nutritive factors on *Pistacia atlantica* leaves which collected on May 5th, May 22th and June 5th 2013 were investigated. The phytochemical screening in four crude extracts of respective leaves (include water, ethanol, acetone and n-hexane as solvents) showed the presence of Steroid, Terpenoids, Anthocyanin, Tannins, Coumarins, Protein, Amino Acid, Flavonoids, Phytosterol, Phenol, Carbohydrate. In addition, flavonoid contents were determined in three different extracts (using C_3H_6O, C_2H_5OH and H_2O as solvents) of leaves [3] .Among the three selected solvents, water was the best for flavonoids extraction. The total ash value was found to be 6.73% w/w indicating the considerable presence of inorganic radicals. The acid insoluble ash and water soluble ash values were found to be 3.47% w/w and 1.5% w/w respectively. The water and alcohol soluble extractive values were found to be 25.6 w/v and 21.7 % w/v respectively [4]. The results showed that the leaves of plant are rich in Mg and K [5]. And protein and ADF contents which were the maximum on leaves of June 5th were determined, so as fat and NDF contents in leaves observed in May 5th [6, 7].

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THE EFFECT OF HESA-A DRUG ON FORMALIN-INDUCED INFLAMMATION AND WEIGHT LOSS IN RATS

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HESA-A is a natural compound with herbal-marine origin that its therapeutic effects have been proven in cancer. Because of relationship between cancer and infection the present study has investigated HESA-A drug effects on inflammation in an inflammatory model in rats. Also we assessed its effect on weight loss in this assay. In this study, four groups of male NMRI rats were used and a sample size was six, in each group. These groups were negative control (distilled water), positive control (Methylprednisolone) and treatment groups (HESA-A in dosages of 150 and 225 mg/kg). On the first day, the drugs were injected intra-peritoneally, in each group. After thirty minutes of injection, paw volume was measured by plethysmometer and immediately, formalin solution was injected subcutaneously in the hind paw of rats. After an hour, inflamed paw volume was measured. In days 2-8, the inflamed paw volume was measured and immediately drug was injected intra-peritoneally. In addition, we measured the weight of these rats during these periods. In this study, comparing of the HESA-225 and control groups and also, HESA-225 and HESA-150 groups, indicated significant differences in days 2-8. The mean volume of rats paw in HESA-225 group was significantly less than HESA-150 and control groups ($P<0.05$). In addition, significant decrease in the mean volume of rats paw, was observed in Methylprednisolone group compared to negative control group, in days 3-8 ($P<0.05$). The weights of animals in HESA-225 group decreased during this study and in comparison to negative control group were significantly different since 5th day. The HESA-A drug (225 mg/kg) has a chronic anti-inflammatory effect in intra-peritoneal administration, therefore it's probable that anti-cancer properties of HESA-A can be done with this effect. In addition, because of it's components such as *Cuminum Cyminuml* and *Apium Graveolens*, HESA-A can decrease weight.

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COMPARISONE OF ANTIOXIDANT PROPERTIES EXTRACTS FROM THREE CAMEROON MEDICINAL PLANTS: *ACALYPHA RACEMOSA*, *GARCINIA LUCIDA* AND *HYMENOCARDIA LYRATA* WITH TWO IRANIAN MEDICINAL PLANTS: *TEUCRIUM POLIUM* AND *LWSONIA INERMIS*

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Garcinia lucida, *Hymenocardia lyrata*, *Acalypha racemosa*, *Teucrium polium* and *Lawsonia inermis* plant extracts are used against many diseases in folk medicine. The aim of the present study was to investigate the in vitro antiradical and antioxidant properties of methanol extracts of the three plants. We determined the in vitro antioxidant activity, the total phenolic content and the phytochemical screening of the extracts from fruits, barks, leaves, roots and stems of these plants using standard procedures. The results of the antioxidant properties showed that more than 60% of DPPH°, NO° and HO° radicals were inhibited by the extracts. The radical scavenging activity, the total antioxidant capacity as well as the reducing power increased with the concentration of the extracts. The 50% inhibitory concentration (IC50) varied from 1.46 to 21.65 µg/ml depending of the type of extract and the antioxidant tests. The results indicated that all the extracts exhibited antioxidant properties and the roots of *H. lyrata* showed the best antioxidant activity (217.17 ± 9.45 mg Equivalent catechin/g of extract) while the highest total phenol content was found in its barks (169.782 ± 3.025 mg Eq cat/g of extract). The methanol extract of *H. lyrata* possess the most antioxidant property among the five extracts.

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RATE AND HOMOGENITY OF BALANGO (*LALLEMANTIA ROYLEANA*) GRAIN GERMINATION UNDER TREATMENT OF GAMMA RAY

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Balangois belongs to the Lamiaceae family, including medicinal plants that contain many ingredients. The grains of Balango have several properties including heart tonic and housing [2]. Given the importance of genetic diversity in plant breeding, mutation breeding is an important method for inducing genetic diversity [1]. In this study the grains of Balango were irradiated with gamma rays at different doses (0, 50, 100, 150, 250, 350, 450, 550, 700, and 900 Gray) through completely randomized design with four replications. The variance analysis of data showed differences among doses are statistical significant at 1% probability level for traits under study. Although the maximum germination rate was observed in doses 0, 50, 100, 150, 250, 350 Gray, but the difference among them were not statistically significant. The lowest germination rate was obtained in 700 Gray. The germination homogeneity (GH) was not significant among doses 450, 550, 700, 900 Gray, although GH was highest in these doses. We concluded the doses from 150 to 550 Gray were suitable in mutation breeding of Balango.

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CONTROLLING THE CONTAMININATION OF *BERBERIS VULGARIS* EXPLANTS IN VITRO

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Berberis is one of the valuable nutritional and medicinal plants. This experiment was carried out for achieving the best method for sterilization of berberis explants in vitro. Because one the main problems in berberis in vitro culture is the high fungal and bacterial contamination. Though in the current experiment the efficacy of different disinfectants like sodium hypochlorite, mercuric chloride, various antibiotics as well as Benomyl as fungicide were evaluated on sterilization of axillary buds of *Berberis vulgaris*. The explants were cultured on WPM media after disinfection. The data collection began after 3 days of culture and continued to day 40. The results showed that the application of 0.5% Benomyl for 10 minute followed by immersing the explants in 70% ethanol for 1 minute and 0.1 % mercuric chloride for 8 minute produced the highest number of intact explants.

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EFFECTS OF ORGANIC FERTILIZERS AND MYCORRHIZA INOCULATION ON LEAF AREA INDEX AND DRY YIELD OF DWARF CHICORY (*CICHORIUM PUMILUM* JACQ)

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The aim of this study was the evaluation of the effects of organic fertilizers and mycorrhiza inoculation on leaf area index (LAI) and dry yield of dwarf chicory (*Cichorium umilum* Jacq). A field experiment was conducted at Research Farm of Ferdowsi University of Mashhad, in growing season of 2013.Experimental data was analyzed as a factorial-split based on completely randomized block design with three replications. Treatments including four levels of organic fertilizers (Cow manure, humic acid, fulvic acid and control), three levels of mycorrhiza inoculation (*Glomus mosseae*, *Glomus intraradices* and no inoculation) and two cuts (15 June and 13 July). Results showed that, cow manure and mycorrhiza inoculation treatments significantly influenced LAI, fresh and dry yields of dwarf chicory, compared to other treatments. In addition, fresh and dry yields of dwarf chicory in the second cut were significantly greater that first cut. Based on our results it seems that integrated management of organic fertilizers and mycorrhiza inoculation could be an effective approach for increasing the dwarf chicory yield under controlled conditions [1].

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EFFECT OF SELENIUM AND SILICON ON GROWTH OF PEPPER (*CAPSICUM ANNUUM* L.) UNDER SALT STRESS

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Selenium is a chemical element with symbol Se and atomic number 34 and was discovered in 1817 by Jons Jacob Berzelius [1]. It is an essential element for animals and humans, and also been useful to plants. Some studies showed that Se has allviate various abiotic stresses that induced in plants such as cold, drought, high light, water, salinity and heavy metals. In the other hand, Se was harmful for plants in high concentrations [2]. Silicon is the second most abundant element in soils. But only in some plants this element is essential. Some researches demonstrated that si can improve plant growth against biotic and abiothc stress [3]. Today salinity is a dangerous problem in agriculture measure of the total amount of soluble salt in soil. As salinity levels increase, plants extract water less easily from soil, aggravating water stress conditions [4]. The pepper (*Capsicum annuum* L.) is one of the important field crop in the worlds, and contain some compounds such as vitamins (A and C), and essential mineral (*calcium, iron and phosphorus*). In this investigation the effect of selenium and silicon on the pepper (*Capsicum annuum* L.) in hydroponic conditions were studied. In this experiment we using a completely random design with three replication under salt stress (*0, 75 mM*), selenium (0, 0.2, 2, 5 µM) and silicon (0, 0.05, 0.2, 1.5 mM). The results showed that salinity decreased dry and fresh weights of shoot, root and fruit significantly but selenium and silicon improved growth in plants that treated with salinity, especially in 0.2 µM concentration for Selenium and 1.5 Mm concentration for silicon. From this experiment we concluded that selenium and silicon were useful for growth stimulation in pepper that exposed to salt stress.

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EFFECTS OF MATERNAL BULB WEIGHT AND FARM MANURE ON REPRODUCTION AND YIELD OF SHALLOT (*ALLIUM ALTISSIMUM* REGEL.).

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Shallot (*Allium altisimum* Regel.) is one of the medicinal and industrial species in *Allium* genus in Iran. One of the major problems in the process of plant domestication and breeding how to reproduce it. The aim of this study was to examine the influence of maternal bulb weight and manure fertilizer (cattle) on reproduction and yield of the shallot. Therefore, a factorial experiment based on complete randomized blocks design was conducted in the research field of faculty of agriculture of shirvan in 2012. First factor includes 3 levels of bulbs weight (15-25, 25-35 and 35-45 gr) and second factor contains 3 levels of farm manure (0, 40 and 60 tons per hectare). Results indicated that maternal bulb weight and manure treatments didn't any effects on bulbs reproduction. However, various levels of maternal bulbs weight significantly ($p>0.05$) affected dry mater yield of bulbs, plant height and bulbs diameter. Various levels of farm manure on these characters were also significant. With increasing of maternal bulbs weight, mean dry mater of bulbs, bulb diameter, emergence percentage and total dry mater weight of plant were increased. Interaction effects between farm manure and maternal bulb weight on dry mater yield was positive and significant so that the most means of dry matter yield in the third treatment (35- 45 gr) of maternal bulb weight and control (no manure consumption) treatment (341.4 $g.m^2$) were shown, and the least means was belong to the first treatment of maternal bulb weight and second level of farm manure (74.26$g.m^2$).

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IN VITRO ANTIOXIDANT CAPACITY AND ANTIBACTERIAL ACTIVITY OF THREE *CENTAUREA* L. SPECIES (ASTERACEAE) FROM IRAN

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The genus *Centaurea* L. is a polymorphous genus belonging to tribe Cardueae Cass., a tribe of the Asteraceae family, and comprises 400-700 species of annual, biennial and perennial grassy plants, rarely dwarf shrubs predominantly distributed in Europe and Asia [1]. *Centaurea* species have been used for their antidandruff, antidiarrhoic, anti-rheumatic, anti-inflammatory, choleretic, diuretic, digestive, stomachic, astringent, antipyretic, cytotoxic and also antibacterial properties in folk medicine [2]. Plants contain a diverse group of phytochemicals such as phenolic compounds, flavonoids and the others, which have antioxidant properties and antibacterial activities [3]. These constituents are important for the maintenance of human health and protection from some pathological disturbances, such as heart diseases and cancer [4]. The aim of the present study is determination of antioxidant capacity and antibacterial activity of three *Centaurea* species (*C. iransharii*, *C. imperialis* and *C. glastifolia*). Total phenol and flavonoid contents, antioxidant properties of capitol and aerial parts of the species were studied by spectrophotometry. Total phenol content of the extracts varied from 35.92 - 73.00 mg GAE/g and total flavonoid content from 4.45-5.30 mg QE/g. In the present study, *C. iransharii* had greater antioxidant activity than those of C. imperialis and *C. glastifolia*. The antimicrobial activities of the extracts were tested by the disk diffusion method against six microbial species. Results showed that the extracts possess antibacterial activity against three of gram positive bacteria including *Staphylococcus aureus*, *Bacillus cereus* and *Bacillus thuringiensis*. Gentamicin, Penicillin, Nitrofurantoin and Neomycin were used as positive controls in this experiment.

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ANTIMICROBIAL ACTIVITY AND CHEMICAL COMPOSITION OF ESSENTIAL OILS OF FLOWERS OF *CENTAUREA BALSAMITA* LAM. FROM KHORASAN, IRAN

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The genus *Centaurea* L. (Asteraceae) is represented by a very large number of species, distributed in the wourld. Furthermore *Centaurea* is a polymorphous genus and comprises 400 to 700 species of annual, biennial and perennial grassy plants, rarely dwarf shrubs predominantly distributed in Europe and Asia [1]. *Centaurea* is represented in Iran with 74 native species out of which 38 of are endemic [2]. Also members of the genus *Centaurea* have been used in traditional plant based medicine. The essential oil obtained by hydrodistillation from the flowers of *C. balsamita* from plants growing wild in Khorasan, Northeast of Iran, were analyzed by gas chromatography (GC) and gas chromatography/mass spectral (GC/MS). In the oil of flower of *C. balsamita* 52 (0.12%v/w) components was identified, accounted for 98.2% of the total flower oil. α-Pinene (13.5%), β-caryophyllene (19.0%), (*Z*)-β-ocimene (6.7%), β-copaene (7.2%), germacrene D (2.5%) and spathulenol (8.0%) were major constituents. The essential oil obtained from the flowers of *C. balsamita* was screened for antibacterial activity against four bacteria (*Escherichia coli, Bacillus cereus, Salmonella enteritidis, Staphylococcus aureus*). The antibacterial activity was evaluated by the microdilution method and the minimum inhibition concentrations (MIC) and minimal bactericidal concentration (MBC) of the oil were determined. The essential oil was active against gram positive and gram negative bacteria. The antimicrobial activity of oil of plant was shown by the essential oil, and in general, the oil showed moderate activity against all tested microorganisms.

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EVALUATION TREATMENT OF CUTANEOUS LEISHMANIASIS WITH ALOE VERA EXTRACT IN BALB/CAND OUTBRED SW MICE

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Aloe vera has wide spread use in health products, and several reports on the whole plant and inner gel has been reported [1]. Leishmaniasis is one of the six most common parasitic infections in tropical regions. There are different therapeutic modalities. However therapeutic resistance is developed and resulted in numerous problems. So evaluation of other therapeutic modalities is performed extensively. Current treatments of CL are poorly justified and have sub-optimal effectiveness. Treatment can be based on topical or systemic regimens [2]. We compared the therapeutic response of cutaneous leishmaniasis with Glucantime and *Aloe Vera* extract in animal model. This experimental study was conducted in Shahed University. The therapeutic response of cutaneous leishmaniasis to Glucantime and *Aloe Vera* extraction animal model was studied in BALB/c and outbred SW mice. These two races were divided in three groups according to receiving either one of these two agents or no treatment (control). The therapeutic response was evaluated according to parasitic load before and after treatment and also with measuring the size of the lesions. The results showed that Aloe Vera had good therapeutic efficacy in treatment of lesions in mice ($P < 0.05$) that this efficacy was significant in sixth, seventh and eighth weeks after the treatment. There was also a statistically significant difference between the groups regarding the parasitic load ($P < 0.05$).According to the results, it may be concluded that Aloe Vera extract would have a good efficacy in treatment of cutaneous leishmaniasis that is comparable with glucantime.

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EVALUATION OF COLD TOLERANCE IN LANCELOT PLANTAIN (*PLANTAGO LANCEOLATA* L.) UNDER CONTROLLED CONDITIONS

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Lancelot plantain (*Plantago lanceolata* L.) is a perennial herb from Europe, temperate Asia and North Africa [1]. It has been used for various medicinal purposes for centuries in Europe [2] and only more recently as a forage plant [3]. In order to evaluating freezing tolerance of this species conducted one experiment in 2011-12 under controlled conditions. Five ecotypes of Lancelot plantain (Bojnord, Kalat, Mashhad, Ghayen and Birjand) after 3 mounts growth and hardening in natural environment exposed to 8 freezing temperatures (0, -3, -6, -9, -12, -15, -18 and -21°C). Electrolyte leakage percentage (EL%) and lethal temperature for 50% of plants according to EL (LT_{50el}) determined for assessing plasma membrane stability. Plant re-growth determined 4 weeks after freezing treatment based on survival percentage (SU%), lethal temperature 50 percentage according to survival (LT_{50su}), number of leaf, leaf area, leaf dry weight and reduced dry matter temperature 50 ($RDMT_{50}$). Results showed that Mashhad and Birjand ecotypes had the least and the most EL% respectively. At the case of LT_{50el}, Mashhad ecotype was the most tolerant and Kalat and Birjand ecotypes were the most sensitive ecotypes. Mashhad ecotype had more SU% than other ecotypes. In addition LT_{50su} in Mashhad ecotype was 5.3°C lower than Birjand ecotype. Kalat and Birjand ecotypes had the highest and the lowest leaf area respectively. Mashhad and Birjand ecotypes were produced the highest and the lowest number of leaf and leaf dry weight, respectively. $RDMT_{50}$ for Bojnord ecotype is 3°C lower than Birjand ecotype. Pearson correlation coefficient of EL% with SU% and leaf dry weight of plants in recovery period was negative and significant (-0.702^{**} and -0.537^{*} respectively). In addition there was positive and significant correlation between LT_{50el} and LT_{50su} (0.526^{*}) and $RDMT_{50}$ was exhibited negative and significant correlation only with SU% (-0.529^{*}). According to these findings, Mashhad, Bojnord and Ghayen ecotypes exhibit suitable freezing tolerance. However for better understanding of Lancelot plantain responses to freezing stress there is needed doing more studies under field and controlled conditions.

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VARIABILITY IN THE ESSENTIAL OIL CONTENT AND COMPOSITION OF DIFFERENT PLANT PARTS OF *PEROVSKIA ABROTANOIDES* (LAMIACEAE) GROWING WILD IN IRAN

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Perovskia abrotanoides Karel. (Lamiaceae), with the common Persian name of "Brazambel", is an aromatic shrub which is mainly growing in mountains at an altitude of 2200 to 4200 m from Northeastern Iran across Northern Pakistan to Northwestern India. The plant is used in Iranian folk medicine as an analgesic inrheumatic pains and treatment of fever. Bioactive tanshinones with leishmanicidal, antiplasmodial and cytotoxic activities have been also isolated and reported from the plant. The essential oil of *P. abroatnoides* is also non-toxic with antimicrobial activity. In the present study, variability in the essential oils obtained from the different parts (leaves, stems and flowers) of the wild plant collected from Ghamsar (Kashan, Isfahan Province) has been studied. The essential oils were isolated by hydrodistillation and were analyzed by GC and GC-MS. The essential oil content (w/w %) was in the order of: flowers (4.1%)>leaves (2.8%)>stems (0.6%).In total 24, 17 and 22 compounds were identified and quantified in leaves, stems and flowers, representing 99.5, 99.8, and 99.7 of the total oil, respectively. Camphor (14.0-38.1%), 1,8-cineol (14.8-27.8%) and α-bisabolol (4.1-25.4%) were the major compounds in the oil of all plant parts. Oxygenated monoterpenes (49.0-66.5%) were the major compound class in the oils of studied parts of *P. abrotanoides*.

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ANTIFUNGAL EFFECT OF THE AQUEOUS AND ETHANOLIC *AVICENNIA MARINA* EXTRACTS ON *ALTERNARIA CITRI* AND *PENICILLIUM EXPANSUM*" *IN VITRO*"

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Fungal contamination of food products is a main problem in developing countries and it leads to a decline in quality and foodstuffs quantity. Some plant or spice extract can be used as food preservatives due to their strong antimicrobial activity. *Avicennia marina* (Forssk.) is commonly known as gray mangrove tree classified in the plant family Avicenniaceae. The aim of this study was to determine antifungal effect of the aqueous and ethanolic extracts of *Avicennia marina* (different concentrations) on *Alternaria citri* and *Penicillium expansum" in vitro"*. In this study, mangrove leaves were dried under suitable condition (in shadow), and then extraction was carried out with ethanol 96 degree and water. Antifungal effect of the extracts was evaluated by two methods, "Collins method" (spreading of the extract on medium surface) and "disk agar diffusion method" at 10, 20, 30 and 40 mg/ml. Minimum Inhibitory Concentration (MIC) and Minimum Fungicidal Concentration (MFC) was determined by incorporating various concentrations of extracts in Sabouraud Dextrose Agar (SDA) in tubes against *Alternaria citri*. Statistical analysis was carried out by analysis of variance (ANOVA). The results showed that the ethanol extract of mangrove leaf with "Collins method" in 2000 µg/ml inhibited the growth of *Alternaria citri* and *Penicillium expansum*. The aqueous extract in both "disk agar diffusion assay" and "Collins method" did not show any inhibition effect on *Penicillium expansum*. The results showed that MIC of *Avicenna marina* leaves of the aqueous and ethanolic extracts for *Alternaria citri* was 64 and 16 mg/ml and *Penicillium expansum* was 32 and 16 mg/ml respectively. The aqueous and ethanolic extracts MFC of *Avicenna marina* leaves for *Alternaria citri* was 128 and 32 mg/ml and *Penicillium expansum* was 64 and 32 mg/ml respectively. Results that showed *Avicenna marina* extract can be used as natural antimicrobial in food products.

TISSUE CULTURE OPTIMIZATION OF *ZIZIPHUS JUJUBE*

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Jujube (*Ziziphus jujuba*) is a tree from *Rhamnaceae* family. As a valuable medicinal plant and resistant to different climatic condition is widespread in many parts of Iran. In this research, *in vitro* optimization of tissue culture and mass production of jujube was investigated. Apical and axillay buds were used as explants. The best treatment for sterilization was 0.02% mercuric chloride for 2 min, 70% ethanol for 5 min and 50% NaOCl for 15 minutes. Explants were transferred to MS medium supplemented with different concentrations of plant growth regulators. The most regeneration was observed in 3 mg/l BAP+0.01mg/l IBA. The results showed that MS medium containing 0.5 mg/l Kin + 0.1 mg/l IBA and QL medium supplemented with 5 mg/l Kin + 0.1 mg/l IBA was suitable for proliferation. The most rooting was observed in ½ MS with 2mg/l IBA. Then plantlet was transferred to soil.

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THE EFFECT OF THERMAL SHOCH ON INCREASING THE QUALITATIVE PROPERTIES OF AQUEOUS DISTILLATION OF SAFFRON (*CROCUS SATIVUS*)

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Saffron is the most expensive spice in the world that is derived from the dried stigma of the crocus flower (*Crocus sativus*). Saffron is from the family of Iridaceous. The part of saffron that is mostly used is the end of stigma with the red or orange color. Because of this wonderful color it is used as an eatable or additive pigment in cooking and in many food industries. Saffron has a long medicinal history as a part of traditional healing. According to modern researches, saffron is helpful for a lot of diseases such as: digestion problem, arthritis, insomnia, depression, eye problem and etc. Saffron stigma contains a variety of naturally-occurring active plant constituents, including crocin (color factor), safranal (aroma) and picrocrocin (bitter taste).These chemical compounds are known as qualitative properties of saffron. The aim of study is: to prepare or extract the aqueous distillation of saffron by using thermal shock and show that how it can improve and enhance the qualitative attributes of saffron stigma. In this research all the red saffron stigmas are ground. Adding the saffron powder to the solvent (water is the solvent in this process) and stir them for 5 hours at room temperature. Solvent that is used in three temperature 25˚C, 80˚C, and 100˚C. After finishing the process, separate the fibre of saffron with ultracentrifuge and evaluate the effect of thermal shock on qualitative properties by measuring the absorption amount with UV-spectrophotometer in three wavelengths 440nm for crocin, 330nm for safranal and 257nm for picrocrocin. The result illustrates that using high temperature water as a main solvent caused a wonderful increasing in amount of crocin, safranal and picrocrocin. According to this, the color amount (crocin) of final aqueous distillation in 440nm at 25˚C is 221, for aroma (safranal) in 330nm is 22.4 and for flavour in 257nm is 81 whereas the amount of crocin, safranal and picrocrocin at 100˚C respectively are 300 (440nm), 44 (330nm) and 107.3 (257nm).By comparing these data understand that thermal shock caused refraction in cell contexture or cell membrane easily at the first time of reaction. This process due to improve the releasing of qualitative factors.

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EFFECTS OF PLANT DENSITIES AND IRRIGATION LEVELS ON GROWTH CHARACTERISTICS AND FLOWER NUMBER OF BORAGE (*BORAGO OFFICINALIS* L.)

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Borage (*Borago officinalis* L.) is an important medicinal plant that is grown for its Gamma Linolenic Acid, contained in the seed oil which is used for skin disorders including eczema, seborrheic dermatitis and neurodermatiti. In order to investigate the growth characteristics and flower number of borage (*Borago officinalis* L.), a field experiment was conducted as split plot based on a complete randomized block design with three replications at the Agricultural Research Station, Ferdowsi University of Mashhad during growing season of 2012-2013. Three irrigation levels such as 1000 (I_1), 2000 (I_2) and 3000 (I_3) $m^3.ha^{-1}$ and four plant densities including 16 (D_1), 20 (D_2), 26.67 (D_3) and 40 (D_4) plants.m^{-2} were allocated to the main and sub plots, respectively. Criteria such as plant height$_{max}$, leaf area index$_{max}$ (LAI_{max}) and flower number at three stages of borage were measured accordingly. Result showed that simple effect of plant densities and irrigation levels were significant ($p \leq 0.05$) on plant height$_{max}$, LAI_{max} and flower number at three stages. These traits significantly affected by interaction between plant density and irrigation. The highest and the lowest LAI_{max} were observed in I_3D_1 and I_1D_1 with 2.51 and 1.01, respectively. The maximum flower number at the first, the second and the third sampling stages were recorded in I_1D_3 with 99.67, 156.67 and 201.67 flowers.m^{-2}, respectively.

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MORPHOLOGICAL AND PHONOLOGICAL VARIATION IN DIFFERENT *ACHILLEA* SPECIES

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Germplasm collections, genetic resource have provided valuable genetic diversity of materials that may be used to improve crop production. The variation of morphological and phonological study of twelve genotypes belonging to six species (*A. millefolium, A. pachycephala*, *A. filipendulina*, *A. nobilis*, *A. aucherii* and *A. santolina*) *Achillea* was performed using a randomized complete block design with three replicates. During plant growth, fourteen morphological and phonological traits were measured. Analysis of variance showed that genotypes for the measured traits were significantly different at the 1% level. Leaf width, number of flowers per inflorescence and floret number revealed the highest phenotypic and genotypic coefficients of variation. Among studied genotypes *A. aucherii* and *A. santolina* showed the highest flowering duration (90 and 92 day). *A. millefolium*, *A. santoilna* and *A. aucherii* had the lowest plant height. The lowest variation was noted between *A. santolina* and *A. aucherii*. The results showed that high variation in morphological and phonological traits could be used for further *Achillea* breeding programs.

EFFECT OF WATER STRESS ON MORPHOLOGICAL TRAITS OF MOTHERWORT (*LEONURUS CARDIACA* L.)

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Motherwort, *Leonurus cardiaca*, (Lamiaceae) is one of the oldest medicinal plants. The plant is especially valuable in treatment of female weaknesses and disorders, allaying nervous irritability, inducing quiet and passivity of the whole nervous system. In order to study water stress effect on morphological traits in four populations of *L. cardiaca*, a split plots experiment was carried out based on randomized complete block design with three water level (field capacity (FC) (as control), one third and two third of FC) and three replications. The results of ANOVA and comparison of means indicated that the effect of water stress on morphological traits was significant and variation was observed among the populations for the most of the studied characteristics. Fresh weight, drought weight, plant height, number of floral cycles, leaf area and crown diameter had the maximum values under water stress of 2/3 FC. Based on the results of analyses, Kerman was the most drought tolerant in some characteristics compared with other studied genotypes.

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COMPARISON OF THE EFFECT OF HARVESTING SEASON ON ESSENTIAL OIL YIELD AND TOTAL PHENOLIC COMPOUNDS OF *ACHILLEA* NOBILIS IN LEAVES AND FLOWERS

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Yarrow (*Achillea* spp) belongs to Asteraceae family and is one of the valuable medicinal plant worldwide. Climatic conditions affect the quality and quantity of active components of medicinal plants. In this study *A. nobilis* (collected from Shandiz, Mashhad) used for the research. The experiment performed based on randomized complete block design with three replicates. Alcoholic extract of leaves and flowers during different seasons was extracted using phenol Folin – ciocalteu reagent and was measured by spectrophotometer. Furthermore, essential oil yield of each sample in each season were evaluated using Clevenger apparatus. Analysis of variance showed a significant variation ($P < 0.05$) between seasons for oil yield and total phenol content in the vegetative and reproductive organs. The highest oil yield obtained for summer (0.88%). Vegetative organs showed higher amount of polyphenols (77.11mgt/gdm) than reproductive (42.57 mgt/gdm) one in the summer. Finally, the highest oil yield and polyphenols obtained in the samples harvested in summer.

EVALUATION OF ANTIOXIDANT, ANTIBACTERIAL ACTIVITY, AND PHENOLICS CONTENT OF *CENTAUREA PSEUDOSCABIOSA* L. FROM IRAN

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Centaurea L. is the largest genus of Asteraceae family in Iran. Most taxa are endemic to the country and much localized [1]. *Centaurea* species have been used for their anti-dandruff, antidiarrhoic, antirheumatic, antiinflammatory, choleretic, diuretic, digestive, stomachic, astringent, antipyretic, cytotoxic and also antibacterial properties in folk medicine [2]. Antioxidant and antibacterial activity of the methanolic extracts of aerial parts and capitulla of *Centaurea pseudoscabiosa* L. was studied. Both extracts were found to posses antioxidant activity as determined by effect on DPPH free radical scavenging, Cu-chealating and also β-carotene–linoleic acid bleaching. Total phenol and flavonoid contents of the species were determined by Folin-Ciocalteu and $Alcl_3$ assays, respectively. Disc diffusion method was used to determine antibacterial activity of the extracts against three positive and Gram negative bacterial strains. The aerial parts extract showed a higher content of total phenolics and also DPPH radical scavenging activity than those of capitulla extract. However, capitulla extract represented a higher antioxidant activity in β-carotene-linoleic acid assay and Cu-chealating and also better antibacterial activity against bacteria tested.

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EFFECT OF DIFFERENT LEVELS OF *SCROPHULARIA STRIATA* EXTRACT ON PERFORMANCE OF BROILER CHICKENS

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The experiment was conducted to investigate the effect of feeding *Scrophularia striata* extract on the performance of broilers. A total of 160 one day old male Ross-308 chicks were used in the experiment. Birds were partitioned into four experimental groups of 40 birds in each. Each treatment was composed of 4 replicates with 10 birds each. The dietary treatments consisted of basal diet (control), and different level of extract of *Scrophularia striata* (0/1, 0/2, 0/3 percentage of diet). Feed Intake (FI) and Feed Conversion Ratio (FCR) were calculated in each pen on weekly bases. The data were analyzed using GLM procedure of SAS (2003). For significant differences (p<0/05) means were compared by using the Duncan's method of the same statistically package. Plant extract supplementation did not influence (P>0/05) feed intake, body weight gain and feed conversion efficiency significantly; however, treatments groups achieved numerically higher performance values. The lowest FCR was achieved with 0/3% (1/83), 0/1% (1/85), 0/2% (1/85) and control (1/89). It can be concluded that extract of *Scrophularia striata* could provide positive advantages in broiler performance.

ANTIBACTERIAL ACTIVITY OF *SATUREJA KHUZISTANICA* ESSENTIAL OIL AGAINST MULTIDRUG RESISTANT CLINICAL ISOLATES OF *ACINETOBACTER BAUMANNII* AND *KLEBSIELLA PNEUMONIAE*

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In recent years, the emergence of bacterial resistance to almost all available antibiotics has caused interest in discovering new agents including the products of medicinal herbs. We evaluated the antibacterial activity of *Satureja khuzistanica* essential oil against 21 multidrug resistant clinical isolates of *Acinetobacter baumannii*, 15 urinary isolates of *Klebsiella pneumoniae*, and 4 ATCC standards including: *K. pneumonia* (ATCC 10031), *E. coli* (ATCC 25922), *P. aeruginosa* (ATCC 85327) *and S. aureus* (ATCC 25923). The aerial parts of *S. khuzistanica* were collected at full flowering stage from Ilam, Iran. The essential oil was isolated by hydrodistillation and analyzed by a combination of capillary GC and GC-MS [1, 2]. Antibacterial activity was measured by disc diffusion. Minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) were also determined using broth microdilution [2, 3]. Analysis of *Satureja khuzistanica* essential oil showed carvacrol as the major oil component (92.87%) [4]. Disc diffusion results showed that all *Acinetobacter baumannii* clinical isolates were sensitive to the essential oil with inhibition zones around 34 mm and the disc test results for clinical isolates of *K. pneumonia* as well as the ATCC standards showed marked susceptibility with zones of inhibition around 21 mm. MIC and MBC values confirmed the disc test results and were 0.31 mg/ml for the all clinical isolates of *Acinetobacter baumannii* and 0.62 mg/ml for all isolates of *K. Pneumoniae* and standard isolates except for one *K. pneumoniae* (0.31 mg/ml) and *S. aureus* (1.25 mg/ml). *S. khuzistanica* essential oil and specifically carvacrol, may have a potential to be used against multidrug resistant Gram positive and Gram negative pathogens.

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BREATH TOXICITY STUDY OF FOUR MEDICINAL PLANTS: *SYZYGIUM AROMATICUM*, *LAURUS NOBILIS*, *FOENICULUM VULGARE*, *SATUREJA HOTENSIS* ON THE BIOLOGICAL ACTIVITY OF *TRIBOLIUM CASTANEUM*

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Medicinal plants are more than simply objects with useful chemical and symbolic aspects. They are living organisms that are functionally embedded in the cultural fabric of social groups and institutions [1]. In this study, breath toxicity of four medicinal plants consist of *Syzygium aromaticum, Laurus nobilis*, *Foeniculum vulgare, Satureja hotensis* in temperature of 27 degrees and relative humidity of 60% in the dark area were carried out on the biological activity of lice flour. Breath toxicity increases with increasing concentration of plant essential oil. Over 24 hours percent mortalityis of *Tribolium Castaneum* is about 67, 45,3 and 27 respectively for *Syzygium aromaticum,* Laurus nobilis, *Foeniculum vulgare* and *Satureja hotensis* .LC_{50} for four plants was also determined and it is about 27.1, 41.2, 53.4, 57.2 (µl) respectively for *Syzygium aromaticum, Laurus nobilis*, *Foeniculum vulgare* and *Satureja hotensis*. Result show that *Syzygium aromaticum* toxicity is more than other plants so it is the best candidates for Manufacture of insecticides.

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(THE ROLE OF ESSENTIAL OIL IN PRESERVATION OF ENVIRONMENT) INSECTICIDE EFFECT OF ESSENTIAL OIL FROM *LAURUS NOBILIS* AND *SYZYGIUM AROMATICUM* ON *CALLOSOBRUCHUS MACULATUS*

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Now a days in order to preserve the environment, it is necessary to substitute essential oil instead of chemical gaseous poisons for the control of plagues. The collected plants are extracted with distilled water in the celevenger system.by the bioassay method, the LC_{50} of essential oil on *Callosobruchus maculatus* have been measured. The obtaining LC_{50} for under assayś plants, after 24 hours for essential oil of *Syzygium aromaticum* and *Laurus nobilis* on *Callosobruchus maculatus*, was 8.7 and .7 (µl), respectively. The results show that, by the passage of time and increase of density, the rate of insect moratility will be improved. The maximum percent of losses, after 24 hours, will obtain in 3 ml density of *Syzygium aromaticum* essential oil. The registered ralues indicate that the maximum sensitivity of *Callosobruchus maculatus* to *Syzygium aromaticum* was more than *Laurus nobilis.*

(THE ROLE OF MEDICINAL PLANTS IN THE BIOLOGICAL) INSECTICID EFFECTS OF ESSENTIAL OIL OF FOUR MEDICINAL PLANTS *SYZYGIUM AROMATICUM*, *LAURUS NOBILIS*, *FOENICULUM VULGARE*, *SATUREJA HOTENSIS* ON *CALLOSOBRUCHUS MACULATUS*

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Legumes such as cowpea most important sources of protein for many poor countries. For economic reasons, the majority of people in these countries are unable to meet their protein needs from Animals. One of the key pests of grain beetles That is four point beetle, *Callosobruchus maculatus* that will damage to varieties of beans, peas, mung beans, broad beans, etc [1]. In this study effect of four medicinal plants consist of *Syzygium aromaticum, Laurus nobilis*, *Foeniculum vulgare, Satureja hotensis* in temperature of 27 degrees and relative humidity of 60% in the dark area were carried out on the biological activity of *Callosobruchus maculatus*. Over 24 Hours Percent mortalityis of *Callosobruchus maculatus* is about 100, 87,72 and 70 respectively for *Syzygium aromaticum,* Laurus nobilis, *Foeniculum vulgare* and *Satureja hotensis* .LC_{50} for four plants was also determined and it is about .7, 8.7, 27.1, 28.4 (µl) respectively for *Syzygium aromaticum, Laurus nobilis*, *Foeniculum vulgare* and *Satureja hotensis*. Results show that essential role of medicinal plants that can be replaced for pest poison.

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THE EFFECTS OF MANURE AND ARBUSCULAR MYCORRHIZAL FUNGUS ON GROWTH AND YIELD OF AJOWAN (*TRACHYSPERMUM AMMI*)

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Ajowan is plant from Apiaceae family with a wide range of usage in traditional medicine. The nutrient requirement of ajowan (*Trachyspermum ammi*) is generally met by the application of chemical fertilizers. Information on use of organic sources of nutrition are lacking in ajowan. The production of ajowan can be increased considerably through integrated nutrient management. A field experiment was conducted at research field of agricultural faculty of Islamic Azad University of birjand to study the influence of manure and bio-fertilizers on growth and yield of ajowan (*trachyspermum ammi*). The factors were manure (0, 1.5 and 3 t ha^{-1}) and mycorrhizal fungus inoculation (inoculated and non-inoculated). The experiment design was factorial experiment in the base of randomized complete blocks design (RCBD) with eighteen treatments and three replications. Mean comparison was carried out using LSD range test (at 5% level).The results showed that application of manure and mycorrhizal at all levels had significant effect on, umbels $plant^{-1}$, umbellets $umbel^{-1}$, seeds $umbellet^{-1}$, 1000-seed weight and yield. With increasing manure with mycorrhizal, umbels per $plant^{-1}$, umbels per plant, seeds $umbellet^{-1}$, 1000-seed weight and seed yield per ha were increased. The highest seed yield (1123 kg ha^{-1}) of ajowan was obtained with application of manure 3 t ha^{-1}+ mycorrhizal). Prabhu et al (2000) reported significantly higher yield of coriander with 25% recommended dose of fertilizer + FYM 10 t ha^{-1} + Azospirillum sp. with VAM over other combination of nutrient sources [1]. Similar results were obtained by Mehta et al (2007) in case of fennel and dill [2]. Application of manure and mycorrhizal is responsible for the improvement of physical, chemical and biological properties of the soil which in turn enhance availability and uptake of macro and micronutrients which affect various physical and biochemical processes in plants resulting better yield attributing characters and yield of the crop.

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ACTIVATED CHACOAL EFFECTS ON SEEDLING GROWTH FROM EMBRYO CULTURE OF *KELUSSIA ODORATISSIMA*

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Kellus (*Kelussia odoratissima*) is a scarce and extinction plants that only growth in the part of Zagros Mountains [1]. The best method for planting of this plant is embryo culture because it has seed dormancy. The embryos separated from the seed and transport in medium. And a problem that almost occurs in tissue culture especially in aromatic plant became tissue brown. One of the methods that solve this problem is use of activated charcoal in medium. Activated charcoal is often used in tissue culture to improve cell growth and development. It plays a critical role in micropropagation, seed germination, somatic embryogenesis, another culture, synthetic seed production, protoplast culture, rooting, stem elongation, bulb formation etc [2]. In order to study of the activated charcoal effect on growth seedling an experiment designed with three levels of activated charcoal (0.25, 0.5 and 0.75 gr per liter) and zero (control) in Completely Randomized Design (CRD) with five replication at biotechnology laboratory of Shahrekord university in 2013. All of them added to ½ MS and MS medium. Results showed that increase in activated charcoal concentration had a significant effect on seedling growth but there was no significant effect between 0.5 and 0.75 gr per liter activated charcoal. The highest of seedling growth was observed in MS medium and 0.5 gr per liter activated charcoal. It is suggested that MS medium with 0.5 gr per liter activated charcoal be used in embryo culture of Apiaceace family (like kellus and galbanum).

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STUDY OF THE ESSENTIAL OIL CONTENT IN *KELUSSIA ODORATISIMA* M. DURING THE GROWING SEASON UNDER IRRIGATED AND RAINFED CONDITIONS

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Keluss (*Kelussia Odoratissima* M.) is an aromatic plant that just growth in Iran and no reported on other parts of the world. It has medicinal and food aspects, that find in the central of Zagros Mountains [1]. This plant is a perennial and regrowth of it depended on ambient temperature, it is growing early march to early June. In order to study the effect of growing season on essential oil content in during the growing season and the effect of drought stress on essential oil content and morphological traits of Keluss (*Kelussia Odoratissmia* M.) two independent experiments were conducted as a randomized completely blocks design with three replications on five years old plants at Shahrekord University in 2012. First experiment was determination of oil content during growth season (early, mid and final growth) and second study was done in rainfed and irrigated condition (irrigation once a week). The results indicated that essential oil content in during growth season (harvests) were significantly ($p \leq 0.1$) different in the both irrigated and not irrigated condition. Early growing season showed the highest content of essential oil content with %4.75 and it decreased to the final harvest with %1.94. Comparing of the two conditions indicated that drought stress was not significant effect ($p \leq 0.5\%$) on essential oil content. and morphological traits. This is possible occur because the of distribution of rainfall on during the growing season.

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THERAPEUTIC EVALUATION OF CRUDE EXTRACTS OF GARLIC AGAINST MANGE OF DOGS

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Mange is a skin disease caused by several species of tiny mites, common external parasites found in companion canines. Some mange mites are normal residents of dog's skin and hair follicles, while others are not. All mites can cause mild to severe skin infections if they proliferate. Sarcoptic mange is caused by a parasitic mite (*Sarcoptes scabiei*) that burrows just beneath the surface of the skin. This is a zoonotic disease or a disease transmissible from pets to people. The mite feeds on material in and on the skin. Also all dogs raised normally by their mothers possess demodectic mange mites (*Demodex canis*), which are transferred from mother to pup via cuddling during the first few days of life. At this investigation, therapeutic effects of crude extracts of garlic were evaluated against mange of dogs. Results shows that local application of crude extracts of garlic, as 1:10 (v/w) were effective against sarcoptic mange in dogs. Recovery rates for was 54% and the average numbers of days required for complete cure was 22 ± 0.6, days. Also all treatments were refractory in treating Demodex spp. infection.

THE COMBINED EFFECT OF BOTH POWDER AND THYME HERB PEPPERMINT MICRO FLORA ON THE DIGESTIVE IN CHICKENS

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This study was conducted to evaluate the microflora of broilers fed diets supplemented with powders of two medicinal plants; *Mentha Pipermit and Thymus Vulgaris*. The experiment was done using complete randomized design including 5 treatments wit 3 replications (20 male and female chicks in each replication).In the study, 300 one-week-old broilers (Ross-308) were used. Treatments Includes; 1, without any additives (control) ; 2, contains %1 of peppermints and 0.5% percent thyme; 3 , contains %1 peppermint and %1 thyme; 4, contains%2 peppermints and 0.5% thyme and 5, contains %2 peppermint and %1 thyme. The results indicated that the total count of coliforms in intestinal tract of broiler in treatment 5 was found to be significantly lower than control treatment (P < 50/0). As a whole, treatment 5(%2 of the dry powder of peppermint and %1 of the dry powder of thyme) had a significant effects on. Evaluate the microflora of broilers. Tshyr, (2000) reported that the use of carvacrol (from oregano Ingredients) is to stimulate the growth and proliferation of Lactobacillus. The study Jamvrz et al (2005) found that carvacrol has increased the number of lactic acid bacteria. Herbal Extract Thyme The main effect of volatile oil of oregano contains decrease the microbial population and population growth of harmful microorganisms such as Lactobacillus was helpful.

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ANTIOXIDANT AND ANTIBACTERIAL PROPERTIES OF POD EXTRACT OF *PROSOPIS FARACTA* IN SISTAN REGION

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Prosopis faractaa medicinal plant of Fabaceae family has antibacterial and antioxidant properties. Antioxdants neutralize free radicals and reduce the risk of cardiovascular disease and stroke and also prevent of cancer progression. Because of increased bacterial resistance to antibiotics and their side effects, plant extracts have been of great interest. After collecting the *Prosopis faracta* plant from Sistan region, ethanol pod extract of plant was prepared by maceration method, then the antioxidant properties of the extract were measured by HPLC system. To measure of antibacterial properties, Bacteria cultured in media with different concentrations (10, 20, 40,80µl) of pod extract. The effect of extracts on bacteria growth was evaluated. The results showed that the pod extract of *Prosopis faracta* has antioxidant properties and rich of natural antioxidants that they can neutralize free radical activity. The antibacterial results showed that the pod ethanol extracts in 40 and 80µl concentrations have the highest antibacterial properties against *Staphylococcus* and *Escherichia coli*. This plant is recommended as prevention of different diseases and help treat some diseases.

THE EFFECT OF DIFFERENT LEVELS OF NITROGEN ON MORPHOLOGICAL INDICES OF BASIL (*OCIMUM BASILICUM* L.) INTERCROPPING WITH COWPEA (*VIGNA UNGUICULATA* L.) AND WEED COMPETITION

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In order to evaluate the crop productivity in monocropping and intercropping of basil (*Ocimum basiilicum* L.) and cowpea (*Vigna unguiculata* L.), a field experiment was carried out during 2011. An additive series experiment was laid out in a split-split plot based on randomized complete block design (RCBD) with three replications. Two levels of weed management (weed free and weed infested), three levels of nitrogen (0, 50 and 100 kg ha^{-1}), and five levels of planting ratio (monoculture of cowpea and basil, additive planting ratio 25, 50 and 75% basil) were as main plots, sub plots, and sub-sub plots, respectively. The results showed that, in weed free and weed infested, the maximum number of leaves and branches (171.50, 12.87) and (60.00, 3.75) were devoted additive ratio of 25% basil with 100 kg ha^{-1} nitrogen application that it had 65 and 70% reduction compared to control treatment, respectively. The minimum number of leaves and branches, (47, 3) and (28.82, 0), also belonged to monocropping and lack of nitrogen fertilizer, respectively. The highest and lowest height of basil (97.25, 50 cm) were allocated in monocropping with 100 kg ha^{-1} and lack of nitrogen application and weed free and weed infested, respectively. Therefore the lack of nitrogen application and weed interference reduced the height of basil and its competitiveness. Between planting pattern, the highest yield of cowpea (684 kg ha^{-1}) and dry matter yield of basil (420 kg ha^{-1}) were devoted to 20, 50% basil ratio and 50 and 100 kg ha^{-1} nitrogen fertilizer, respectively. The highest essence yield in weed free and weed infested (69.24 and 70.40 percent) compared to basil monocropping belonged to 50 and 25% of additive basil intercropping with 100 kg ha^{-1} nitrogen application, respectively. Also the dry weight of shoot and oil yield in monoculture treatments was significantly higher than intercropping. The leaf percent and the ratio of leaf and flower to stem was significantly lower in monocropping than intercropping. In weed infested conditions, the highest basil yield (160 kg ha^{-1}) and with the maximum percentage of stem belonged to 25% basil ratio and 100 kg ha^{-1} nitrogen application.

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ANTIMICROBIAL EFFECTS OF *ECHINACEA* EXTRACT ON SEVERAL DIFFERENT TYPES OF BACTERIA

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Echinacea purpurea is a species of flowering plant in the genus Echinacea of the family Asteraceae. Its cone-shaped flowering heads are usually, but not always, purple in the wild. It is native to eastern North America and present to some extent in the wild in much of the eastern, southeastern and Midwest United States. Coneflower extracts inhibit the growth of bacteria to verify the research was conducted. Results showed *Bacillus subtilis* & *Staphylococcus aureus* at density concentration of 0.25%, of 1 & 2% were resistant sensitive. The results revealed this the bacteria are sensitive to concentrations of 4 and 8%. *Salmonella typhi* of concentration of 0.25%, 1, 2, and 4% were resistant but 8% dilution of the extract. *An Escherichia coli* in 0.25 % were resistant to 1, 2, 4 & 8-critical but has been diluted. *Pseudomonas aeruginosa* is resistant to the extracts at a concentration of 0.25%; but at concentrations of 1 and 2% is sub-critical. The results revealed this the bacteria are sensitive to concentrations of 4 and 8%. Results showed that Echinacea extracts inhibitory effect on bacterial growth.

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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 goal was investigate the effect of light with different frequencies on growth and the effect on the chemical composition of the plant *Artemisia aucheri*. After gathering information, the plant is desired, such as morphology, chemical composition, pharmacological properties, and the pharmacological effects of using different sources were considered, the overall picture of things that should be done. Culture was used, the solid medium Mvrashyng and Skoog, without growth regulators. Sequential subcultures were doing a lot of plants, 5 treatments, we considered, in terms of lighting, including luxury 1000, 2000, 3000 rays and UV and dark treatment. After collecting the samples and check the appearance, measurements of wet and dry weights the information entered in the software program SPSS version 17 and were compared together. The best lighting conditions in this experiment was 300 lux, which is transverse elongation and plant growth better and even has a great effect on root growth. With increasing light intensity decreased the time to reach maximum density.

ROSA DAMASCENA YIELD AFFECTED BY THE SIMULTANEOUS USE OF MANURE AND CHEMICAL FERTILIZERS

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Rosa damascena known as aromatic gold, is one of the oldest and most valuable medicinal plants. The soils is considered to *Rosa* cultivation should be rich in nutrient and organic matter. On the other hand, simultaneous use of NPK and manure fertilizer increase photosynthesis capacity and improve growth condition. Amount of growth is correlated with yield and flowers number. It should be noted that the major problem of *Rosa* product is quantity yield reducing in the second half of flowering period. So this project was performed to identify the exact amount of these elements for reaching high yield with keeping quality in the whole of flowering period (1-22 May). The project was conducted in Research Institute of Forests and Rangelands, as randomized complete blocks design with 3 replications and 5 fertilizer levels (1: N0, P0 & K0kg/ha + manure 0ton/ha, 2: N40, P40 & K0kg/ha + manure 15ton/ha, 3: N40, P40 & K40kg/ha + manure 15ton/ha, 4: N80, P80 & K40kg/ha + manure 30ton/ha & 5: N120, P120 & K80kg/ha + manure 40ton/ha). Analysis of variance showed that high significantly different of flowers number were on 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16, 17 and 18 days. The average comparison results indicated, the highest and lowest flowers number belonged to fertilizer treatment 4 on ninth day with 397.83n/plant and control treatment on the first day with 9.83n/plant. Furthermore, the highest and lowest number of flowers observed in fertilizer treatment 4 and free fertilizer treatment with 3937.8n/plant and 2551.5n/plant, respectively. According to results, Treatment 4 is the suitable quantity of combine fertilizer that showed the highest flowers number in the whole flowering period especially in the second half of it (12-22 May). Thus right amount of combine fertilizer (chemical + manual fertilizer) provide food needs during flowering period and make sustainable and optimum production of *Rosa damascena*.

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DETERMINATION OF CATECHIN AND GALLIC ACID IN GREEN TEA EXTRACT BY ELECTROCHEMICAL METHOD

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Green tea is derived from the fresh tea leaves of *Camellia sinensis L*. Phenolic compounds including are assumed to be responsible for the potential benefits of green tea. Specifically, health benefits of tea have been attributed to the antioxidant activity of phenolic compounds [1-5]. In this study, we report a novel and sensitive electrochemical method for the simultaneous determination of catechin and gallic acid in extract of *green tea.* A voltammetric determination of catechin and gallic acid was conducted with a novel sensor based on a modified carbon paste electrode with gold nanoparticle. Satisfactory dynamic ranges and low detection limits were obtained for both compounds. The results revealed that the modified electrode showed an electrocatalytic activity toward anodic oxidation of catechin and gallic acid, and an enhanced current response in buffered solutions at a pH of 2.0. This method was successfully applied to the determination of catechin and gallic acid in extract.

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EFFECTS OF MEDICINAL PLANTS IN COLD REGIONS OF IRAN HEALING DISEASES OF THE SPLEEN

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Helping members of the spleen to the liver. Cause the breakdown of red blood cells that life is over. Then make them usable form and then returns to the body. Part of them metabolism of fat and protein in the spleen takes place. Because the spleen is a blood purifier And the occurrence of disease, boost immune function is. The occurrence of some diseases such as cholera, malaria, poisoning, etc. will cause swelling of the spleen. General treatment of diseases of the spleen is used, the tail celery juice and daisy plants shedandraisins and black currant juice. Studies show that eating *Cynodondactylon* and Creeping thistle, wild root is effective in relieving pain in the spleen And eating olive oil, Nigella sativa oil and lemonforun blocking the spleen is effective.

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EFFECT OF DIFFERENT HARVEST TIME ON QUANTITATIVE AND FUNCTIONAL CHARACTERISTICS OF YARROW (*ACHILLEA MILLEFOLIUM* L.)

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Yarrow is one of the most important medicinal plants that its yield, yield components and pharmaceutical quality may be affected by harvesting time. Therefore, the effect of different harvesting times on quantitative and functional traits of yarrow was determined using a split plot based on a completely random block design with three replications at research farm of Isfahan University of Technology in 2012. Analysis of variance revealed significant difference for harvest times and morphological traits ($p<0.01$). The highest flowering, plant height, flower diameter, flowering duration and dry weight was noted in harvesting (10 August) , while the highest leaf length, leaf width and spreads was recorded in the second harvesting (14 November). Among studied genotypes, Amuk had the highest and the lowest dry weight and height, respectively. The results showed that harvesting on August 10 was superior to November 14 and harvesting time may effect yarrow yield and related traits.

THE EFFECT OF METHANOLIC EXTRACT OF *LEONURUS CARDIACA* L. AS AN ISCHEMIC-POSTCONDITIONING MIMETIC IN ISOLATED RAT HEART

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Ischemic heart disease is the leading cause of morbidity and mortality in the developed countries. Inducing a rapid reperfusion in ischemic heart is essential for maintaining its normal function, however creates ischemia/reperfusion (I/R) phenomenon which causes an extensive myocardial injuries. Two strategies, for cardioprotection against I/R injuries are mechanical and pharmacological pre- and post-conditioning. Post-conditioning has beneficial effects in patients with MI and is a safe and simple strategy in lowering reperfusion injury in the clinical setting. Motherwort (*Leonurus cardiaca L.*) which originally came from central Europe, is a perennial herb, with short woody rhizomes, grows to about 120 cm and has an unpleasant smell. Motherwort is stated to possess efficient antioxidant properties and known to have significant amounts of phenolic and flavonoid compounds. Traditionally, it has been used for cardiac debility, simple tachycardia, effort syndrome, amenorrhoea and especially for cardiac symptoms associated with neurosis. In this study, to investigate the cardiac post-conditioning effect of methanolic extract of *L. cardiaca*, obtained from the experimental plot of the Zardband Pharmaceutical, isolated rat hearts (n=20) were mounted on a Langendorff perfusion apparatus. In all groups, the hearts underwent 30 min of regional ischemia followed by 120 min of reperfusion. In the I/R group, ischemia and reperfusion was induced. In the ischemic postconditioning (Ipost) group, hearts underwent 6 cycles of 10 s reperfusion and 10 s ischemia at the beginning of reperfusion. In the other groups, the plant extracts were perfused 5 min before the onset of reperfusion and continued for 25 min with the following doses: 125, 250, 500 µg/ml. The infarct size (IS), calculated at the end of reperfusion. The IS decreased considerably in Ipost group compared to IR group ($P<0.05$). Also, the infusion of methanolic extract of *L. cardiaca* dose-dependently reduced IS significantly compared to the IR group ($P<0.05$). In summary, dose dependent administration of methanolic extract of *L. cardiaca* at the end of regional myocardial ischemia and beginning of reperfusion reduces the extent of cardiac injury and mimics the ischemic postconditioning.

APPLICATION OF METHYL JASMONATE ON INCREASING OF SECONDARY METABOLITES OF LEMON VERBENA (*LIPPIA CITRIODORA*)

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Plants have been used as medicines throughout history and are main sources for medicine and pharmacy in most of the world. According to statistics reported 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 jasmonic acid (JA) and methyl jasmonate (MeJA) can induce secondary metabolites in various plants [3]. Application of exogenous MeJA has been investigated to increase the contents of secondary metabolites in various plants. *Lippia citrodora* is a perennial plant and belongs to verbenaceae family. Sedative and Antibacterial 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 methyl jasmonate was studied to increase of Secondary Metabolites in *Lippia citrodora* with 4 treatments (0, 12.5, 25 and 50 mg/l methyl jasmonate 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 1, 8-cineole was increased in 12.5 mg/l methyl jasmonate. The naral and genarial compounds were increase with 12.5 mg/l methyl jasmonate.

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HYDROALCOHOLIC EXTRACT OF *RHEUM RIBES* L. IMPROVES PASSIVE AVOIDANCE LEARNING AND MOTOR PERFORMANCE IN RAT MODEL OF ALZHEIMER

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Alzheimer's disease (AD) is a neurodegenerative disorder that leads to progressive cognitive decline. Previous researches have shown different findings for motor learning and motor performance in Alzheimer's patients (1). Some researchers report that Alzheimer's patients demonstrate normal motor learning but deficit in motor performance. The aim of this study was to induce Alzheimer's disease in rats and to evaluate the effect of *Rheum Ribes L.* hydroalcoholic extracts on passive avoidance learning and motor performance. Hydroalcoholic extract of *Reum Ribes* roots (250 and 500 mg/kg) was prepared using maceration method and rotary. In addition, Alzheimer's disease was induced by bilateral lesions in Nulceus Basalis of Meynert (NBM) in rats. The NBM-lesioned rats received *Rheum Ribes* extracts (i.p) for 20 days while the control and sham groups received distilled water. Passive avoidance learning was performed using Shuttle box apparatus and motor performance was tested by rotarod apparatus. Data was analysed using one-way ANOVA followed by LSD test. Results showed that motor performance was impaired in NBM-lesioned rats. *Rheum Ribes L.* extract in dose of 250 mg/kg reversed motor performance deficit in NBM-lesioned rats, but dose of 500 mg/kg had no effect. Analysing the data collected from shuttle box experiment revealed that passive avoidance learning was significantly reduced in NBM-lesioned rats. Interestingly, treatment with *Rheum Ribes* extracts significantly compensated passive avoidance learning deficits observed in NBM-lesioned rats both in 250 and 500 mg/kg concentrations. In conclusion, findings of the present study indicate that *Rheum Ribes* hydroalcoholic extracts can significantly improve motor performance and passive avoidance learning deficits in Alzheimeric rats.

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TOTAL PHENOL AND FLAVONOID CONTENT AND ANTIOXIDANT ACTIVITY OF METHANOLIC EXTRACT FROM *PEROVSKIA ABROTANOIDES* KAREL AT DIFFERENT STAGES OF PLANT GROWTH AND DEVELOPMENT

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Perovskia abrotanoides Karel is an Iranian medicinal plant belonging to the Lamiaceae family. Different biological properties are mentioned for the plants of this genus including antibacterial, antioxidant, cytotoxic activities and apoptosis induction. Present study was carried out to evaluate the amount of phenolic compounds and antioxidant properties of methanolic extracts of *P. abrotanoides* Karel leaves at vegetative and flowering stages. Aerial parts of the plant, were collected from Kalat in northeast of Khorassan Razavi province of Iran. Phenolic compounds were extracted by sonication method. Total phenol and flavonoid contents of all extracts were obtained by aluminum chloride [1] and Folin-Ciocalteu [2] colorimetric methods, respectively. Antioxidant activities of extracts were measured by β-carotene bleaching (BCB) assay [3]. Phenolics content and antioxidant activity of leaves at vegetative stage, were significantly more than the other stage. The amount of total phenol and flavonoids of leaves at vegetative stage were estimated as 4.347 ± 0.067 g gallic acid and 1.063 ± 0.043 g quercetin per 100 g dry weight, respectively. At vegetative stage, leaves extract had the best performance in BCB assay (IC_{50} = 0.267 ± 0.03 mg/ml); compared with flowering stage (IC_{50} = 0.516 ± 0.06 mg/ml). A positive correlation was observed between the total phenol and flavonoid concentrations, and antioxidant activity of extracts in BCB assay (R^2=0.89 & 0.90, respectively). It may represent the role of phenolic and flavonoid compounds of the plant in its antioxidant potential.

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TOTAL PHENOL AND FLAVONOID CONTENT AND ANTIOXIDANT ACTIVITY OF AERIAL PART AND RHIZOME OF *EREMOSTACHYS MACROPHYLLA* MONTBR. & AUCH.

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Eremostachys macrophylla (family: Lamiaceae *alt.* Labiatae) is one of the 15 endemic species from Eremostachys genus in Iran [1]. Previous phytochemical investigations on the species of the genus *Eremostachys* revealed the presence of flavonoids, fatty acids, phenylethanoid glucosides, iridoids, mono and diterpene glycosides and ferulic acide derivatives which showed Anti-inflammatory, antinociceptive, antidepressant, antioxidant, and antibacterial activities [2-6]. The objectives of this study were the investigating and comparison of the radical scavenging activity of aerial parts and rhizoms of Eremostachys macrophylla and determination of their phenol and flavonoids contents and analyses of correlation between them. The dried and ground rhizomes and aerial parts of *E. macrophylla* (100 g) were Soxhlet extracted, successively, with *n*-hexane, dichloromethane and methanol (1.5 L each). All these extracts were separately concentrated and the MeOH extract (2 g) was subjected to Sep-Pack fractionation using a step gradient of MeOH water mixture (10:90, 20:80, 40:60, 60:40, 80:20 and 100:0) and evaporated separately. Total contents of the phenolic compounds were determined by Folin- Ciocalteau assay. Also Total flavonoid contents and antioxidant activities measured using $AlCl_3$ and DPPH methods. The highest antioxidant activity, total phenolic and flavonoid contents were obtained from the 40% fraction of methanol extract of aerial parts (Rc50:0.0111 ± 0.002, TPC: 358 ± 3 mg / gr, TFC: 639 ± 6 mg/gr) which had shown the positive correlation between TPC-TFC and antioxidant activity of extracts. These findings suggest that phenolic and flavonoid contents responsible for the radical scavenging and chelating properties and could be used as an indicator of antioxidant properties.

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STIMULATORY EFFECT OF BAP AND NAA ON GROWTH AND CHEMICAL CONSTITUENTS OF *DRACOCEPHALUM KOTSCHYI* BOISS. PLANTS

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Dracocephalum kotschyi Boiss. (Labiateae) is an endangered medicinal plant of Iran. Recent pharmacological studies have confirmed some of the methoxylated flavonoids in plant's parts having anti-cancer properties [1, 2]. This plant had shown an abnormal growth when cultured in out of its natural habitat. It is reported previously hormonal translocation is disrupted in plants parts when grown out of natural habitat. This study was done to answer this question that "If abnormal growth *viz.*, horizontal growth, geotropism in *D. kotschyi* is in relation with disturbance in hormonal translocation in plant parts?" Hormones play an important role in regulating the growth and development, photosynthesis, transpiration, ion uptake and transport. However, there is a little information about improvement of growth factors during domestication. Therefore a study was conducted as factorial base experiment in complete randomized design. The following treatments were used in present study; Naphthalene acetic acid (NAA) (0, 10, 15 and 20 $mg.L^{-1}$) as first factor and benzylaminopurine (BAP) (0, 5, 10 and 15 $mg.L^{-1}$) as second factor. Treatments were applied at 4-6 leaf stage with foliar spraying for three times in two week intervals. The investigated growth and chemical characteristics was including plant height, stem and leaf diameter, chlorophyll (*a*, *b* and total), prolin and soluble sugar content. Results showed that BAP treated plants significantly ($P<0.01$) showed highest plant height, stem and leaf diameter, prolin and soluble sugar content. The highest chlorophyll *a* was obtained with NAA (10 $mg.L^{-1}$) treated plants. Enhancing of exogenous BAP (0 to 15 $mg.L^{-1}$) in foliar applications increased plant height, stem and leaf diameter, prolin and soluble sugar, whereas the result showed no significantly difference in chlorophyll *a* and total by BAP applications in compare with control. Also maximum plant height (24.66 cm) recorded in BAP (15 mg/l) treated plants. There was a positive correlation between chlorophyll *a* and total under NAA treatments. It seems that according to results exogenous foliar application of BAP (15 mg/l) can be as an effective treatment on vertical stem growth in *D. kotschyi*. However further studies in necessary to understand how BAP change the growth behavior in this valuable plant.

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ANTIBACTERIAL EFFECTS OF *GONTSCHAROVIA POPOVII* ESSENTIAL OIL AND EXTRACT ON EIGHT BACTERIAL STRAINS IN COMPARISON WITH SOME ANTIBIOTICS

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Gontscharovia Popovii is a type of thyme endemic of Iran. The aim of the study is to evaluate the effect of the essence and extract of *Gontscharovia Popovii* on eight bacterial strains. In this study, *Gontscharovia Popovii* was collected from the southern regions of Iran. The plant extract was prepared using percolation method, and the essence was obtained by hydrodistillation using Clevenger apparatus. Qualitative and quantitative analysis of chemical compounds of *Gontscharovia Popovii* was performed using GC/Mass chromatography. Then, the effects of various concentrations of the essence and extract of the plant on the bacterial species were evaluated and the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were measured. The results of evaluation of the essence indicated that there are 49 compounds in the plant essence, among which thymol is the major one. Moreover, it was demonstrated that the essence and extract of *Gontscharovia Popovii* have a high anti-bacterial potential, and inhibits the growth of the bacteria studied. However, among the strains studied, *Pseudomonas aeruginosa* had the highest resistance against the essence and extract; such that the MIC of *Gontscharovia Popovii* essence and extract for *Pseudomonas aeruginosa* was 2 and 5 µl, respectively. This is while lower concentrations were effective on other bacterial strains. Essence and methanol extract of *Gontscharovia Popovii* showed a considerable inhibitory effect on growth of pathogenic bacteria, particularly gram-positive ones [1, 2].

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THE ANTIBACTERIAL EFFECT OF THE METHANOL EXTRACT OF AERIAL PART OF *PYCNOCYCLA NODIFLORA* AGAINST SIX BACTERIAL STAINS

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Several studies demonstrated the antimicrobial effects of family of Apiaceae [1, 2]. Therefore, in this study the antibacterial activity of the total methanol extract of the aerial parts of *Pycnocycla nodiflora* against six bacterial stains were evaluated. The aerial parts methanol extracts were prepared by percolation. Primary antibacterial effect of extracts against *Staphylococus aureus* (PTCC-1431), *Methicillin-resistant Staphylococcus aureus* (ATCC-33591), *Staphylococcus epidermidis* (PTCC-1435), *Escherichia coli* (PTCC-1399), *Pseudomonas aeroginosa* (PTCC-1430), *Salmonella typhi* (ATCC-14028) were evaluated by cup-plate method and then MIC and MBC value were determined by broth macro-dilution method according to CLSI[3]. The determined MIC of methanol extract against *S. aureus, MRSA, S. epidermidis, E. coli, S. typhi, P. aeroginosa* were 62.5, 62.5, 62.5, 125, 62.5, 125 mg/ml respectively, and the MBC were 125, 125, 125, 250, 125, 250 mg/ ml. Results of both "cup-plate" and "broth macro-dilution" methods demonstrated that methanol extracts of aerial parts of *Pycnocycla nodiflora* can inhibit growth of every six bacterial stains.

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EFFECT OF PLANTING DATE AND PLANT SPACING ON YIELD AND OIL CONTENT OF *MENTA PIPERITA*

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In order to evaluate the effect of planting date and spacing on yield and oil content of *Menthe piperita* and experiment (split plot) was conducted in agricultural and natural Resources Center of Khorasan at Mashhad, Iran, in 2007. The traits were planting date (25 April, 24 July) and plant spacing(20,30and40cm on rows).Variance analysis for yield showed that plant spacing effect of planting date was significant for plant height, stem fresh weight and leaf dry weight. For essential oil yield, planting date showed no significant effect, but effect of plant spacing was significant, in this study, the optimum planting date was 25 April and the best plant spacing was found to be 20 cm.

APPLICATION OF ZEIOLTE IN IRRIGATION RESTRICTION CONDITION ON OFFSET PRODUCTION IN *ALOE BARBADENSISI*

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Aloe barbadensis Miller is an important medicinal plant. Main vegetative propagation method of Aloe plants is by using offsets. Offset production in plant of *Aloe vera* in greenhouse depended directly upon the availability of water and environmental fluctuations in its abundance. The objective of this study was to evaluate the effect of water restriction with of the zeolite application on the offset production of *Aloe barbadensis*. Treatments include four levels of irrigation (80, 20, 40, and 20 of FC) and three levels of zeolite (0, 4, 8 g/kg^{-1} soil). The following variables were determined: number of offset, high offset, fresh and dry weight, total dry and fresh weight. The results showed that the with increasing water deficit reduced traits of offset, however, with application of zeolite this decrease was less use of zeolite. The plant irrigation with 60% of FC and application of 4g/kg^{-1} soil presented the best production of offset traits. [1, 2]

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VALUTION OF AMOUNT OF ESSENTIAL OIL AND SECONDARY COMPOUNDS WITH SPRAYED ACID JASMUNIC IN PEPPERMINT (*MENTHA PIPERITA* L.)

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In this study the effect of different concentrations Jasmunic acid on physiological characteristics of Peppermint herb (*Mentha piperita* L.) under field conditions in Shahrekord city in 1391, were studied. The experimental design was a randomized complete block with 3 replications with foliar application of Jasmunic acid levels (50, 100, 150 and 200 ml), ethanol as solvent and distilled water (control) in two steps at a time (before and next flowering), were sprayed. During the trial precedent of secondary compounds in the essential oils were examined. Essential to identify compounds derived secondary mass chromatograph (GC-MS). Results showed that the concentration of injected acid had a significant impact Jasmunic 1% probability level. Comparison of treatment means showed that with increasing acid concentration Jasmunic significantly increase the amount of Essential oil to the amount of 100 ml and it was significantly reduced with the use of concentrations of acid Jasmunic. Peppermint essential oil to produce the highest concentration of 100 ml can be used. Well combined Mentufuran Neomentol and methyl acetate showed no significant effect [1-3].

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EFFECT OF GAMMARAY ON GRAIN GERMINATION CHARACTERISTICS IN BALANGO (*LALLEMANTIA ROYLEANA*)

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Balango as a medicinal plant, is belongs to the Lamiaceae family, containing many ingredients. The grains of Balango have several properties including controlling reflux disease [3]. R*oyleana* and *Ibeica* are main species of Balango in Iran [2]. The success of any breeding program depends heavily on the initial genetic variation [1]. This study was designed to study the effects of gamma rays at different doses (0, 50, 100, 150, 250, 350, 450, 550, 700 and 900 Gray) on grains of Balango through completely randomized design with four replications, in order to determine favorite dose of gammaray. Theraits under study were included: shoot length, root length, shoot fresh weight, root fresh weight, shoot dry weight, root dry weight and germination rate. The variance analysis of data showed significant differences among doses in shoot dry weight, root fresh weight, root length and shoot length. The maximum shoot length, root length, root fresh weight, shoot dry weight and germination rate were observed in 250 Gray and the minimum amounts of shoot length and root length were obtained in 900 Gray. We concluded 250 Gray dose as suitable ones in mutation breeding of Balango (*Lallemantiaroyleana*).

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EVALUATION OF SOME PHYSIOLOGICAL PARAMETERS IN THE APPLICATION OF ACID JASMUNIC PEPPERMINT (*MENTHA PIPERITA* L.)

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In this study the effect of different concentrations Jasmunic acid on physiological characteristics of Peppermint herb (*Mentha piperita* L.) under field conditions in Shahrekord city in 1391, were studied. The experimental design was a randomized complete block with 3 replications with foliar application of Jasmunic acid levels (50, 100, 150 and 200 ml), ethanol as solvent and distilled water (control) in two steps at a time (before and next flowering), were sprayed. During the trial extinction coefficient of dry matter, leaf area index, RWC; were studied. The results showed that different concentrations of acid Jasmunic traits had a significant impact on the level of a percent. Comparison of treatment means showed that with increasing acid concentration significantly increased Jasmunic. Maximum amount of control replication RWC was 80%. With increasing acid concentration Jasmunic RWC decreased significantly. were also RWC reduced the leaf relative water content [1-3].

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CONSIDERING MEDICINAL COMPOUNDS IN *DERACOCEPHALUM KOTSCHYI* KALUS TISSUE CULTURE AND REGENERATED PLANT

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Present research include considering medicinal compounds in callus tissue and regenerated plant of *Deracocephalum kotschyi* that based on culture environment MS and 2, 4-D growth regulators (1 mg/l) with Kin (0/1 mgl/l) and environment without witness hormone. Then best manner for hormone compound, organ and environment was selected by spss software and were determined 2,4-D growth hormone have the most growth and production on stem organ in light environment, and 2,4-D hormone had good effect over callus production. The least rate of production was related to leave organ that nothing hormones and environment effect on it. In second stage, we prepared culture environment MS with BAP (0/5 mgl/l) and NAA (1 mg/l) hormones for primary growth and organ generation in *Deracocephalum kotschyi*. That among them, only in BAP hormone was generated callus and there were not vegetation in witness environment and environment with NAA hormone. Produced callus samples were measured rate of their medicinal compounds by BAP hormone for accurate consideration by chromatography method and density spectrometry and compared to existing compounds sample in natural plant [1-5].

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THE EFFECT OF LONG TERM ADMINISTRATION OF GREEN TEA EXTRACT ON CARDIOTOXICITY INDUCED BY DOXORUBICIN IN RAT

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The anthracycline antibiotic Adriamycin (doxorubicin) is one of the most effective chemotherapeutic agents against a wide variety of cancers [1]. However, its use is seriously limited by the development in the heart of acute and chronic toxic effects. It has been proposed the capacity of doxorubin to inhibit DNA synthesis as a result of mode of action [2]. Since ancient times, green tea (GT) consumption has been known to possess health-promoting potential. It has been shown to have anticarcinogenic, antimutagenic and antioxidant properties. GT is an excellent source of polyphenols, particularly of a group known as GT catechins [3, 4]. In this study, the effect of long term administration of Green tea extract on cardiotoxicity induced by doxorubicin in rat were investigated. 35 adult male wistar rat were randomly divided into 6 groups: control (natural conditions), GT1 (long term administration of green tea?mg/kg for 60 days), GT2 (short term administration of green tea?mg/kg for 10 days), GT+DXR1(long term administration of green tea?mg/kg and intraperitoneal injection of 2 mg/kg doxorubicin for 3 days), GT+DXR2(short term administration of green tea and intraperitoneal injection of 2mg/kg doxorubicin for 3 days), DXR (intraperitoneal injection of 2mg/kg doxorubicin for 3 days). 24h after the last injection of DXR, rat euthanized and after fixation of heart samples in formalin-buffer 10%, tissue slides were prepared and embedded in paraffin and stained with H&E. Histopathology investigation showed that passive congestion, cell swelling and vacuole in myocardial cell cytoplasm with mild necrosis and infiltration of mononuclear inflammatory cells in DXR group. Less severity of this lesion without necrosis was seen in GT+DXR2 group. In GT+DXR1 group only congestion was observed. In other groups there was no lesion. The result of this study showed that intraperitoneal injection of doxorubicin caused injury in rat heart muscle, but long term and concurrent administration of GT had inhibitory effect on heart lesions induced by DXR that likely play this role through antioxidant function and reduce of free radicals production.

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EFFECT OF COLD STRATIFICATION ON SEED GERMINATION AND DORMANCY BREAKING IN *FERULAGO ANGULATA* SUBSP CARDUCHORUM, AN ENDANGERED MEDICINAL HERB

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Ferulago angulata belongs to the *Apiaceae* family and grows to 60-180 cm in height. It is one of the important medicinal plants endemic in west of Iran. Also, *angulata* is recorded as a vulnerable species in the Red Data Book of Iran. 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 [1, 2]. The aim of this study was to enhance the germination percentage and rate of *Ferulago angulata*, a medicinally important vulnerable species, which have a low germination rate under normal laboratory conditions. The mature seeds of this plant were received from research station of Kermanshah in September. The efficacy of different treatments including cold stratification(in 4°C for 60 , 75 and 90 days in addition to cultured in soil or MS medium) and soaking with running water(48 h) for germination improvement was tested. The treatments were arranged in a Randomized Design (RD) with three replicates per treatment. Analysis of variance indicated that Cold stratification is not significant effects on seed germination percentage between various of chilling, but treatments chilling (4 °C) for period of 90 day and cultured in MS medium were most effective in germination rate. Among the combined chilling treatments, minimum germination was at socking in running water and control treatments. These results suggested that *Ferulago angulata* seeds exhibit endogenous dormancy. Cold stratifications decreased seed dormancy in a relatively short period of time. Germination rate was positively correlated with period of Cold stratification.

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THE EFFECT OF *FOENICULUM VULGARE* ESSENCE ON REPRODUCTIVE PARAMETERS OF LAYING HENS

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An experiment was conducted to evaluate the effect of fennel essence on ovarian morphology of commercial laying eggs for ten weeks in completely randomized design. In this experiment, one hundred and sixty 30-wk-old commercial egg laying type Hy-Line (W36) were randomly assigned into 4 treatments with 5 replicates and 8 birds per each. Basal diet contained 2870 kcal/kg metabolisable energy and 15.5% crude protein. Treatments were a control (0.0% essence) and diets containing 200, 400 and 600 ppm fennel essence. At the end of the experiment, 2 birds of each replicate was randomly selected and slaughtered for recording of ovarian, oviduct and stroma weight. Also, diagonal ovary follicles were measured by caliper. Diagonal follicles that are higher than 10 mm named large yellow follicles and those that are between 5-10 mm named small yellow follicles. Also diagonal of follicles that are lower than 5 mm named white follicles. The results of this experiment showed that fennel essence had no significant effect on the relative weight of the ovary, oviduct and stroma (p>0/05). Also, number of large yellow follicles, small yellow follicles, and white follicles did not affected significantly. Although, maximum number of large yellow follicles were in 200 ppm of fennel essence and maximum number of small yellow follicles and white follicles were in 400 ppm essence. These results are in contrast with the results of Malaki (1). The results showed that the addition of fennel essence had a significant effect on ovary morphology.

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EFFECT OF PURSLANE POWDER ON BLOOD LIPID PARAMETERS AND ANTIOXIDANT STATUS OF BROILER CHICKENS

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Portulaca oleracea L. (Purslane) is an herbaceous weed widely distributed throughout the world. The plant has been used as vegetable and for medical purpose for hundreds of years [3]. Purslane has been described as a "power food of the future" because of its high nutritive value [1]. Pharmacological tests have revealed that Purslane has antioxidant and antihyperlipidemic properties [2, 3]. Thus, the aim of the present study was to evaluate the effect of Purslane on blood lipid parameters and antioxidant status of broiler chickens. One hundred forty four day old broiler chicks (Ross 308) were allocated randomly in 3 groups with 4 replicates to receive diets supplemented with 0 (control), 1 and 2 % of dried Purslane for 42 days. On day 42, eight chicks from each treatment were bled via the brachial vein to determined plasma lipid parameters and blood antioxidant status. Except triglyceride, there was no significant effect for purslane on plasma biochemical parameters such as glucose, total cholesterol, HDL-c and LDL-c concentration ($P>0.05$). HDL-C was numerically increased and LDL-C decreased with inclusion of Purslane. The values obtained in this study were not agreement with Ezekwe *et al.* (2011) [2]. They suggested, since diet cholesterol at normal level, plasma cholesterol unaffected by Purslane supplements. Scientists suggested Purslane was affective in lowering plasma LDL-C and increasing HDL-C in hypocholesterolemic subjects [2]. Purslane rich in pectin content and it may be binding with the bile acids in the intestinal lumen and subsequently excreting this metabolite as fecal acids [2]. Dietary Purslane inclusion, reduced malondialdehyde concentration and glutathione peroxidase activity and increased superoxide dismutase and total antioxidant activity in broiler blood when compared with the control treatment ($P\leq0.05$). Purslane contains various compounds recognized as antioxidants due to their ability to scavenge free radicals. Therefore, increasing activities of SOD would subsequently enhance the capacity of broilers to clear out the oxygen free radicals. Reduced serum MDA level in Purslane supplemented as compared with control broilers indicated that lipid peroxidation was reduced by Purslane via enhancing antioxidative action. On the basis of the above results, it can be concluded that Purslane could be useful for the prevention of oxidative stress in poultry industry.

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COMPARISON OF ANTHOCYANIN AND ASCORBIC ACID CONTENT IN QARE-QAT (*VACCINIUM ARCTOSTAPHYLOS* L.) FRUITS (CASE STUDY:GILAN)

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Vaccinium arctostaphylos L. (Ericaceae), locallynamed Qare-Qat and have long been one of the most important medical species attempt to reduce the effects of glucose and blood pressure and has been used in traditional medicine in Iran as an anti-inflammatory and antiangiogenic. Anthocyanin is one of the major secondary metabolites [1] and Ascorbic acid is a powerful antioxidant [2] in Qare-Qat fruits. The main attempt of this study was comparing the amount of Anthocyanin and Ascorbic acid in Qare-Qat fruits which were collected from three mountainous sites (Asalem, Khotbeh-Sara, Havigh) in Gilan Province. The results revealed the amount of Anthocyanin and Ascorbic acid in Havigh area was the highest (651.73 and 16.095 mg/100, respectively) and the lowest amount of these material belong to Khotbeh-Sara area (529.53 and 13.94 mg/100, respectively). Nowadays, these species are under sever degradation and more attempt needs to prevent the extinction of these valuable plants.

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A SURVEY ON ANALGESIC EFFECT OF *CUCURBITA MAXIMA DUCH* HYDROALCOHOLIC EXTRACT IN RAT

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Flavonoids constitute a group of polyphenolic compounds. Consumption of foods rich in flavonoids is associated with a reduction of pain [1, 2] .This experiment was performed to study the analgesic effect of a medicinal plant rich in flavonoid (*Cucurbita maxima duch*) in Wistar rats. In this experimental study, the analgesic effect of *Cucurbita maxima duch* was evaluated by the tail-flick test and inhibition of writhing in the visceral pain test (acetic acid injections, i.p.). In each experiment 120 Wistar rats were divided into 10 groups as following: group 1 distilled water, group 2-4 hydroalcoholic extract (50, 100 and 200mg/kg), group 5 Ibuprofen, group 6 received Naloxan plus 200 mg/kg extract. Extract was prepared using maceration and rotary method. Data analysis was performed using One way ANOVA followed by Tukey tests. The results indicated that the analgesic effect of *Cucurbita maxima duch* was significant in dose of 100 and 200mg/kg ($p<0.001$). The analgesic effect of the extract was inhibited by naloxone. In addition, results indicated that the *Cucurbita maxima duch* has antioxidant activity. *Cucurbita maxima duch* extract demonstrate anti-nociceptive activity in rats, using two methods of tail flick and acetic acid tests.

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PHYTOCHEMISTRY OF *ARTEMISIA ANNUA* L. GROWING IN NORTH OF IRAN AND ESSENTIAL OIL CHEMICAL COMPOSITION, ANTIMICROBIAL AND ANTIOXIDANT EFFECTS

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Artemisia annua L. (Asteraceae) commonly known as sweet wormwood or Qinghao is an annual herb/shrub native of Asia. The plant grows wild in Europe and America and on a large scale in China, Iran, Turkey, Afghanistan, and Australia [1, 2]. *A. annua* is well-known medicinal plant for being as a source of antimalarial compound artemisinin [3]. *A. annua* essential oil has potential to be used in perfumery, cosmetics and aromatherapy [4]. Since the phytochemical compounds and oil composition and effects vary in different climate, our objective was to investigate the *A. annua* oil from Rasht region in Iran. The aerial parts *A. annua* was gathered, dried and powdered and extracted by Soxhlet apparatus with methanol. This extract was fractionated in to petroleum ether, chloroform and ethyl acetate fractions. Isolation and purification of chloroform and ethyl acetate fractions compounds were performed using CC, PTLC, MPLC and HPLC. As results of phytochemistry tests, 5 compounds as scopoletin (coumarin), scopolin (comarin glycoside), domesticoside (phloroacetophenone), chrysosplenol-D (flavonoid) and norannuic acid (bisnor-cadinane) were isolated. Artemisinin wasn't found as a major compound. Structural elucidation of compounds carried out using different methods of UV, FTIR, EIMS, 1D, 2D-^{1}H, ^{13}CNMR. The essential oil of *A. annua* prepared by hydro-distillation and was analyzed by GC/MS. 48 out of 52 compounds were identified. Major constituents were β-selinene (16.16%), camphor (12.12%) and β-caryophyllene (7.43%). In DPPH antioxidant test, the oil was able to reduce purple color of the stable free radical DPPH to the yellow colore with IC_{50} = 22.6 ± 2.93 µl which was more potent than vitamin E and BHA. Antimicrobial and antifungal tests carried out by Agar dilution method, showed inhibition against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, *Bacillus cereus*, *Bacillus subtilis*, *Candida albicans* and *Aspergilllus niger* with MIC = 2.5, 2.5, 2.5, 1.25, 0.156, 2.5, 2.5 µlml^{-1} respectively and did not show significant activity on *E. coli*.

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ETHNOBOTANICAL STUDY OF EAST MAZANDARAN PROVINCE (IRAN)

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In this survey ethnobotanical study of east Mazandaran has been studied. The region is separated to tree main township: Neka, Behshahr and Galogah. Less heights in the region relevant to Galogah and most heights relevant to up-country of Neka. Rate of maximum and minimum temperature during 30- years- study statistically was 29.8 ºC and 9.1 ºC respectively. Also humidity average during 30- years- study statistically was 81 percent. In this tow-years research we asked from native people some questions about medicinal plants that they used for their treatments. Sometimes when they could not exactly tell about some medicinal plants we asked them to help us for collect them. Plants have been collected according to classical taxonomy methods were recognized determined by families, genera and species by using of indispensable references. After asking about medicinal plants and the usage from native people, we recorded them in a questionnaire. We could record 57 medicinal plants during our ethnobotanical study from the region.

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EFFECT OF METHYL JASMONATE TREATMENT ON EXPRESSION PROFILE OF SOME GENES INVOLVE IN ALKALOID BIOSYNTESIS PATHWAY AND AMOUNT OF NICOTINE FROM *NICOTIANA BENTHAMIANA* IN HAIRY ROOT CULTURE

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Nicotiana benthamiana is one of the important species of solanaceae family. The Solanaceae produce a variety of interesting biologically active products including the steroid alkaloids solanidine, nicotine and tropane alkaloids [1]. Putrescine N-methyltransferase (*PMT*) is an enzyme that catalyses s-adenosylmethionine-dependent methylation of putrescine in one of the primary steps of nicotine and tropane alkaloids biosynthesis pathway [2]. Two tobacco members of the AP2/ERF-domain transcription factors family called *NtORC1* and *NtJAP1* were shown to up regulate the activity of the *NtPMT* promoter in *N. benthamiana* under environmental stresses [3]. The AP2/ERF-like protein *NbERF1* shows 82% amino acid identity with tobacco *NtORC1* [4]. Several members of the APETALA2/Ethylene Response Factor (AP2/ERF)-domain transcription factor family have emerged as important players in JA-responsive gene expression [3]. In this work, hairy root of *N. benthamiana* were cultured on hormone-free half-strength MS medium at 28 ºC in darkness. Samples were then affected by 20 and 100 µg/ml methyl jasmonate. Plants were harvested at 0.5, 4, 24, 72 and 144 hours after each treatment. Concentrations of nicotine were determined with HPLC analysis. Results showed that amount of nicotine significantly increased in 100 µg/ml of methyl jasmonate treatment for 72 hours. Finally, the expression patterns of *NtPMT*, *NtORC1* and *NtJAP1* were studied.

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VIRUS-INDUCED GENE SILENCING (VIGS) SILENCING OF NBPMT IN *NICOTIANA BENTHAMIANA*

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Virus-induced gene silencing (VIGS) is a robust technology that exploits an antiviral defense mechanism in plants as a tool for plant reverse genetics. VIGS circumvents the need for plant transformation and methodologically is simple and yields rapid results [1]. *Nicotiana benthamiana* is one of the important species of solanaceae family. The solanaceae plants produce a variety of interesting biologically active products such as nicotine and tropane alkaloids [2]. Putrescine N-methyltransferase (PMT) is an enzyme that catalyses s-adenosylmethionine-dependent methylation of putrescine in one of the primary steps of nicotine and tropane alkaloids biosynthesis pathway [3]. In this study, a 450 bp fragment of the *NbPMT* gene was cloned into the TRV2 vector and was transferred into the plant using *Agrobacterium tumefaciens*. The expression pattern of *NbPMT*, was studied. Concentrations of nicotine were examined by HPLC analysis. Results showed that nicotine level compared with the mock treatment, increased in the control group and decreased in the *NbPMT* gene silenced plants which means the efficiency and robustness of VIGS technique to investigate the PMT function in *N. benthamiana*.

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EVALUATION OF SOME MORPHOLOGICAL TRAITS OF FOUR SPECIES SALVIA GENUS IN ARDABIL REGION

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Salvia is the largest genus of plants in the family Lamiaceae, with the number of species estimated to range from 700 to nearly 1000. Members include shrubs, herbaceous perennials, and annuals. There are three main regions of radiation of *Salvia*: Central and South America, with approximately 500 species; central Asia and the Mediterranean with approximately 250 species; eastern Asia with approximately 90 species [1]. Several different investigations have been made on *Salvia* species (Lamiaceae) and it is still in the focus of interest today [2]. The experiment was carried to evaluate some morphological traits, 4 species of *Salvia* genus called *Salvia officinalis*, *Salvia verticillata*, *Salvia nemorosa*, *Salvia sclarea* during two years (2012 and 2013) at the Natural Resources Research station of Ardabil (Sammian). Four species of *salvia* was planted in a randomized complete block design with four replications. During development and post-harvest canopy length and width, plant height, crown area, number of main and secondary branches, inflorescence height, biomass yield (wet yield), dry matter yield, the dry weight to wet weight, amount of aroma and distillate was measured. Combined Analysis of variance the assessed trait was observed that significant difference among genotypes for plant height, width, length and area of canopy cover, biomass weight, plant dry weight, dry weight to biomass weight, number of main and secondary branches, number of leaves, inflorescence height, amount of aroma and distillate, between years and genotype × year in terms of plant height, length, width and area of canopy cover, biomass weight per plant, dry weight per plant, number of main and secondary branches and inflorescence height. *Salvia officinalis* had the highest canopy cover height, biomass weight, dry weight, number of leaves per plant and amount of aroma and distillate.

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EFFECTS OF DROUGHT STRESS ON PROTEIN, OIL AND FATTY ACID COMPOSITION IN SEED SAFFLOWER (*CARTHAMOUS TINCOTRIOUS* L.)

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Safflower one of the world's oldest oil plants [2]. Protein, oil content and fatty acid composition of vegetable oils are the main characteristics of the study [1, 3]. The effects of drought stress on protein, oil and fatty acid composition of five safflower genotypes were studied in an experiment as a Randomaized Blocks Design with three replication. Crude protein, oil and fatty acid composition were determined by Kjeldaheal, Soxhlet and Gas Chromatography methods, respectively. The Sahuripa-88 genotype had the highest content of oil and Crude protein under drought stress condition. local genotype of Ghochan and CW-4440 showed the highest oil and protein percentage in drought condition, respectively. Drought had a significant effect on protein and oil content but the total oil was reduced and the protein content increased under this condition. Drought stress condition led to increasing level of linoleic acid and decreasing stearic, oleic and linolenic acids contents. There was a negative association between oil and protein content and the linoleic with stearic, oleic and linolenic acids. This research revealed the possibility of identification and cultivation the desirable safflower genotypes with high quality of oil content growing under drought conditions.

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ANTIBACTERIAL EFFECT OF ESSENTIAL OILS FROM *PEROVSKIA ABROTANOIDES* KAREL AGAINST PERIODONTAL PATHOGENS, *STREPTOCOCCUS MUTANS* AND *STREPTOCOCCUS SANGUINIS* AND IT'S RELATIONSHIP WITH PLANT PHENOLOGY

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In long period of time, plants were used to improve dental health and promote oral hygiene. Periodontal disease is a complex inflammatory disease characterized by bacterial infection. The aim of present study was to determine the antimicrobial activity of essential oils extracted from *Perovskia abrotanoides* Karel against oral pathogens, *Streptococcus mutans* (ATCC35668) and *Streptococcus sanguinis* (ATCC CIP.55.128). Perovskia is a genus belongs to the Lamiaceae family which is represented in Flora Iranica. The aerial parts of Perovskia *abrotanoides* Karel were collected during three periods of growth: vegetative, full flowering and seed setting from Kalat in northeast of Khorassan Razavi province of Iran. Essential oils were extracted by steam distillation method. Extraction yields related to leaves at vegetative, flowering and seed setting were estimated as 1.69%, 1.49% and 1.29% w/w respectively. Efficiency of essential oils extraction for flowers was 1.64% w/w. Antimicrobial activity was assayed via broth macro dilution method. Minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) of essential oils were determined. Essential oils showed effective antimicrobial activity at low concentrations especially full flowering (flowers and leaves) and seed settinging. The MIC and MBC from essential oil of flowers was the same with leaves flowering and seed setting. Therefore, MIC and MBC were measured as 0.125, 1 µg/ml for *Streptococcus mutans* and 0.25, 2 µg/ml for *Streptococcus sanguinis*.

EFFECT OF SALICYLIC ACID AND ORGANIC FERTILIZERS ON TOTAL PHENOL, FLAVONOID AND ANTIOXIDANTS OF *ECHINACEAE PURPUREA*

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Echinacea purpurea (L.) Moench, Asteraceae, a native of North America is among the most frequently utilized *Echinacea* spp. for medicinal, cosmetic, and beverage preparations. Most of the *Echinacea* preparations in the industry originate from wild harvesting and few from non-standardized cultivation and harvesting. According to the recent reports (Letchamo et al. 1999), *Echinacea* preparations are among the best selling herbal immunostimulant products in health food stores in the US. In order to investigation of total phenol, flavonoids and antioxidants amount of this plant was done a research using factorial experiment in a randomized complete block design with two factors and three replications. Organic fertilizers as factor A were vermicompost, cow and sheep manures and Control and salicylic acid (SA) as factor B were concentrations 10^{-6},10^{-4},10^{-2} M and control. Plant organs were sampled at flowering stage. Total phenol, flavonoids and antioxidants were extracted by methanol. Total phenol and flavonoids were measured by spectrophotometer at 415 nm and antioxidants were measured at 517 nm. The highest amount of total phenol and Antioxidants were measured in (root and leaves) in salycilic acid with concentration of (10^{-2}), sheep treatment and the highest of flavonoids were obtained concentration is the same in organs using vermicompost treatment.

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A STUDY OF THE VEGETATIVE COVER AND HERBAL MEDICINES IN HESARBON REGION IN THE CITY OF FIROUZKOUH

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Around 99 percent of human life had been allocated to hunting and exploiting nature, and only 1 percent has caused changes in exploitation to meet its needs leading to its damaging effects. The preservation and management of vegetative cover can be employed to prevent the progress and acceleration of such damages. For this purpose, this research aims to study the vegetative cover of the rural area of Hesarbon located in the central district of the city of Firouzkouh 60 kilometers far from the northwest of the city. A random systematic sampling method was applied in the transect of 50 meters in the representative regions and 4 m^2 plots were used. Field studies show that there are different plants in the site that have nutritional, industrial, and pharmaceutical values. The site is a shrubbery, in which increasers have been dominated. The most common plants of this site are two species of the genus *Artemisia* with different frequencies. *Artemisia sieberi* is the most frequent species in this site and is spread more in the lower parts.

THE IMPROVING EFFECTS OF HYDROALCOHOLIC STEM EXTRACT OF *EQUISETUM ARVENSE* ON FEMALE RAT RBC

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Studies show that horsetail extract has anti-inflammatory and antioxidant effects. The aim of this study was to determine the effects of hydroalcoholic stem extract of *Equisetum Arvense* on female rat RBC membrane stability. In this laboratory experimental study, female Wistar rats blood samples were divided to control group and groups exposed to 6, 8 and 10 mg/kg/body weight of hydroalcoholic horsetail extract. In each group 5 blood samples of 5 rats were examined. Membrane stabilizing activity of each blood sample was calculated and the data were analyzed using ANOVA. Our findings indicated that female rats RBCs membrane stability did not significantly change following exposure to 6 and 10 mg/kg of extract; however, 8 mg/kg of horsetail extract resulted in significant increased RBC membrane stability compared to control group ($p<0.01$). Appropriate dose of horsetail extract can enhance RBC membrane stability; according to which, the anti-inflammatory effects of horsetail can be partly attributed to the effects of extract on RBCs membrane stability. On the other hand, using of appropriate dose of horsetail extract, particularly in traditional medicine, is vital to be considered by patients consuming horsetail extract.

EVALUATION OF EDUCATION PROGRAMS ON SUSTAINABILITY OF SAFFRON PRODUCTION SYSTEM (CASE STUDY: BIRJAND)

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Saffron is one of the strategic and exportable products in Iran. Saffron, as the most valuable agricultural product and medicinal plant in the world, occupies a high position among Iranian industrial and exportable products and plays a critical role for livelihood of many farmers [1]. Considering the potential of agricultural education programs on promoting sustainable knowledge and practices, the main aim of this study was to explore the impact of education programs on the sustainability of saffron production system. A survey was conducted using a random sample of 120 farmers of Birjand County. A semi structured questionnaire was designed to collect data. Despite the rather low use of the education programs and services by farmers the findings revealed the importance of education services as a predictor of sustainability of saffron production system. There were a positive significant relationship between education services and the three variables economic, ecological, and social of sustainability. Improving the effectiveness and efficiency of education services are recommended as means of achieving sustainability.

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CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF THE ESSENTIAL OIL OF *HYPERICUM FURSEI* GROWING IN IRAN

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The genus *Hypericum fursei* (Family Hypericaceae) consists of over 460 species, which occur in all temperate parts of the world [1]. Seventeen species of them are found in Iran. This genus contains different natural product classes, including naphthodianthrones, prenylated phloroglucinols, xanthones, flavonoids, bioflavonoids, tannins, proanthocyanidins, and phenolic acids [2]. *Hypericum* species are long regarded as healing herbs. The whole plant extract has antidepressive effects on neurotransmitter levels in the brain. *Hypericum* species are generally known locally in persian by the names "Hofarighon, Alafe chai and Gole raei". The composition and antimicrobial activity of the essential oil *Hypericum fursei* an endemic species from Iran, was studied. The volatile oil obtained by hydrodistillation as characterized by the physico-chemical properties, gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS) techniques. Forty-five compounds, accounting for 99.01% of total oil, were identified. The main constituents were α-pinene (47.64%) and β-pinene (8.62%) limonene (7.98%) and β-myrcene (3.24%). The in vitro antimicrobial activity of essential oil were also examined against seven microbial strains (gram positive and gram negative) by disc agar diffusion method and in general, the oil showed moderate activity against all tested microorganisms.

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ANTIMICROBIAL ACTIVITY AND VOLATILE CONSTITUENTS OF THE ESSENTIAL OIL *ACHILLEA CUNEATILOBA* FROM IRAN

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The genus *Achillea* L. (commonly known as yarrow) belongs to the family Asteraceae and comprises more than 100 species worldwide. These often medicinal and rhizomatous perennial plants are native to Europe, Western Asia and North Africa, although they are also found in Australia, New Zealand and North America [1, 2]. In traditional systems of medicine, *Achillea* species have a long history of use as medicinal plants mainly due to their anti-inflammatory, anti-spasmodic, diaphoretic, diuretic, carminative, tunic, vermifugal and emmenagogic properties, and are used as a cure for hemorrhage, pneumonia, rheumatic and abdominal pains, stomach ache and wounds [3]. This research reports GC/MS analysis of the essential oil from the flowering aerial parts of *Achillea cuneatiloba*. The plant aerial parts were collected from north-west Iran, in June 2013 during the flowering stage. Air-dried and grond herbal parts of the plant were subjected to hydrodistilation using a Clevenger apparatus and the yellow-colored essential oil was obtained in the yields of 2.1% (v/w). The essential oil of was analyzed by GC/MS system and fifty-one compounds were identified. The major compounds were 1,8-cineole (20/13%), α-thujene (7/36), α-pinene (5/24%), linalool (4/58%), grmacrene-D (4/31). In vitro antimicrobial activity of essential oil of *A. cuneatiloba* 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. The oil exhibited higher activities against the Gram-negative tested bacterial strain.

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INTRASPECEFIC CHEMICAL VARIABILITY OF THE ESSENTIAL OIL OF *SALVIA MIRZAYANII* (LAMIACEAE) FROM IRAN

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The genus *Salvia* L. is one of the largest members of the Lamiaceae family and includes about 900 species distributed all over the world. Several *Salvia* species have been shown to possess a significant array of biological and pharmacological properties such as antiseptics, astringents and spasmolytics [1].This genus is represented in Iran by 61 species of which 17 as *S. mirzayanii* Rech. f. & Esfand. is endemic [2]. *S. mirzayanii* with the common Persian name of Moortalkhis growing in the south of Iran, especially in Fars and Hormozgan Provinces [3].In the present study,phytochemical diversity among seven wild populations of the plant including Bavanat, Tang-e-Zagh, Darab, Sarchahan, Sarvestan, Syrmand and Lar were studied for determining valuable characteristics for future breeding programs and medicinal purposes. The essential-oil content (% w/w) of the studied populations ranged from 0.58 (Sarvestan population) to 2.2% (Syrmand population). The chemical composition of all the oil samples was mainly investigated using both GC-FID and GC-MS analyses. In total, 58, 58, 65, 53, 67, 51 and 72 compounds were identified and quantified in Bavanat, Tang-e-Zagh, Darab, Sarchahan, Sarvestan, Syrmand and Lar populations, respectively. The major components of all samples were 1,8-cineole (3.2-7.4%), α-terpineol (2.0-5.5%), linalyl acetate (4.9-10.3%),bicyclogermacrene (1.0-5.8%), α-cadinol (2.8-6.3) and spathulenol (3.4-6.4%). For the determination of the chemotypes and the intraspecefic chemical variability, the essential-oil components were subjected to cluster analysis (CA). The five different chemotypes characterized were *Chemotype I* (Linalyl acetate/1,8-Cineole) including Tang-e-Zagh and Sarchahan populations, *Chemotype II* (Linalyl acetate/ Linalool/α-Terpinyl acetate) including Syrmand population, and *Chemotype III* (Linalyl acetate/ Sabinene hydrate) including Bavanat population, *Chemotype IV* (Linalyl acetate/γ-Cadinene) including Darab and Larpopulations, *ChemotypeV* (α-Terpiny lacetate/1,8-Cineole) including Sarvestan population.

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EVALUATIONS OF SEED GERMINATION AND DORMANCY BREAKING OF FIGWORT (*SCROPHULARIA STRIATA* BOISS)

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This experiment was conducted to overcoming seed dormancy of *Scrophularia striata* Boiss. It accomplished on basis of completely randomized design with 13 treatments and 4 replications in seed technology laboratory of medicinal plants institute in 2013. Treatments of study were as follow soaking in cold water for 24 hours, leaching and rinsing the seed for 24 hours, stratification of seed in moist sand for 1 and 2 weeks at 4 °C, seed scarification with concentrated sulfuric acid (97%) for 5, 10 and 15 minutes, gibberellic acid (200, 400 and 600 ppm), potassium nitrate (0.3 and 0.8%) and control (distilled water), respectively. Results indicated that maximum germination percent (72%), germination rate (5.41), vigor index (32.78) and hypocotyle dry weight obtained with using gibberellic acid (400 ppm) and maximum radicle dry weight obtained with using gibberellic acid (600 ppm). Based on the results of experiment, application of GA_3 treatment (400 ppm) had significantly ($p<0.01$) most positive effect on dormancy breaking and plantlet growth of figwort [1, 2].

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EXTRACTION AND IDENTIFICATION OF ANTHOCYANINS IN *BERBERIS VULGARIS* L.

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Anthocyanins are one of the major flavonoid classes. They produce colors from orange to blue in petals, fruits, leaves and roots in different pH. Anthocyanins are beautiful in appearance and possess antioxidant activity. The color stability changes with the pH, solvent, temperature, structure, it's concentration, oxygen presence, light and enzyme presence. Among edible plants, berries with red, blue or purple colours constitute one of the most important sources of anthocyanins [1]. Berberis vulgaris L. (barberry) belongs to the Berberidaceae family and is rich in anthocyanins. In this study barberry's anthocyanins extracted and isolated using a four-solvent system which consists of ethyl acetate, acetic acid, formic acid and distilled water [2]. The pigment was identified with UV-Visible spectroscopy and Qualitative tests [3].

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GC-MS ANALYSIS OF *SCROPHULARIA UMBROSA* ESSENTIAL OIL

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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]. Essential oils of this plant were analyzed by GC-MS. Essential oil from *S. umbrosa* obtained by hydro distillation of powdered dried aerial parts using soxhlet, then analyzed by the GC-MS. About 30 compounds in *S. umbrosa* were identified from the essential oils of the aerial parts. The identified compounds represented 98.1% of the total essential oils. The main components of the *scrophularia umbrosa* essential oil were n-Hexadecanoic acid (28%), Phytol (18.32%), 2-Pentadecanone, 6, 10, 14-trimethyl-(7.54%), Hentriacontane (4.22%) and Myristic acid (4.1%).

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QUANTIFICATION OF MINERAL ELEMENTS IN PLANT SALVIA AND BIOLOGICAL EFFECT ON BLOOD PRESURE

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Salvia genus belongs to the subfamily of Nepetoideae, Mentheae tribe of Lamiaceae family. Numerous species of the genus Salvia have been taken as a folk medicine. Due to their significant biological activity, they have been subjected to extensive pharmacognostic research, including antibacterial, antiviral, adstringent, antitumor, spasmolytic, antioxidant, anti-inflammatory, antihydrotic [1]. Furthermore they have been used in the treatment of mental, nervous and gastrointestinal diseases. In this study, Ca, Mg, Na, K, Mn, Fe element contents were measured [2]. The results have showed that potassium has the highest concentration and Salvia was responsible in controlling and reducing blood pressure.

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ASSESSMENT OF TOTAL FLAVONOIDS AND PHENOLS IN FIGWORT (*SCROPHULARIA STRIATA* BOISS) POPULATIONS

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The figwort (*Scrophularia striata* Boiss) populations due to the presence of flavonoids and phenols have different therapeutic properties. In order to assess the total flavonoids and phenols of figwort populations in Qazvin, an experiment was conducted on basis of completely randomized block design. The plant samples were collected from different regions (Razjerd, Qalat, Derbehan, Changureh) in Qazvin. After leaf drying, the content of flavonoids and phenols in the examined plant extracts was determined using spectrophotometric method. The sample contained 1 ml of methanol solution of the extract in the concentration of 1 $mg.ml^{-1}$ and 1 ml of 2% $AlCl_3$ solution dissolved in methanol. The samples were incubated for an hour at room temperature. The absorbance was determined using spectrophotometer at ëmax = 415 nm. The samples were prepared in triplicate for each analysis and the mean value of absorbance was obtained. Based on results of experiment, the highest and lowest total flavonoids were observed in Qalat (41.8 mg/g) and Derbehan (26.62 $mg.g^{-1}$), respectively. The highest and lowest total phenols were obtained in Razjerd (66.7 $mg.g^{-1}$) and Derbehan (40.31 $mg.g^{-1}$), respectively [1, 2].

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COMPARATIVE ANALYSIS OF SOME PHENOLIC COMPOUNDS IN *SALVIA VERTICILLATA* L. AND *SALVIA OFFICINALIS* L.

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The *Salvia* L. genus belongs to Lamiaceae family consists of about 700 species, of which 58 are distributed in Iranian flora [1]. A large number of secondary metabolites, belonging to various chemical groups, such as essential oils, terpenoid compounds and phenolic derivatives, have been isolated from the genus [2]. The pharmaceutical properties of Salvia species and their metabolites, predominantly phenolic acids and their derivatives are mainly due to the their antioxidant activities [2, 3]. *Salvia verticillata* L. (purple rain or lilac sage) is one of the *Salvia* species of Iran [1], which is widely distributed in different regions of the country as dispersed wild populations. The plant contains a variety of polyphenols with strong antioxidant activities, volatile oils and diterpenoids [2]. In this project, we studied qualitatively and quantitatively some phenolic compounds (rosmarinic acid, salvianolic acid A, salvianolic acid B and carnosic acid) of *S. verticillata* and medicinal species of *S. officinalis*. Plant samples of two wild and one cultivated populations of *S. verticillata* and one wild population of *S. officinalis* were collected at full flowering stage from their natural habitats. Methanolic extracts of the dried and powdered leaf and root samples were prepared and the amounts of the phenolic compounds in the extracts were quantified by HPLC with UV detection (280 nm). Based on our results, the leaves of *S. verticillata* from Tehran and Qazvin sites were the richest sources of rosmarinic acid with values of 41.07 ±2.96 and 41.53±1.5 mg/g DW, almost three times more than that of *S. officinalis* (15.02±0.53 mg/g DW). The highest content (5.99±0.98 mg/g DW) of rosmarinic acid was obtained in roots of *S. verticillata* from Qazvin, while the lowest content (2.31±0.25 mg/g DW) of this phenolic acid was found in roots of *S. officinalis*. Leaves of *S. verticillata* from Qazvin site and Iranian Biological Resources Center(IBRC) with 41.71±5.96 and 8.10 ±0.96 mg/g DW were rich in salvianolic acid B and salvianolic acid A, respectively. Leaves and roots of *S. officinalis* with 7.75±1.06 and 4.41±0.95 mg/g DW were the richest sources of phenolic diterpene of carnosic acid. This study is the first report to show that *S. verticillata* as a wild *Salvia* species of Iran is a rich source of rosmarinic acid and it's derivatives. Our results confirm that in addition to *S. officinalis*, the other wild species can be also used for medicinal purposes.

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EVALUATION OF MORPHOLOGICAL TRAITS AND HYPERCIN CONTENT VARIABILITY OF *HYPERICUM PERFORATUM* POPULATIONS IN IRAN

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Hypericum perforatum L. is a medicinal plant abounding with secondary metabolites which have clinically proven anti-inflammatory, antiviral, antifungal, and antidepressant activities [1]. The present study was conducted to determine morphological variability of *H. perforatum* sampled from different locations of Iran. 19 populations were evaluated for hypercin content, leaf gland, flower gland, plant height, day to flowering, number of flower, number of sub-branches, Number of flower branches, number of clone, dry weight and fresh weight .Analysis of variance showed significant variation in most of traits among populations. Hypercin content varied from 0.32 g/100gDW to 0.13 g/100gDW in Golestan and Hamedan populations respectively. Number of flower gland varied from 23.17 to 1 in Ziyarat and Sari populations respectively. Number of leaf gland varied from 71.55 and 13.2 respectively. Cluster analysis using UPGMA method separated populations of *H. perforatum* into four distinct groups. The Pierson correlation values was calculated among hypercin content and other traits. positive significant correlation observed between hypercin content and number of flowers , leaf glands and flower glands (0.73, 0.49, 0.67 respectively). Other morphological traits negatively associated with hypercin content. Result supporting that, number of flowers, leaf glands, and flower glands must be at the center of attention in breeding of *Hypericum perforatum* to have much more hypercin content in this plant.

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EVALUATION OF FREEZING TOLERANCE ABILITY OF GARLIC ECOTYPES (*ALLIUM SATIVUM* L.) IN SEEDLING STAGE UNDER CONTROLLED CONDITIONS

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This study assessed the freezing tolerance ability of garlic (*Allium sativum* L.) under controlled conditions and in a factorial completely randomized design with three replications at Ferdowsi University of Mashhad. Treatments consisted of two planting dates (late September and late October) in four ecotypes of garlic occurring (khaf, Torbat, Nishapur and Bojnurd) with eight temperature treatments including zero temperatures , -3, -6, -9, -12, -15-, -18, -21 ° C), respectively. In order to acclimation, 3-4 leaf stage plants were grown in pots in a natural environment. Pre- stress qualities such as fluorescence, photosynthesis, stomatal conductance and leaf relative water content were the number of bushes. The pots were transferred to freezer thermogradient were exposed to experimental temperatures. Stability of cell membrane electrolyte leakage was evaluated using the index and the lethal temperature for 50 % of the samples (LT50el) were determined based on. Between ecotypes in terms of photosynthesis, stomatal conductance and relative water content, there was no significant difference. The results showed that the percentage of electrolyte leakage was also significantly effects by treatments.

GENETIC STRUCTURE OF *HYPERICUM PERFORATUM* POPULATIONS IN IRAN'S NATURAL HABITATS

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The theoretical purpose of the present work was to study genetic relationship and genetic structure of Iranian populations of *Hypericum perforatum* .Genetic structure of 19 population of *H. perforatum* collected from different region of Iran were identified by inter simple sequence repeat (ISSR) markers. 15 ISSR primers were used and detected a total of 323 scorable fragment Molecular variation within and among the populations were estimated 71% and 29% of total variance, respectively. According to the Nei's (1973) gene diversity and Shannon's Information index, the most genetic diversity observed in Karaj (h=0.1955 and I= 0.2927) and Sari (h= 0.1424 and I= 0.2131) populations respectively. Results showed suitable gene flow (Nm= 1.14) and low Fst (0.17) among and within populations. Total heterozigosity (Ht) was 0.24 and most of it belonged to Heterozogosity within populations (H_s= 0.2). Differentiation among-population (G_{ST}=0.3) and Heterozigosity among populations (D_{ST}= 0.04) was low. The result showed populations of *Hypericum perforatum* in natural habitat of Iran are in proper relationship and over times differentiation hasn't occurred among them.

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EFFECTS OF ABSCISIC ACID ON PHYSIOLOGICAL CHARACTERISTICS OF MARIGOLD (*CALENDULA OFFICINALIS* L.) IN DROUGHT STRESS CONDITION

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Medicinal plants are an important medicinal resource that has been used for thousands of years. The World Health Organization has estimated that more than 80% of the world people use medicinal plants in traditional or modern form [1]. *Calendula officinalis* L. because of active ingredients such as the Calendulin, Salicylic acid, Inulin and Saponins, is an important medicinal plant. Biological and non-biological stresses have adverse effects on plant metabolism and growth [2]. Drought stress is one of the most important environmental factors effects on plant growth and biochemical properties, especially in plant with medicinal value, hence finding the way to help the plant for resistant against adverse effects of drought stress is necessary. In order to investigate the effects of ABA and drought stress on physiological properties of *C. officinalis,* a factorial experiment was performed on sand culture condition with two moisture levels (Control and drought stress with PEG) and two hormone spraying level (Control and spraying hormones with ABA 100 μM) in a completely randomized design with three replications. Results indicated that drought stress had a significant positive effect on total chlorophyll content, chlorophyll a content and negative significant effect on chlorophyll b content. The Superoxide dismutases activity and ascorbate peroxidase activity of aerial part of marigold were significantly affected by Hormone and drought stress. Based on our data, spray of ABA on marigold could increase antioxidative defense mechanism in drought condition and reduced the negative effect of water depletion in growth period.

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PHYTOCHEMICAL AND MORPHO-PHYSIOLOGICAL RESPONSES OF LEMON BALM (*MELISSA OFFICINALIS* L.) TO BIOSTIMULATORS APPLICATION

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Lemon balm (*Melissa officinalis* L.) is a well-known medicinal plant from the family Lamiaceae [1]. This plant has long been known as an effective medicine for the treatment of headache, rheumatism, hypersensitivities, and digestion disorder, as well as for its sedative properties [2]. This study was done to effects evaluation of bio-stimulators on quality and quantity of lemon balm. The experiment was conducted in a complete randomized block with six treatments and three replications at Medicinal Plants Institute (MPI), ACECR. Plants were sprayed three times. Treatments were consist of Aminolforte, Kadostim, Fosnutren, and Humiforte (each of them 2 $L.ha^{-1}$), complete fertilizer, and control. Biochemical analysis revealed a significant increase in content of citronellal, neral, delta-cadinene, germacrene and geranial, due to application of Aminolforte and Fosnutren. Essence content was increased with application of Kadostim and complete fertilizer. Foliar application of Fosnutren improved leaf length, leaves in stem, leaf area, leaf dry weight and shoot dry weight. There was no variation in number of branches per plant among Kadostim and Aminolforte treatment. Foliar application of free amino acids based commercial formulations (Aminolforte, Kadostim, Humiforte, Fosnutren) could be influence quality and quantity yield of lemon balm.

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EFFECTS OF MYCORRHIZA INOCULATION (*GLOMUS INTRARADICEAE*) ON NUTREINT ELEMENTS UPTAKE, VEGETATIVE AND GENERATIVE TRAITS OF DRAGON'S HEAD (*LALLEMANTIA IBERICA* F. & C. M.)

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In order to study the effects of mycorrhiza fungi (*Glomus intraradices*) inoculation on nutrients uptake, vegetative and generative characteristics on dragon's head **(***Lallemantia iberica* F. & C. M.**)**. An experiment was performed at medicinal plants institute in 2012 as randomized complete block design with three blocks and three replications. The results showed that plant height, plant dry weight, plant fresh weight, stem fresh weight stem dry weight, stem collar diameter, number of node in stem, leaf fresh weight, leaf dry weight, root fresh weight and root dry weight significantly became higher in inoculated plants than non-inoculated plants. But, it had not significant differences on number of leaf per plant. Seed number and seed mucilage percent was significantly fewer than inoculated plants. 1000-seeds weight between inoculated plants and non inoculated plants was significant. Concentration of nutrients (N, P and K) increased significantly in inoculated plants than non-inoculated plants. In the point of symbiosis effects, the result of this study indicated that inoculated plants with mycorrhiza fungi (*Glomus intraradices*) had better growth and yield than non-inoculated plants [1, 2].

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EFFECT OF GAMMA RAY ON SEED GERMINATION IN BALANGU (*LALLEMANTIA ROYLEANA*)

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One of most important factors of evolution in plant is mutation. Nowadays, large number of plants is successfully refined by means of physical or chemical mutagens [1]. balangu is one of the Lamiaceae family members [2], which is used in traditional medicines. The aim of this experiments is to study the effect of various doses of gamma radiation (0, 50, 100, 150, 250, 350, 450, 550, 700, and 900 Gray) on germination percentage of M1 balangoo seeds which were kept for one year in cold environment. This experiment was carried out in a fully randomized design with four replications. Results of variance analysis showed that there is no significant difference among them in terms of germination percentage. Although it is normally advised to plant the seeds in the first year after irradiation due to destructive effect of gamma ray on Chromosomes. Observations showed that seeds kept in cold environment had superior germination percentage (84.8%) in comparison with those which were planted in first year (37.8%).

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EVALUATION OF ANTIBACTRIAL AND CYTOTOXIC ACTIVITIES OF *ARTEMISIA AUSTERIACA*

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The genus *Artemisia* L., one of the largest and most widely distributed genera of the family Asteraceae, comprises about 200-400 species of herbs and shrubs, the most notable being A. annua for producing the antimalarial drug artemisinin .This genus, with its common Persian name "Dermane" and the common English name "Wormwood", includes approximately 34 species that are found wild all over Iran. There are some reports about pharmacological activities of this genus including antimalarial, antiviral, antitumor, antipyretic, antibacterial, anticoagulant, anti-inflammatory and antioxidant properties. In this study the extract of one medicinal plant of this genus, *Artemisia austeriaca*, were evaluated for antibacterial and cytotoxic activities against a range of gram positive and gram negative bacterial strains, cancer and normal cell lines, respectively. *n*- Hexane and methanol extract of aerial part of *Artemisia austeriaca*, were prepared and their antibacterial activity against some gram negative bacterial strains as well as gram positive bacterial strains and cytotoxic effect on HT29 (colon carcinoma), A549 (human lung adenocarcinoma epithelial) as cancer cell lines and HUVEC as normal cell lines were investigated using paper-disk agar diffusion method and MTT assay respectively. Methanol extract of this plant had no antibacterial effect against none of the examined strains but n-hexane extract had a moderate activity on some bacteria especially within the gram positive group. Furthermore n-Hexane extract had cytotoxic effect on HT29 cell line in various concentrations. None of the extracts had cytotoxic effect on HUVEC cell lines. The results indicate that n-hexane extract of this plant as a non- polar extract had significant antibacterial effect on the examined gram positive bacterial straines. Also N-hexane extract as non –polar extract were showed cytotoxic effect against specific cancer cells and non toxicity to normal cells.

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EFFECT OF CHEMICAL FERTILIZERS ON YIELD ANDPERCENTAGE OF ESSENTIAL OIL OF *NEPETA RACEMOSA*

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Nepeta racemosa L. is a perennial plant that has backward in the treatment of some diseases, and generally flowered stems is introduced as a drug in the Pharmacopoeia. In order to investigate the effect of nitrogen and phosphorus fertilizer on yield and percentage of essential oil of *Nepeta racemosa*an experiment was conducted under field conditions in 2012 in Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. Treatments 4 levels consisting of different rates of nitrogen and phosphorus (N_0P_0, N_0P_{150}, $N_{300}P_0$ and $N_{300}P_{150}$ kg/ha). The Experimental design was the form of a randomized complete block design with three replications. As the flowering starts, the plant harvested and samples were dried in shadow, grinded and essential oil was produced by hydro distillation using a Clevenger.Yield and percentage of essential oil per hectare was calculated based on shoot dry weight. The results of the analysis of variance indicated the effect of fertilizer on percentage of essential oil at $P\leq0.05$and significantly affected essential oil yield at $P\leq0.01$. Mean comparison of the treatments indicated the highest essential oil yield was in $N_{300}P_{150}$ (10.22Kg/ha) and N_0P_0 (10.49kg/ha). So mean comparison of the treatments indicated the highest essential oil percentage was in $N_{300}P_0$ (0.59%) and N_0P_0 (0.61%). It could be that the P element deficiencies due to decreasing tolerance of plant according to environmental stresses, leads to an increase the percentage of essential oil.

ANTIDEPRESSANT-LIKE EFFECT OF ETHANOLIC EXTRACT OF *PASSIFLORA INCARNATA* IN ANIMAL MODELS OF DEPRESSION

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Studies showed sedative and anti-anxiety proprieties of *Passiflora incarnata* (PI) .Therefore, antidepressant -like effect of ethanolic extract of PI in the forced swim test (FST) and tail suspension test (TST) in male mice was investigated. Forty-eight male mice were randomly divided into 6 groups of 8: negative and positive control groups received normal saline (10 ml/kg, i.p.) and fluoxetine (20mg/kg, i.p.) respectively and treatment groups received ethanolic extract of PI (200, 400 and 800 mg/kg, i.p.). Immobility, swimming and climbing behaviors were recorded within 6 minutes .All doses of PI significantly and dose dependently reduced immobility time in FST (128.83±9.34, 114.14±6.64 and 99.73±9.15 respectively; $p<0.001$) and TST (120.03±10.49, 97.98±8.51 and 76.72±6.05 respectively; $p<0.001$) compared to control groups (189.11±7.25 and 197.55±3.86 respectively). These extract increased swimming time (107.67±9.67, 120.84±5.69 and 138.21±10.41 respectively; $p<0.001$) without significant change of climbing time ($p>0.05$).Also, All doses of extract weaker than fluoxetine reduced immobility time in FST and TST (73.55±7.03 and 128.6±6.02 respectively; $p<0.001$) and increasing swimming time (153.85±11. 3; $p<0.001$). Based on present study findings it seems serotonergic and GABAergic systems involved in antidepressant like-effect of PI ethanolic extract , but further studies need to be carried out to better understanding this mechanism.

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EVALUATION OF ANTIBACTRIAL AND CYTOTOXIC ACTIVITIES OF RHIZOME OF *EREMOSTACHYS AZARBAIJANICA*, LABIATEA

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The genus *Eremostachys* belongs to the family Labiatae and comprises more than 80 species which grow mostly in Central Asia. *Eremostachys azarbaijanica* is one of the important species of the genus *Eremostachys*, which is widely distributed in Iran, particularly in Azarbaijane sharghi. There are some reports about pharmacological activities of this genus including antibacterial and antioxidant activities. In this study the extracts of *Eremostachys azarbaijanica* were evaluated for antibacterial and cytotoxic activities. *n*- Hexane, Dichloromethane (DCM) and methanol extracts of rhizome of *Eremostachys azarbaijanica*, were prepared and their antibacterial activity against some gram negative bacterial strains as well as well as gram positive bacterial strains and cytotoxic effects on HT29 (colon carcinoma), A549 (human lung adenocarcinoma epithelial) as cancer cell lines and HUVEC as normal cell line were investigated using paper-disk agar diffusion method and MTT assay respectively. Methanol extract of this plant had no antibacterial effect against none of the examined strains but n-hexane and DCM extracts had a moderate activities on some bacteria especially within the gram positive group. Also *n*-Hexane and DCM extract had cytotoxic effect on HT29 and A549 cell lines in various concentrations. None of the extracts had cytotoxic effect on HUVEC cell lines. The results indicate that n-hexane and DCM extracts of *E. azarbaijanica* as a non-polar extracts had significant antibacterial effects on the examined gram positive bacterial straines. Also n-hexane and DCM extracts as non – polar extracts were showed cytotoxic effects against specific cancer cells and non toxicity to normal cells.

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THE IMMUNOSTIMULANT EFFECT OF GIANT MILKWEED (*CALOTROPIS PERSICA*) SEED MEAL IN THE DIET OF JUVENILE RAINBOW TROUT (*ONCORHYNCHUS MYKISS*)

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A 56-day feeding trial was conducted on the juvenile rainbow trout (11.5 ± 3.64 g) to assess the effect of giant milkweed (GMW) in the diet of on innate immune responses including lysozyme activity (LYZ), total immunoglobulin (Ig) and alternative complement activity (CoM). Five levels (10, 20, 30, 40 and 50 g kg^{-1}) of GMV together with a control diet were used (n=3) at 18 raceway systems at a density of 200 fish per tank. Fish fed with the diet containing 40 g kg^{-1} GMV displayed significantly ($p<0.05$) higher activities of LYZ (5.12 ± 0.59 µg/ml), Ig (3.67 ± 0.72 µg/ml) and CoM (4.15 ± 0.12 U/ml) in the serum compared to other treatments. The results showed positive effects of GMV as a potent immunostimulant on non-specific immune system of rainbow trout.

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STUDY OF PHENOLOGICAL STAGES OF HOLY BASIL (*OCIMUM SANCTUM*) IN AHVAZ

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The study of phenological aspects of plants involves the observation, recording and interpretation of the timing of their life history events. Phenology is the observation and measurement of events in time and relationships with weather and climate. Phenological study on vital stages of plants is very important for the regulation of exploitative programs, effective compounds, seed collection, pest control, preventing of untimely harvests and weed annihilation. *Ocimum sanctum* L. or *Ocimum tenuiflorum* L, commonly known as the holy basil in english or tulsi in the various Indian languages, is an important medicinal plant in the various traditional and folk systems of medicine in Southeast Asia. Scientific studies have shown it to possess anti inflammatory, analgesic, antipyretic, antidiabetic, hepatoprotective, hypolipidemic, antistress, and immunomodulatory activities. Preclinical studies have also shown that Tulsi and some of its phytochemicals eugenol, rosmarinic acid, apigenin, myretenal, luteolin, β-sitosterol, and carnosic acid prevented chemical-induced skin, liver, oral, and lung cancers and to mediate these effects by increasing the antioxidant activity, altering the gene expressions, inducing apoptosis, and inhibiting angiogenesis and metastasis[1]. In order to study the effect of phenological stages of holy basil, an experiment was arranged in three replication at research farm of Faculty of Agriculture, Shahid Chamran University of Ahvaz. According to this plant dosn't planting in the Khuzestan province, in the first the reviews designed to determine the best planting date And due to results of reviews, the collected Seeds In late winter (February) was cultivated. After planting Phenological stages including (sowing date to emergence, squaring, Develop Accessories branch, Emergence flowering to 100% flowering and seeds collected) regularly recorded. The Growth degree-days (GDD) were calculated for each phenological Stage. The results of this study help us measure and compare holy basil phenological patterns cultured in Ahvaz with other part of the world and give the best planting date of this plant.

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STUDY OF PLANT DENSITY AND PLANTING METHOD ON SEED AND FRUITS YIELD OF PUMPKIN (*CUCURBITA PEPO* SUBSP. PEPO CONVAR. PEPO VAR. STYRIACA)

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Pumpkin (*Cucurbita pepo*) is an annual plant that has been introduced to Iran in recent years. Its effective components are used to cure some diseases such as prostate hyperplasia, control of taenia, Arleriosclerosis, regulation of alimentary canal and hormonal balance especially in women. Selection of suitable planting methods to obtain better seed yield and reduce weed problems plays an important role, On the other hand, regarding to its high and indefinite shoot development, plant density is highly important to get the highest yield. The experiment was carried out based of a factorial design in a randomized complete block design by three replications, to evaluate three planting distances (including 50, 40 and 30 cm) and two planting methods (direct seeding and transplanting) in Department of Agriculture of Ferdowsi University of Mashhad. When the weather condition became suitable and seedlings were at the four leaves stage, both seeds and seedlings were planted at the same time in the farm. Sampling was in ripening stage. Results showed that plant density and planting method had significant effect on oil percent, fruits number, thousand seeds weight, fruits diameter, seed yield and oil yield. In this experiment the most oil percent obtained from transplanting method with 50 cm distances. Also the most oil yield and seed yield obtained from transplanting method with 50 cm distances, and the most number of fruits obtained from transplanting method with 30 cm distances. Thus transplanting method had higher yields and suggest as a more reliable production method.

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THE PREBIOTICAL EFFECT OF GIANT MILKWEED (*CALOTROPIS PERSICA*) SEED MEAL IN THE DIET OF JUVENILE RAINBOW TROUT (*ONCORHYNCHUS MYKISS*)

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A 56-day feeding trial was conducted on the juvenile rainbow trout (11.5 ± 3.64 g) to assess the effect of giant milkweed (GMW) in the diet on flora of gasterointestinal tract including total aerobic count (TC) and lactobacillus count (LAB). Five levels (10, 20, 30, 40 and 50 g kg^{-1}) of GMV seed meal together with a control diet were used (n=3) at 18 raceway systems at a density of 200 fish per tank. The proximate analysis of GMW seed meal had 385.7 g kg^{-1} crude fiber and 272.9 g kg^{-1} nitrogen-free extract. With an increase of GMW seed meal in the diet from 10 to 40 g kg^{-1}, LAB increased significantly ($p<0.05$) from 4.7×10^4 to 6.1×10^4 CFU ml^{-1}. The results showed positive effects of GMV as a potent prebiotic on the flora of gastrointestinal tract of rainbow trout.

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MORPHOLOGICAL EVALUATION OF SOME IRANIAN AND FOREIGN *CANNABIS* ACCESSIONS

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Cannabis sativa L. is an important plant that cultivated for different purposes such as extraction of medicinal substances and fiber. This species grows throughout various geographical areas of Iran and some other countries. This study was done to quantify the morphological evaluation of some Iranian and foreign *Cannabis* accessions. Seeds of some Iranian and foreign accessions were grown and individual plants from each accession were assessed from the seedling stage to seed maturation for morphological attributes. The plants showed significant differences for the most observed traits between accessions. Minimum and maximum of biomass belonged to Saqez and Shiraz accessions, respectively. Also, significant correlations were observed in some traits e.g. Diameter of shoot and the number of nodes. Cluster analysis made a good classification of the accessions. The accessions of CAN52 and CAN46, fiber cultivars, along to the accessions of Qazvin and Kermanshah, from the west of Iran, placed in a same cluster. Our finding from the research suggested high morphological variation among the *Cannabis* genotypes that may be reflected in genetic background and may be applied for improvement of the plant.

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INVESTIGATION ON THE EFFECT OF BIOPHOSPHORE AND HUMIC ACID FERTILIZERS ON YIELD AND OIL CONTENT IN EVENING PRIMROSE (*OENOTHERA BIENNIS* L.)

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Evening primrose (*Oenothera biennis*) is a biennial plant which its seed oil has noticeable pharmaceutical and nutritional value due to the presence of gamma linolenic acid (GLA).[1]The aim of the research was determining the effect of humic acid and biophosphore on oil content, oil yield and seed yield of evening primrose. The experiment was conducted as a randomized complete block design with three replicates. Treatments consisted of 4 level of humic acid (0, 0.1, 0.3, 0.5 %) and 2 level of biophosphore (without biophosphore or with biophosphore). The measured parameters were seed weight, oil content, seed yield per plant, oil yield per plant and oil yield per square meter. The results showed that increasing levels of humic acid were significantly decreased seed weight. Application of humic acid significantly increased seed oil content in comparison to control, but there are not significant differences between different levels of humic acid as seed oil content as concerned. Humic acid also increase seed yield and oil yield significantly. Application of biophosphore alone increased 1000 seed weight significantly, but co-application of humic acid with biophosphore decreased 1000 seed weight. In general it can be conclude that co-application of humic acid with biophosphore decreased all studied traits significantly except the seed yield.

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AG^+ ENHANCED ANTIOXIDANT ENZYMES ACTIVITIES IN SHOOT CULTURES OF *ARTEMISIA ANNUA* L.

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In plants, reactive oxygen species (ROS) are constantly produced. However, uncontrolled production of ROS can cause cellular damage directly or through the formation of secondary toxic substances. Plants have developed a complex antioxidant system to protect themselves against such oxidant damage. Antioxidant protection system include enzymes like superoxide dismutase (SOD), catalase (CAT), peroxidase (POD), guaicol peroxidase (GPX), ascorbate peroxidase (APX) and glutathione reductase (GR), which scavenge both radicals and their associated non-radical oxygen species. *Artemisia annua L.* belongs to Asteraceae family. This plant has several pharmaceutical features such as antimalarial and anticancer features. So far, the impact of different stresses on the activity of antioxidant enzyme has been studied in many experiments, mostly have the result of increased activity of these enzymes. To test the effect of silver nitrate on activities of antioxidant enzymes, Artemisia shoots (90-days old on MS medium) were transferred and cultured for 7days. Four concentrations of AgNO3 (0.2, 0.1, 0.01, 0.001 mM) were added to shoot cultures. Our results showed that, the activities of CAT, SOD, APX, GPX and GR enzymes were enhanced in the leaves of Artemisia plants under Ag treatments, compared to the control [1-3].

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THE EFFECT OF PLANT DENSITY AND SEED PRIMING WITH SALICYLIC ACID AND HUMIC ACID ON PHYSIOLOGICAL CHARACTERISTICS OF FENUGREEK

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Rich source of medicinal plants in the country, there is a possibility to export it. The climate of opinion in the field of medicinal plants is one of the best places in the world, so it can be a major source of export revenue for the country. Fenugreek is one of the medicinal plants of the pea family is of Iranian origin in West Asia and the Mediterranean region have been reported. In order to study the effect of plant density and seed priming with salicylic acid and humic acid on physiological characteristics by experimental of Fenugreek Agricultural and Natural Resources Research Center of Mazandaran (Sari) In crop year 2012 as a split plot randomized complete block design with three replications. Treatments were three levels of density (80, 100 and 120 plants per m^2) as a main factor priming treatments at four levels (control, seed money salicylic acid 0.5 mm humic acid foliar 0.5 thousands, of seeds + foliar application of salicylic acid, salicylic acid mine 0.5 mm) as the subplot. At the end of the growing season, total dry weight, number of seeds per pod, seed weight, biological yield, grain yield and harvest index were calculated. The results showed that the density and priming had a significant effect on all traits. The highest average yield was obtained with a density of 120 plants per square meter. Effect of seed priming was significant for all traits measured. The highest average yield of seed treatment + foliar salicylic acid mine acetyl salicylic acid was obtained. The highest harvest index by pre-treatment and foliar salicylic acid respectively [1, 2].

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EFFECT OF ORGANIC AND BIO-FERTILIZERS ON HYDROGEN PEROXIDE AND MALONDIALDEHYDE CONTENTS OF FENNEL

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Fennel (*Foeniculum vulgare* Mill., Apiaceae) is one of the most important medicinal and aromatic plants due to its estrogenic activities and uses as a carminative, diuretic, anti-inflammatory, and microbial. Continuous usage of inorganic fertilizers affects soil structure. Hence, organic and bio-fertilizers can serve as alternative to mineral fertilizers for improving soil structure and microbial biomass. Using bio-fertilizers that contain different microbial strains has led to a decrease in the use of chemical fertilizers and has provided high quality products free of harmful agrochemicals for human safety. Levels of hydrogen peroxide (H_2O_2) and malondialdehyde (MDA) are frequently used as indicators of oxidative stress in plants. Therefore, the main objective of this study was to determine the effect of organic- and bio-fertilizers on the oxidative status of fennel plants. Thus, in greenhouse experiment, the effects of mineral-, organic-, and bio-fertilization on hydrogen peroxide and malondialdehyde contents of fennel plants were investigated. Experiment was carried out based on randomized complete blocks design with four treatments and three replications. Treatments were: control (without fertilizer), Barvar-1 (nitrogen bio-fertilizer) + Barvar-2 (phosphate bio-fertilizer), Humix (organic fertilizer), and NPK (20-20-20). The results showed that all fennel plants that were fertilized with amendments supplying the plant's nitrogen and phosphorus needs, had lower hydrogen peroxide and malondialdehyde contents in shoots relative to the control. The lowest values were obtained by Barvar-1 + Barvar-2 treatment, followed by Humix. The highest values were obtained in the control. Our study suggests that the Barvar-1, Barvar-2 and Humix may be used as bio- and organic fertilizers for medicinal plants production.

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INVESTIGATION AGRONOMY TRAITS AND ESSENTIAL OIL OF SAVORY (*SATUREJA SAHENDICA* BORNM)

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Since the side effects of synthetic medications are revealed to the public, consumption of medicinal plants to cure diseases is increasingly under attention. Because very low data is in hand about yield improvement in medicinal plants, it is important to conduct researches on the techniques of improving yield and quality of these plants [1]. In order to investigate agronomy traits of *Satureja sahandica*, this experiment was conducted in 2012 in Alborz Research Station, Research Institute of Forests and Rangelands, Karaj, Iran, to study the effect of planting time and planting density on savory (*Satureja sahendica* Bornm). The experiment was conducted in split plot in time in the form of a randomized complete block design with three replications. The main factor was planting time in two levels (including fall and spring planting) and the sub factor was planting density in four levels (including 20 × 20, 40 × 40, 60 × 60 and 80 × 80 cm).Results indicated that planting time significantly affected the number of lateral branches on the main stem, the number of flowering branches, flowering shoot yield and essential oil yield at $P \leq 0.01$, and the number of tillers, plant height, single plant shoot yield and essential oil percentage at $P \leq 0.05$. The effect of planting density was also significant on all measured traits except for the plant height. Mean comparison of planting time showed that in all planting densities, fall planting was better than spring planting. Mean comparison of planting densities indicated that the highest number of tillers (7.67), the number of flowering stems (6.5), single plant shoot yield (22.98 g/plant) and essential oil percentage (2.01%) were achieved in the lowest planting density (80 × 80 cm). However, the highest number of lateral branches (5.67), flowering shoot yield (1587.5 kg/ha) and essential oil yield (14.53 kg/ha) were achieved in the highest planting density (20 × 20 cm). The interaction of planting time × planting density significantly affected all measured traits except for the number of tillers and the number of flowering branches. Results of this experiment indicated that selection of suitable planting time and planting density is important to obtain high essential oil yield; fall planting × the highest density (20 × 20 cm) gave an acceptable yield in Karaj climatic conditions.

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ORGANIC AND BIO-FERTILIZERS AFFECTS HYDROGEN PEROXIDE AND MALONDIALDEHYDE CONTENTS IN GARDEN CRESS PLANTS

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Garden cress (*Lepidium sativum* L., Brassicaceae) has been used in traditional and folklore medicine for the treatment of bronchial asthma, diabetes, local and rheumatic pain. Continuous usage of inorganic fertilizer affects soil structure. Hence, organic- and bio-fertilizers can serve as alternative to mineral fertilizers for improving soil structure and microbial biomass. Bio-fertilizers are microbial inoculants consisting of living cells of micro-organism like bacteria, algae and fungi alone or combination which may help in increasing medicinal plants productivity. Levels of hydrogen peroxide (H_2O_2) and malondialdehyde (MDA) are frequently used as indicators of oxidative stress in plants. Therefore, the main objective of this study was to determine the effect of organic- and bio-fertilizers on the oxidative status of garden cress plants. Thus, in greenhouse experiment, the effects of mineral-, organic-, and bio-fertilization on hydrogen peroxide and malondialdehyde contents of garden cress plants were investigated. Experiment was carried out based on randomized complete blocks design with four treatments and three replications. Treatments were: control (without fertilizer), Barvar-1 (nitrogen bio-fertilizer) + Barvar-2 (phosphate bio-fertilizer), Humix (organic fertilizer), and NPK (20-20-20). The results showed that all garden cress plants that were fertilized with amendments supplying the plant's nitrogen and phosphorus needs, had lower hydrogen peroxide and malondialdehyde contents in shoots relative to the control. The lowest values were obtained by Barvar-1 + Barvar-2 treatment, followed by Humix. The highest values were obtained in the control. Our study suggests that the Barvar-1, Barvar-2 and Humix may be used as bio- and organic- fertilizers for medicinal plants production.

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PROTECTIVE EFFECT OF POMEGRANATE SEED EXTRACT ON PULMONARY FIBROSIS IN RATS

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Many studies have concentrated on oxidative stress as one of the key mechanisms involved in pathogenesis of pulmonary fibrosis. It is assumed that pomegranate seed extract (PSE) with a potent antioxidant activity may alleviate pulmonary fibrosis. Male Spraque–Dawley rats were divided into 5groups: rats in group I instilled intratracheally (IT) with a single dose of bleomycin (7/5 IU/kg) as positive control. Rats of group II only instilled saline (IT) as negative control. Treatment groups (III-V) received PSE (100,200,400 mg/kg) orally 1 week before and 3 weeks after instillation of bleomycin. At day 28, animals were sacrificed. Lung removed and fibrotic changes in lung were estimated by lung collagen content and histological investigation (modified Aschroft's criteria).Histopathology of lung tissue showed advanced fibrosis and structured remodeling in bleomycin treated group. However, PSE treatment could reduce the inflammation and cell proliferation due to bleomycin. The results of this study showed that collagen level in bleomycin treated rats (24.96 ± 2.55) was significantly higher than the saline group (5.33 ± 0.59) ($p < 0/05$) after 28 days, it reduced significantly in the PSE groups compared to the positive control ($p < 0/05$). Collagen level (5.88 ± 0.46) in the rats treated with 400 mg/kg PSE was similar to the saline group. PSE was able to prevent bleomycin-induced pulmonary fibrosis and this inhibition may be due to its antioxidant effects. It has been shown that PSE has a dose-dependent antioxidant effect and the highest protective effect was observed in the dose of 400 mg/kg.

STUDY OF OIL, PROTEIN AND ANTHOCYANIN OF *ZIZIPHORA TENUIOR* IN YAZD

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Researches on active constituents of plants indicate that some of these species are highly valuable for medical and industrial. This study examined the Lamiaceae family of plants *Ziziphora tenuior* .This plant height in narrow plane for the study was collected in 2100. The amount of oil, and anthocyanins protein was three times the height. Oil using Clevenger apparatus, method Kejeldal proteins and anthocyanins were measured with a spectrophotometer. The results of this study indicate that the protein plant protein has at least 10.90, max 14.35, the average protein level of 13.18 and the average of 3.98 is at the root. This analysis was performed on the amount of anthocyanins suggests that this species has a minimal amount of anthocyanin in the aerial 0.575, Max: 0.958 and the average 0.8. The maximum height of the oil in 100 grams, 1.6 cc, min: 0.4 cc and the average1.06 cc were compared to similar analyzes (0.8 cc) showed higher levels.

EFFECT OF BAP AND 2, 4-D ON CALLUS INDUCTIONIN *ACHILLEA WILHELMSII*

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The *Achillea* genus (Asteraceae) has more than 100 species spread all over the world, especially in Asia and Europe. *A. wilhelmsii* is a member of *Achillea* genus which is widely found in different parts of Iran [1]. This plant is an important herb which has been used for its analgesic, antiphlogistic, antispasmodic, and antibacterial, antihypertensive and hypolipidemic [2]. In this study, callus induction from *A. wilhelmsii* was studied on MS medium containing 3% sucrose supplemented with different concentrations of two plant growth regulators including BAP (0.0, 0.5 and 1.0 mg/l) and 2,4-D (0.0, 1.0 and 2.0 mg/l). The explants included hypocotyl, cotyledon of eight-day old seedlings and leaves of six-week old plants. After five weeks incubation in darkness at 24°C, the results showed that the optimum hormone combinations for callus induction for all tested explants, included 0.5 mg/l BAP without 2,4-D. Also, the best explant with the highest percentage of callus induction appeared to be hypocotyl. Several parameters including callus weigh, size and callus induction rate, were analyzed using SPSS software.

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RESPONSE OF *NEPETA RACEMOSA* LAM TO DROUGHT STRESS

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Nepeta genus has 250 species and there are 67 species in Iran that 39 of this genus are endemic. In order to investigate the effect of drought stress on essential oil of *Nepeta*, this experiment was conducted in 2011, at the Research Institute of Forest and Rangelands, Alborz station, Iran. In the form of a randomized complete block design with three replications. Drought levels were 100% (control), 80% (low stress), 60% (medium stress) and 40% (sever stress). The results showed that the drought stress on essential oil percentage of the leaf, stem, inflorcence and essential oil yield of the leaf, stem, inflorcence separately ($p \leq 0.01$). Mean comparison showed that the highest essential oil percentage of leaf with 1.72%, shoot with 1.27% and flower with 1.93%. It could be the medium stress achieved the maximum essential oil percentage.

COMPARISON OF MORPHOLOGICAL TRAITS IN YARROW (*A. MILLEFOLIUM* L.) POPULATIONS COLLECTED FROM DIFFERENT NORTHERN HEMISPHERE COUNTRIES

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Yarrow (*A. millefolium* L.) belongs to Asteraceae family and more than 100 species have been recognized in this genus. To date, different medicinal applications of yarrow, such as spasmolytic, choleretic, treatment of wounds and anti-inflammatory activities has been recognized. Among the species of this genus, *A. millefolium* has extensive application in pharmaceuticals and is scattered in Northern hemisphere. In this study, 10 populations belonged to Iran (IRI), Austria (AUS), Slovenia (SLO), Japan (JPN), USA (US11 and US9), England (UK), Spain (ESP), Lithuania (LIT), Canada (CAN) were evaluated in a randomized complete block design with three replications. Thirteen morphological traits were measured, that high variation obtained in reproductive and vegetative traits. The highest and the lowest flower diameter obtained in populations US11 (12cm) and SLO (4.1cm), respectively. Moreover, the short population was US11 (18.66cm) and the tallest one was LIT (65.4cm). Cluster analysis divided populations to four groups. The results revealed that the populations which were collected from similar latitudes such as US9 and ESP were clustered in the same group Populations from AUS and US11 had the most genetic distance in dendrogram that are more suitable for further breeding programs [1 , 2].

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THE RELATION OF MORPHOLOGICAL AND PHYSIOLOGICAL TRAITS IN ARTEMISIA OF ALBORZ PROVINCE, IRAN

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In this experiment, *Artemisia* was collected from Alborz province, Iran, at full flowering stage, by the means of nine plots. 20-40 collected samples were evaluated for their morphological traits such as plant height, number of tillers, minimum and maximum canopy diameter and flowering shoot yield. Moreover, the content of chlorophyll, soluble sugars, proline, Na, K, Mg, Ca and Cl were evaluated in each plot. Results indicated that plant height had significantly positive correlation with the number of tillers, flowering shoot yield, shoot yield and chlorophyll a, and significantly negative correlation with essential oil percentage and proline content. Flowering shoot yield had significantly positive correlation with shoot yield total chlorophyll, and had significantly negative correlation with root yield, essential oil yield, soluble sugars and proline. Root yield was significantly correlated to soluble sugars and proline. Essential oil percentage had significantly positive correlation with soluble sugars, proline, Na, K, Ca and Cl and negative correlation with total chlorophyll and chlorophyll a. Soluble sugars had significantly positive correlation with proline, Ca and Cl, and negative correlation with total chlorophyll content, chlorophyll a and chlorophyll b. Proline had significantly positive correlation K, Ca and Cl, and negative correlation with chlorophylls. Na was significantly correlated to K, Mg and Ca. K was significantly correlated to Mg, Ca and Cl. Ca was significantly correlated to Cl. Results of principal component analysis (PCA) indicated that the four first factors contributed to more than 96% of the variations. The firs factor contributed to more than 69% of the variations through total chlorophyll, chlorophyll a and b, shoot yield, flowering shoot yield, the number of lateral branches and the number of tillers, which are all related to shoot yield. Stepwise regression analysis indicated that absorbed K, the number of tillers and total dry matter entered the model respectively; the model explained more than 98% of the variations in essential oil percentage. Path analysis also indicated that absorbed K had the highest direct and positive effect on essential oil percentage.

EFFECT OF SALICYLIC ACID ON ESSENTIAL OIL COMPOSITION OF *MELISSA OFFICINALIS* L. PLANTS UNDER NI STRESS

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Melissa officinalis L., commonly named as lemon balm is one of the important medicinal plant species belongs to Lamiaceae family [1]. The potent therapeutic properties of lemon balm are sedative, carminative, antispasmodic, antibacterial, antiviral, anti-inflammatory and antioxidative [2]. It is well known that two group of compounds are mainly responsible for the pharmacological activities of this plant, the essential oil and phenolic compounds [3]. Essential oils of lemon balm are used as an anti-tumoral agent for prevention or remedy of cancers [5]. In the present study, we evaluated the effects of exogenous application of salicylic acid (SA) on essential oil components of *M. officinalis* L. in the absence or presence of different concentrations of nickel (Ni). Sterilized healthy and mature seeds were transferred into pots and irrigated with Hoagland nutrient solution, under glasshouse conditions. Plantlets at the 6-8 leaf stage were treated with different concentrations of Ni (0, 25, 50, 75, 100, 250, 500 µM) every alternate day and SA (0 and 1000 µM) mixed with tween-20 was sprayed in the evening of the same day. After 60 days of treatment, areal parts of the plants were harvested and further analyses. The essential oils were obtained from the samples by hydrodistillation for 5h, using a Clevenger-type apparatus and analysed by GC-MS. Results showed that application of Ni affected on the content of three main components of the essential oils. So, the contents of geraniol and geranial were decreased as a result of heavy metals pollution, while neral content was significantly increased in the essential oils. The observed decrease in the levels of geraniol and geranial in the treated plants under Ni treatment indicated a decline of the essential oils quality. The results also showed that SA application influenced quality and quantity of the essential oils components and consequently altered the tolerance of the plants against Ni stress. The useful component such as geranial, geraniol and neral were increased under Ni and SA treatments, which in turn enhanced the plants antioxidant properties. These results clearly provide evidences that metal pollutions can change the chemical composition of *M. officinalis* L.

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THE EFFECT OF FOLIAR APPLICATION OF NANO-IRON CHELATE AND IRON CHELATE ON THE ESSENTIAL OIL CONTENT AND YIELD OF HOLY BASIL(*OCIMUM SANCTUM*) AT FIRST AND SECOND HARVESTS.

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Ocimum sanctum (Holy Basil) is an aromatic plant in the family Lamiaceae. 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]. The aim of this study was: to investigate the effect of different concentrations of nano-iron chelate and iron chelate on the essential oil content and yield of *Ocimum sanctum* at first and second harvests. Field experiment was conducted based on randomized complete block design with three replications at the research farm of Shahid Chamran University, Ahvaz. The treatments were foliar application of nano iron chelate (0, 0.5, 1 and 1.5 g/l) and iron chelate (1 and 1.5 g/l). The first foliar application was done at the 6-8 leaf stage was repeated with interal 14 day until the end of the study. The plants were harvested at the full bloom stage and were dried in shade and room temperature. The essential oil was extracted by Clevenger apparatus. The results showed essential oil content and yield was increased by nano iron chelate and iron chelate in comparison with control plants. At the first harvest nano iron chelate 1 g/l (2.17%) and 1.5 g/l (2.05%) and iron chelate of 1.5 g/l (2.10%) led to produce the recorded the maximum amount of essential oil content in comparison with control (0.90%). At the second harvest, the same result was observate. According to the results, the best treatment for improving yield and content essential oil was nano-iron chelate 1 g/l.

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THE EFFECT OF FOLIAR APPLICATION NANO-IRON CHELATE AND IRON CHELATE ON THE PHOTOSYNTHESIS PARAMETRS AND CHLOROPHYLL CONTENT OF HOLY BASIL (*OCIMUM SANCTUM*)

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Holy Basil or Tulsi (*Ocimum sanctum*)is an aromatic plant of the family Lamiaceae. that plant has been evaluated pharmacologically for antimicrobial, anti-stress, anti-inflammatory, anti-asthmatic, hypotensive and analgesic activities [1]. To evaloated the effect of different concentrations of nano iron chelate and iron chelate on the photosynthesis parameters and chlorophyll content of *Ocimum sanctum.* An experiment was carried out at base on randomized complete block design with three replications at the research farm of Chahid Chamran University, Ahvaz. The treatments were foliar application of nano-iron chelate (0, 0.5, 1 and 1.5 g/l) and iron chelate) 1 and 1.5 g/l). The foliar application was started at the 6-8 leaf stage and was repeade with interal 14 day until the end of the study. The photosynthetic parameters such as net photosynthesis rate(Pn), stomatal conductance (gs), transpiration rate (E), water use efficiency (WUE) and chlorophyll content were measured on the 5th and 6th nearly full expanded leaves at the beging of full bloom. The results indicated that foliar application of nano iron chelate and iron chelate had significant effects on photosynthesis parameters and chlorophyll content. The highest amount of gs (0.40 mmol H_2O m^{-2} s^{-1}), E(3/10 mmol H_2O m^{-2} s^{-1}), Pn so the application of nano iron chelate 1g/l had most of the gs (0.40 mmol H_2O m^{-2} s^{-1}) and the E (3/10 mmol H_2O m^{-2} s^{-1}) and the most Pn (12 µmol CO_2 m^{-2} s^{-1}) was recorded in plants treated with 1 g/l nano iron chelate. The highest value of WUE (4/68 µmol CO_2 mol H2O-1) was obsorvate by using nano-iron chelate 1.5 g/l. The highest chl content was recorded by nano iron chelate 1g/l(0.92) and 1.5 g/l(1.01) and the lowest total chl content was observad by control treatment(0.51) and iron chelate 0.5 g/l(0.5040). According to the results, the best treatment for improving the photosynthesis parameters and chlorophyll content was using nano iron chelate 1g/l.

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EFFECT OF SOIL SALINITY ON ESSENTIAL OIL, NUTRIENT UPTAKE AND SOLUBLE SUGARS OF ARTEMISIA

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Samples of *Artemisia* were collected at full flowering stage from Ghom province, Iran, by plotting in three different areas with different salinity levels (area one, highly saline; area two, saline; area three, slightly saline). Then, samples were analyzed for their soluble sugars, proline, chlorophyll, Na, K, Mg, Ca and Cl content. Analysis of variance indicated that plotting area significantly affected soluble sugars, proline, total chlorophyll, chlorophyll a, Na, K, Mg and Cl at $P \leq 0.01$, and chlorophyll b and Ca at $P \leq 0.05$. Mean comparison indicated that area one had the highest essential oil percentage (0.75%) and area three had the lowest (0.6%). Area one had also the highest soluble sugars (0.68 mg/l) and area three had the lowest (0.42 mg/l). Proline content was the highest (1.17 mg/l) in area one and the lowest (0.41 mg/l) in area three. Total chlorophyll content was the highest (0.81 mg/l) in area three and the lowest (0.49 mg/l) in area one. Chlorophyll a and b were the highest in area three (0.38 and 0.43 mg/l, respectively) and the lowest in area one (0.17 and 0.23 mg/l, respectively). Area one had the highest Na content (11.66 ppm) and area three had the lowest (8.77 ppm). Area three had the highest K content (15.66 ppm) and area two had the lowest (13.42 ppm). Mg content was the highest (4.71 ppm) in area one and the lowest (3.8 ppm) in area three. Area one had the highest Ca content (22.86 ppm) and area three had the lowest (20.98 ppm). Finally, area one had the highest Cl content (35516.2 ppm) and area three had the lowest (28225.3 ppm).

THE EFFECT OF FOLIAR APPLICATION OF NANO IRON CHELATE AND IRON CHELATE ON MORPHOLOGICAL TRAITS OF HOLY BASIL (*OCIMUM SANCTUM)*

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Ocimum sanctum (Holy Basil) is an aromatic plant in the family Lamiaceae. different parts of this plant are used in cold, headache, cough, flu, earache, fever, colic pain, sore throat, bronchitis, asthma hepatic diseases, malaria fever, flatulence, migraine headaches fatigue, skin diseases, insomnia, arthritis, blidness, diarrhea and influenza[1]. the purpose of this study was: to delineate the effect of different concentrations of nano iron chelate and iron chelate on the morphological traits of *Ocimum sanctum*. Field experiment was conducted based on randomized complete block design with three replications at the research farm of Shahid Chamran University, Ahvaz. Treatments were foliar application of nano iron chelate (0, 0/5, 1 and 1.5 g/l) and iron chelate) 1 and 1/5 g/l). First foliar was at the 6-8 leaf stage and conducted was repiteded with intrral 14 day until the end of the study. Morphological traits were measured in both vegetative and reproductive stages. The results showed the, plant height, number of branches, leaf length, leaf width in the vegetative stage, and the leaf area, number of branches, plant height, shoot fresh weight, shoot dry weight, number of leaves, dry weight of inflorescences, leaf length, leaf width in the reproductive stage was recorded with foliar applictiom nano iron chelate 1 g/l. According to the results, the best treatment for improving morphological traits is using nano iron chelete 1g/l.

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THE EFFECTS OF NUTRIENT RESOURCE AND PLANT DENSITY ON SOME AGRONOMIC CHARACTERISTICS OF *CARUM CARVI* L.

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In order to investigate nutrient resource and plant density on some agronomic characteristics of *Carum carvi* L., an experiment was conducted as split plot based on complete randomized block design with 3 replications at Agricultural Research Station, Ferdowsi University of Mashhad, Iran, during 2013. Treatments were vermicompost (5 ton per hectare), manure (30 ton per hectare), nitroxin biological fertilizer (5 kg per hectare), chemical fertilizer (100 kg per hectare of urea and triple super phosphate) and control (Without the use of fertilizers) in main plots and three plant densities (20, 40 and 60 plants per m^2) in sub plots. The results indicated that the kind of fertilizer and plant density affected studied charachteristices. Applying chemical and organic fertilizers increased seed yield, bilogical yield, umples per plants, the number of seeds per plant and plant height, whereas 1000 seed weight and harvest index didn't affect. The highest and the lowest biological and seed yields were observed in vermicompost treatment and control, respectively. Also, with increasing plant density, total studied characteristics increased significantly. The highest and the lowest agronomic characteristic were obtained in 60 and 20 plants per m^2, respectively.

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EFFECT OF SI SUPPLY ON GROWTH PARAMETERS AND ESSENTIAL OIL OF LEMON BALM (*MELISSA OFFICINALIS* L.) UNDER SOILLESS CONDITION

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Recently, Si has been known as an essential element in some plant families (Cyperaceae and Poaceae), and as a quasi essential in soilless cultivation of horticultural crops such as cut roses, gerberas and cucumber; while there is no information about effects and necessity of Si application in medicinal plant production. Therefore, this study was carried out to investigate the effects of different Si levels (0, 50, 100 and 125 ppm) on morpho-physiological traits of lemon balm based on the completely randomized design with three replications. Based on the results Si showed the significant effects on plant fresh weight, essential oil concentration and content (yield). In compared with control plants (without Si application), the maximum biomass and essential oil concentration and yield were obtained in 125 ppm Si application. The water-distilled essential oil from aerial parts of plants which was analyzed by GC/MS showed that Citronellal, Geraniol, Linalool, Neral and Citral were affected by Si application. The results of the present study showed that nutrition management especially application of beneficial elements such as Si in addition to essential elements, have important effects on quantity and quality of medicinal plant, which need to more attention.

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EFFECT OF PLANTING TIME AND PLANT DENSITY ON THE YIELD AND PERCENTAGE OF ESSENTIAL OIL OF *ACHILLEA MILLEFOLIUM*

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Achillea millefolium or Yarrow is a native plant in Europe and Iran. Yarrow has been used as medicine historically, mainly because of its astrigent effects. In order to investigate effect of planting time and plant density on essential oil of *Achillea millefolium,* this experiment was conducted in 2012 at Alborz research station, Research Institute of Forest and Rangelands, Karaj, Iran. Experimental design was factorial in the form of a randomized complete block design with three replications. Treatments of planting time were at 5 March, 24 March, 13 April and 4 may and densities were 30*30cm, 20*20cm and 15*15cm.Analysis of variance indicated that planting time and plant density affected the percentage and yield of essential oil at $P \leq 0.01$.Mean comparison showed that the maximum of essential oil present (0.15%) was achieved in the 30*30 cm treatment and the yield of essential oil (2226.7gr/ha) was maximum in 15*15 cm treatment. Mean comparison showed that the highest yield (1921.3 gr/ha) and percentage (0.14%) of essential oil was achieved in the first planting time treatment.

EVALUATION OF ANTIOXIDANT ACTIVITY OF SOME MEDICINAL PLANTS

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Recently, interest in plant-derived food additives has grown, mainly because synthetic antioxidants suffer from several drawbacks. Furthermore, plant extracts have been shown to possess health-promoting properties. Therefore, introduction of new natural antioxidants (especially those with plant origin) is very important [1,2].In this study essential oil of *Mentha piperita* L, (Mint), *Rosmarinus officinalis* L, (Rosmary), *Thymus vulgaris* L. (Thymus), *Zataria multiflora* L, (Zataria), *Cinnamomum zeylanicum* L (Cinamon), *Eugenia caryophyllata* L,(Clove), *Ocimum basilicum* L, (Basil), *Foeniculum vulgar* .L(Fennel) was prepared by hydrodistillation and analyzed by GC/MS instrument. The antioxidant activity of essential oils was measured using free radical scavenging activity with 2-2-diphenyl, 1-picrylhydrazyl (DPPH) and it was determined by treated with different concentrations of essential oils and vitamin C as standard antioxidant compound. The percentages of DPPH inhibition and IC_{50} were recorded, and the total phenolic was determined by Folin–Ciocalteu method. Results show in comparison with these plants antioxidant activity of the, clove oil by DPPH method showed higher result 18.20 µg/mL in free radical scavenging activity**.** The major components of clove oil was Eugenol (76.47%) Antioxidant capacities and related with chemical compositions of clove was analyzed. The strong antioxidative nature of clove oil could be attributed to the phenolic content estimated as gallic acid equivalent. Finally it can be said these plants involve high amount of polyphenols including eugenol, thymol and carvacrol, which were reported to possess the high antioxidant activity and because of its potential antioxidant activity and have good taste, can be used as food flavor, therefore they could be suitable for using as antioxidative agents in the food industry and a preventing agent for many diseases.

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ISOLATION AND STRUCTURE ELUCIDATION OF SECONDARY METABOLITES FROM *ECHINOPHORA PLATYLOBA* DC. FROM IRAN

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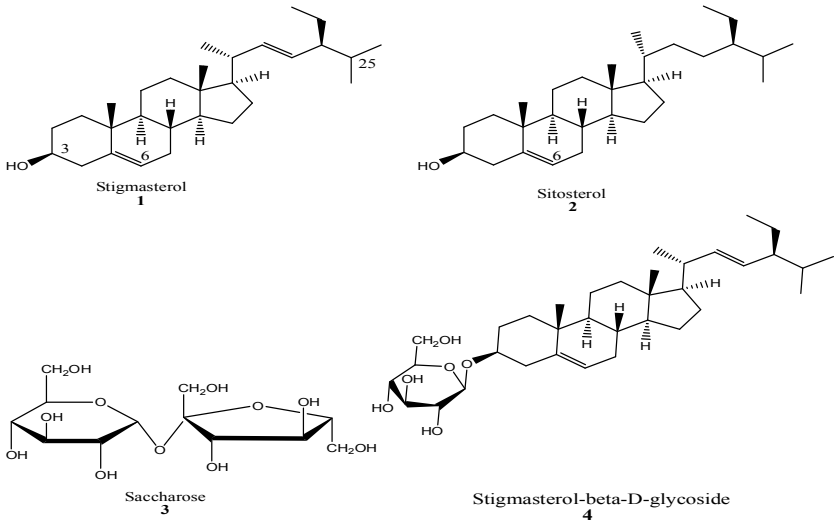
Echinophora platyloba DC (Apiaceae) is one of the two endemic species of this genus in Iran [1]. It has medicinally important properties such as antifungal, antibacterial and antiprimary dysmenorrhea [3]. Traditionally it is used as flavoring agent for soup, meat, and dairy products in Azarbaijan province, Iran [2]. In the best of our knowledge, any phytochemical studies have not been reported on this specie of genus *Echinophora* before. Some of the secondary metabolites were isolated from *n*-hexane, ethyl acetate and methanol extracts from the aerial parts and root of this plant. Resulting extracts were subjected to column chromatography using EtOAc/*n*-hexane and methanol as eluent. Stigmasterol, Sitosterol, Stigmasterol-β-D-glycoside and Sucrose were purified and characterized from these extracts using spectroscopic data (^{1}H NMR, ^{13}C NMR, MS and FT-IR), and by comparing with literature.



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INVESTIGATION GROWTH INDICES OF *ACHILLEA MILLEFOLIUM* L.

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Nowadays use of plants for medical purpose has become very common. *Achillea millefolium* L, is being used in traditional and modern medicine due to various chemical compounds. Yarrow leaves are more astringent than the flowers which are more aromatic. Growth indices of Yarrow investigate in 2012 at Alborz research station, Research Institute of Forest and Rangelands, Karaj, Iran. Experimental design was factorial in the form of a randomized complete block design with three replications. Treatments of planting time were at 5 March, 24 March, 13 April and 4 may and densities were 30*30cm, 20*20cm and 15*15cm. The result of Dry matter accumulation analysis showed that 44 plant /m2 had hieghest Dry matter (300 g/ m2) after get 2000 GDD. Investigate of leaf area index indicated that maximum LAI (2.5) belong to 44 plant/ m2 and minimum of LAI (2.5) belong to 25 plant/ m2 after get 2600 GDD.

EVALUATION OF SAFFRON PHARMACOLOGICAL EDIBLE EXTRACT'S SHELF LIFE

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Saffron is one of the natural edible dyes with high economical and biological value which is used to increase acceptability of foods in society. Saffron stigma includes Crocin, Picrocrocin, Safranal which are related to its color, flavor and odor, respectively. Up to now many scientists make pharmacological extract, but the aim of this research is production of saffron extract with increasing its quality factors and evaluation of its shelf life. This product is extracted with polar solvent and produced as a ready to use solution which can be diluted in water and include saffron color, odor and flavor. Our research up to now shows that the best method for producing saffron extract is use of the hydro alcoholic solvent [2]. In this study, after extracting, the product stored in refrigerator for determined its shelf life in 4 three month period during 1 year. The results show that when we used alcohol as extraction solvent its shelf life can be increased up to 6 month. To respect of result, when samples haven't got Entrobactriacea and *E. coli* in samples at first test, it didn't change up to end of shelf life. But Mold, Yeast and Sulfite reduction Clostridiums increased during this period. For Yeast it increased from 6.5×10 to $9/76\times10^2$ after 6 month that is near to critical point of standards, and after 9 month it increased to $8/16\times10^3$ which is unacceptable for using to respect of ISO3632 [1]. For Clostridiums it is similar too. After 6 month it changes from 13/33 to 75/33 and after one year it become near 97. Therefore it is near the critical point but because Mold/Yeast are more than critical point in this period, the best time for saffron pharmacological/edible extract is 6 month in refrigerator in sterile dark bowls.

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EFFECTS OF NITROGEN, VERMICOMPOST AND DROUGHT STRESS ON PHYSIOLOGICAL CHARACTERISTICS OF (*SALVIA SCLAREA*)

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Salvia sclarea is a perennial and Dry-friendly plant of the Labiateae family (Lawrence, 1992). falahi et al (1989) An study about salinity and osmotic stress on great sage shows high tolerance in sage against drought and salinity stress at germination stage. Ghazi manas etal (1392) reported Great sage is well-suited for dealing cultivation and domestication in Mashhad. Evaluation of vermicomposting and nitrogen on performance characteristics was significant on the 0.01 level but there was no significant interaction effects on some traits. To study the effects of nitrogen fertilizer, vermicompost and drought stress on *Salvia sclarea* a test was carried in Split-split plot experiment in randomized complete block design with three replications at the Research Institute of Forests and Rangelands, Alborz Research Station in 1392. The treatments included two levels of irrigation (%35 and %90 of field capacity), vermicompost in three levels (0, 5, 15 T/ha), and nitrogen in three levels (0, 150, 300 kg/ha). Characteristics studied were included, Stand canopy height, canopy diameter, canopy area, leaf length and width, number of inflorescences per bushes, number of leaves and stem diameter. The results showed that the effect of drought stress and agricultural evaporation was significant at the one percent level on characters of stand canopy height, canopy area, leaf width and number of leaves, but was not significant at the one percent level on characters of canopy cover, leaf length, number of inflorescences per bushes and stem diameter. The effect of nitrogen fertilizer on all traits were significant at the one percent level, except for the diameter and length of the leaf canopy, which was not significant. Interactive effects of drought stress and nitrogen fertilizer was not significant in any of the traits measured. Effect of vermicompost fertilizer was not significant on all traits except for leaf width that was significant. Interaction between drought stress and vermicompost were not significant in all traits except for Stand canopy height that was significant. The interaction effect of vermicompost and nitrogen and the interaction effect of drought stress and vermicompost and nitrogen was not significant in all traits except for leaf width and number of leaves traits that was significant.

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EFFECT OF EXOGENOUS SALICYLIC ACID ON ACCUMULATION OF NI IN THE ROOTS AND LEAVES OF *MELISSA OFFICINALIS* L. PLANTS UNDER NI STRESS

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Melissa officinalis L. commonly named as lemon balm is one of the important medicinal plant species belongs to Lamiaceae family [1]. The potent therapeutic properties of lemon balm are sedative, carminative, antispasmodic, antibacterial, antiviral, anti-inflammatory and antioxidative [2]. It is well known that two group of compounds are mainly responsible for the pharmacological activities of this plant, the essential oil and phenolic compounds [3]. The present investigation was carried out to in order to evaluate the effects of salicylic acid (SA) on content of Ni in leaves and roots of *M. officinalis* plants exposed to nickel (Ni) stress. Sterilized healthy and mature seeds were transferred into pots and irrigated with Hoagland nutrient solution, under glasshouse conditions. Mean day temperature was 28±5 °C, night temperature 22±3 °C, with photon flux density 400-600 µmol m^{-2} s^{-1} (PAR), 16/8 light/dark photoperiod and average relative humidity (RH) 35.9±6.5 during the entire growth period. Plant lets at 6-8 leaf stage were treated with different concentrations of Ni (0, 25, 50, 75, 100, 250, 500 µM) every alternate day and SA (0 and 1000 µM) mixed with tween-20 was sprayed in the evening of the same day. After 60 days of treatment, leaves and roots of the plants were collected by hand and dried for further analyses. Samples were wet digested as described by Stoltz and Greger, (2002). The Ni content (µg g^{-1} DW) determined using atomic absorption spectrometry (ICP-OES). Our results showed that with increasing the Ni concentration, accumulation of Ni increased in the root samples more than in the leaves. These results suggest that protective barriers exist to prevent the penetration of Ni from the roots into leaves. Also the results indicated that SA decreased root-to-shoot translocation of Ni and hence improved Ni toxicity in the leaves. The lowest level of Ni accumulation (25.6 µg/g DW) was observed in the leaves of plants which were treated with 25 µM of Ni and 1000 µM of SA. In addition, roots more than leaves are affected to the damages caused by heavy metals, therefore these organs are more responsive to Ni stress. Higher accumulation of Ni in the roots and substantially lower content (<1000 µg g^{-1} DW) of Ni in the leaves, supports *M. officinalis* classification as a Ni excluder and not a hyperaccumulator medicinal plant to Ni stress.

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EFFECT OF BAP AND 2, 4-D ON CALLUS INDUCTIONIN *OCIMUM BASILICUM* L.

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Ocimum basilicum L. "sweet basil" of the family Lamiaceae is an herbaceous species rich in aromatic essential oils and is valuable for its pharmaceutical, aromatic and culinary stomatic, antihelminthic, antipyretic, diaphoretic, properties. The plant is expectorant, carminative, stimulant and pectoral [1]. In this study, callus induction from *O. basilicum* was studied on MS medium containing 3% sucrose supplemented with different concentrations of two plant growth regulators including BAP(0.0, 0.5 and 1.0 mg/l) and 2,4-D(0.0, 1.0 and 2.0 mg/l). The explants included hypocotyl, cotyledon of two-week old seedlings and leaves of four-week old plants. After four weeks incubation in light and darkness at 24°C, the results showed that the optimum hormone combinations for callus induction for all tested explants, included in light conditions is MS without hormons (control) and best explant with the highest percentage of callus induction appeared to cotyledon and in dark conditions included 1 mg/l2,4-DwithoutBAP. Also the best explant with the highest percentage of callus induction appeared to be hypocotyl and cotyledon. Several parameters including callus weigh, size and callus induction rate, were analyzed using SPSS software.

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EFFECTS OF FOLIAR APPLICATION OF NANO ZINC CHELATE AND ZINC SULFATE ON CHLOROPHYLL CONTENT, PHOTOSYNTHETIC PARAMETERES, ESSENTIAL OIL CONTENT AND YIELD OF HOLY BASIL *(OCIMUM SANCTUM)*

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Holy basil (*Ocimum sanctum*), belonging to the lamiaceae family, is a perennial sub-shrub plant. Essential oil of holy basil contains estragol, linalool, eugenol and methyl chavicol. This plant is known as "Queen of plants" the mother medicine of nature ranks among the most important aromatic herbs for its enormous medicinal properties [1]. Essential oil biosynthesis of medicinal plant is strongly influenced by Zn and the stresses caused by deficiency of other elements [2]. In order to evaluate the effect of foliar application of zinc fertilizer on chlorophyll content, photosynthetic parameteres, essential oil content and yield of holy basil at first and second harvests, an experiment was conducted at research farm of faculty of agriculture, Shahid Chamran University of Ahvaz based on randomized complete block design, with three replications. The treatments were nano zinc chelate (zero, 0.5, 1 and 1.5 $gr.lit^{-1}$) and zinc solfate fertilizers (1 and 1.5 $gr.lit^{-1}$). Foliar application of fertilizer was done at six to eight leaf stage and was repeated with interal 15 days until the end of the study. The net photosynthesis (Pn), stomatal conductance (gs), transpiration rate (E), quantum yield (QY), water use efficiency (WUE) and chlorophyll content were measured on adult leaf at begining of flowering. Then, the plants were harvested at full bloom stage and dried in shade. The essential oil was extracted by a clevenger apparatus. The results showed that the effect of foliar application of zinc fertilizer on Pn, gs, E, QY, chlorophyll content, essential oil content and yeild of holy basil were significant ($p \geq 0.01$). There was no significant difference between treatments in water use efficiency (WUE). The highest values of Pn (11.75 µmol CO_2 $m^{-2}s^{-1}$), gs (0.31 mmol H_2O m^{-2} s^{-1}), E (2.80 mmol H_2O m^{-2} s^{-1}), QY (6.10 µmol CO_2 µmol. $photon^{-1}$), chl a, chl b and total chlorophyll (0.99, 0.20 and 1.19 $gr.kg^{-1}$(FM)), essential oil content (2.11%) and yeild (39.13 $gr.m^{-2}$) were obtained in plant sprayed with 1.5 $gr.lit^{-1}$ nano zinc chelate. In total, chlorophyll content, photosynthetic parameteres, essential oil content and yeild of holy basil were increased by foliar application of zinc and 1.5 $gr.lit^{-1}$ nano zinc chelate was recommended.

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DOES CURCUMIN IMPROVE THE FLESH QUALITY AND GROWTH PERFORMANCE OF RAINBOW TROUT (*ONCORHYNCHUS MYKISS*)?

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In the recent years, identification and optimization of feed supplements used in the aquafeed industries as stimulastors of growth and immune system and color quality of fillet are considered as an important area in the nutrition of aquatic species. In this regard, astaxanthin (AX) is the most popular synthetic pigments. High cost, low bioavailability and variable purity have limited the use of AX in the industry [1]. Curcumin as a yellow pigment obtained from rhizomes of Curcuma longa is commonly used as a spice and food colouring. Curcumin and turmeric extracts have several pharmacological effects such as antitumour, anti-inflammatory, antioxidant and anti-infectious activities. In the present study, the potential of curcumin (CN) as a natural pigment in the diet of rainbow trout (45 ± 3.8 g) was compared to that of AX based on the some biological indices including growth performance (specific growth rate, % day^{-1}), immunological indices (lysozyme and complement) and fillet quality. Five inclusion levels (mg kg^{-1}) of CN (50, 100, 150, 200 and 250) and AX (30, 40 and 65) together with a basal diet (control) were used in the diet for 126 days. Results showed that immunological indices including lysozyme and complement levels of the serum of fish fed the diet containing 200 mg kg^{-1} increased (9.8 µg ml^{-1} and 11.2 unit ml^{-1}, respectively) significantly ($p \leq 0.05$) compared to all inclusion levels of AX (mean: 6.9 µg ml^{-1} and 8.3 unit ml^{-1}, respectively) and control diet (4.5 µg ml^{-1} and 5.1 unit ml^{-1}, respectively). Using 200 mg kg^{-1} CN increased the final weight (197.8 ± 4.3 g) compared to all inclusion levels of AX (mean: 168.1 ± 3.1 g) and control group (101.5 ± 5.1 g). Specific growth rate fish fed the diets containing 200 mg kg^{-1} CN (2.4 % day^{-1}) increased significantly ($p \leq 0.05$) compared to all inclusion levels of AX (mean: 1.9 % day^{-1}) and control diet (1.8 % day^{-1}). Based on the L*a*b indices, the flesh quality of fillets in the fish fed the diets containing different levels of CN improved significantly ($p \leq 0.05$) compared to other treatments. Based on the results, using 200 mg kg^{-1} CN in the diet of rainbow trout was possible.

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GROWTH AND IMMUNOSTIMULANT EFFECTS OF GINGER EXTRACT ON *BARBUS SHARPEYI*

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In the last decades, interest for using from herbal medications as growth promoters and immunostimulants in fish farms has been increased. Among immunostimulants and immunomodulators, herbal derivatives have the lowest side effects on environment and they can be proposed as a good substitute for chemical drugs and supplements in aquaculture. In the current study, effects of ginger extract on growth and immunity system of *Barbus sharpeyi* were studied. In this study, ethanolic extract of ginger (*Zingiber officinale*) was prepared by standard method. Different levels of ginger extract (included of 0 (as control group), 0.1, 0.5 and 1 % as treatment groups) were added to fish diet. Fish were divided to 12 fiberglass tanks with 300 liters capacity with continuous aeration (four treatment groups in triplicates). During the experimental period, fish were fed three times per day for 3% of body weight by experimental diets. This study lasted for eight weeks. At the end of the experiment, biometry was performed and blood samples were collected from caudal vein. Blood samples were centrifuged and serum was separated. CBC and Serum Lysozyme activity were done and growth parameters were calculated. The results showed that, oral administration of ginger extract could increase serum lysozyme activity ($p<0.05$) and this increase was dose dependent so that 1% of ginger extract had the best effects on fish. Increase in serum lysozyme activity may be an effect of ginger extract on WBC and neutrophils. This result is in agreement with results obtained by other researchers [1,2]. Also, growth parameters (MBWG and SGR) were affected by different levels of this herbal extract (Immenuel et al., 2009). Based on the results obtained from this study, Ginger extract can be proposed in aquaculture as an immunostimulant and growth promoters.

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THE SURVEY OF SOME SECONDARY METABOLITES IN CITRUS CULTIVARS ON YOZO ROOTSTOCK

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The existing metabolites in citrus contain antioxidants that can be used in pharmaceutical, food and hygienic make up industries. In view of the fact that secondary metabolites in citrus have great importance, this research was carried out with the purpose of comparing the amount of total phenol, total flavonoid and antioxidant features in different parts of fruit including: endocarp (the fruit flesh), exocarp and mesocarp (the fruit skin) and studying the influence of rootstock and scion on these parameters. grafting trees was included: moro, mars, salostiana, Italian and the rootstock was yozo. This study was done in the form of randomized factorial design in citrus research station (situated in kotra, tonekabon) in three replications and phytochemical analyses were done in the horticulture laboratory of gorgan agricultural science and natural resources university. Antioxidant features, the amount of phenol and flavonoid were measured using DPPH, folin siu caltive reagent, chlorid aluminium and potassium acetate reagent respectively and with spectrophotometer. The results have shown that the two factors of rootstock and scion have significant effect on total phenol, total flavonoid and antioxidant features in citrus extraction. Accordingly, the highest level of phenol compounds was seen in the orange mesocarp and exocarp (skin) in italian variety engrafted on yozo rootstock (17.67 Mg of gallic acid per gram dry weight) and the lowest level in endocarp of yozo rootstock (1.39 Mg of gallic acid per gram dry weight). In addition, the total flavonoid exists in the fruit skin of salostiana variety engrafted on yozo rootstock (0.337 Mg of quercetin per gram dry weight) and the least exists in endocarp of yozo rootstock (0.138 Mg of quercetin per gram dry weight). According to the result antioxidant features were in yozo variety mesocarp and exocarp (skin) tissue.

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THE EFFECT OF VARIOUS HORMONES ON CALLUS INDUCTION AND REGENERATION OF STEVIA STRESSFUL

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Stevia is a perennial plant of the Asteraccae family, native to central south America. The leaves of this plant monosaccharides, astrvzyyd be extracted and used in many pharmaceutical and food industries. It also has good stability properties of fresh consumers. This material is also used for the production of sugar for diabetics. Given the importance of the plant and the production of genetically stable strains, tissue culture for mass production will be a priority. Causing the callus tissue culture is the first step, thus causing experiment with 9 treatment combination was used for callus to view the results of statical analysis showed that callus induction and callus Maximum combined. B5 medium fortified with hormone (IBA) 1.5 mg/L and 6-benzyladenine (BA) 2.0 mg/L + kinetin3.0 mg/L was and also combined MS medium fortified with hormonal α-naphthalene acetic acid (NAA) 1.0 mg/L + 6-benzyladenine (BA) 2.0 mg/L and (IBA) 1.5 mg/L regeneration from callus was observed.

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THE STUDY OF CARBOHYDRATE, NUTRIENT CONTENT, PHOSPHORUS AND TOTAL FLAVONOID CONTENT IN *TAMARIX SEROTINA* PLANT

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Carbohydrates, which are sometimes referred to simply as sugars, and their derivatives are a group of polyhydroxy aldehydes, ketones, acids or their derivatives, together with linear and cyclic polyols. Carbohydrates are found abundantly in nature, both in plants and animals, and are essential constituents of all living matter [1]. While nutrient content including crude protein, NDF and ADF are essential in growth of animals and human body, identifying the nutrient content of a plant body will be a useful way for determining rangeland capacity, the most proper time of utilization of range plants, prediction of malnutrition and evaluation of nutrition requirements of plants [2]. *Tamarix serotina,* a member of Tamariaceae family, is an adaptable plant of desert areas of Iran. In this study, we evaluated *Tamarix* properties including carbohydrates and crude protein (CP). CP is determined by Kjeldahl method. Neutral Detergent Fiber (NDF) and Acid Detergent Fiber (ADF) are determined according to the method of Goering and Van Soest. The carbohydrates content was measured spectrophotometrically using the Anthron and Glucose reagents according to a method that described by Deraiz. The results showed the maximum amount of carbohydrate in the flower (84.931 gr/kg). In nutrient contents, the maximum amount of CP (12.88%), NDF (66.84%) and ADF (52.66) were found in flower, root and stem of *Tamarix serotina*, respectively. we have determined flavonoids content in three different extracts (H_2O, EtOH and Me_2CO) of flower and leaf. According to Jia, et al. the total flavonoid content in the extract was determined using slightly modified colourimetric method, which is based on the formation of flavonoid-aluminum complex [3]. The results showed that water extract of flowers has the highest amount of flavonoids (5.709 mg/g). The phosphorus content of the flower and leaf of this plant was investigated by UV-Vis spectrophotometry method in 420 nm. Phosphorus in flower (1052.01 ppm) was higher than leaf (257.05 ppm), which makes this plant a good candidate for animal diet.

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STUDY ON DIFFERENT LEVELS OF TURMERIC MEAL (*CURCUMA LONGA*) IN THE DIET ON SOME BIOLOGICAL INDICES OF NARROW-CLAWED CRAYFISH (*ASTACUS LEPTODACTYLUS* LEPTODACTYLUS)

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Sustainable aquaculture need to identify and optimize feed supplements used in the aquafeed as stimulastors of growth performance, haemolymph indices and color quality of tail fillet. In this regard, astaxanthin (AX) is the most popular synthetic pigments. High cost, low bioavailability and variable purity have limited the use of AX in the industry [1]. Curcumin as a yellow pigment obtained from rhizomes of Curcuma longa is commonly used as a spice and food colouring. In the present study, the potential of curcumin (CN) as a natural pigment in the diet of sub-adult crayfish (15.3 ± 4.9 g) was compared to that of AX based on the some biological indices including growth performance (specific growth rate, % day^{-1}), immunological indices (lysozyme and complement) and fillet quality. Five inclusion levels (mg kg^{-1}) of CN (50, 100, 150, 200 and 250) and AX (30, 40 and 65) together with a basal diet (control) were used in the diet for 126 days. Results showed that immunological indices including lysozyme and complement levels of the haemolymph of crayfish fed the diet containing 200 mg kg^{-1} increased (11.3 µg ml^{-1} and 12.7 unit ml^{-1}, respectively) significantly ($p \leq 0.05$) compared to all inclusion levels of AX (mean: 7.9 µg ml^{-1} and 9.3 unit ml^{-1}, respectively) and control diet (5.1 µg ml^{-1} and 6.7 unit ml^{-1}, respectively). Using 200 mg kg^{-1} CN increased the final weight (51.8 ± 4.3 g) compared to all inclusion levels of AX (mean: 38.1 ± 5.1 g) and control group (29.5 ± 6.1 g). Specific growth rate of crayfish fed the diets containing 200 mg kg^{-1} CN (4.1 % day^{-1}) increased significantly ($p \leq 0.05$) compared to all inclusion levels of AX (mean: 2.1 % day^{-1}) and control diet (1.9 % day^{-1}). Based on the L*a*b indices, the flesh quality of tail fillets in the crayfish fed the diets containing different levels of CN improved significantly ($p \leq 0.05$) compared to other treatments. Based on the results, using 200 mg kg^{-1} CN in the diet of crayfish was possible.

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INDUCTION OF ANTIOXIDANT DEFENSIVE MECHANISM IN SHOOT CULTURE *ARTEMISIA ANNUA* L IN RESPONSE TO COPPER STRESS

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Variety of environmental stresses such as soil salinity, drought, extremes of temperature and heavy metals cause oxidative damage to plants by increasing the production of reactive oxygen species (ROS). The ROS produced during the electron transport chain or metabolic pathways and in turn cause damage to the biomolecules. To combat oxidative damage, plant have the antioxidant defense system consisting of lipid peroxidase (LPO), superoxide dismutase (SOD), guaicol peroxidase (GPX), ascorbate peroxidase (APX) and glutathione reductase (GR), catalase (CAT) which remove or neutralize the ROS[1]. Antioxidants found in the leaves of Artemisia *Artemisia annua L.* (Belonging to the Asterassea family) is useful for the treatment of malaria and cancer [2]. Research has proved that various stresses including heavy metals stress on antioxidant enzyme activity is effective. Given the importance of these enzymes in plants, numerous studies on the antioxidant activity under various stress conditions has been performed. The purpose of this study was to investigate the activities of antioxidant enzymes in the stem of Artemisia copper sulfate treatment compared with control. In this examination stems in MS medium with copper sulfate (5, 10, 25 and 50 mM) were cultured. After a week in vitro cultivation of Artemisia increased enzyme activity of SOD, GR, APX, GPX, CAT.

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EFFECT OF DEHYDRATION METHODS ON MEDICINAL PROPERTIES OF ALOE VERA GEL

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Aloe Vera gel consists of 99% water and more than 60 % (w/w) of its solid contents are polysaccharides with medicinal properties [1]. One of these polysaccharides is Glucomannan curative for type 2 diabetes and high cholesterol [2]. *Aloe Vera* gel easily loses its normal biological activity as exposed to ambient temperature after harvesting. In order to avoid the problem, it is necessary to reduce amount of the existing water and drying of the gel [3]. In dehydration process of the Aloe gel, polysaccharides structure may be destroyed and it is therefore important to save therapeutic properties of gel by using suitable dehydration method. In this study, the effect of concentration and drying on medicinal properties of *Aloe Vera* gel has been investigated by measuring the Glucomannan amount by the colorimetery method. The reverse osmosis concentration and spray drying methods, which are relatively safe for dehydration of thermal sensitive medicinal plants, were selected as operational methods for this purpose. The effect of some important factors as viscosity of Aloe gel, pressure gradient, and temperature and flow ratio of gel to input air in spray dryer was studied on final amount of Glucomannan polysaccharides and optimal range of each parameter for producing Aloe concentrated and dried gel was determined. Experimental results showed that in order to have a sufficient Aloe processed gel in term of therapeutic properties, the temperature of drying should be reduced down to the range of 200-230 ˚C) leading to flow ratio of gel to air in the specified range of 0.10 – 0.33 w/w.

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EFFECTS OF REPLACING FISH MEAL WITH GRADED LEVELS OF COOKED MANGO-SEED KERNELS (*MANGIFERA INDICA*) ON THE PERFORMANCE, CARCASS YIELD AND MEAT QUALITY OF RAINBOW TROUT (*ONCORHYNCHUS MYKISS*)

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A 126-day feeding trial was conducted on the juvenile rainbow trout (60.5 ± 3.19 g) to assess the effect of cooked mango-seed kernels (CMK) in the diet on growth performance and biological indices, five levels (10, 20, 30, 40 and 50 g kg^{-1}) of CMK together with a control diet were used (n=3) at 18 raceway systems at a density of 50 fish per tank. Specific growth rate (SGR) of fish fed the diets containing 50 g kg^{-1} CMK (2.16% day^{-1}) increased significantly ($p \leq 0.05$) compared to all inclusion levels of CMK (mean: 1.62% day^{-1}) and control diet (1.12% day^{-1}). Feed conversion ratio (FCR) of fish fed the diets containing 50 g kg^{-1} CMK (1.01) decreased significantly ($p \leq 0.05$) compared to all inclusion levels of CMK (mean: 1.37) and control diet (1.91). With an increase of CMK in the diet from 10 to 50 g kg^{-1}, protein efficiency ratio (PER) as one of the most important of nutritional efficiency indices increased significantly ($p \leq 0.05$) from 2.16 to 4.18 compared to control (1.28) and then it remained insignificantly constant. With an increase in CMK dose from 10 to 50 g kg^{-1}, the levels (ng ml^{-1}) of plasma triiodothyronine (T_3) of fish fed the diets of CMK increased significantly ($p \leq 0.05$) from 3.7 to 4.2 ng ml^{-1} compared to control (1.9 ng ml^{-1}). The results of present study showed it is possible to include 50 g kg^{-1} CMK as a supplement in the diet of juvenile rainbow trout.

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A VIEWPOINT TOWARD ECONOMIC SITUATION OF *AMYGDALUS SCOPARIA* IN TAFTAN MOUNTAIN IN SISTAN AND BALUCHESTAN PROVINCE

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Taftan is an active stratovolcano in southeastern Iran situated in the Sistan and Baluchestan province. At nearly 4,000 metres (13,000 ft) above sea level, it is the highest mountain in southeastern Iran. The nearest city is Khash. Taftan is a Persian word which means "The Place of Heat". The acreage of forestlands in Taftan is about 18471 ha. One of the main forest species in the Taftan Mountain is *Amygdalus scoparia*. The density of *Amygdalus scoparia* in eight villages around Taftan Mountain is about 7294667 trees. This tree plays an important role in rural economy and maintaining soil in this region. Its maximum height receiving to four meters and its roots are very strong and resistant to shortage of humidity. *Amygdalus scoparia* is native to Iran. This species has an important role in fighting desertification and yielding human consumption products. It occupies large areas in many parts of the country and in other neighboring countries. It has an important role in fighting desertification and providing human consumption products. This species is also used as a rootstock for commercial almond production. In this paper, author state a viewpoint toward economic situation of *Amygdalus scoparia* in Taftan Mountain in Sistan and Baluchestan Province.

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PHYTOCHEMICAL PRPPERTIS OF RHEUM IRANSHAHRI (POLYGONACEAE)

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Rhubarb (*Rheum* sp., polygonaceae), widely used traditional medicinal herb and one of the important ingrediants in the world traditional prescriptions. The main pharmacological action of rhubarb are purgation, antibacterial as described in literature, rhubarb consist of the roots and rhizomes of *Rh. Ribes, Rh. Persicum* and *Rh. Turkestanicum* in Iranian country. *Rh. Iranshahri* discovered and introduced from Iran, recently and based on present knowledge, is endemic to Iran. This species is closely related to *Rh. turkestanicum* and distribute mainly in the mountains of north of Semnan. No detailed analysis has been carried out for this species. This study characterized the biochemical (base on GC-MS) and some physiological properties of Rh. *Iranshahri*. Results showed that there are more than 28 different biochemical componets in root and shoot of in plant, arterial harvested in vegetative and generative growth phase in this species. Aloe- emodin, emodin have the greatest value in root harvested in the last generative phase, while the highest value of phenolic content was measured in shoot of vegetative period. Based on our result, it was found that, reducing power of the extracts from shoot has the lowest but we measured the highest antioxidant activity in the root harvested in the final stage of generative. Result of this study mentioned that the root of *Rh. Iranshahri*has great medicinal value than other parts if harvest in final stage of growth [1, 2].

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PHENOLIC COMPOUNDS PRODUCED BY IN VITRO SHOOTS OF *SALVIA LERIIFOLIA*

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A protocol for in vitro propagation of the *Salvia leriifolia* was developed. Shoot tips were excised from in vitro seedling and established on MS medium containing 0.5 -3 mg/l 6-benzylaminopurine (BAP) or kinetin (KIN) and 0-1 mg/l indol-3- butyric acid (IBA). proliferared microshoots were rooted on MS medium supplemented with 0-1.5mg/l 2,4-dicholorophenoxyacetic acid(2,4-D),α-naphthalenacetic acid(NAA) or IBA. Results indicated that number of proliferated shoots and leaf number were highest for explants cultured on a medium containing 2mg/l BAP and 0.5mg/l IBA. Microshoots cultured on a medium supplemented with 1 mg/l IBA exhibited the highest rooting percentage. The concentrations of caffeic acid, rosmarinic acid and salvianolic acid B in microshoots and shoot of nature-grown plant were determinated by HPLC. The results showed that rosmarinic acid was the main compound in both phenolic extracts .The content of caffeic acid and rosmarinic acid were higher in the microshoots than shoot of nature-grown plant.

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INTRODUCING DRAGONHEAD AS A VEGETABLE IN FOOD BASKET

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Dragonhead, *Dracocephalum moldavica*, is a medicinal plant belonging to Lamiaceae family. The essential oil of the herb of this plant had been found to include antiseptic, analgesic and anticolic effects, and is used against headaches, colds and kidney complaints and also in food and cosmetic industries. In this research trial, nutritional value of dragonhead was investigated for introducing as a vegetable in food basket. GC and GC/MS analysis showed that the main components of essential oil (0.88%) consisted of geranial, geraniol, geranil acetat, neral contained about 90% of essential oils. The results also demonstrated dragonhead is full of macro and micro elements especially iron, boron, magnesium, potassium and calcium. The comprasion of mineral content of dragonhead with other leaf vegetables showed that the content of iron in 100 gr fresh dragonhead was higher than spinach (5.2mg) and parsley (4.8 mg), about 7.8 mg. The content of protein in this plant was high and nearly was as well as Brussels sprouts. The survey of flavor and taste among people in the age of 25-40 years old showed that it is suitable for introducing to food basket as vegetable.

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THE REGULATORY EFFECT OF VITEX PSEUDO-NEGUNDO ON THE MATURATION STAGES OF FEMALE GIANT GOURAMI (*OSPHRONEMUS GORAMY* LACEPEDE, 1801)

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The global shortage of fishmeal to use in the fomulated aquafeed and the need of producing high- nutrient density (HND) diet based on the plant proteins (PPs) are the most important challenges faced on the cost-benefit production of aquatic species [1]. In spite of reducing the cost of aquafeeds when to include PPs in the diets, PPs reduce the nutriet bioavailability and disrupt the levels of esteroid hormones (EHs) of fish fed the diets included with high levels of PPs. In this regard, Vitex Pseudo-Negundo (VPN) as a naturally regulating candidate of EHs was included at five levels (1, 10, 100, 1000 and 10000 mg kg-1 basal diet) in the diet of adult gourami (16 ± 3.6 g) for 126 days. The profile of EHs (esterogen, testosteron, β-estradiol and progestrone) in the experimental fish (n=30) and fecundity were measured in the first and final days. Results showed that the use of 1000 mg VPN per Kg diet reduced significantly ($p \leq 0.05$) the ratios of EHs profiles (esterogen: progestrone; esterogen: β-estradiol and testostrone: β-estradiol). The normal ratios of EHs profiles with the least disturbance range were one of the most important external stimuli affecting on the reproduction. The fecundity of gourami broodstocks showed a significantly trend ($p \leq 0.05$; r2 = 87.5 %) with an increase in the VPN level in the diet. Based on the results, using 1000 mg/Kg VPN in the diet of gourami broodstocks was practical.

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EFFECTS OF BIOLOGICAL AND CHEMICAL FERTILIZERS ON FLOWER YEILD AND FLAVONOIDS CONTENT OF POT MARIGOLD (*CALENDULA OFFICINALIS* L.)

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Pot Marigold (*Calendula officinalis* L.*)* from the Asteracea is one of the most important officinal plants in our country. Its flowers are used in pharmacy, food and sanitary industry. One of the main second metabolites which have been made in the flowers is flavonoid compounds. The aim of this study was to evaluate the effects of chemical and biological fertilizers on flower yield and quantity of compounds. For this purpose we had done factorial in the research green house of Birjand University as a completely randomized design (CRD) with three replications as six levels of biological fertilizers (without biofertilizer, fluorescencesedomonas187, fluorescence sedomonas187p, fluorescencesedomonas169, putida sedomonas159, fluorescencesedomonas36), and chemical fertilizers NPK with four levels (0, 25, 50, 100%). The types of chemical fertilizers for nitrogen, phosphate and potassium were $CO(NH2)_2$, $Ca(HPO_4)_2$, K_2SO_4 respectively. The results showed that all of biological fertilizers had significant effects on flavonoid contents. Moreover, increasing the chemical fertilizer level enhanced flavonoid content at any biological fertilizer. But flower, leaf and stem dry and wet weight were not affected by biological fertilizers whereas chemical fertilizers had significant effects on these factors. The intractions ofchemical and biological fertilizers on leaf dry weight. harvest index and flavonoid contents was significant. The most flavonoid contents and leaf dry weight was observed influorescencesedomonas36 and fluorescencesedomonas169 respectively, where 100% of chemical fertilizer was used. The greatest harvest index observed influorescencesedomonas 187 with usage of 50% chemical fertilizer. It seems that usage of biological fertilizers increases stability yield, quality and the flavonoid content in this plant.

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HAIRY ROOT INDUCTION IN PLANTAGO MAJOR L. BY AGROBACTERIUM RHIZOGENES (A4 STRAIN)

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Plantago major belongs to the family Plantaginaceae and this highly diverse genus comprising approximately 256 species. P. major originated in Eurasia and is now naturalized almost throughout the world. Plantago major has numerous phytochemicals in its leaves, seeds and roots, which apparently have medicinal properties like blood refining, broncshitis, urethra disorders, commendiarrhoea, and treatment of asthma, stomatitis, toothache and even earache. Leaves and roots of plantago have mucilage, gum, organic acids, emulsion, tannin and glucosids [3]. Induction of hairy root by Agrobacterium rhizogenes, is one of the best ways for the production of secondary metabolites. In this study, Plantago major were investigated for induction of hairy root using Agrobacterium rhizogenes (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 rolBgene confirmed the integration of the T-DNA fragment of Ri plasmid to the genome of hairy roots [1, 2].

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ALLELOPATHIC POTENTIAL OF MADDER (*RUBIA TICTORUM*) EXTRACTS AS A MEDICINAL PLANT ON SORGHUM (*SORGHUM BICOLOR*) AND JOHNSON GRASS (*SORGHUM HALEPENSE*) GERMINATION CHARACTERISTICS.

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To access the allelopathic potential of madder extract as a medicinal plant on seed germination characteristics of Sorghum and Johnson grass, two laboratory experiments were conducted at the University of Applied Science, Yazd, in 2013. The experimental designs were completely randomized with 4 replicates. The results showed that, increasing the extract concentration above 25% in both species, germination percentage and rate decreased significantly, but that suppressive effect on Johnson grass was stronger. Increasing the extract concentration up to 50% had no significant effect on sorghum shoot length, but effects of the extract concentration 25% on Johnson grass was the reduction. However, the extract, reduced the sorghum root length, but Johnson grass was more sensitive to inhibitory effects of madder than sorghum. In this study, root and shoot dry weight decreased significantly with increasing the extract concentration above 75% in sorghum, and 25% in Johnson grass. It seems that application 25% of tissues extract of madder may suppress Johnson grass growth with lower impact on initial growth of sorghum. Application extract of medicinal plants such as madder may be promising in biological control of noxious weeds in sorghum fields.

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PHYTOCHEMICAL INVESTIGATION OF *LYCIUM RUTHENICUM* FROM IRAN

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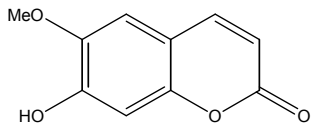
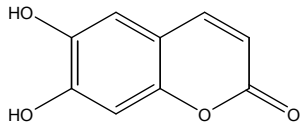
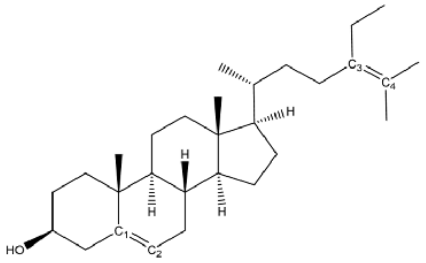
Lycium ruthenicum is a native medicinal plant of Iran. It has been used in traditional Chinese medicine to nourish liver and kidney, and brighten the eye [1]. Studies indicate that *Lycium ruthenicum* has anti-oxidant properties, immunomodulation, anti-tumor activity and cytoprotection [2]. Alkaloids, flavonoids, steroids and coumarins are main metabolites of this genus [3]. In this work, ethyl acetate extract of aerial parts of plant was subjected to silica-gel column chromatography and eluted by EtOAc/n-hexane. Two coumarins (Scopoletin and Sculetin) and one plant sterol (24-Ethylcholesta-5,24-dien-3β-ol) were isolated and characterized as the major constituent using ^{1}H-NMR, ^{13}C-NMR and FT- IR spectroscopic data, GC/MS and by comparing with literature values. This is the first phytochemical investigation of this species in Iran.



Scopoletin **1**



Esculetin **2**



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STUDY ON DIFFERENT LEVELS OF GIANT MILKWEED (*CALOTROPIS PERSICA*) SEED MEAL ON SOME BIOLOGICAL INDICES OF RAINBOW TROUT (*ONCORHYNCHUS MYKISS*)

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To study the different inclusion levels of giant milkweed (GMW) in the diet of juvenile rainbow trout (11.5 ± 3.64 g) on growth performance and biological indices, five levels (10, 20, 30, 40 and 50 g kg^{-1}) of GMV together with a control diet were used (n=3) for 56 days in 18 raceway systems with a stocking rate 200 fish per pond. Specific growth rate (SGR) of fish fed the diets containing 40 g kg^{-1} GMW (2.36% day^{-1}) increased significantly ($p \leq 0.05$) compared to all inclusion levels of GMW (mean: 2.13% day^{-1}) and control diet (1.92% day^{-1}). Feed conversion ratio (FCR) of fish fed the diets containing 20 g kg^{-1} GMW (1.31% day^{-1}) decreased significantly ($p \leq 0.05$) compared to all inclusion levels of GMW (mean: 1.57) and control diet (1.71). With an increase of GMW in the diet from 10 to 30 g kg^{-1}, protein efficiency ratio (PER) as one of the most important of nutritional efficiency indices increased significantly ($p \leq 0.05$) from 2.36 to 3.48 compared to control (2.17) and then it remained insignificantly constant. With an increase in GMW dose from 10 to 30 g kg^{-1}, the levels (ng ml^{-1}) of plasma triiodothyronine (T_3) of fish fed the diets of GMV increased significantly ($p \leq 0.05$) from 2.3 to 3.5 ng ml^{-1} compared to control (2.1 ng ml^{-1}). The results of present study showed it is possible to include 40 g kg^{-1} GMV as a supplement in the diet of juvenile rainbow trout.

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EFFECT OF SI APPLICATION ON MORPHO-PHYSIOLOGICAL TRAITS AND ESSENTIAL OIL COMPOSITION OF *ROSMARINUS OFFICINALIS* L. IN HYDROPONIC SYSTEM

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This study was carried out to investigate the content and chemical composition of essential oil and morpho-physiological traits of *Rosmarinus officinalis* L. under different Si concentrations (0, 25, 50, 75, 100 and 125 ppm) based on the completely randomized design with three replications under soilless culture conditions. Results showed that in compared with control plants (without Si application) the highest aerial plant parts, root volume, plant height, essential oil concentration and content were obtained in the maximum Si concentration (125 ppm). The main essential oil compounds such as 1, 8-Cineole, Camphor, Camphene and Bornyl acetate showed lower levels in silicon treated plants. The results of the present study led to conclusion that more researches and studies should be carried out for understanding of how Si as quasi essential affects the secondary metabolites biosynthesis in medicinal plants such as rosemary.

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ASSESSMENT OF GENETIC VARIATION OF GENUS SALVIA L. BY ISSR MARKERS

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Salvia L. is an important and the largest genus of the Lamiaceae family which includes 900 species spread throughout the world. The genus consists of 58 species in Iran, which seventeen of them are endemic. The plants are considered as rich sources of di- and tri terpenoids, phenolic acids, and flavonoids and have been used therapeutically for treatment of diseases such as acquired immunodeficiency syndrome (AIDS), diabetic nephropathy, liver and Alzheimer. Despite Salvia is a valuable medicinal plant, there is no comprehensive data on genetics structure of its populations. Molecular markers provide a powerful tool for good description of germplasm and their organization [1]. In this study, a number of ISSR markers were applied to assess the level and pattern of genetic diversity in some of wild growing *salvia* species of Iran. After preliminary tests, five primers were chosen for further analysis. Amplicons size was estimated in a range of 400-5000 bp and bands were scored as 1/0 represents presence/absence of polymorphic bands. Based on our results, the ISSR primers generated polymorphic bands and detected polymorphism level represents high genetic distance at intra- and inter-species level. Results confirmed that ISSRs are efficient markers for genetic relatedness assessment in genus *Salvia* and are powerful enough to accurate assessment of genetic variation in *Salvia* species.

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THE EFFECTS OF CHEMICAL AND BIOLOGICAL FERTILIZERS ON CHLOROPHYLL INDEX, CONCENTRATION AND MICRONUTRIENTS CONTENTS OF *CALENDULA OFFICINALIS* L. LEAVES

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Pot marigold *(Calendula officinalis L.*) is one of the most important medicinal plant. Its flowers which have many usages in pharmacy also have the antibacterial and antivirus effects. Fertilizer management is an important factor for a successful growth of officinal plants and the identity of suitable fertilizers in plants could have the desirable effects on quantitative and qualitative indices. This factorial experiment was conducted in the research green house of Birjand University as a factorial completely randomized design (CRD) with three replications for evaluation the effects of chemical and biological fertilizers on chlorophyll index, nitrogen, phosphate and potassium contents in this plant. The first factor was biological fertilizer with six levels (witout biofertilizer, fluorescence sedomonas187, fluorescence sedomonas187p, fluorescence sedomonas169, putida sedomonas159, fluorescence sedomonas36), and the second factor was chemical fertilizer NPK with four levels (0, 25, 50, 100%). The types of chemical fertilizers for nitrogen, phosphate and potassium were $CO(NH2)_2$, $Ca(HPO_4)_2$, K_2SO_4 respectively. The results showed that biological fertilizers had no significant effects on chlorophyll index, nitrogen, phosphate and potassium concentrations in leaf but had significant effects on nitrogen content. Using of chemical fertilizers, increased chlorophyll index, nitrogen content, leaf potassium contents and and leaf phosphorus contents and its concentration. The chemical fertilizers, had no significant effect on leaf phosphorus and nitrogen concentration. The interactions of chemical and biological fertilizers on chlorophyll index. nitrogen contents and its concentration was significant. Using of 50% of chemical fertilizer showed the most chlorophyll index (35.5spad), nitrogen concentration (2.96%), nitrogen content (0.085g) observed in sedomonas187 strain. The lowest chlorophyll index (without use of chemical fertilizer) was observed in fluorescence sedomonas187, and in the same status nitrogen concentration was the lowest in fluorescence sedomonas169, and nitrogen content was the lowest in fluorescence sedomonas187p. So we can suggest that the usage of fluorescencesedomonas 187 with 50% of chemical fertilizer was the best option in this research. The results showed that just usage of biological fertilizers or with combination with chemical fertilizers had the positive effects on physiological traits of *Calendula officinalis* L., and using the biological potential instead of continuous usage of chemical fertilizers can improve the stability of agriculture and certify the quality of officinal plants.

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PHYTOCHEMICAL ANALYSIS OF *FERULA FLABELLILOBA*

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Ferula flabelliloba Rech. F., & Aell. (Apiaceae) is an endemic plant growing mainly in east of Iran in Binalood mountains. This is a tall plant, widely used as early spring vegetable. The aerial parts of this plant are used traditionally as medicinal value and is one of important ingredients in North east of Iran [1]. The main pharmacological action of this plant are: expectorant, aphrodisiac, stomachdisorders, sedative, antipyogenic, antiseptic, carminative, insecticidal, antibacterial, laxative, analgesic, anthelminitic, diuretic [2]. The most scientist focused on biochemical analysis of aerial parts this species, while the phytochemical properties of plant will change during the growth period and there is some reports indicated that the root of Umbeliferean species have medicinal value. This study focused on biochemical (based on GC_MS) and some pharmacological properties of F. flabelliloba in vegetative and generative growth phase collected from Binalood mountains in NE of Iran. Result indicated that, there are more than50 different biochemical components in root and shoot of plant materials. sesquiterpenes and sesquiterpene coumarins have the greatest value in shoot harvested in the last generative phase, while the highest phenolic content and reducing power were measured in plant material collected in vegetative phase. Based on biochemical analysis, the most sesquiterpenes and sesquiterpene coumarins and phenolic contents were measured in shoot collected in vegatative phase, then medical purpose, we suggested that all consumers use this part of *F. flabelliloba*.

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CHEMICAL COMPOSITION OF ESSENTIAL OIL OF FLOWER AND LEAVES OF *UTRICA DIOICA* FROM IRAN

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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 diols, terpene diol glucosides and alpha-tocopherol [1]. In this study *Urtica dioica* were collected from montain of Neyshabur area in Khorasan Razavi province, Iran. Chemical constituents of essential oil of flower and leaves of Urtica dioica were determined. Dried flowers and leaves of plant were subjected to hydrodistillation in a Clevenger–type apparatus until there was no significant increase in the volume of the oil collected. The yield of the oil was 0.09 (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 [2]. Forty four compounds were identified constituting more than 97.5% of the oil. Palmitinic acid (4.9%), linoleic acid (46.0%), linolenic acid (5.1%), carvacrol (3.5%), spathulenol (2.0%), valerenol (3.5%), dibutyl phthalate (2.5%), phytol (4.0%), and (Z) -9, 17-octadecadienal (3.5%) were major components in essential oil of flower and leaves of *Urtica dioica*.

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THE EVALUATION OF PHYTOCHEMICAL CHARACTERISTIC AND NUTRIENT CONTENT IN THREE SPECIES OF *ARTEMISIA DESERTI* KRASCH, *ARTEMISIA SIEBERI* BESSER AND *ARTEMISIA AUCHERI*

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Carbohydrates are molecules that deliver energy for plant growth and provide building blocks for plant structural components as well. On the other hand, the nutrient content of a plant body including protein (CP), Neutral Detergent Fiber (NDF) and Acid Detergent Fiber (ADF) are essential in growth of animals and human body. Flavonoids have shown to have a wide range of biological and pharmacological activities [1]. Phosphorus, also plays a key role in many plant processes [2]. *Artemisia deserti* Krasch, *Artemisia aucheri* and *Artemisia sieberi* Besser are members of Asteraceae (compositae) family which widely grow in even and high areas of Birjand, Iran. In this study, we evaluated Artemisia properties including nutrient content (Goering and Van Soest method). The carbohydrates content was measured spectrophotometrically according to a method described by Deraiz. Also, total flavonoid content in the aerial parts of *Artemisia deserti* Krasch and *Artemisia sieberi* Besser was determined using slightly modified colourimetric method described by Jia et al. based on the formation of flavonoid-aluminum complex [3]. The quantity of phosphorus was measured spectrophptometrically in *Artemisia aucheri* and *Artemisia sieberi* Besser. Heavy metals have been determined in Artemisia deserti Krasch using atomic absorption spectroscopy. The results showed the highest amount of carbohydrate in the aerial parts of *Artemisia deserti* Krasch (468.77 g/kg). Also, the quantity of CP in the aerial parts of *Artemisia sieberi* Besser (9.24%) was more than other species. The highest quantity of NDF and ADF belonged to the root of *Artemisia sieberi* Besser plant (82.86% and 73.10%, respectively). The highest quantity of flavonoids was found in Acetone extract in the aerial parts of *Artemisia sieberi* Besser (4.18 mg/g). The highest amount of phosphorus (402.30 ppm) existed in the aerial parts of *Artemisia sieberi* Besser. The root of *Artemisia deserti* Krasch was rich in Ca and the high quantity of K existed in the aerial parts of plant.

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EVALUATION OF IMMUNOPATHOLOGIC EFFECTS OF AQUEOUS EXTRACT OF *ECHINACEA PURPUREA* IN MICE AFTER EXPERIMENTAL CHALLENGE WITH *PASTEURELLA MULTOCIDA* SEROTYPE A

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In order to assess *Echinacea purpurea* extract (EPE) on bacterial pneumonia, forty female BALB/c mice were randomly divided into four groups. Groups were as follow: Control group (sterile distilled water 2 times/week for 2 weeks, intraperitoneally and then 100 µl sterile saline intranasally), PMA group (sterile distilled water same as control group and after 2 weeks, 100 µl of *Pasteurella multocida* inoculums intranasally), EPE+PMA group (*Echinacea purpurea* extract intraperitoneally 2 times/week for 2 weeks and then challenged same as PMA group) and EPE group (*Echinacea purpurea* extract intraperitoneally 2 times/week for 2 weeks and then 100 µl sterile saline intranasally). After 24 and 48 hour post challenge half of animals in each group were sacrificed. The results showed significant differences in lung bacterial counts between PMA and EPE+PMA groups. Histopathological examination revealed infiltration of neutrophils in alveolar septa and hyperemia in PMA. The criteria of bronchopneumonia were partially recovered in EPE+PMA. Serum TNF_{α} level was significantly higher in PMA group. According to this study, it seems that *Echinacea purpurea* extract can be used for prevention or treatment of *Pasteurella* pneumonia.

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THE EFFECT OF SALT STRESS DIFFERENT LEVELS ON OIL YIELD, CHLOROPHYLL, COMPARISON OF ANTIOXIDANT ACTIVITY AND TOTAL PHENOLIC COMPOUNDS OF *MYRTUS COMMUNIS* L.

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Myrtus Communis L. is one of the important aromatic and medicinal species of *Myrtaceae* family. Myrtle shrub growing to 5 m tall, simple and toothless leaves and leathery texture with small and clear spots on leaves. The leaves and roots 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 amoung 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. The pot experiment was conducted at Isfahan University of Technology in a randomized complete block design with four treatments of salinity including (control, 6, 9 and 12 dS) and 4replications. According to experiments, Pots irrigating with 9 dS saline water had the highest oil percent with the amount of 1/73% and 12 dS treatment had the lowest oil percent with the amount of1/07%. The results show that the most oil yield was for the plants which were under 9 dS treatment. Also, chlorophyll was measured from 4 treatments by SPAD device and evaluated by SAS software .The results of data analysis showed significant differences between 6 dS treatment and 12 dS treatment. Total phenolic was determined by using Foline-reagent method and antioxidant activity was measured using DPPH .Pots irrigating with 9 dS saline water had the highest phenolic content with the amount of 93/46(mgt/ gr_ dw) and 6 dS treatment had the lowest phenolic content of 56/241 (mgt / gr _dw). This result showed that the chlorophyll and SPAD's decreasing was from salt stress and salt stress led to increasing in oil yield and oil percentages. The phenolic compounds are increased under salt stress. The highest rate of IC_{50} (726.93) was observed in the control treatment while the lowest amount was in the treatment of 6 dS (564.32) that had lowest phenolic content. This result showed that under salinity stress, antioxidant activity was increased in *Myrtus Communis* and moderate levels of salinity can be useful for this plant. So, we can conclude that the secondary plant metabolism increases in this situation.

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PHENOLIC ACIDS EXTRACT OF *PROSOPIS FARCTA*: COMPOSITION IDENTIFICATION BY HPLC, BIOLOGICALLY ACTIVITIES INVESTIGATION

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The plant of *Prosopis farcta* is used to apply in traditional medicine of Iran especially in Sistan area. In this study the phenolic acids extract of peel and flesh of fruit of *Prosopis farcta* have been investigated. Reversed-phase high performance liquid chromatography equipped with photo diode array detector (RP-HPLC-DAD) and a multistep binary gradient elution program was applied for the identification of phenolic acids composition of extracts. Also antioxidant activity (DPPH assay), total phenol and total flavonoid content of extracts were evaluated and compared to HPLC results [1, 2]. cytotoxicity assays of extracts carried out on human cell lines includes Hela and Hep G2. The results were meaningful, and there was a correlation between cytotoxicity results and phenolic acids composition of this plant [3, 4].

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OPTIMIZATION OF CALLOGENESIS AND PLANT REGENERATION OF *CARUM CAPTICUM* L.

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Carum capticum originated in the Middle East and Egypt, and the Indian subcontinent, but also in Iran and Afghanistan. The essential oil of *C. capticum*is mainly thymol, with p-cymene, dipentene, alpha and beta pinene, t-terpinene, camphene, myrcene, beta-3-carneen, limonene, carvacrol. Contains the glycocide 6-*O*-beta-D gluopyranosyloxythymol, as well as palmiticpertoselenic oleic and linoleic acids. The present study managed to initiate the callus from the explants (leaves, internodes of stems and root) of the complete plant of *C. capticum* in MS medium which was supplied with various concentrations of (0/25-2mg.l^{-1}2-4-D &6-BA), (0/2-0/5mg.l^{-1} N.A.A &0/5-3mg.l^{-1} 6-BA) for 6 week after culture. Maximum weight of callus was obtained from leaf explants in MS medium containing 1.5 mg.l^{-1} 2, 4-D & 2mg.l^{-1} 6-BA). The leaf explants showed callogenesis and root regeneration (10-14%) in the concentrations (2mg.l^{-1} 6-BA & 0/25 mg.l^{-1} 2,4-D),(0/5mg.l^{-1}2,4-D & 6-BA), (0/5mg.l^{-1}2,4-D & 0/25mg.l^{-1} 6-BA), (2mg.l^{-1}2,4-D & 0/25mg.l^{-1} 6-BA), (1mg.l^{-1}2,4-D &0/5mg.l^{-1} 6-BA). The best callogenesis was recorded for stem explants in MS medium containing (1mg.l^{-1} 6B-A & 0/25 mg.l^{-1} 2,4-D). After 4 weeks, the callus and explants separated and Callus growth increased.100% of Regeneration was showed after 2-3 times subculture (every 20 days)in optimum concentration of 1mg.l^{-1}6B-A &0/25mg.l^{-1} 2,4-D.

SAFFRON YIELD AFFECTED BY CORM NUMBER AND PLANTING INTERVAL

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Saffron (*Crocus sativus* L.) belongs to the iridaceae family that propagates by corm. This research was conducted to investigate the effect of plant density and corm number on saffron yield. The project was conducted in Research Institute of Forests and Rangelands, as randomized complete blocks design in a factorial arrangement with 3 replications. The row spaces were 15*15, 20*20 and 25*25cm and tree corm density were 2, 4 and 6 corm in each place. The results showed that row spaces, had significant effect on the yield of a plant's stigma, the yield of style, the yield of a plant's stamen, the yield of petal, the yield of flower and the number of leaves in a plant ($p<0.01$). The effect of corm density was significant on the yield of a plant's stigma ($p<0.05$), the yield of a plant's style, the yield of stamen, the yield of petal, the yield of flower, the yield of leaf and leaf length ($p<0.01$). The most yield of stigma observed in treatment with 6 corm (6.7 kg/ha), the most yield of style (1.98kg/ha) and petal (9.15kg/ha) in 15*15cm row space. The highest flower yield belonged to 15*15cm (109kg/ha) and treatment with 6 corm (100.053kg/ha). According to results, the highest yield of saffron in the first year was obtained in 15*15cm row space and 6 corm in each place

HYDROALCOHOLIC EXTRACT OF *CUCURBITA MAXIMA* REDUCES RED BLOOD CELLS AND HEMOGLOBIN IN ADULT RATS

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The *Cucurbita maxima* is one of the plants that are recommended in traditional medicine. It is believed that *Cucurbita maxima* has positive effect to cure anemia, however; no scientific research has been done to confirm the suggested effect. The aim of this study was to evaluate the effect of hydro-alcoholic extract of *Cucurbita maxima* plant on peripheral blood cells in rats. Hydro-alcoholic extract was prepared from the *Cucurbita maxima* using maceration method and rotary. Male rats were injected normal saline or the extract (50, 100 or 200 mg/kg, i.p.) for a period of two weeks. After pre-treatment period, rats were anesthetized and their blood samples were prepared from the heart. Peripheral blood samples were used for complete blood count (CBC) by Cell Counter apparatus. White cell differential diagnosis was performed manually by a hematologist. Data was statistically analysed using One-way ANOVA followed by Tukey test. Red blood count experiment showed that the number of red blood cells was significantly reduced by *Cucurbita maxima* extracts (50-200 mg/kg) compared to the control group ($P<0.05$). In addition, hematocrit and hemoglobin evaluations demonstrated that *Cucurbita maxima* extract at the 50 mg/kg concentration decreased both hematocrit ($P<0.05$) and hemoglobin ($P<0.01$) values. No significant changes were observed in the amounts of WBC, platelets, MCV, MCH and MCHC values in extract-treated groups ($P>0.05$). Findings of this study showed that interaperitonealy injections of *Cucurbita maxima* extracts for a period of two weeks decreases that the number of red blood cells, hematocrit and hemoglobin values in adult rats.

EVALUATION OF ADAPTABILITY OF FOUR SPECIES OF *SALVIA* GENUS IN ARDABIL REGIN WITH GGE-BIPLOT METHOD

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The naming of distinct *Salvia* species has undergone regular revision, with many species being renamed, merged, and reclassified over the years. *Salvia officinalis* (common sage), has been cultivated for thousands of years, yet has been named and described under six different scientific names since 1940. At one time there were over 2000 named species and subspecies [1, 2]. The experiment was carried to yield stability evaluation of four species of *Salvia* genus called *Salvia officinalis*, *Salvia verticillata*, *Salvia nemorosa*, *Salvia sclarea* during two years (2012 and 2013) at the Natural Resources Research station of Ardabil (Sammian). Four species of *salvia* was planted in a randomized complete block design with four replications. During development and post-harvest some morphological traits like biomass yield, dry matter yield, the dry weight to wet weight and amount of aroma was measured. The results of Combined Analysis of variance of assessed traits observed that significant difference among genotypes for biomass weight, plant dry weight, dry weight to biomass weight and amount of aroma between years and genotype × year in terms of biomass weight per plant and dry weight per plant. *Salvia officinalis* had the highest biomass weight, dry weight and amount of aroma. Four species were grouped based on all traits in three groups. The first group was included two species of *S. verticillata* and *S. nemorosa*, the second group include *S. officinalis and* the third group include and *S. sclarea.* The first group was the highest amount of aroma, biomass weight and dry weight. According to the results of this experiment, GGE-bipolt was the suitable method for selection of yield and stability simultaneously. This method was selected *S. officinalis* as high yield and stability.

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SALIX AEGYTIACA L. ETHANOLIC EXTRACT PRODUCED ANTIDEPRESSANT- LIKE EFFECTS IN THE FORCED SWIM TEST AND IN THE TAIL SUSPENSION TEST IN MICE

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The aim of present study was to investigate the antidepressant-like effect of ethanolic extract of *Salix aegytiaca* L. (SA) in forced swim test (FST) and tail suspension test (TST) in male mice. In this experimental study forty male mice (20-30g) were randomly divided into 5 groups of 8: negative and positive control groups received normal saline (10 ml/kg, i.p.) and fluoxetine (20mg/kg, i.p.) respectively and treatment groups received ethanolic extract of SA (100, 200 and 400 mg/kg, i.p.). Immobility, swimming and climbing behaviors were recorded within 6 minutes [1, 2]. All doses of SA significantly and dose dependently reduced immobility time in FST (99.39±9.34, 89.94±6.64 and 74.39±9.15 respectively; $p<0.001$) and TST (100.81±10.49, 87.16±8.51 and 76.84±6.05 respectively; $p<0.001$) compared to control groups (188.12±6.15 and 199.50±3.76; respectively). This extract increased swimming time (138.99±9.67, 148.25±5.69 and 164.0±10.41 respectively; $p<0.001$) without significant change of climbing time ($p>0.05$).Also, only high doses of extract in FST (72.51±6.03; $p<0.001$) and all doses of extract in TST similar to fluoxetine reduced immobility time (127.6±6.02; $p<0.001$). Also, only high doses of extract better than fluoxetine increased swimming time (152.85±11. 3; $p<0.001$). Our results showed that SA ethanolic extract has considerable antidepressant effect and has similar effects to fluoxetine. Therefore, it seems serotonergic system involved their antidepressant- like effects [3].

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EFFECTS OF *SATUREJA KHUZESTANICA* AND *OLIVERIA DECUMBENS* EXTRACTS ON SOME HEMATOLOGICAL AND IMMUNOLOGICAL FACTORS OF *CYPRINUS CARPIO*

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In the current study, the effect of oral administration of Marze (*Satureja khuzestanica*) and Mountain laal (*Oliveria decumbens*) extracts on hematological, specific and non-specific immunological parameters in common carp was investigated. During five weeks period, 320 common carp (30±3 g) were divided into two immune and non-immune groups. Each group was further subdivided into four treatments, which were fed with experimental diets containing Marze (*Satureja khuzestanica*) extract (0.5%), Mountain laal (*Oliveria decumbens*) extract (0.5%), a combination of both extracts (0.5%-0.5%) and control group (without any extract). Immunization was carried out by IP injection of formalin-inactivated bacteria (*Aeromonas hydrophila*) on the first and 15th days of the experimental period. At the end of the experimental period, blood samples were collected from each treatment for assessment of immunological activity, serum bactericidal activity and hematological parameters such as WBC and Differential WBC count. Also, 30 fish from each treatment (10 specimens in three replicates) were challenged with live bacteria, *Aeromonas hydrophila* to determine relative percent of survival rate during 10 days period [2]. Results showed that oral administration of plant extracts had no significant ($p>0.05$) effect on lysozyme activity in immune carps, whereas lysozyme activity significantly ($p<0.05$) increased in non-immune carps. The effect of extract administration on serum bactericidal activity and complement activity of immune and non-immune groups were not significant ($p>0.05$). In both immune and non-immune groups of experimental fish, no significant differences was observed in WBC count and the differential WBC count in antibody titres against *Aeromonas hydrophila*, between treatments. Based on the results obtained in this study, it could be concluded that marze extract and in second stage, combination of marze and laal extract have good potential as a suitable immune stimulant agent for this species [1].

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CYCLIC PEPTIDE SCREENING IN IRANIAN SPECIES OF RUBIACEAE FAMILY

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Plant cyclotides are a unique family of disulfide rich macrocyclic proteins of 28-27 amino acids. They are recently discovered and isolated from plants of Violaceae, Rubiaceae, Cucurbitaceae and Fabiaceae families. The cyclic cystine knot (CCK) motif originated from disulfide bonds arrangement of cyclotides caused they displays resistance to degradation by extreme thermal and pH condition or chemical and enzymatic reactions. The cyclotides display a diverse range of intrinsic biological activities, drives form their unique topology, including uteretonic, hemolytic antineurotensin, anti-HIV, cytotoxic, antibacterial activities [1]. Mentioned activities made cyclotides interesting subject to researcher [2, 3]. Until now more than 200 cyclotides have been reported. In this study, about 10 native species of Rubiaceae family was studied. After extraction, cyclotide contain fraction subjected to SPE C18 cartriges for more purification. Then, obtained fractions were analyzed by HPLC. Obtained results confirmed existence of cyclotides in some species based on their run times and mobile phase composition on HPLC. Further analysis carry out by MALDI-TOF to confirm their mass weights [3-5]. The obtained results confirmed presence of cyclotides in some native species of Rubiaceae family.

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CHANGE IN PHOSHORUS CONTENT AND PHYSIOLOGICAL PARAMETERS IN PLANTS OF MARIGOLD (*CALENDULA OFFICINALIS*) POPULATIONS GROWING IN HYDROPONIC SYSTEM UNDER DROUGHT CONDITION

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Marigold (*Calendula officinalis* L., Asteraceae) has been used in horticulture science ancient times and is not known as wild in nature. More recently, several cultivars of Calendula spp. Have found an increasingly market as pot plants and for outdoor planting. Marigold has been used in traditional medicine in Europe and China, and also for flavoring and coloring in cheese and butter, and as a salad ingredient (Funk et al. 2009). The effect of drought on photosynthetic activity and phosphorus contents of marigold plants were studied. Two populations differing in drought tolerance were tested in hydroponic system in a greenhouse at 30/21 degree centigrade (d/n), and a photoperiod of 16:8 h. seeds were allowed to germinate in Petri dishes. After 8 days of germination, the seedlings of the same shape and size were transferred to plastic container (8 plants per container) with a Hoagland s nutrient solution. After one week, the plants were submitted to 4 drought treatment (by polyethylene glycol): control, -3, -4 and -5 mega Pascal. Result indicated that the drought stress significantly affected dry flowers weight, chlorophyll a, chlorophyll a/b, total chlorophyll, flavonoid, charotenoid and phosphorus contents of plants with the difference between the tested population.

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FATTY ACID COMPOSITION OF *SALVIA* SEED OIL: A POTENTIAL SOURCE OF OMEGA-3 AND OMEGA-6 FATTY ACIDS FOR NUTRITIONAL SUPPLEMENTS

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Salvia L., is one of the largest genus of the family Lamiaceae. This genus are includes nearly 900 species which are species of which spread throughout the world [1]. In the flora of Iran, the genus is represented by about 58 species of which 17 are endemic [2]. A very limited number of investigations for fatty acid patterns have been reported in this genus. Persent survey was preformed on six species of *Salvia* (*S. atropatana* Bunge, *S. chorassanica* Bge., *S. nemorosa* L., *S. sclarea* L., *S. spinosa* L., *S. virgata* Jacq.) growing in different regions of Iran. Seed oils were extracted using n-hexane as solvent in a Soxhlet apparatus. The fatty acid compositions were determined by GC and GC-MS as methyl ester derivatives after transmethylation reaction. The range of total oil content varied between 18.84% in *S. chorassanica* to 35.21% in *S. sclarea*. Fatty acid (FA) analysis revealed that α-linolenic (C18:3n3) (38.89-50.75%) linoleic (C18:2n6) (13.04-26.70%), and oleic (C18:1n9) (10.79-23.20%) were the main unsaturated FA. Palmitic (C16:0) (3.50-7.93%), and stearic acid (C18:0) (1.82-2.59%) is also the main saturated FA. There were significant differences between fatty acid profiles of samples based on n-3 (30.99-51.96%) and n-6 (13.46-26.98%) fatty acid concentrations. Due to its composition, *Salvia* oil might compete successfully with falx and other plant oils as a source of α-linolenic fatty acid in industrial and dietary applications.

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EFFECT OF ETHANOLIC EXTRACT OF *CAPPARIS SPINOSA* LEAVES ON ANXIETY-RELATED RESPONSE IN RATS

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We investigated the effects of ethanolic extract of *Capparis spinosa* (EOC) in rats submitted to anxiety model: EPM (elevated-plus-maze). EOC from leaves were obtained and administered at the doses of 50, 100, 200 and 400 mg/kg by intraperitoneally (i.p.) injection 30 min before the behavioral evaluation in the EPM. EOC at dose 100 mg/kg significantly ($p<0.05$) increased the time of permanence and the number of entrances in the open arms. On the contrary, the time of permanence and the number of entrances in the closed arms were decreased. This results similar to the reference drug, Diazepam (1 mg/kg, i.p.). In conclusion, the results of present study suggest that EOC exert anxiolytic-like effect in behavior related to anxiety and anxiolytic effects of EOC that might involve an action on benzodiazepine-type receptors. Further studies are in progress in order to enable us to understand the precise action mechanisms of *Capparis spinosa.*

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CHANGES OF VEGETATIVE PARAMETRS, OIL YIELD, TOTAL PHENOL AND ANTIOXIDANT CAPACITY AT HYDROPONIC CULTURES OF *VALERIANA OFFICINALIS* IN RESPONSE TO VARIOUS AMMONIUM: NITRATE LEVELS AND LIGHT INTENSITIES

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Use of novel cultivation methods has been of great interest in recent years, aiming at elevation of their vegetative yield and oil content. In Iranian folk medicine, *Valeriana officinalis* is an herb applied as a tranquilizer, stimulant and antidepressant. This investigation was arranged to study the effects of two light intensities (14000 and 30000 lux) and four fertilizing solution with different ammonium: nitrate ratios (0.5, 0.6, 0.7 and 0.8) comparing to controls (no fertilization) in factorial layout based on completely randomized design with three replicates and three samples in each replicate. The evaluated traits were plant height, crown diameter, leaf count and area, leaf area index (LAI) and specific leaf area (SLA), chlorophyll content (SPAD), shoot fresh and dry weights, root fresh and dry weights, root length, total phenol and antioxidant activity of hydro-alcoholic extracts of root, as well as root oil content. The obtained results indicated superiority of ammonium: nitrate ratio of 0.7 and light intensity of 30 klux.

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ANTISPASMODIC EFFECTS OF YARROW (*ACHILLEA MILLEFOLIUM* L.) EXTRACT IN THE ISOLATED ILEUM OF RAT

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Achillea millefolium L. is cultivated in Iran and widely used in traditional medicine for gastrointestinal disorders. The aim of this study was to determine the effect of hydroalcoholic extract of *A. millefolium* on the contraction and relaxation of isolated ileum in rat. In this experimental study, aerial parts of *A. millefolium* were extracted by maceration in ethanol 70% for 72h. Terminal portion of ileum in 100 male Wistar rats was dissected and its contractions were recorded isotonically in an organ bath containing Tyrode solution (37 ºC, pH 7.4) under one gram tension. Acetylcholine (1mM) and KCl (60mM) were used to create isotonic contractions. Propranolol and Nω-Nitro-L-arginine methylester hydrochloride (L-NAME) were used to investigate the mechanisms of action prior to giving the extract to the relevant groups. Data were compared by ANOVA and Turkey's post hoc test.. The results showed that the ileum contraction was induced by KCl and acetylcholine induced contraction was significantly reduced by *A. millefolium* extract. The cumulative concentrations of *A. millefolium* relaxed the KCl and acetylcholine induced contractions ($n=14$, $p<0.001$). The inhibitory effect of extract on contraction induced by KCl and acetylcholine was not significantly affected neither by propranolol (1µM) nor by L-NAME (100 µM). There was no significant difference in the rate of relaxation by propranolol and L-NAME between the two groups. In conclusion, *A. millefolium* can inhibit contraction of smooth muscle of ileum in rat, and it can be used for eliminating intestinal spasms. These results suggest that the relaxatory effect of *A. millefolium* on ileum contractions can be due to the blockade of voltage dependent calcium channels. In addition, the β-adrenoceptors, cholinergic receptors and nitric oxide production are not powerful actors in inhibitory effect of *A. millefolium*. So, the nitric oxide and adrenergic systems may also be involved in the antispasmodic effect of *A. millefolium*.

INVESTIGATION OF MEDICINAL SPECIES EFFECT AND CROPS ON WEEDS DENSITY AND DIVERSITY

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In order to investigate the effect of medicinal species effect on weed density and diversity, an experiment was conducted on factorial design based on a complete randomized block with 3 replications at the agricultural research station, Ferdowsi University of Mashhad, Iran, during 2013. Treatments included 4 medicinal species (*Althaea officinalis, Malva sylvestris, Silybum marianum* and *Chicorium intybus*) and 2 crop species (*Glycine max* and *Phasaelous vulgaris*). The results indicated that effect of medicinal species on total weed density was significant. The highest weed density (31.34 weeds.m^{-2}) and weeds dry matter (655.09gr.m^{-2}) was observed in *Phasaelous vulgaris* without medicinal species. Shannon and Margal of indices of weed were affected by plant species, significantly. So that the highest and lowest Shannon and Margal of indices were observed in *Phasaelous vulgaris* without medicinal species (0.54) and *Althaea officinalis*+*Phasaelous vulgaris* (0.50) and *Malva sylvestris*+ *Glycine max* (0.51) respectively [1, 2].

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ANTISPASMODIC EFFECT OF *EPHEDRA MAJOR* ON ADRENERGIC RECEPTOR ON THE RAT JEJUNUM

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Tendency to utilize Ephedra contain product are increasing due to its favorable properties such as energytic, fat burning, decongestant etc [1, 2]. Present of gastero-intestinal system agonism α and β adrenergic compound and lack of systematic research on this issue, we conduct this study to determine the *Ephedra major* Host (*E. Major*). Hydroethanolic extract effect on the gastero-intestinal system and reveal the underlying mechanism for this constriction effect. Isolated jejunum from 24 male Wistar rat (Body weight 220±30) were tested in organ bath. Rats were anesthetized and jejunum placed in crebs solution with bubbled 95% O_2 and 5% CO_2 Carbogene then cut into segment 2-3cm in width which then mounted in 25ml chamber of organ bath and constructive response recorded in 4 groups[3]. Statistical compression made by student T-test and ANOVA (SPSSVer.19). $P \leq 0.05$ considered as statistically significant. Half Maximal Effective concentration calculated by Lab ChartVer.7 software. The result was shown *E. major* extract has a relaxant effect on rat jejunum. The cumulative concentration of *E. major* (0.00625, 0.0125, 0.025, 0.05, 0.1, 0.2, 0.4, 0.8, 1.5 and 3mg/ml) relaxed the KCl 80mM induced contraction dose-dependently (n=6, $P \leq 0.05$). The inhibitory effect of extract was unaffected by phenoxybenzamine as a α antagonistic receptor blocker but the propranolol as a β antagonistic receptor blocker, inhibited the relaxant effect of extract on jejunum. This result showed the part of relaxant inhibitory effect of *E. major* extract involve adrenergic receptors. The results support the usage of this plant in traditional medicine.

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ANTISPASMODIC EFFECT OF *EPHEDRA MAJOR* ON ADRENERGIC RECEPTOR ON THE RAT UTERUS

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Tendency to utilize Ephedra contain product are increasing due to its favorable properties such as energytic, fat burning, decongestant etc [1, 2]. Present of reproductive system agonism α and β adrenergic compound and lack of systematic research on this issue, we conduct this study to determine the *Ephedra major* Host (*E. major*). Hydroethanolic extract effect on the reproductive system and reveal the underlying mechanism for this constriction effect. Isolated uterus from 24 virgin Female Wistar rat (Body weight 220±30) were tested in organ bath. Rats were anesthetized and uterus placed in De jalon solution with bubbled 95% O_2 and 5% CO_2 Carbogene then cut into segment 2-3cm in width wich then mounted in 25ml chamber of organ bath and constructive response recorded in 4 groups [3]. All of animals received an injection of oestradiol valerate (0.5mg/kg, S.C.) 24h prior to the experiment. Statistical compression made by student T-test and ANOVA (SPSSVer.19). $P \leq 0.05$ considered as statistically significant. Half Maximal Effective concentration calculated by Lab ChartVer.7 software. The result was shown *E. major* extract has a relaxant effect on rat uterus. The cumulative concentration of *E. major* (0.00625, 0.0125, 0.025, 0.05, 0.1, 0.2, 0.4, 0.8, 1.5 and 3mg/ml) relaxed the KCl 60mM induced contraction dose-dependently (n=6, $P \leq 0.05$). The inhibitory effect of extract was unaffected by phenoxybenzamine as a α antagonistic receptor blocker but the propranolol as a β antagonistic receptor blocker, inhibited the relaxant effect of extract on uterus. This result showed the part of relaxant inhibitory effect of *E. major* extract involve adrenergic receptors. The results support the usage of this plant in traditional medicine.

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EFFECTS OF IRON AND TITANIUM NANO FERTILIZERS AND LEAD HEAVY METAL ON SOME TRAITS OF BASIL (*OCIMUM BACILICUM* L.)

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In order to investigate the effects of nano fertilizers and heavy metals on some traits of basil (*Ocimum bacilicum* L.) an experiment was conducted under greenhouse condition in Ferdowsi University of Mashhad, Iran during 2012. Treatments were combination of 2 nano fertilizers (iron and titanium) in 0, 2 and 4 ppm and lead heavy metal in 0 and 50 ppm arranged in a completely randomized design with 3 replications. The results indicated that Iron and titanium nano fertilizers affected SPAD reading. The highest SPAD reading was observed in 4 ppm Iron and 0 ppm titanium, respectively. Also, with increasing Iron fertilizer, leaf number decreased but leaf area increased. The effect of lead heavy metal was significant on plant height, leaf area, SPAD reading, leaf number and leaf dry weight, statistically. With applying lead, plant height, SPAD reading and leaf number increased but leaf area and leaf dry weight decreased. In general, the highest leaf weight was obtained in integrated treatment of 4 ppm Iron, 2 ppm titanium and 0 ppm lead.

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STUDY OF MORPHOLOGICAL ATTRIBUTES RELATED TO SEX IN *CANNABIS SATIVA* L.

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Cannabis sativa L. is one of the most important medicinal plants with large variety of applications. Female plants are used in pharmaceutical industries and male ones are more important in fiber production while pollination decreases the quality of products. Therefore, sex determination of cannabis plantlets is one of the concerns for researchers and producers. Due to access to morphological characteristics related to sex, morphological attributes were studied between male and female individuals. This study was performed in a controlled greenhouse. Height of mature male and female plants, height of first flowering node, number of lateral inflorescence, number of first lateral inflorescence, diameter of stem, length of internodes, number of nodes, length of main inflorescence, length of the longest lateral inflorescence, length of mid leaflet, width of mid leaflet, leaf area, and length of flowering stem, were measured in male and female individuals. The results showed positive and significant correlations between sex and length of main inflorescence, height of flowering stem, height of first flowering node and height of mature plant and also there was negative and significant correlation between number of node in first lateral inflorescence and sex. Also it was found significant differences among males and females for length of mid leaflet, number of nodes, height of mature plants, length of main inflorescence, length of flowering stem, leaf area, height of flowering node, number of node in first lateral inflorescence, number of flowering stem node. The results appeared considerable differences among the two sexes that may be applied in *Cannabis* breeding projects.

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INVESTIGATION EFFECT OF COROPS AND MEDICINAL PLANT ON INSECT DIVERSITY

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In order to investigate the effect of medicinal species and crops effect on insect density and diversity, an experiment was conducted a factorial design based on complete randomized block with 3 replications at the agricultural research station, Ferdowsi University of Mashhad, Iran, during 2013. Treatments included 4 medicinal species (*Althaea officinalis, Malva sylvestris, Silybum marianum* and *Chicorium intybus*) and 2 crop species (*Glycine max* and *Phasaelous vulgaris*). The results indicated that effect of medicinal species on insect density was significant. The highest insect density was observed in *Althaea officinalis* without Crops. Shannon indices of insects were affected by plant species, significantly. So the highest Shannon indices were observed in *Malva sylvestris without crops.* The highest and lowest percentage of predator populations was obtained in *Althaea officinalis* without Crops and *Phasaelous vulgaris* without medicinal plants respectively.

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EFFECTS OF IRON AND TITANIUM NANO FERTILIZERS AND CADMIUM HEAVY METALS ON SOME TRAITS OF BASIL (*OCIMUM BACILICUM* L.)

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In order to investigate the effects of nano fertilizers and heavy metals on some traits of basil (*Ocimum bacilicum* L.) an experiment was conducted under greenhouse condition in Ferdowsi University of Mashhad, Iran during 2012. Treatments were combination of 2 nano fertilizers (iron and titanium) in 0, 2 and 4 ppm and cadmium heavy metal in 0 and 50 ppm arranged in a completely randomized design with 3 replications. The results indicated that the effect of iron nano fertilizer was significant on leaf area, leaf number, leaf weight and stem weight, statistically. With increasing iron, stem and leaf dry weight and leaf area decreased. Titanium affected chlorophyll meter reading, plant height, leaf number and root dry weight, significantly. The highest leaf number and root dry weight were obtained in 2 ppm titanium. Cadmium affected leaf area, chlorophyll meter reading and leaf dry weight, significantly. The highest chlorophyll meter reading was observed in 50 ppm cadmium treatment, but with applying cadmium, leaf dry weight and area decreased. Leaf number, area and dry weight were affected by interaction of iron and cadmium. In general, the highest leaf dry weight of basil was obtained in control (no application of fertilizer).

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BIOASSAY STUDY OF SAFFRON EXTRACT'S ALLELOPATHIC EFFECTS ON GERMINATION AND EARLY GROWTH OF TWO WEED SPECIES

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In order to study the effect of saffron (*Crocus sativus* L.) extract on *Rapistrum rugosum* and *Gipsophylla* sp. germination, an experiment was conducted in completely randomized design with 3 replications for plants separately. Treatment included the extract of saffron corms and leaves in 5 levels (0, 0.5, 1, 1.5 and 2%). The results indicated that regression relationship between different level of concentration and percentage and speed of plant germination were significant statistically. With increasing the concentration of saffron extract, germination percentage and rate of *Rapistrum rugosum* and *Gipsophylla* sp. decreased. Allelopathic effect of leaves was more than corms. In *Rapistrum rugosum*, germination percentage in control, 2% corms and 2% leaves were 100, 92 and 47%, respectively. Also, in *Gipsophylla* sp., germination percentage in control, 2% corms and 2% leaves were 88, 88 and 5.33%, respectively. With increasing the concentration of saffron extract, root and shoot length of studied plants, decreased.

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BIOASSAY STUDY OF FENNEL EXTRACT'S ALLELOPATHIC EFFECTS ON GERMINATION AND EARLY GROWTH OF *PORTULACA OLERACEA* L. AND *AMARANTHUS RETROFLEXUS* L.

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Problems and environmental effects of chemical pesticides has caused to search new ways such as plant extracts. In order to investigate fennel extract's allelopathic effects on germination and early growth of two weed species, an experiment was conducted as factorial based on completely randomized design with 3 replications. Treatments were 2 weed species (*Portulaca oleracea* L. and *Amaranthus retroflexus* L.) and four concentrations of fennel extract (0, 2500 5000 and 7500 ppm). The results indicated that fennel extract affected germination rate and percentage and root and shoot length in two studied species. In both studied species, with increasing extract concentration, germination percentage increased but germination rate and shoot and root length decreased. The highest germination rate and root and shoot length were observed in control and the lowest of these traits were obtained in 7500 ppm. However, further studies in this field are necessary.

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ESTABLISHMENT OF CALLUS AND CELL SUSPENSION CULTURES OF *SALVIA LERIIFOLIA*, AN ENDANGERED MEDICINAL PLANT

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An efficient procedure has been developed for callus induction and cell suspension cultures of *Salvia leriifolia* for the first time. Explant selection was carried out among leaf, embryo and shoot tip to select a suitable type of explants capable of higher callus formation. Leaf explants thus selected showed maximum response to callus induction. MS medium supplemented with 5 mg/l 6-benzylaminopurine (BAP) and α-naphthalenacetic acid (NAA) was the most favorable medium for callus formation with the highest induction rate and greatest fresh weight of callus. cell suspension cultures was established by transferring 0.5 -1.5 fresh callus to 30 ml liquid MS medium. An inoculum size of 0.5 g produced the greatest biomass accumulation and rosmarinic acid production. These prepared cell suspension cultures provided a useful material for further regulation of rosmarinic acid biosynthesis and for enhanced production of valuable phenolic acids on a large scale.

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STUDYING MAIN PRODUCTIONS, MEDICAL USAGES AND ECONOMIC IMPORTANCE OF *PISTACIA ATLANTICA* IN NEHBANDAN IN SOUTH KHORASAN PROVINCE

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Pistacia atlantica is a species of pistachio tree known by the English common name Mt. Atlas mastic tree and as the Persian turpentine tree. In Iran it is called baneh. In the Canary Islands it is known as Almacigo, and in Arabic, it is called (buṭm or buṭum). It is a tree of the genus *Pistacia*. It is a member of the same genus as pistachio, terebinth, and mastic. It is important to combat soil erosion. It strengthens the soil, and is used for reforestation of arid and steep slopes and against landslides. It is a typical urban street tree in the Black Sea cities. The seeds, like pistachio, are edible oil seeds, like nuts, and contain up to 60% fat. Candy made with *P. atlantica* in Turkish are called tsukpi pistachio. Sometimes, the immature fruit is harvested and eaten with sour milk. The plant contains a resin, used as chewing gum in Kevan, Turkey, where it is called kevove rubber tree. The resin is used to manufacture alcohol and lacquer. Its essential oils are used in perfume industry. The leaves are rich in tannins, up to 20% in the galls caused by an aphid parasite, used as the raw material for tanning in the leather industry. The sap is dried and used as incense, and its smoke releases a pleasant smell to the local environment for celebrations and religious ceremonies, as "incense". Nehbandan County or Nahbandan County) is a county in South Khorasan Province in Iran. The capital of the county is Nehbandan. At the 2006 census, the county's population was 56,089, in 13,541 families. The county has two districts: Shusef District and Central District. The county has two cities: Shusef and Nehbandan. In this article, author state a viewpoint toward studying main productions, medical usages and economic situation of *Pistacia atlantica* in nehbandan in south khorasan Province.

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THE EFFECT OF PLANTING DATE ON AGRONOMIC TRAITS OF TWO LANDRACES OF FENNEL (*FOENICULUM VULGAR* L.)

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In order to investigate The effect of planting date on agronomic traits of two landraces of fennel (*Foeniculum vulgar* L.), an experiment was conducted at the Agricultural Research Station, Ferdowsi University of Mashhad, during growing season of 2003-2005.This experiment was performed in the manner of Split Blocks based on completely randomized Blocks with three replications. Treatments were two fennel ecotypes (Khorasan and Kerman) and three planting dates (October, December and March). Fennel seeds only were planted in 2003 and in next year, plants were grown of remains parts of stem in surface of soil. Results showed in end of first years, number of remain plant in March planting date was three times of October planting date. In second years, number of remain plant in March planting date 6.5 and 2.7 times October and December planting dates, respectively. Number of remain plant between Khorasan and Kerman ecotypes were not significantly different in two years. However, effects of planting date and ecotype on dry matter and number of primary and secondary branches were not significant but plant of October planting date was superior to the plant of December and March planting dates. Number of umbel without seed in October planting date was 3.4 and 8.8 times of December and March planting dates. In spite of weight of seed in October planting date highest than December and March planting dates, effect of planting dates on weight of seed in plant was not significant. In first year highest and lowest yield were obtained in October (68.7 gr/m^2) and March (20.5 g/m^2) planting dates. But in second year maximum and minimum of yield were obtained in March and October planting dates with 45.3 and 14.2 g/m^2, respectively.

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EVALUATION OF SOME BIOLOGICAL AND PHARMACOLOGICAL EFFECTS OF METHANOLIC EXTRACT FROM AERIAL PARTS 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].This study is designed to evaluate the cardiovascular effects, radical scavenging activity, total phenol content (TPC) and total flavonoid content (TFC) of MeOH extracts and their solid phase extraction fractions of aerial parts from *scrophularia umbrosa* [2, 3]. For cardiovascular effect, the thoracic aorta was isolated, cut into rings, mounted in organ-bath chambers containing Krebs's solution (37°C, 95% O_2 and 5% CO_2) and equilibrated in resting tension (2g) for 60 min. Isometric tension was recorded under the treatments with vasoconstrictor (phenylephrin) and methanolic extract and its fractions. Relaxation was expressed as % reduction of initial contraction induced by phenylephrin. The antioxidant activity of the extract and fractions were examined by DPPH method. Total phenol and total flavonoid quantities of the samples were determined by spectrophotometer using Folin-Ciocalteu and AlCl3 reagents respectively. Associated with cardiovascular effects of the MeOH extract and fractions, the 10% MeOH-water fraction showed the highest amount of relaxation (7.5%), and 40% MeOH-water fractions exhibited the highest degree of free radical scavenging property (RC5= 2.5×10-3) compared to that of the positive control quercetine 0.0039 mg/ml. As assumed, the amount of total phenolics was high in 40% MeOH-water fractions (18.91 mg per 100 g) and this fraction has been found to be rich in flavonoids (32.43 mg per 100 g dry extract of *Sc. umbrosa*). According to the results, a direct link observed between the free radical scavenging activity potential and total phenol of samples. Also observed relaxation effect probably related to the presence of cardiac glycosides or iridoid compounds. Identification of these compounds by various methods such as HPLC and NMR is being investigated.

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THE EFFECT OF DIFFERENT AMOUNTS OF VERMICOMPOST AND PLANTING DATES ON YIELD QUANTITY AND QUALITY OF FENUGREEK

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Fenugreek (*Trigonella foenum-graecum)* is one of the important medicinal plants belong to *Leguminosae* family. In order to determine effects of vermicompost amounts and planting date on growth and yield in fenugreek and decreasing of chemical inputs for sustainable production, current research was carried out in Research Farm of Agriculture Faculty, Razi University, Kermanshah, Iran at 2012-13 cropping season. The experiment was laid out as split-plot based on Randomized Complete Block Design in three planting date (20 May, 20 July and 20 September) and five different fertilizers (0, 5, 10 and 15 ton/ha vermicompost and a chemical fertilizer based on seed requirement) in three replications. Analysis of variance of data showed that differences among plant height, fresh and dry weight per m^2 and per hectare and plant dry matter were significant ($p<0.01$) for treatments. Also the numbers of branches in pre-anthesis and the numbers of leaves per plant that were affected with planting date were significant ($p<0.05$). However there were not significant differences among treatments for numbers of plant in m^2, extract percentage and numbers of auxiliary branches in post- anthesis period. Analysis of variance of data achieved from effect of different among of fertilizer showed that plant height, fresh and dry weight per m2 and per hectare, leaf extract percentage, seed protein and extract percentage and the numbers of branches in pre-anthesis were influenced ($p<0.01$) by fertilizer treatments. Also there were significant differences ($p<0.05$) among fertilizer treatments for numbers of leaves and branches in post- anthesis period. However there were not significant differences among fertilizer treatments for numbers of plant in m2, leaf protein percentage, numbers of seeds per pod, pod length and numbers of pods in plant. Interaction effects of planting date in fertilizer treatment were significant ($p<0.01$) for fresh and dry weight per m2 and per hectare, leaf extract percentage and the numbers of branches in pre-anthesis and these effects were significantly ($p<0.05$) affect on plant height.

HAIRY ROOT INDUCTION IN *HYPERICUM PERFORATUM* L. AND EFFECT OF VARIOUS ELICITORS ON IN VITRO HYPERCIN AND HYPERFORIN PRODUCTION

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Hypericum perforatum L. is an important medicinal plant rich in secondary metabolites considered as an interesting drug [1]. Recently, hairy roots induction for the production of important secondary metabolites has received a lot of attention [2, 3]. In this research, the induction of hairy roots in *Hypericum perforatum* L. was studied using three strains of *Agrobacterium rhizogenes* (15834, 11325 and A4) with different inoculation and co-cultivation times in four various basal medium (B5, MS, 1/2MS and 1/4MS). The hairy roots induction was confirmed by PCR and transformation frequencies were recorded. Maximum percent and number of hairy roots was obtained in B5 and 1/2MS and also the highest rate of infection occurred with strain 15834 under 72 h inoculation and 45 min co-cultivation times. Effects of adding various elicitors (yeast extract, methyl jasmonate and Chitosan) in hairy root induction liquid medium on secondary metabolite production were investigated and amount of hypercin and hyperforin were measured using HPLC. Results showed that the highest of hyperforin and hypercin content of hairy roots were obtained with application of 50 mg/lit of yeast extract and then with 150 mg/l of chitosan. However, application of methyl jasmonate at 100 and 200 mg/l concentration reduced hyperforin and hypercin content of hairy roots as comparing with control.

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CHROMOTOXIC EFFECTS OF SALINITY ON ROOT MITOSIS IN *NIGELLA SATIVA*

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Salinity induces growth reduction in plants, which causes major problems in crop productivity in lands affected by salt [1, 2]. In this study, the effects of NaCl (0, 75, 150, 225 and 300 mM for 36 h) on the cell division pattern in root tips of medicinal plant *Nigella sativa* was investigated. Results showed that there were significant differences among the mitotic indices for various concentrations of NaCl as compared with the control. NaCl induced mitotic abnormalities like anaphase bridge, fault polarization of chromosomes at anaphase, chromosome fragmentation, C-metaphase and bundle of chromosomes. In addition, interphase cells with micronuclei and unequal-sized nuclei were observed. Moreover, total cell abnormality increased with increasing NaCl concentration. The results also indicated that inhibition of root growth was due to the chromotoxicity effects of NaCl through inhibition of cell division and induction of chromosome aberrations. Reduction of mitotic index values indicate inhibition of cell division by NaCl, resulting from its action on chromatin organization and the mitotic spindle [3]. It is clear from the results of the study that NaCl is cytotoxic on meristematic cells of the *Nigella sativa*.

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PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY OF NATURAL COSMETIC POWDER (ARAI) FROM WASTE VEGETATIVE MATERIAL

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Peel and corn of various fruits and waste vegetables are not currently utilized for commercial purposes; In contrast, it is discarded as agro-industrial wastes and source of pollution. Peels of fruits have been found to be a good source of phytochemicals, such as polyphenols, carotenoids, vitamin E, dietary fiber and vitamin C and they exhibited good antioxidant properties [1]. Removing the peelings of fruits and vegetables can reduce a major portion of phenols, because the concentrations of these substances are often higher in outer than in inner parts [2]. Aqueous extract of Arai powder, which is the mixture of peel and corn of various fruits and waste vegetables, is used in traditional system of medicine as a natural cosmetic by local people in some regions of Iran. In this study, influence of three storage periods on phenolic contents of this powder was evaluated. Antioxidant activities of the aqueous and methanol extracts were evaluated by DPPH assay and compared with those of ascorbic acid as positive control. Results indicated that total phenol content was varied from 91.66 ± 1.78 to 243.30 ± 1.99 mg /g dry weight (dw). Decrease in total phenolic, flavonoid and anthocyanin contents as well as antioxidant capacity was observed during storage. The percentage of antioxidant activity for all samples was between 4.3 to 83.4%. Preliminary exploration of bacterial flora in Arai powder showed no pathogenic effect. Therefore, Aria powder may be considered as a potential source of antioxidants for cosmetic industries.

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EFFECT OF GROWTH STAGES ON CONTENT AND QUALITY OF ESSENTIAL OF PEPPERMINT ESSENTIAL OIL AS A MEDICINAL PLANT

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Peppermint with the scientific name of *Mentha piperita* L. is valuable medicinal and aromatic plant from Lamiaceae (Labiatae) family which due to the essential oil in its vegetative body special leaves is a pleasant smell and a cool, slightly spicy (peppery) taste. The average essential oil content of the aerial parts is 1 to 1.5%. This plant has medicinal properties and many usages including anti-flatulent, antibacterial drugs, mouthwash solutions and also has great applications in food, health, cosmetics and soft drink industries. In order to examine the essential oil yield and its quality of peppermint affected by different growth stages, an experiment was performed based on a completely randomized design with five replications at the Special Crop Laboratory, College of Agriculture, Ferdowsi University of Mashhad during year of 2012. Leaves and branches of peppermint were collected at three stages including before flowering, full flowering and after that then dried in shade. Results showed that growth stages had a significant effect on essential oil content of peppermint ($p \leq 0.01$). The highest essential oil content for Peppermint was observed in full flowering stage with 1.3%. The main content of essential oil was also influenced by harvest stage; the major essential oil compounds for peppermint at the flowering stage were Menthol, Menthofuran, Menthone with 16.5, 12.1, 8.5%, respectively. Thus, the results suggest that harvest stage should be determined based on their qualitative and quantitative characteristics in order to achieve the highest quality and quantity yield of secondary metabolites in medicinal plants and prevent the loss in essential oil and its quality.

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STUDY THE QUANTITATIVE AND QUALITATIVE YIELD OF LEMON BALM AS A MEDICINAL PLANT AFFECTED BY GROWTH STAGE

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Lemon balm (*Melissa officinalis* L.) belongs to Lamiaceae family. The most important used parts of this valuable medicinal species are its petioles. Its flowering branches are also being used. Its ingredients are used for treating neurological disorders, gastrointestinal and heart diseases with neurological origin. In order to examine the essential oil yield and its quality of lemon balm affected by different growth stages, an experiment was performed based on a completely randomized design with five replications at the Special Crop Laboratory, college of Agriculture, Ferdowsi University of Mashhad during year of 2012. Leaves and branches of lemon balm were collected at three stages including before flowering, full flowering and after that and then dried in shade. Results showed that growth stages had a significant effect on essential oil content of lemon balm ($p \leq 0.01$). The highest essential oil content was observed in before full flowering stage with 3.4%. The main content of essential oil was also influenced by harvest stage; at the stage of flowering, the major essential oil compounds for lemon balm were α-Tojon, β-Tojon and Camphor with 22.9, 15.5, and 14.1%, respectively. Thus, due to effect of growth stages on essential oil content and their compounds in medicinal plants such as lemon balm and in order to achieve the maximum essential oil yield, harvesting time should be determine carefully based on their growth stage.

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DETERMINATION OF ANTIOXIDANT PROPERTIES AND CHEMICAL ACTIVE AGENTS IN FENNEL FRUIT

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Fennel (*Foeniculum vulgare*) is a plant species in the genus Foeniculum. It is a member of the family Apiaceae (formerly the Umbelliferae). It is erect, glaucous green, and grows to heights of up to 2.5 m, with hollow stems. The leaves grow up to 40 cm long. The flowers are produced in terminal compound umbels 5–15 cm wide, each umbel section having 20–50 tiny yellow flowers on short pedicels. The fruit is a dry seed from 4–10 mm long, half as wide or less, and grooved.it is contain: Volatile oils, Coumarins, tannin, Flavonoids and alkaloids. Flavonoids are a class of plant secondary metabolites, and also have anti-allergic, anti-microbial and anti-cancer activities. Alkaloids are a group of naturally occurring chemical. compounds that contain mostly basic nitrogen atoms. They often have pharmacological effects and are used as medications. Vitamin C also helps regulate the immune system It is needed in the manufacture of collagen and norepinephrine and helps to benefit the skin, teeth, and bones. In this study at first Soxhlet extraction (Sox) was performed in an apparatus equipped with cellulose extraction thimbles. Exhaustive extraction with methanol performed on 30 gr of accurately weighted dried powder fruit of fennel. Extraction was performed for about 8h with 250 ml methanol. Condensed extract were prepared for the qualitative tests the families: saponins, flavonoids, tannins, alkaloids and glycosides. Then the fruit prepared for determination of (DPPH) antioxidant properties and the extract concentrations providing 50% of radicals scavenging activity (EC50) was calculated by interpolation from linear regression analysis. Also the amount of ascorbic acid (vitamin C) was determined. So at first aqueous extraction was performed on 10 gr of fruit of fennel, then sample solution titrated with iodine solution to measurement the ascorbic acid.

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ANTIBACTERIAL EFFECT OF METHANOLIC EXTRACT OF *EUPHORBIA CONDYLOCARPA*

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Spurge family is a large family of plants that includes more than 300 genera and 800 species, of which 5 genera and 72 species find in Iran. Some of this important family can be used in the treatment of various diseases such as cancer, rheumatism, asthma, pain and bacterial infections. This study was based on a more comprehensive study of the anti-bacterial effects of the plant *Euphorbia Condylocarpa* by Iranian Kurdish name '*Shoaleh Koleh* ' In this study eight strains of bacteria including: *Escherichia coli* (ATCC 8739), *Pseudomonas aeuroginosa* (ATCC 9027), *Salmonella typhimurium* (ATCC 14028), *Klebsiella pneu*monia (ATCC 10031), *Staphylococcus aureus* (ATCC 6538), *Staphylococcus epidermidis* (ATCC 12228), *Enterococcus faecallis* (ATCC 11700), *Bacillus subtilis* (ATCC 6633); were used for evaluation of antibacterial effect. The methanol extract of the *Euphorbia condylocarpa* was prepared by percolation and primary antibacterial properties were investigated by agar well diffusion followed by determination of MIC methods using macro dilution method. The results showed that *Staphylococcus aureus* (G+) and *Pseudomonas aeuroginosa* (G-) have the most sensitivity with MIC equal to 250, 125 mg/ml, respectively. Minimum growth inhibition radius was 14mm related to *Escherichia coli* and maximum growth inhibition zone was 27mm related to *Pseudomonas Aeuroginosa*. The finding of this research showed that the extract of the plant *Euphorbia Condylocarpa* has medium effect in some cases on bacteria.[1, 2]

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ANXIOLYTIC ACTIVITY OF *PLANTAGO MAJOR* ETHANOLIC EXTRACT IN RAT

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We investigated the effects of ethanolic extract of *Plantago major* (EEP) in rats submitted to anxiety model: EPM (elevated-plus-maze). EEP from leaves were obtained and administered at the doses of 25, 50, 100, 200 and 400 mg/kg by intraperitoneally (i.p.) injection 1 hr before the behavioral evaluation in the EPM. EEP at dose 50 mg/kg significantly ($p<0.05$) increased the time spent in the open arms to compare with control group. EEP at dose 25 mg/kg increased the number of entrances in the open arms but not significant. The results of EEP 50 mg/kg similar to the reference drug, Diazepam (1 mg/kg, i.p.). In conclusion, the results of present study suggest that EEP exert anxiolytic-like effect in behavior related to anxiety and anxiolytic effects of EEP that might involve an action on benzodiazepine-type receptors. Further studies are in progress in order to enable us to understand the precise action mechanisms of *Plantago major.*

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EFFECTS OF SALICYLIC ACID ON SEED GERMINATION OF COMMON PURSLANE (*PORTULACA OLERACEA* L.) UNDER SALINITY STRESS

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Purslane, which is one of the most important plants in the Halophyte family, is potentially a valuable resource for agriculture in saline areas and can be cultivated as fodder, vegetable and oil seeds. Purslane, is being proposed as one of the most important and recent pharmaceutical Halophyte plants and has had a special place in the Iranian traditional medicine since long ago. Several research findings on the history of Purslane cultivation as well as the high quality of the oil which exists in its seeds have prepared the ground for further investigations on the use of this valuable plant as vegetable and condiment in Human, Animals and Aquatics Nutrition. Furthermore, Purslane is a high-grade oily plant with various pharmaceutical applications specifically in saline circumstances. Accordingly, a research has been conducted to investigate Purslane's level of tolerance at germination stage with Prime Salicilic Acid. The experiment has been carried out in a factorial form with six levels of Salinity (0, 60, 120, 180, 240 and 300 mM NaCl) and 4 levels of Salicylic Acid (0, 0.5, 1 and 2 mM) with 4 replications in laboratory of seed in Yasooj University in Iran. The findings have revealed that the increase in salinity have caused a decrease in the level of germination. The level of germination has fallen from 100% in control treatment to 50% in 300 mM level of salinity. Moreover, the increase in the level of salinity has affected other traits including, germination speed, seedling length, the ratio of radicle length over plumule length, the stamina of the seed and has caused a decrease in their level. seed priming with salicylic acid decreases were all characters germination. in this study, On the contrary, Salicylic acid not only in terms of salinity can improve seed germination, but was reduced the germination .

STUDY OF CHICORY MORPHOLOGICAL VARIATION BASED ON PEDICLE LENGTH PHENOTYPES FOR SELECTION OF DESIRED POPULATIONS

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Common chicory, *Cichorium intybus*, is a somewhat woody, perennial herbaceous plant usually with bright blue flowers, rarely white or pink. Various varieties are cultivated for salad leaves, chicons (blanched buds), or for roots (var. sativum), which are baked, ground, and used as a coffee substitute and additive. It is also grown as a forage crop for livestock. It lives as a wild plant on roadsides in its native Europe, and in North America and Australia, where it has become naturalized. In Iran, Chicory flowers are used in the treatment of fatty liver. Chicory (especially the flower), used as a folk medicine in Germany, is recorded in many books as an ancient German treatment for everyday ailments. It is variously used as a tonic and as a treatment for gallstones, gastro-enteritis, sinus problems and cuts and bruises. One of important problem with chicory flowers harvesting is its small size and lack of pedicle or very short peduncles. About 75% of the studied plants had short peduncle and about 25% of samples are characteristic of long pedicle. The study was designed to identify and selecting of long pedicle phenotypes. This can be useful for developing appropriate machine systems for optimal flower harvesting of chicory.

EFFECTS OF GENETIC AND ENVIRONMENTAL CONDITIONS ON BULBING QUALITY OF 38 IRANIAN GARLIC (*ALLIUM SATIVUME* L.) CULTIVARS.

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The study was carried out with 38 collected garlic cultivars from five important garlic producer locations in Iran including Tarom, Zanjan, Hamadan, Ghaemshahr and Sarei. The cloves were planted in medium pots, size as 30x30cm in control conditions (average temperature: 20 0C and 60 % RH). A randomized complete block design with 3 replication was conducted. The quality of bulbing (bulb weight, bulb circumference and number of cloves per bulb) were evaluated during years of 2011 – 2012. Observations made regularly during the growing stage explained strong differences of growth linked to the varietal group of the tested varieties. Although all 38 parental grown cultivars in greenhouse were firstly multiple cloves, but only few cultivars have produced multi cloves. Two classes of garlic cultivars were observed. Class A including 26 cultivars formed only single clove that their weights were varied between 7.2g to 25.27g. Class B including 12 cultivars presented significant differences in the number of harvested bulbs: The cultivar of Zanjan had the biggest bulbs (65 g in average), and others (Tarom 9, Tarom 14 & Hamadan1- 5) were intermediate (bulbs of 40 g in average). These results appeared to be strongly correlated with the genetically parameters. The number of clove in each bulb in class B was 6-11. Identification and assessment records revealed that 10 of 12 varieties of class B are multi cloves owned areas are planted in the spring such as Zanjan and Hamadan (cold regions). Our research findings demonstrated that quality of bulbing in garlic can be done successfully in greenhouse depends on genetic and environmental requirements. We identified 12 Iranian garlic cultivars for greenhouse planting which can produced normal and commercially multi cloves successfully. Other 26 cultivars that produced single clove were suitable for cooking usages due to easy skin peeling.

SEED DORMANY IN *PASSIFLORA CAERULEA* DORMANCY BREAKING REQUIRMENT

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Passiflora caerulea is native to brezilya and one of endangered medicinal plant. The seed is known for its physical dormancy. In the present study, seeds' coat were analysed anatomically to determine its water absorption ability. Later, some pretreatments of physical and chemical scarification were carried out to break physical dormancy of the seeds. For physical scarification, a sharp knife and sand paper were utilized. In the chemical scarification, seeds were immersed in pure sulphuric acid (H_2SO_4) for either 2, 4, 8, 10, 20 and 30 min., and then rinsed thoroughly in running water for 20 min. After scarification, different treatments of gibberellic acid and potassium nitrate for breaking dormancy and speeding germination. Anatomical analysis suggested *Passiflora caerulea* seeds having hard, impermeable macrosclereids seed coat. In contrast to scarified seeds, non-scarified seed did not absorb water. Analysis of variance indicated that the absorption of water and weight of seeds scarified with knife and sulphuric acid for 20 and 30 min significantly increased. These results suggested that *Passiflora caerulea* seeds exhibit both paradormancy [1, 2]. Therefore, based on seed-coat thickness and hardness and viability testing longer scarification times are suggested [3].

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HAZARD ANALYSIS AND CRITICAL CONTROL POINT (HACCP) SYSTEM AGRIPRODUCTS PROCESSESING

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The HACCP system, which is science based and systematic, identifies specific hazards and measures for their control to ensure the safety of food. HACCP is a tool to assess hazards and establish control systems that focus on prevention rather than relying mainly on end-product testing. Any HACCP system is capable of accommodating change, such as advances in equipment design, processing procedures or technological developments. HACCP can be applied throughout the food chain from primary production to final consumption and its implementation should be guided by scientific evidence of risks to human health. As well as enhancing food safety, implementation of HACCP can provide other significant benefits. In addition, the application of HACCP system can aid inspection by regulatory authorities and promote international trade by increasing confidence in food safety. The successful application of HACCP requires full commitment and involvement of management and the work force. Pior to application of HACCP to any sector of the food chain, that sector should have in place prerequisite programs such as good hygienic practice according to the codex general principle of food hygiene, the appropriate codex codes of practice, and appropriate food safety requirements. These prerequisite programs to HACCP, including training, should be well established, fully operational and verified in order to facilitate the successful application and implementation of the HACCP system. For all types of food business, management awareness and commitment is necessary in order to implement an effective HACCP system. The effectiveness will also rely upon management and employees having the appropriate HACCP knowledge and skills.

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THE EFFECTS OF *VACCINIUM ARCTOSTAPHYLOS* LEAF POWDER ON ROSS BROILER CHICK GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS

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There have been considerable focus on using the medicinal plants and their components in different fields including poultry farming during last three decades. *Vaccinium arctostaphylos* or Caucasian whortleberry is a species of shrub (family Ericaceae) which grows in Guilan jungles. The fruit of this plant has antihypertensive and antdiabetic effect. This study was exerted to determine the effects of *Vaccinium arctostaphylos* leaf powder on chick broilers growth performance and carcass characteristics. In this study, 100 one day-old Ross broiler chick were randomly divided into 4 treatment, each lot with 3 repetitions, with 10 chick broilers each. Treatment groups were fed with basic ration (control), and 1%, 1.5% and 2% of *Vaccinium arctostaphylos* leaf powder. The highest feed conversion ratio was observed in treatment groups feeding with 1% and 2% of *Vaccinium arctostaphylos* leaf powder ($P<0.05$). The highest carcass efficiency was observed in treatment groups were fed with 2% of *Vaccinium arctostaphylos* leaf powder and lowest carcass efficiency was observed in control group ($P<0.05$).

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PRIORITY ASSESSMENT EXTENSION EXCELLENCE SYSTEM IN PRESERVATION OF ENVIRONMENT AND NATURAL RESOURCES: ANALYTICAL HIERARCHY PROCESS (AHP)

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Although in recent years the Government Extension System for reasons such as high costs, limited resources to further promote the implementation activities and non insufficient technical condition and sufficient personnel and lack of calls with the stakeholders of Natural Resources and Environment due to the limited of human resources, has been seriously criticized. But it seems to be in areas that do not have a good position in terms of potential profit use of organization promoting the need for new approaches to review and provide. This study tries to answer the this question that If you wish to non-governmental Extension for the protection of the environment and natural resources, compared with the governmental Extension What are your capabilities? In other words, comparing the efficacy, of private and public non-governmental and governmental extension system in protecting the environment and natural resources and to determine the relative priority theoretically superior, are the main subjects of this study. This study, using a questionnaire and using a hierarchical analysis technique (AHP) has been performed. Department of Natural Resources and Environment, population experts in Tehran are effective in Extension the use of natural resources and environment. The results from the technique (AHP) revealed that the government Extension the conservation of natural resources and environment priority is relative, but in non-governmental Extension many options can be promoted alongside the government to promote the preservation of the environment and natural resources play a role track.

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COMPARISON OF CHEMICAL COMPOSITIONS OF THE ESSENTIAL OILS OF THREE *SATUREJA* SPECIES

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The genus *Satureja* (Lamiaceae, subfamily Nepetoideae and tribe Mentheae) constitutes about 200 species of herbs and shrubs, widely distributed in Mediterranean area, Asia and boreal America [1]. Fourteen species of *Satureja* are growing wild in western and northern parts of Iran [2]. *Satureja khuzestanica* Jamzad. (Marzeh-e-Khuzestani in Persian) and *Satureja bachtiarica* Bunge. (Marzeh-e-Kohi) are endemic plant that widely distributed in the southern parts of Iran [3, 4]. The aerial parts of *S. khuzestanica* Jamzad. and *S. bachtiarica* Bunge. collected from Mongreh in North Khuzestan province and Sabz-e-kuh in South Chaharmahal va Bakhtiari province, respectively. The aerial parts of *Satureja hortensis* L. native Iranian medicinal plants, collected from lands cultivated in Isfahan at 2012. The chemical compositions of essential oils were analyzed by gas chromatography–mass spectrometry (GC/MS). The yields of essential oils of *S. khuzestanica* Jamzad. and *S. bachtiarica* Bunge. and *S. hortensis* L. were 0.53 and 1.39% and 0.7 ml/100 g based on the dry weight of plants material, respectively. Major oil constituents of *S. khuzestanica* Jamzad. were carvacrol (90.88%) and *p*-cymene (3.11%). Main oil constituents of *S. bachtiarica* Bunge. were carvacrol (46.34%), γ-terpinene (21.32%) and *p*-cymene (9.42%). Carvacrol (45.67%) and γ-terpinene (37.94%) were main compositions of the essential oil of *S. hortensis* L. In finally, the essential oils of three species especially *S. khuzestanica* Jamzad. and *S. bachtiarica* Bunge. contain an appreciable amount of carvacrol which has a great demand in perfumery industry.

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PHYTOCHEMICAL SCREENING, ANTIOXIDANT AND BURN HEALING POTENTIAL OF *GALIUM ODORATUM* AQUEOUS EXTRACT

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Galium odoratum (L.) Scop. from Rubiaceae family is naturally distributed in various regions in the north of Iran. Aerial parts have been used as a treatment for nervous agitation and circulation disorders and the bruised leaves have been applied topically to reduce inflammation and improve wounds healing [1,2]. This study was conducted to evaluate the antioxidant and burn wound healing activity of aqueous extract of *G. odoratum*. The total extract was prepared from aerial parts of the plant with distilled water. An attempt was made to observe the presence or absence of different phytochemical constituents in the extract qualitatively [3]. The antioxidant potential of the extract was assessed by 1, 1-diphenyl-2-picryl-hydrazyl (DPPH) assay [4]. Deep second degree burns were induced in four groups of six rats each. Groups 1 and 2 received eucerin and silver sulfadiazine as control and reference standard and groups 3 and 4 were given aqueous extract of 15% and 30% (w/w in eucerin base) respectively. The topical treatment was done daily for 14 days. The percentage of wound contraction and histology parameters of healed wounds were observed. The extraction procedure yielded 22.57% (w/w) for aqueous extract. The results of phytochemical screening tests were positive for flavonoids, tannins, saponins and anthraquinones. The extract exhibited a good and notable dose dependent DPPH scavenging activity with IC_{50} of 83 µg/ml. There was statistically significant improvement in wound contraction of animals treated with both concentration of aqueous extract in comparison to control ($p<0.05$). The healed wounds in extracts-treated animals contained less inflammatory cells and had better re-epithelialization. Wound contraction and histology parameters were relatively better for higher concentration.

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KARYOTYPE ANALYSIS AND NEW CHROMOSOME NUMBER REPORTS IN *SILENE COMMELINIFOLIA*, *S. EREMICANA*, *S. LUCIDA* & *S. NURENSIS* FROM AURICULATAE SECTION (CARYOPHYLLACEAE)

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Silene with about 700 species is the largest genus of Caryophyllaceae with 110 species in Iran [1, 2]. Some of *Silene* species are of economic and medicinal importance in Chinese traditional medicine. Antimicrobial and antioxidant effects are recorded for this genus [3]. These species have X= 10 & 12 chromosome base number. In this project karyotype of 14 populations of 4 species were studied. Somatic cells of root tips were studied in germinated seeds after 3-10 days with 8-hydroxyquinolin as pretreatment. In this study ploidy variation was observed that could be the reason for population divergence. Karyotype studies shown ploidy levels 2n=2x=24, 2n=4x=48 for *S. commelinifolia*, ploidy level 2n=2x=24 for species *S. nurensis* and ploidy level 2n=4x=48 for *S. eremicana* and *S. lucida*, respectively. Ploidy level 2n=4x=48 and the presence of B chromosomes in *S. commelinifolia* and ploidy level 2n=2x=24 for *S. nurensis* is the first report. The chromosomes were mainly metacentric or sub-metacentric and their size varied from 1.10 µm in *S. nurensis* to 7.11 µm in *S. commelinifolia*. The species studied differed significantly in the total size of the chromosomes, the size of the short arms and the long arms, indicating the role of quantitative genomic changes in the *Silene* species diversification. The *Silene* species were placed in 1A and 1B classes of Stebbins karyotype symmetry showing symmetrical karyotypes.

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MORPHOLOGICAL CHARACTERS EVALUATION IN *SILENE COMMELINIFOLIA*, *S. EREMICANA*, *S. LUCIDA* & *S. NURENSIS* FROM AURICULATAE SECTION (CARYOPHYLLACEAE)

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Silene with more than 700 species is the largest genus of the carnation family. The main center of its biodiversity is central Asia and south of Balkan [1]. Species delimitation is not resolved in this genus. In Iran 110 species of this genus are distributed from which 35 are endemic [2]. These species are of medicinal importance in Chinese traditional medicine. *Silene* root is used for worm removal and antimicrobial effect [3]. For morphological studies 24 accessions of *Silene commelinifolia, S. nurensis*, *S. lucida* and *S. eremicana (Auriculatae* section*)* were studied. 34 qualitative and quantitative were used for morphological studies. Statistical multivariate analyses as cluster analysis, Factor analysis and principal component analyses were done by SPSS software ver. 20. Statistical results indicate that features as shape of basal and caulinal leaves, capsule shape and position in calyx, alternate stamens to epipetal ones, length and width of basal and caulinal leaves, alar and parietal peduncle, length of epipetalus filament to claw and length of calyx indentations are of diagnostic importance in accessions separation of four studied species. Based on cluster analysis by WARD and UPGMA methods different populations of *S. commelinifolia* var. *commelinifolia* and *S. nurensis* are greatly related. *S. commelinifolia* var. *ovatifolia* is located at a separate position. Populations of *S. lucida* are more similar to *S. eremicana* in the second step. Two *S. commelinifolia* varieties as *commelinifolia* and *ovatifolia* are proposed to consider as subspecies.

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EFFECT OF DROUGHT AND GPB EFFECT ON THE MORPHOLOGY AND PHOTOSYNTHETIC PIGMENTS OF MEDICINAL PLANT MARIGOLD PLANTS (*CALENDULA OFFICINALIS* L.)

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Marigold herb is one of the medicinal plants of Asteraceae family, with scientific name (*Calendula Officinalis*), today flower and its essential oil is used many in health industries, pharmaceutical and cosmetic industries. To study the effects of nitrogen fertilizer (PGPR) biological and water stress on quantitative and qualitative yield of Marigold herbs, a study was conducted at the Research Farm located south of Tehran University. The experiment was a split plot in a randomized complete block design with three replications in the crop year 90-89. Experimental factors were include drought as the main factor (in four levels 40, 80, 120 and 160mm evaporation from pan evaporation from class A) and the application of PGPR (Azotobacter + Azospirillum) that allocated in main plots, and application of four methods of PGPR an Sub factor including (without the use of rhizobacteria growth or control, foliar application of PGPR, PGPR as seeding treatment consumption, consumption of PGPR with irrigation water) were considered. Traits including plant height, number of flowers per plant, biological yield, anthocyanin content and photosynthetic pigments, respectively. Results showed that all traits except biological yield was affected by drought and application of PGPR, So that the maximum height and number of flowers per plant were obtain at in 40 mm evaporation and water consumption associated with bacteria, Biological yield in 40 mm evaporation and the use of bacteria as seeding treatment, and a maximum value of 120 mm by evaporation and consumption of anthocyanin was acquired bacteria sprayed. But for rising of photosynthetic pigments content, an application of spraying bacteria under 40 mm evaporation was the best treatment.

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DIFFERENTIATION OF *LAVANDULA ANGUSTIFOLIA* MILL. AND *NEPETA MENTHOIDES* BOISS & BUHSE USING MICROSCOPIC AND PHYTOCHEMICAL EVALUATIONS

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Lavandula angustifolia Mill. and *Nepeta menthoides* Boiss & Buhse are two species from Lamiaceae family. They are used as traditional medicine with similar common name "Ostokhodus", in Iranian traditional and folk medicine and this cause make a misidentification in market [1, 2]. In this investigation we use simple and fast microscopic and phytochemical evaluations to differentiate these two medicinal plants in crushed form. Phytochemical tests were positive for triterpene, sterol, saponin and flavonoid in both plants except that there were qualitatively more abundant in *N. menthoides*. In microscopic evaluation, different types of trichome were seen in both plants and some of them were diagnostic for each plant. In conclusion our investigation showed that micromorphological and phytochemical assessments can facilitate distinction of *L. angustifolia* and *N. menthoides*.

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IMMUNIZATION OF T. GONDII ESA WITH ARTEMISIA ANNUA AS ADJUVANT PROTECT MICE AGAINST LETHAL INFECTION WITH *TOXOPLASMA GONDII*

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Toxoplasma gondii is an important food-borne protozoa transmitted primarily from animals to humans through meat consumption [1]. In human, infection with *T. gondii* in pregnancy can result in congenital infection with severe sequelae or late on set eye disease and is a frequent cause of encephalitia in severely immune suppressed patients with AIDS [2]. Considering that the treatment for toxoplasmosis is based on drugs that show limited efficacy due to their substantial side effects [3]. *Artemisia annua* is native to Asia which *Artemisia*-derived drugs have shown effects on a variety of parasites such as *Fasciola hepatica, Plasmodium spp, Babesia spp, Leishmania spp* and *Schistoosoma spp*, and have been successfully tested a cancer treatment [4].The aim of this study was to evaluate the ability of *A. annua*, to enhance the protection of a ESA vaccine, which functions as a vaccine model against a facultative intracellular parasites. For immunization of the mice, were allocated 30 female BALB/c mice (6-8 week-old) were divided in to 3 groups of 10 mice. The first and second groups received the ESA (*T. gondii* excreted/secreted) vaccine alone, the ESA-*A. annua* respectively, and the control group received phosphate buffered saline (PBS), all mice were immunized on days 0, 10, 20. Ten days after the final immunization, mice all groups were divided in to two groups: 5 to measure the DTH and 5 to evaluate cellular immune responses (MTT test and measurement of concentration of IFN-γ and IL-5). Results showed that *A. annua* extract, as an adjuvant relatively boosts that ability of the ESA vaccine to enhance lymphocyte proliferation, delayed-type hypersensitivity responses (DTH) and also measurement of concentration of IFN-γ and IL-5. Our results the indicate of the *A. annua* extract as an adjuvant in combination with the ESA vaccine, can increase cell-mediated immunity and shift the immune response to ESA.

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THE EFFECT OF DROUGHT STRESS ON GERMINATION OF *THYMUS* SPECIES (*T. ERIOCALYX*, *T. KOTSCHYANUS*, *T. VULGARIS*)

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Due to investigating the effect of drought stress on *Thymus* species, a factorial disign under completely randomized design conducted with four replications. The factors of germination in vitro included *Thymus* species (*T. ericalyx*, *T. kotschyanus*, *T. vulgaris*) and second factor were included drought stress by PEG in 5 levels (-3, -6, -9, -12 bar and well water (control)). The percentage of germination, speed of germination, root length and shoot length were measured. The results showed that effect of species and drought stress were significant in all traits. *T. eriocalyx* had the maximum percentage of germination. Also *T. eriocalyx* produced the maximum root length and shoot length. *T. vulgaris* had the maximum speed of germination. Drought stress of -6 bar had maximum speed of germination. So, according to the results, percentage of germination, root length and shoot length. *T. eriocalyx* could be introduced as a suitable species in drought stress conditions. Finally concluded that the local species is suitable than foreign specie (*T. vulgaris*) in vitro tests.

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EFFECT OF AQUEOUS EXTRACT OF MINT (MENTHA) ON RAINBOW TROUT (*ONCORHYNCHUS MYKISS*) ANESTHESIA COMPARED WITH AQUEOUS EXTRACT OF CLOVE (CARNATION)

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Mint, plant the seeds of a continuous exogenous flowers and the green leaves of edible Lamiaceae dark leader. These plants are found in different parts of Iran. Our plant were prepared in ChaharMahal and Bakhtiari, due to water and weather and favorable geographical position and mountainous and prone, and having a beautiful and varied vegetation and pasture,. After preparing the plant on it by dipping extracted and put it in 4 different doses (150, 300, 450, and 600 microliters per liter) prepared then by dipping aqueous extract of clove were also the extract at 4 different doses (150, 300, 450, and 600 microliters per liter) providing said. We are working on 8 groups of 20 each fish rainbow trout took the 4 groups of 4 different doses of mint use and 4 others 4 doses of aqueous extract of clove also pouring into the water. The anesthetic MS222 in fish farms in Iran, which has adverse effects on the human body, we found that the use of medicinal plants native to Iran to address this problem. The results of comparing these two plants identified that Adding mint to the water had no effect on the exposure and mode no fish in each doses. While adding alcove extract were caused anesthetisa in 4 doses in Rainbow trout.

THE EFFECT OF *PORTULACA OLERACEA* SEEDS ON PULMONARY FUNCTION IN ASTHMATIC PATIENTS

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Asthma is a disease with chronic inflammation of airway [1]. *Portulaca oleracea* is a plant that grows in many areas in the world [2]. Some studies reported antitussive and brochodilatory effects for extract of *Portulaca oleracea* [3-5]. The experiment is designed to study the effect of *Portulaca oleracea* seeds on pulmonary function in asthma patients. In a randomized clinical trial, 61 patients with asthma disease that refer to clinics of Tabriz University of Medical Sciences divided to intervention and control groups. First group (n=33) received protocol treatment and 10g/day *Portulaca oleracea* seeds in two doses, while participants in second group (n=28) had only their protocol treatment for 8weeks. At the baseline and end of study, Asthma Control Test (ACT), dietary intake and physical activity questionnaires and spirometry were obtained for each person. The mean age of the participants at baseline was 43.89 ± 10.81 years. Median duration of asthma estimated 9.4(3to15) years. Administration of seeds showed no significant difference in ACT score and pulmonary function tests (PFTs) including peak expiratory flow (PEF (% pred)), forced expiratory volume in one second (FEV1 (% pred)), forced vital capacity (FVC (% pred)) and FEV1/ FVC% in intervention group comparing with control (P>0.05). However, the level of PEF (% pred) indicated significant increment in intervention group (P=0.026). The increase of ACT score was 58% and 39% in *Portulaca oleracea* and control groups, respectively. If administration of *Portulaca oleracea* seeds as adjunctive therapy exhibited a non-significant increase in PFTs as compared to the control group but it slightly improved ACT score in intervention group. Apparently, further investigations about this topic are needed.

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QUANTIFICATION OF SOME ACTIVE MATERIALS IN LEAVES OF IVY BY HPLC

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Ivy (*Hedera helix* L., Araliaceae), is an evergreen medicinal and ornamental plant with various biological and pharmacological properties. The *H. helix* phytochemicals, in particular its saponins are at the present time known to act as anti-inflammatory, antibacterial, mucolytic and antispasmodic [1]. The ivy leaves were extracted and subsequently analyzed by reversed-phase high performance liquid chromatography (RP-HPLC). Quantitative determination of its most prominent saponins hederacoside C and a-hederin of ivy leaf extracts were performed on a C_{18} column at gradient elution at 200 nm and acetonitrile and 0.5% phosphoric acid aqueous solution as mobile phase. The analysis revealed that hederacoside C is the predominant compound of saponins. The hederacoside C and a-hederin In dry leleaf were 7.83 and 0.74%, respectively [2, 3].

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HPLC-UV AND PHOTOMETRIC METHODS FOR *TRIBULUS TERRESTRIS*

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Tribulus terrestris is a valuable herb known for its application in the human medicine that used for the treatment of various diseases. The steroidal saponins of *T. terrestris* are considered to be the factor responsible for biological activity of products derived from this plant. It comprises spirostanol saponin and frustanol saponin, which are the major components of *T. terrestris*. The aim of the present study is to quantify total frustanol saponins and protodioscin as a marker compound in fruits of *T. terrestris* by colorimetric and high-performance liquid chromatographic (HPLC) methods. The colorimetric method was used for determination of total frustanol saponins based on protodioscin with Ehrlich reagent (p-dimethylaminobenzaldehyde in concentrated hydrochloric acid) at 510 nm [1]. Extraction was performed with several solvents. The total concentration of saponins was found to be in the rang of 1.1-4.8% in the fruit and its extracts. HPLC method have been applied to measure the amount of protodioscin in the fruit and dry extracts [2, 3]. The analysis was carried out using a C_{18} column at 205 nm at 30 ˚C. The protodioscin content in the fruit and dry extracts ranged from 0.86 to 3.64%.

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THE INVESTIGATION OF OIL YIELD OF THREE VARIETIES OF BLACK SEED (*NIGELLA SATIVA*) IN DIFFERENT PLANT DENSITIES

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It is important in traditional medicine in that reason it is cultivated in some regions of Iran and the world [4]. In order to investigating changes range of oil yield and percentage attention to plant density on three varieties of black seed, an experiment was conducted in the form of factorial based on completely randomized block designs (RCBD) with 4 replications in Saat-Loui agricultural station of West Azerbaijan province. In this research, the first factor (A) contained two levels 20 and 40 cm inter rows, the second factor (B) contained three levels 2, 4 and 6 cm intra rows and the third factor (C) contained three different varieties of Baft, Bukan, and Arbil. The specimens were planted on April 22nd, 2009. The results showed that sensitivity of germination to water potential was more sensitive to temperature and black seed plants most susceptible to changes in temperature and water potential showed [1]. Studies have been shown that with increasing of density in the black seed farms, the environmental factors such as humidity, light and nutrients won't be sufficient [2, 3]. Samsam Shariat [5] showed that the best row space for black seed is 50-70 cm. The results showed that the effects of plant density and harvest arrangement on grain yield, oil yield and oil percentage were significant. The highest and least grain yield, oil yield and oil percentage obtained from varieties of Baft and Arbil respectively. Oil percentage of inter rows 20 cm and intra rows 6 cm was 31.26 and 33.77 percent respectively. The content of oil percentage in variety Baft was 32.33 percent. On the whole, the best content of oil percentage obtained from inters rows 20 cm with intra rows 6 cm in variety Baft about 37.47 percent.

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THE INVESTIGATION OF ANTIMICROBIAL ACTIVITY OF *VITEX PSEUDO-NEGUND* ESSENTIAL OIL

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Hydro-distillated oil from flower of *Vitex pseudo-negund* were investigated for its antibacterial activity against a panel of 11 bacterial and one yeast strains. The minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) were determined by broth micro-dilution method and tetrazolium chloride salt [1]. The results indicated that Gram-positive bacteria are more sensitive to essential oil than Gram-negative bacteria. MIC and MBC of essential oil for the most sensitive strain, *Staphylococcus aureus*, was 0.08 mg/mL. The essential oils of *V. pseudo-negund* may be considered as a potential source of a natural antimicrobial for the food industry after testing different experiments including the toxic and irritating effects on humans [2].

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IDENTIFICATION OF HAPLOTYPES IN 28 ARTEMISIA L. SPECIES BY PCR-RFLP BASED ON IC2, CSAND BDREGIONS OF CHLOROPLAST DNA

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Artemisia is one of the largest and most widely distributed genus of Asteraceae. Thirty-four species belongs to this genus have been reported in Iran which a few of them are endemic. Chloroplast DNA (cpDNA) was studied in 28species of *Artemisia* sampled across Iran. The polymerase chain reaction–restriction fragment length polymorphism (PCR-RFLP) method, which included amplification of cpDNA regions with three universal primer pairs (IC2, CS, BD) and subsequent digestion with three restriction enzymes (*Hinf*I and*Taq*I), revealed 19 haplotypes for the 28species studied. High polymorphism in the cpDNA of Artem*i*sia has to be considered carefully when planning phylogenetic studies involving this species.

COMPARISON OF VEGETATIVE AND GENERATIVE CHARACTERISTICS OF SIX LOCAL LANDRACE OF DILL *(ANETHUM GRAVEOLENS L)* CULTIVATED IN MASHHAD CLIMATIC CONDITIONS

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Dill *(Anethum graveolens L)* is a medicinal plant that native to Iran. Landrace of dill are differ from each region of development and growth. Choosing the best population needs to investigate by planting them in the same condition. This study was conducted to examine and compare vegetative and reproductive growth of six indigenous dill. A pot experiment conducted in the basis of completely randomized design with six population (Mashhad, Gonbad, Birjand, Isfahan, Shiraz and Sanandaj) in six replications. The characteristics of include thousand seed weight and seed essential oil (EO) content was measured. The measured characteristics including vegetative (stem length, root length, leaf number, leaf area, chlorophyll a, b, carotenoids, fresh weight, dry weight and herb EO content) and reproductive traits (flowering date, no of umbels, no of inflorescence, umbellate number, seed number, fresh and dry weight of seed, one thousand seed weight, seed yield per plant, seed EO percentage, EO yield, biological yield). Analysis were done by using JMP software. Results showed that six studied populations had significant difference in the most studied traits. The results also showed that the highest thousand seed weight (1.55 g), and the highest percentage of the initial EO (2.31%), six landraces mass of Birjand, The lowest thousand seed weight (0.52g) in Shiraz population and a lower percentage of the initial EO (1.25%) were observed in the popular Isfahan After popular planting Sanandaj highest thousand seed weight (1.70g), seed yield (3.23 g/plant) show few signs of thousand seed weight (1.21g) in Shiraz population, the highest percentage of EO (2.03%) of the popular Gonbad, and the lowest percentage EO (1.65%) was observed in Sanandaj popular. maximum plant height (57.58cm) biological yield (2.21g) was detected in Mashhad population. The lowest seed yield (1.8, 1.9 g) was recorded in Gonbad and Mashhad population. Average variation thousand seed weight in Mashhad population constant without modification, but the other five cultivated populations the positive increasing EO was reducing the percentage change in Birjand but mass increase was observed in five populations. In conclusion, it could be expect that Sanandaj population was superior to other as EO yield as concerned and this need to a field experiment for validation.

FORMULATION AND CHARACTERIZATION OF MICROEMULSION AND NANOEMULSION CONTAINING *MENTHA SPICATA* ESSENTIAL OIL

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Microemulsions and nanoemulsions have given particular attention because of their potential advantages over other types of colloidal delivery systems for certain applications: high optical clarity; good physical stability; and enhanced bioavailability [1]. Lipophilic performance ingredients are usually incorporated into aqueous-based drops and lotions in the form of colloidal dispersions. In this work, we examined the rate and extent of solubilization of emulsified *Mentha spicata* oil in mixed non-ionic surfactant solutions by two emulsifiers such as Creomophor RH 40 and Tween 80. The influence of surfactant concentration, type, and mixing ratio on *Menthe spicata* oil solubilization was investigated, with the aim of identifying suitable conditions and better efficacy of *Menthe spicata* oil as anti carminative agent for preparing stable microemulsions and nanoemulsions. According to obtained result, the nanoemulsions containing Creomophor RH 40 showed a particle size < 80 nm that measured by DSC and zeta potential analyses. Therefore, there is an appreciable increase in mean particle diameter and visible evidence of precipitate formation after 6 month storage in accelerated condition.

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CHEMICAL COMPOSITE AND ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL FROM *TANACETUM POLYCEPHALUM* SCHULTZ–BIP

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Tanacetum polycephalum Schultz–Bip., is a perennial with a stem 50 to 70 cm tall with yellow inflorescences like yarrow, known as "Mina–e–Sakhrezi" in Persian. *T. polycephalum* wild grows in Iran, Turkey, Caucasia, and Iraq. This herb grows naturally in rocky slopes at 2500–3000 meters above sea level in areas Iran [1]. The flowers of this species are used as an anti–hemorrhoid, anti–inflammatory, and sting by kuridsh tribe in Ilam, Iran [2]. The essential oils from *T. polycephalum* leaves and flowers collected from the alpine area of Zagros Mountains, (longitude: 50° 28´ E, latitude: 32° 31´ N; altitude: 2577 m above sea level) in Chaharmahal va Bakhtiari province, Southwestern Iran at June 2012. The essential oil yields were 0.21 (ml/100g dry matter) for the leaves and 0.54 (ml/100g dry matter) for the flowers. Results of GC-MC analysis identifed 43 compounds that The main constituents were, chrysannthenol, 1-,8cineol, comphore, bornyl acetate for the flowers and chrysannthenol, borneol, 1-,8cineol, comphore. bornyl acetate for the leaves. 1-8, Cineole ($C_{10}H_{18}O$) known as eucalyptol, is a terpenoid oxide present in many plant essential oils [3]. Result of the antibacterial test indicated the essential oil from the leaves of *T. polycephalum* against *Listeria monocytogene, Bacillus cereus* had the highest antibacterial activity.

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THE EFFECT OF BIOLOGICAL FERTILIZER ON ESSENTIAL OIL PERCENT AND YIELD OF *NEPETA RACEMOSA*

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Medicinal plants are rich sources of secondary metabolites which means they are repository of active ingredients for many of the drugs. However the biosynthesis of secondary metabolites is controlled genetically, but their construction are strongly influenced by environmental factors. This project was performed in field conditions by using randomized complete blocks design with 3 replications in 2012 in Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. Treatments included (1) control, (2) AM (combination of *Glomus intraradices* + *G. Mosseae* + *G. etunicatum*) + PSM (*Pseudomonas fluorescens*), (3) PGPR (combination of *Azotobacter chroococcum* strain 5 + *Azospirillum lipoferum* strain OF + *Pseudomonas putida* strain 41) and (4) combination of AM + PSM + PGPR. Analysis of variance indicated that the effect of biofertilizers was significant on essential oil yieldat $P \leq 0.05$ but by usage treatments any different wasn't seen significant on essential oil percent. Study of the mean comparison of the biofertilizers indicated that the highest essential oil yield (11.93 kg/ha) was achieved in AM + PSM + PGPR treatment. Mean comparison of the biofertilizer levels showed that the highest essential oil percent (0.63%) was achieved in the AM + PSM + PGPR, with no significant differences from other treatments. Result of this experiment showed that essential oil yield was the lowest in the control; indicating that essential oil yield is affected by a suitable combination of AM, PSM and PGPR application rates.

COMPARISON OF QUALITATIVE AND QUANTITATIVE CHANGES IN THE ESSENTIAL OIL OF *FERULA GUMMOSA* IN CULTIVATED AND HABITATS CONDITION

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Ferula gummosa is a medicinal and industrial plant and it is distribute in arid a semi-arid areas of Khorassan province. This plant grows in altitude between 1000 and 2700 m in khorassan. The gum is extracted for medicinal industry and its export is considerable. At the present time; area of *F. gummosa* is limited due to over exploitation and lack of suitable methodology. The objective of this study was field cultivation to evaluate the effects of habitat and field condition on essential oil components of *Ferula gummosa.* The Gum is collected of plant in early August at habitat and farm condition. The resin is collected 3-4 days after the incision with the help of a forged iron formed like a spoon. After harvesting the plant essential oil content was measured by standard Clevenger methods. Composition of essential oil plant was determined by gas chromatography Technique (GC/MS). Galbanum essential oil contents were varies between different sites. Gum essential oil percentage in *Ferula gummosa* was 32.8% in cultivated crops and 24% in natural samples were determined. The essential oil was 16 chemical constituents from the natural habitat and 19 components in cultivated condition. The most important components of gum essential oil was Betapinene (44.8%) and Ocimene & caryophyllen were at least in field condition. Beta-pinene and delta -3 -caren had the most amounts of habitat conditions. The results suggest that the cultivation and production of *Ferula gummosa* is possibility.

SALINITY EFFECTS ON PHOTOSYNTHESIS PARAMETERS AND ANTICANCER COMPONENTS IN *ANDROGRAPHIS PANICULATA*

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Andrographis paniculata known as Naein-e Havandi in Iran is a medicinal herb in the family Acanthaceae. The leaves of the mature plant contain abundant diterpinoids of medicinal properties [1]. Salinity causes the adverse effects in all biochemical and physiological processes [2]. The present study aimed to investigate the salinity effects on photosynthesis parameters and phytochemical components in 12 accessions of *Andrographis paniculata* to illustrate their impacts on genetic variation of the plant's population and photosynthesis parameters and phytochemical components. For this purpose, a total of 12 accessions of *A. paniculata* at mature stage (70-day old) were grown in different salinity levels (0, 4, 8, 12 and 16dSm^{-1}) on sand medium. After 30 days salinity exposure and before flowering, the photosynthesis parameters, total dry weight and andrographolide content were measured. The variance analysis indicated that salinity levels significantly affected the photosynthesis parameters, total dry weight (TDW), total crude extract (TCE) and andrographolide content (AG) in *A. paniculata* ($p<0.01$). The interaction of salinity × accession was significant in terms of chlorophyll-b, net photosynthetic rate (NPR), stomata conductance (COND) and AG content. After four weeks salt exposure time, a significant decrease in growth was apparent in all accessions. The concentration of 16 dSm^{-1} NaCl significantly reduced the dry weight by 62.80% compared to the control. The plant at 12 dSm^{-1} reached relatively higher AG content; however, the photosynthesis parameters were significantly reduced. Analysis of variance showed high significant differences ($P\leq0.01$) among the accessions in terms of photosynthesis parameters and AG content. The concentration of the AG in *A. paniculata* varied from 1.39% (11329) to 2.04% (11339), with mean value of 1.61%. Generally, plants produce secondary metabolites in nature as defense mechanisms under different environmental stresses. In this regard, our results indicated that AG content was positively correlated with the substrate concentration of salt. The broad-sense heritability (h^2) of NPR was the highest (0.97), as well as AG content (0.90), while the h^2 of TCE was the lowest (0.71). In agreement with the reports of Talei et al. [2], the findings of this study indicated that the high heritability of NPR and AG can be considered the direct criterion indicators in the next breeding programs to develop salt-tolerant varieties in *A. Paniculata*.

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IMPACTS OF COMPOST TEA RATES ON YIELD, MACRO AND MICRO NUTRIENTS, UPTAKE IN MEDICINAL PLANT NAEIN-E HAVANDI (*ANDROGRAPHIS PANICULATA*)

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Naein-e Havandi (*Andrographis paniculata*) is a medicinal herb in the family Acanthaceae. The leaves of the mature plant contain abundant diterpinoids of medicinal properties [1]. Plants' species require macro and micro nutrients to complete the growth cycles such as photosynthesis, enzymes' activities and secondary metabolite production. This study was conducted to investigate the macro and micro nutrients uptake of naein-e havandi as affected by compost tea rates to determine the optimum level of fertilizer rates required for optimum growth and quality of naein-e havandi. The plant was propagated using seed and planting in a polybag. After four weeks, the plant was transplanted into polybag. Compost tea was used at rates of (0, 25, 50, 75 and 100 %). Treatments were arranged in Randomized Completely Block Design with three replicates. Before flowering stage, the plants were harvested. The results revealed that rates of compost tea significantly affected growth indices, Mg^{+2} and Ca^{+2} nutrients uptake, while there were no significant difference on other macro and micro nutrients uptake. Compost tea rates caused an increase in growth indices, N, P and K uptake, while a reduction in micro nutrient uptake was happened at the same conditions. Soil amendment with compost tea gave a favorable effect on yield and improved soil pH and CEC. The total dry weight (TDW) was highly significantly differences among the treatments. The greatest TDW (26.15 g) and macro nutrients uptake were observed at the 75% rate of compost tea. These results suggested that *A. paniculata* could reach high biomass and macro and micro nutrients uptake with 75% rate of compost tea. However, in general compost tea had a good potential to improve soil pH and increase yield, macro and micro nutrients uptake. In agreement with the reports of Gayler [2] and Yasmeen et al. [3], the findings of this study indicated that increasing nutrients, especially N, P, K and yield increased. Interestingly, TDW was highly correlated to Mg^{+2} and Ca^{+2} uptake, while the lowest correlation was observed between TDW and micro nutrients uptake. Compost tea rates caused changes in macro and micro nutrients' uptake, which may lead to an increase in photosynthesis capacity and respiration.

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ANTIBACTERIAL ACTIVITIES AND CHEMICAL COMPOSITION OF ESSENTIAL OIL OF *MALABAILA SECACUL* IN FARS PROVINCE

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In order to determine chemical composition and antimicrobial activity of essential oil of *Malabaila secacul*, the aerial part of this plant which grows in the vicinity of Shiraz-Kazeron Road in Fars Province at flowering stage in April 2013 were collected. The samples were cleaned and then drying in the shade, hydrodistillation method was performed to make essential oil. The main oil content of the plants *of Malabaila secacul* was 0.35% (v/w) that essential oil was analyzed by capillary gas chromatography (GC) using flame ionization (FID) and capillary gas chromatography coupled mass spectrometry (GC/MS) for identification. Twenty-three compounds were detected in the essential oil of *Malabaila secacul* that concluded 98.90% of the total oil. The major components were Octyl acetate (53.42 %), Octanol (33.55 %), Limonene (2.24 %) and alpha-Pinene (1.37 %). For study of antibacterial activity of the oil sample, the essential oil tested against six bacterial strains by disc diffusion method. The bacteria used were *Escherichia coli* (PTCC 1338), *Staphylococcous aureus* (PTCC1112), *Staphylococcus epidermis* (PTCC 1114), *Pseudomonas aeruginosa* (PTCC 1074), *Salmonella typhi* (PTCC 1693), *Klebsiella pneumonia* (PTCC 1031) obtained from the Persian type culture collection (PTCC), Tehran, Iran. The results showed that the essential oil of *Malabaila secacul* had strong anti-bacterial effects. This inhibitory effect in *Salmonella typhi* and *Staphylococcous aureus* were the best respectively.

GC/MS ANALYSIS OF ESSENTIAL OIL OF *HAPLOPHYLLUM CANALICULATUM* FROM FARS PROVINCE

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The genus *Haplophyllum* is represented in the flora of Iran by 25 species [1]. In this experiment, the aerial parts of *Haplophyllum canaliculatum* were collected from Fars province at full flowering stage in July 2013. A voucher specimen has been deposited in the MNCRC (Medicinal and Natural Products Chemistry Research Center) herbarium (Shiraz). Air dried aerial parts of the plant sample (100g) were subjected to hydrodistillation to produce essential oils in 0.64 (v/w) yield and chemical composition analysis was done by gas chromatograph (GC) and gas chromatograph connected to a mass spectrometer (GC / MS) apparatuses. 35 compounds were identified in the essential oil of *H. canaliculatum*, representing 96.5% of the oil which the major components were found to be trans-Caryophyllene (17.07%), Piperitone (15.55 %), β-Pinene (12.79%), 1,8-Cineole (9.51%), Caryophyllene oxide (9.36%), and Caryophylla-4(12),8(13)-diene-5β-ol (8.09%) are identified.

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EVALUATION OF ANTIOXIDANT ACTIVITY OF ESSENTIAL OIL IN DIFFERENT PART OF *FERULA ASSA-FOETIDA* FROM SEVERAL AREA OF IRAN

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Ferula assa-foetida is one of the important species of *Ferula*. This species is native to Afghanistan and Iran and locally known as "Anghozeh". Anghouzeh is an oleo gum resin which is obtained by cutting the living rhizome. The oleo gum resin of this plant is used as a flavor in Indian vegetarian cooking. It is also useful for bronchitis, hysteria, stomach pain, insect bite and headache. In this experiment, the antioxidant activity of essential oils obtained from different part of *Ferula assa-foetid* (including: root, oleo-gum resin and seed) from different regions of Iran were evaluated. Hydro distillation by Clevenger-type apparatus was used for the extraction of essential oils. The antioxidant activity of essential oils against DPPH radical was measured with different concentrations of essential oil and vitamin C as standard antioxidant compound. Absorbance of DPPH was detected at 517 nm by UV spectrophotometer and then the percentages of DPPH inhibition and IC50 were recorded. The highest radical scavenging activity (% inhibition) was observed in of the essential oil of the root from Yazd and Tabas (216.2 and 119.4%, respectively). Therefore, we can suggest that they could be suitable for using as antioxidative agents in the food industry.

STUDY OF HERBAL DRUGS ADMINISTRATION BY SPECIALISTS, GENERAL PHYSICIANS AND DENTISTS IN URMIA-IRAN

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Considering the adverse effects of synthetic drugs [1, 2], scientists are looking for natural remedies which are safe and effective. Iran is a country with well- recorded knowledge of herbal medicine. Even though therapeutic potential of herbal products is known to people it is important to study level of herbal drugs administration by physicians and dentists who are more responsible for public health. This study aimed to evaluate level of herbal drugs administration by physicians and dentists in Urmia in 1391. Prescriptions of 20 out of 96 drug stores of Urmia were randomly selected in one day of week during one month every 6 months. Finally, rate, type and dosage form of prescribed herbal drugs by general physicians, specialists and dentists were separately determined in a checklist. Results were analyzed by descriptive statistics and diagrams reported them. In present study on the whole; level of herbal products prescription was 3.2% that 56.5, 37.5 and 5.9% belonged to specialists, general physicians and dentists respectively. 88.8% of prescribed herbal drugs by dentists belonged to herbal mouthwashes. Highest level of herbal products prescription belonged to firstly specialists specially neurologists, secondly general physicians and at last dentists.

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INVESTIGATION OF CHLOROPHYLL, PROTEIN, PROLINE AND ABSCISIC ACID LEVEL OF MEDICAL PLANT, WILD MUSTARD (*SINAPIS ARVENSIS* L.) SEEDLING UNDER COPPER STRESS

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The effect of copper chloride ($CuCl_2$) was investigated on chlorophyll (a+b), protein, proline and Abscisic acid levels in wild mustard (*Sinapis arvensis* L.) seedlings. Control and copper treated (0.5, 0.6 and 0.7 mM) seedlings were grown for 14 days in Hoagland solution. The content of Abscisic acid was measured in root, shoot and leaf tissues of seedlings by HPLC. The result showed that the Abscisic acid contents significantly increased in roots, shoots and leaves of seedlings under copper stress condition. This increase was related to the copper salt concentration. Accumulation of proline in the leaves of seedlings exposed to copper was enhanced. Also the results showed that as copper concentration increased to 0.7 mM, the chlorophyll (a+b) and total protein levels remarkably reduced ($p<0.05$), although the Abscisic acid and proline levels in the leaves of plants were increased - a dose-depended behaviour. The same trends were also recorded with the Abscisic acid level of roots and stems. Copper has dose- depended effects on chlorophyll, protein, proline and Abscisic acid levels of wild mustard (*Sinapis arvensis* L.) seedlings. So, we supposed that the levels of copper increase above some important point's seedling growth get negative effects. This supposition is in line with prior findings.

CADMIUM PHYTOTOXIC EFFECTS ON SEED GERMINATION, SEEDLING GROWTH AND ANTIOXIDANT ENZYME ACTIVITIES IN MEDICAL PLANT, HYSSOP (*HYSSOPUS OFFICINALIS* L.)

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The environment is continuously being polluted by the agglomeration of heavy metal contaminants. These heavy metals could be toxic to human health and aquatic ecosystems and they also accumulate in plants. Cadmium (Cd) is an important heavy metal widely used in electronic and other industries. This study was performed to determine the phytotoxic effects of cadmium (Cd) on seed germination, seedling growth and antioxidant enzymes activity of *Hyssopus officinalis* L.. The various dilutions of cadmium (25ppm; 50ppm; 100ppm; 250ppm and 500ppm) were utilized. Different parameters measured for the study includes seed germination percentage, root and shoot elongation, seedling size, fresh and dry weight, root/shoot ratio, dry weight/fresh weight ratio, seedling vigour index, tolerance index, inhibition of seedling growth, activity of antioxidant enzymes such as peroxidase, catalase and superoxide dismutase. For all the concentrations of Cd were observed inhibitory in action with respect to all the parameters, with the exception of activities of antioxidant enzymes and dry weight/fresh weight ratio which was gradually increased as the Cd concentration increased. However a small decrease in antioxidant enzyme activities was observed due to acute cadmium stress at higher concentrations. The intensity of inhibitory effects on all other parameters was directly proportionate to Cd employed concentration and inhibition was more noticeable at 250ppm and 500ppm.

EFFECTS OF TWO HEAVY METALS (CD AND PB) ON SOME MORPHOLOGICAL AND PHYSIOLOGICAL INDICATORS OF MEDICAL PLANT, BLACK CUMIN (*NIGELLA SATIVA* L.)

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This article presents the results of a research concerning the effect of various concentrations of cadmium (Cd) and lead (Pb) on some morphological and physiological indicators in the dynamics of the seed germination process and in the initial phases of seedling growth for Black Cumin (*Nigella sativa* L.) species. The results underline the particular variations of the analysed indicators (water and dry substance content, total mineral elements content, assimilating pigments content, concentration of cellular liquid, intensity of respiration, vegetative organs lengths of the seedling), depending on the metals nature and their concentrations used for the treatments of seed. At every investigated experimental variant, the water and contents of total mineral elements increased during the analysed period; the concentration of cellular liquid decreased. Cd in concentration of 1ppm determines the respiration process intensification, indicator for underlining the metabolic activity. Irrespective to the concentration of Cd and Pb, they determined the increase of the assimilating pigments content, more evident in the case of chlorophyll.

THE MOLECULAR MECHANISMS OF THE EFFECT OF FRANKINCENSE ON INFLAMMATORY DISEASES

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Frankincense resin is obtained from trees of the genus *Boswellia* (family Burseraceae). Boswellia is grows in dry mountainous regions of India, Northern Africa and Middle East, each producing a slightly different type of resin. Frankincense resin has been considered throughout the ages to have a wealth of health supporting properties. The resinous part of Frankincense possesses monoterpenes, diterpenes, triterpenes, tetracyclic triterpenic acids and four major pentacyclic triterpenic acids i.e. β-boswellic acid, acetyl-β-boswellic acid, 11-keto-β-boswellic acid and acetyl-11-keto-β-boswellic acid, responsible for inhibition of pro-inflammatory enzymes. Out of these four boswellic acids, acetyl-11-keto-β-boswellic acid is the most potent inhibitor of 5-lipoxygenase, an enzyme responsible for inflammation. Also, Incensole acetate (IA), isolated from this resin, was shown to inhibit the activation of nuclear factor-κB, a key transcription factor in the inflammatory response. Here we discuss the latest findings about the molecular mechanism and genetic basis of the effect of frankincense on inflammatory diseases. Furthermore, we indicate how understanding the molecular pathways can lead to pharmaceutical purpose.

INVESTIGATION EFFECT OF ESPHAND (*PEGANUM HARMALA*) ON GROWTH INHIBITION OF MEDICALLY IMPORTANT YEASTS

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Peganum harmala is a native plant from eastern Mediterranean area to Iran and north of India. Also it widely grows in the most parts of the world including North and South America, Mexico and Africa. *Peganum* seeds contain carbohydrates, lipids, proteins, minerals, amino acids and alcoholic compounds. Seeds of the plant have some types of unsaturated fatty acids such as estearic acid, linoleic acid, palmetic acid and linolenic acid. They also have saturated fatty acids, arachidonic acid, estroid components of *peganum* seeds include β-sitostrol, cryptogenin and lanostrol. Also the seeds are made from alkaloid compounds such as harmalin- harmin, harmalol and vasicine. *P. harmala* seeds have significant usages in industrial and medical aspects. *P. harmala* has been medically used by the people of ancient countries such as India, Iran, Egypt and Spain. Some people use it topically for enhancing limbs. People in the west Asia burn the seeds to make smoke for keeping safe against voodoo. Levchenko, Kang and Rashan perform first studies on antiparasitic and anti viral activities of *P. harmala*. Recently anti parasitic effect at the plant seeds reported by Iranian researchers. The goal is determination of MIC and MFC of *P. harmala* on medically important yeasts and molds in vitro. The clinical isolates of *Candida* and *Aspergillus* were used as our subjects. Serial dilutions of *P. harmala* extract were made in sabouraud broth including: 1/20, 1/40, 1/80, 1/160, 1/320, 1/640 titers, then treated *Candida* and *Aspergillus* suspensions followed by 24 hours incubation in 30 °C. MIC was determined by comparing with McFarland standard 0.5. For measuring MFC a small volume of each serial dilution cultured on sabouraud glucose agar 4% medium. After 24-72 hours incubation in 30 °C, the plates looked for growth of yeasts. The highest and lowest inhibitory effects of *P. harmala* extract were seen for *C. glabrata* (MIC: 0.313 mg/ml) and *C. albicans* (MIC: 1.25 mg/ml). The MFC for *Candida* species was from 0.62 to 2.5 mg/ml. The highest fatal effects was seen in *C. glabrata* and *C. tropicalis* (MFC: 0.62 and 0.125 mg/ml, respectively) and the lowest was for *C. albicans* (MFC: 2.5 mg/ml). The extract treatment for Aspegilli showed decreasing growth and sporolation. The alcoholic extract of *P. harmala* showed inhibitory and fungicidal activities on opportunistic pathogenic *Candida* spp, but *Aspergillus* spp.

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COMPARISON OF ESSENTIAL OIL CONTENT AND COMPOSITION OF LEAVE, FLOWER, STEM AND AERIAL PART OF *ANTHEMIS TINCTORIA*

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The *Anthemis* genus has 23 annual species, endemic to Iran, from the Asteraceae family, with the flowers and aerial parts containing essential oil. The essential oil content varies in different parts of the plant; depending on the species, variety, soil and climatic conditions. In order to compare the essential oil composition of different parts of *Anthemis tinctoria*, random sampling was conducted at full flowering stage from aerial parts of the plants cultivated in the field of Alborz research station, Karaj, Iran. Samples were dried in open air and their essential oil was produced separately by hydro-distillation. To analyze the essential oil composition, GC and GC-MS were used. Analysis of leaf essential oil indicated that five main compounds were 1,8-cineol (8.0%), chrysanthenone (8.4%), camphor (15.8%), guaiol (9.6%) and α-eudesmol (10.3%); contributing to more that 50% of the essential oil composition. Four main compounds in the essential oil of stem were bornyl acetate (4.8%), spathulenol (25.6%), caryophyllene oxide (11.8%) and α-eudesmol (14.5%). Moreover, five main compounds in the essential oil of flower were 1, 8-cineol (4.2%), spathulenol (13.3%), 10-epi-γ-eudesmol (7.2%), β-eudesmol (14.3%) and α-eudesmol (25.5%). Results also indicated that four main compounds in the essential oil composition of the plant shoot were 1,8-cineol (4.3%), camphor (6.5%), carvone (9.1%) spathulenol (5.1%) and α-eudesmol (39.9). The results showed the percentage of α-eudesmol as main component of this essential oil is varied from 10 to 40% in different plant parts, the lowest in leaf oil and the highest in aerial part oil. The highest amount of β-eudesmol was found first in flower and then in stem oil. Presence of high amount of chrysanthenone and camphor in leaf oil was remarkable. It can be concluded that not only with using flowering shoot or total aerial parts of *A. tinctoria* in full flowering stage, more essential oil yield would be produced, but also for special purposes and obtaining some special compounds, special plant part could be distilled.

ANTIOXIDANT ACTIVITIES AND TOTAL PHENOLIC CONTENT OF ETHANOL EXTRACTS FROM *ALLIUM HIRTIFOLIUM* (BOISS) BULBS AND *ALLIUM JESDIANUM* (BOISS) LEAVES

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Herbs may contain a wide variety of free radical scavenging molecules, such as phenolic compounds (e.g. phenolic acids, flavonoids, quinones, coumarins, lignans, stilbenes, tannins), which are rich in antioxidant activity [1,2]. Phenolic compounds are believed to account for a major portion of the antioxidant capacity in many plants [3]. The bulbs from *Allium hirtifolium* and the leaves from *Allium jesdianum* of two *Allium* species (Alliaceae) collected from different regions in Zagros Mountains, Chaharmahal va Bakhtiari province, Iran. These herbs had been used in Iranian traditional medicine were investigated. The bulbs (100 g) of *A. hirtifolium* and the leaves (20-25 g) of A. jesdianum were extracted with absolute ethanol using Soxhlet apparatus for 12 h. The total phenolic compound contents in the ethanol extracts were determined by a DPPH assay, using the Folin–Ciocalteu reagent. The phenolic content was calculated from gallic acid calibration curve and expressed as gallic acid equivalents in mg of the dry matter of the extract. The results showed that there were significant differences between the bulbs of different populations of *A. hirtifolium* and between the leaves of different populations of *A. jesdianum* for total phenolic compounds. The variability of total phenolic compounds in ethanolic extracts of different populations of *A. hirtifolium* and *A. jesdianum* attributed mainly to environmental conditions.

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EFFECT OF VESICULAR *ARBUSCULAR MYCORRHYZA* (VAM) ON SOME PHYSIOLOGYCAL CHARACTERISTIC OF *SATUREJA HORTENSIS* UNDER SALINITY STRESS

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Salinity is one of the most widespread environmental stresses, which have enormous effects on crop productivity. In order to study the effect of VAM species (*Glomus mosseae*) on the amount of soluble carbohydrates, photosynthesis pigments and stomatal conductance of savory under salinity stress a Factorial experiments base on completely randomized design was performed with two factors first is salinity with four levels (S_1 = 0 mM, S_2 = 30mM, S_3 =60 mM& S_4 = 90 mM) and second factor is VAM with two levels (M_1= 0 & M_2 = 50 gr Fungal inoculum) in the vases with 25cm diameter and 40cm height. In the Ferdowsi University of Mashhad located in east of Iran. Result show that greatest amount of soluble carbohydrate was related S_4 level of salinity without use of VAM (M_1 S_4). Minimum amount of soluble carbohydrate was related to M_2 S_1. VAM significantly increased the amount of chlorophyll$_a$, but wasn't significant on the rate of decline in carotenoid and increasing in chlorophyll$_b$. VAM treats caused none significant reduction on the amount of soluble carbohydrates in salinity levels and had no significant effect on the stomatal conductance too.

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EFFECT OF VERMICOMPOST ON PHYSIOLOGYCAL AND MORPHOLOGICAL CHARACTERISTICS OF SUMMER SAVORY (*SATUREJA HORTENSIS*) UNDER SALINITY STRESS

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Salinity of irrigation water is one of the most important environmental limiting factors on plant growth in arid and semi-arid regions [1]. In order to evaluate the effect of vermicompost on physiologycal and morphological characteristics of summer savory (*Satureja hortensis*) under salinity stress an experiment was conducted as factorial based on completely randomized design with two factors. First is salinity with four levels(S_1 = 0 mM, S_2 = 30mM, S_3 =60 mM& S_4 = 90 mM) and second factor was vermicompost with two levels (V_1= 0 and V_2 = 1kg in per vase) in vases with 25cm diameter and 40cm height this experiment was performed at research greenhouses of Ferdowsi University of Masshad located in the east of Iran. Result showed that vermicompost application has significant effect on increasing the number of nodes, lateral branches, number of shoots, number of leaves, fresh and dry weight of the root and shoot. Height and diameter of stem, vermicompost also caused increase in the amount of chlorophyll$_a$. carotenoid content was significantly reduced in vermicompost treatments. But there was no significant increase in the amount of carbohydrate and chlorophyll$_b$. Salinity caused a significant decrease in stomatal conductance between treatments S_2 and S_3 but between S_1 and S_2 and also between S_3 and S_4 were not significant. Effect of vermicompost in salinity S_2 and S_3 levels laid to increase chlorophyll$_b$ content significantly, but this effect was not significant in S_4 treatment vermicompost increased number of nodes , lateral branches, number of shoots in threats S_1, S_3 and S_4. But this increasement wasn't significant in S_2 treatment. It seems that vermicompost can have positive effects on the vegetative and physyilogycal characteristics on *Satureja hortensis* and also can adjust the effect of salinity stress.

EFFECT OF VESICULAR *ARBUSCULAR MYCORRHYZA* (VAM) FUNGI ON THE MORPHOLOGICAL CHARACTRISTIC OF SUMMER SAVOURY (*SATUREJA HORTENSIS*) UNDER SALINITY STRESS

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Mycorrhizal vesicular-arbuscular fungi are unique between microorganisms occupying rhizosphere [1]. They can increase the tolerance of plants due to environmental stress. In order to evaluate the effect of Vesicular *Arbuscular Mycorrhyza* (VAM) on morphological characteristics of summer savory under salinity stress an experiment was conducted as factorial based on completely randomized design with three replications and two factors .first factor is salinity with 4 levels (S1 = 0 mM, S2 = 30 mM, S3 =60 mM, S4 = 90 mM) and second factor is Vesicular *Arbuscular Mycorrhyza*(VAM) species (Glomus Mosseae)with two levels (M1= 0 & M2 = 50 gr Fungal inoculums in per vase) in the vases with 25cm diameter and 40cm height. This experiment was performed at Ferdowsi University of Mashhad located in east of Iran. Result of this experiment showed that VAM caused significant increase in the number of leaves, fresh weight, dry weight and length of the root, It also decreased the ratio of shoot to root length and the ratio of height to leaf numbers significantly. VAM increased the leaf number in S1 treatment significantly, but it wasn't significant in S2, S3 and S4 treatments. VAM also increased fresh and dry weight of the root in all of the salt levels. It seems that VAM can decrease the effect of salt stress on growth parameters of summer savory plant.

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EFFECT OF VESICULAR *ARBUSCULAR MYCORRHYZA* (VAM) FUNGI ON SOME BIOCHEMICAL INDICES AND ABSORPTION OF SOME ELEMENTS IN THE SAVORY (*SATUREJA HORTENSIS*) UNDER SALINITY STRESS

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Salinization in soils or waters is one of the world's most serious environmental problems in agriculture [1]. In order to evaluate the effect of *Vesicular Arbuscular Mycorrhyza* (VAM) fungi species (*Glomus mosseae*) on the proline, relative water content (RWC),electrolyte leakage, sodium and potassium of summer savory (*Satureja hortensis*) under salinity stress, an experiment was conducted as factorial based on completely randomized design with two factors and three replications. First was salinity with four levels (S_1 = 0 mM, S_2 = 30mM, S_3 =60 mM& S_4 = 90 mM) and second factor is vermicompost with two levels (V_1= 0 & V_2 = 1kg in per vase) in vases with 25cm diameter and 40cm height. This experiment was performed in the research greenhouses of Ferdowsi University of Mashhad located in the east of Iran. Result showed that application of VAM Causes significant decrease on RWC in S4 treatment, but this reduction wasn't significant in S1, S2 and S3 treatments. VAM treatment also caused Slight decrease in the amount of proline content and increase in the amount of electrolyte leakage, but this effects was not significant. VAM treatment caused reduces on sodium absorption in all salinity treatments, but this decrease was not significant. Potassium was increased VAM treatments in all salinity levels but this diverse wasn't significant. VAM can increase some of the physiological factors and can use As a solution for dealing with limit salinity.

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ANTINOCICEPTIVE EFFECTS OF THE EXTRACT OF *DRACOCEPHALUM KOTSCHYI* BOISS IN THE MICE

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The *D. kotschyi* is a wild-growing flowering plant belonging to the family of Labiatae and is found abundantly in southwestern Asia. *D. kotschyi* has been used as a medicinal herb for several years in Iran folk medicine for its antispasmodic and analgesic properties. Anti- hyperlipidemia and immunomodulatory [1, 2] effects have been reported for *D. kotschyi*. The present study was conducted to test for antinociceptive effects using formalin test in mice. In this research, animals were divided into 4groups (n=28). The 4 groups consist of: a normal control group (received normal saline), a group received morphine 2 mg kg-1, and the other 2 experimental groups were given *D. kotschyi* extract of 200 and 400 mg kg-1.The extracts were administered intraperitoneally 30 min before test injection. The results showed that *D. kotschyi* extract reduced the pain significantly ($p<0.05$), in the late phase (20-30 min) of formalin test.400 mg kg-1of *D. kotschyi* hydroalcoholic extract had a similar effect of 2 mg kg-1morphin in chronic phase .Hydro-alcoholic extract of *D. kotschyi* reduced pain and it may be due to the presence of limonene and α -terpineol in the plant.

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COMPARISON OF QUALITATIVE AND QUANTITATIVE CHANGES IN THE ESSENTIAL OIL OF *THYMUS TRANSCASPICUS* IN CULTIVATED AND HABITATS CONDITION.

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Study of natural habitats of thymus species and their phytoestrogens chemical essential oils were conducted in Khorasan Razavi province. For this purpose, top flowering branches were harvested from a number of different sites. They were dried in shade and milled in laboratory. Essential oils were extracted for three by two types of water distillation and Clevenger apparatus designed according to the British Pharmacopoeia. The essential oils were analyzed using GC gas chromatography and GC / MS to identify the chemical constituents. The observation showed that natural habitat distribution of Thymus in Khorasan Razavi is mainly in areas of high altitude habitats such as Hezar Masjed, Binalood and the north west of Quchan. Thymus species prefer to growth mainly in semi-arid cool climate, and semi-humid cool climate growth. Thyme essential oil *(Thymus transcaspicus)* contents were varies between different sites. The lowest and highest contents were extracted with 1.99% in Tavakal Bagh and 2.35% in Lien sites respectively. The essential oil was consisting of 18-26 chemical constituents in the different condition from the natural habitats and 32-42 components in cultivated species. The most important components of the essential oils were thymol, carvacrol, Parasymn, terpinene and cineole.

THE STUDY ON THE EFFECTS OF FUNGICIDAL ESSENTIAL OIL FROM SEVERAL MEDICINAL PLANTS IN CONTROL *BOTTRYTIS CINEREA* AND *RHIZOPUS STOLONIFER* ROT FUNGUS POSTHARVEST UNDER IN VITRO CONDITIONS

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Essential oils are volatile, natural, complex compounds characterized by a strong odor and are formed by aromatic plants as secondary metabolites. In nature, essential oils play an important role in the protection of the plants as antibacterial, antiviral, antifungal, insecticides and also against herbivores by reducing their appetite for such plants [1]. Takayuki *et al.* (2007) applied to measure the antifungal effects of 52 dried samples of spice and herbs against a soil-borne phytopathogenic fungus, *Fusarium oxysporum*. Essential oils of seven Moroccan Labiatae were chemically analysed and evaluated for their in vitro antifungal activity against *Botrytis cinerea* [2]. In recent years, numerous studies have documented the antifungal effects of plant essential oils to control food spoilage fungi in vitro and in vivo [4]. In this study, antifungal activity of some essential oils extracted from *Foenicolum vulgare*, *Carum carvi*, *Thymus vulgaris* and *Mentha peperita* were investigated against gray mold (*Botrytis cinerea*) and smooth rot (*Rhizopus stolonifer*) of strawberry. Results *in vitro* showed that fennel essential oil perfectly inhibited growth of *R. stolonifer* fungus colonies at concentration higher than 600 µl L^{-1} in PDA medium. Black caraway essential oil perfectly inhibited growth of *B. cinerea* fungus colonies at 400 µl L^{-1} concentration in PDA medium. Mean separate test (Duncan<0.01) indicated essential oils of Fennel (76.29%) and black caraway (74.85%) have the higher inhibition percentage of growth *Rhizopus* and *Botrytis* fungus, respectively. Percentage of fungus spores germination were the lowest in medium Fennel and black caraway essential oils contained and were the highest in Thymus ones. As for GC and GC/MS analysis, dominant essential oil in black caraway was cumin aldehyde and in fennel was anethol that both have strong antifungal effect.

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COMPARISON OF THE PRODUCTION POTENTIAL OF DIFFERENT CULTIVARS OF *MATRICARIA CHAMOMILLA* L. IN TEHRAN CONDITION

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Chamomile (*Matricaria chamomilla* L.) is a well-known medicinal plant species from the Asteraceae family. The main constituents of this plant include the terpenoids α-bisabolol and its oxides and azulenes, including chamazulene. Chamomile is important plant in pharmaceutical and cosmetic industry. In the present study, adaptation and production potential of some Chamomile cultivars was studied. Studied cultivars included those of German origin (Goral, ZlotyLan, Bodegold, Kamile-kultureform), Hungarian origin, Italian origin, and Zardband company and one wild population from Kazerun. All cultivars were planted in a randomized complete block design with 3 replications. Flower and receptacle diameter, plant height and width, flower yield and some other production biological traits were measured. Results showed no significant difference for flower yield of Goral, ZlotyLan, Hungarian, Italian and Zardband cultivars while highest fresh and dry flower yield was observed in Goral (15.11 and 2.79 g. plant, respectively) and lowest yield was observed in Kazerun population (3.42 and 0.64 g. plant, respectively). Maximum essential oil percentage was observed in Kazerun population (0.95 %) and minimum in Italian cultivar (0.51). No significant difference was observed for plant height of Goral, ZlotyLan, Pharmasat Bodegold and Hungarian cultivar while, maximum height was measure in Zlotylan (39.3 cm) and minimum in Kazerun (13.4 cm).

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INVESTIGATION OF ESSENTIAL OIL 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 Iran. *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 seventeen compounds were detected in the oil of *E. endotrichus* representing 87.3% of the total oil. The 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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THE STUDY OF THE SOME ALLELOPATHIC ASPECTS OF CARVONE

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Carvone is a member of a family of chemicals called terpenoids [1]. It is found naturally in many essential oils, such as caraway (*Carum carvi*). The compound most responsible for the flavor of caraway and spearmint, carvone has also been used for millennia in food [2]. In the present work, the allelopathic effects of carvone was study using lettuce assay and inhibitory effects of this compound were evaluated on germination speed and seedling growth of lettuce. The compound was dispersed in water using Tween20. Different concentration of carvone were preparated (0.001, 0.01, 0.1, 1) by dissolving of the compound in distillated water. A control test was performed using distillated water. Our result showed that carvone indicated strong Inhibitory effect on germination of lettuce seeds at concentrations higher than 0.001 g/ml. The compound significantly reduced the shoot and root growth of lettuce seedlings at all tested concentrations. It was concluded that carvone, a natural compound, can be condidated for synthesis of a bioherbicide. Due its considerable phytotoxic activites.

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THE STUDY OF ALLELOPATHIC POTENTIAL OF CHALCONE

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Chalcones are regarded as precursors of flavonoids. They are open chain flavonoids in which two aromatic rings are joined by a three-carbon α, β-unsaturated carbonyl system. They have been reported to be the major bioactive constituents of medicinal herbs because of their anti-inflammatory antioxidant antibacterial antifungal and anticarcinogenic activities. There have been a number of bioassay-guided searches for antitumor properties [1]. Chalcones comprises an important group of natural compounds that are especially abundant in fruits (e.g., citruses, apples), vegetables (e.g., tomatoes, shallots, bean sprouts, potatoes) and various plants and spices (e.g., licorice) [2].In the current work allelopathic effects of the chalcone was study using lettuce assay and inhibitory effects of this compound were evaluated on germination percentage and seedling growth of lettuce. The compound was dispersed in water using Tween 20.Different concentrations of chalcone were preparated (0.001, 0.01, 0.1, 1 mg/ml) by dissolving of the compound in distillated water. A control test was performed using distillated water. Our results indicated that chalcone exhibited significantly effect on root and shoot growth of lettuce seedling at $p \leq \%5$ at the concentrations higher than 0.01 mg/ml It was shown that some secondary metabolites can be used as bioherbicide. These products are expected to offer fewer risks to the environment and to meet social demands. Further studies are need for evaluation of entire allelopathic potential of chalcone.

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EFFECT OF DIFFERENT TREATMENTS OF N-P-K FERTILIZERS ON TARRAGON (*ARTEMISIA DRACUNCULUS* L.) PLANT CHARACTERISTICS

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Tarragon (*Artemisia dracunculus* L.) is a perennial herb belongs to the Asteraceae family and their aromatic leaves used in seasoning. Tarragon extract is used for curing the diabetic hyperglycemia. The effects of three levels of nitrogen fertilizer (urea) (0, 150 and 200 Kg.ha-1) with two levels of phosphorus (super phosphate) (100 and 200 Kg.ha-1) and two levels of potassium (150 and 200 Kg.h-1) fertilizer in different rate of N-P-K on fresh weight of leaf, dry weight of leaf, leaf area, number of leaf and content of oil in leaves of *Artemisia dracunculus* L. in field. According to the results, the rate of 200-200-200 Kg.ha-1 of N-P-K increased fresh weight of leaf, dry weight of leaf and number of leaf while rate of 150-100-200 Kg.ha-1 of N-P-K increased leaf area and oil content in leaves. Furthermore, the obtained results showed a positive correlation between leaf area and oil content.

EVALUATION OF DIFFERENT HORMONAL TREATMENTS AND IN VITRO MEDIUM CULTURE ON (*DROSERA SPATULATA* L.) PLANT

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The use of new techniques such as in vitro regenerated plants an increase in the production of pharmaceutical active ingredients are rapidly deploying. In this study, the effect of hormonal treatment of solid and liquid culture regenerated plants were analyzed. A *Drosera spatulata* or solar dew plant from Droseracea family history of the native country and is well cultivated in vitro [1]. Plant *Drosera spatulata* has medicinal properties such as anti-pain, anti-inflammatory [2] and anti-microbial [3] is a seizure. Geographically wide range of plant growing naturally in the world and in South East Asia to Australia and is found in the eastern part of the territory. Phytochemical analysis of the extract showed that the extract contains *Drosera spatulata* known pharmacological agents such as hyperoside quercetin، myricetin and kaempferol, which can have analgesic properties [4, 5]. Leaves of plants grown on liquid and solid medium (MS) with different hormonal treatments (IAA, BA, GA containing sucrose) were planted. The results showed that the liquid medium with hormonal treatments (IAA 0.5ppm, GA 1ppm, BA 0.5 ppm) have significant effects on the growth, proliferation and flowering plants with a liquid medium.

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DETERMINING THE THRESHOLD SALINITY AND DROUGHT STRESSES ON GERMINATION OF CLOVES (*SYZYGIUM AROMATICUM* MYRTACEAE)

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The inhibitory activity of *clove* (*Syzygium aromaticum*) is due to the presence of several constituents, mainly eugenol, eugenyl acetate, betacaryophyllene, 2-heptanone [1], acetyl- eugenol, alphahumulene, methyl salicylate, iso-eugenol, methyl-eugenol [2], Several studies have demonstrated potent antibacterial effects of *clove* [3].The effects of salt and drought stresses induced by NaCl and Manitol on seed germination were investigated of cloves (*Syzygium aromaticum myrtaceae*).Sterile seed in fungicides. Experimental design was a randomized complete arrangement in three replications in which salinity and drought treatments at five levels of NaCl with EC (0, 10, 20, 30, 40 dsim/m) and Manitol at three concentrations levels (0.5%, 1%, 2%). the result showed that drought and salinity had a significant effects on germination percentage, shoot and root length, Average fresh weight and seedling Average dry weight. Germination percentage and Seedling dry weight decreased more than others. The objective was to determine factors (salt toxicity or osmotic stress due to Manitol) inhibiting seed germination. Germination percentage, mean germination time were measured in the study. The germination results revealed that both NaCl and Manitol inhibited germination, but the effects of NaCl compared to Manitol were less on germination. It was concluded that inhibition in germination at equivalent water potentials of NaCl and Manitol was mainly due to an osmotic effect rather than salt toxicity.

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THE STUDY OF ANALGESIC EFFECTS OF *NEPETA MENTHOIDES* BOISS. & BUHSE IN MICE BY FORMALIN TEST AND HOTPLATE TEST

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Chronic pain and its treatment have always posed a significant challenge for medical practitioners and many attempts have been made to reduce and eliminate it, both in past and recent history .Research to discover new effective drugs with excellent safety profiles is ongoing .the aim of this study was to evaluate the suitability of the plant *Nepeta menthoides* boiss, & buhse for use as an analgesic drug. Forty_two mice were divided randomly in to seven groups (n=6). In the formalin test, the first group received normal saline; the second group, extract of plant seed (300mg/kg); the third group, extract of plant crops (300mg/kg) and the forth group received morphine (1mg/kg). For the hot plate test, the first group received normal saline; the second group, extract of plant seed (300mg/kg) and the third group received extract of plant crops (300mg/kg). All injections consisted of 0.5 ml given intraperitoneally. In the early phase of formalin test, the animals treated with seed and crop extracts did not show analgesic effects compared to control group (p=0.386, p=0.284) respectively .in contrast, in the late phase of formalin test, seed and crop extracts significantly decreased indications of pain compared to the saline group with seed extract showing stronger analgesic effects (p=0.004, p=0.023 respectively).in the hot plate test, crop and seed extracts showed hyperalgesic properties. This effect was stronger in animals treated with crop extracts as compared to seed extracts .These findings indicate that *Nepeta menthoides* can reduce inflammatory pain, probably by inhibiting inflammatory mediators. in contrast ,this plant has no analgesic effects on spinal nociception and conversely may exacerbate it .this study provides a basis for the use of *Nepeta menthoides* extracts in pupolar folk medicine , but further studies are necessary to elucidate the mechanism of its analgesic actions .

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EFFECT OF INTERVALS ON YIELD AND AGRONOMIC CHARACTERISTICS OF *DIANTHUS BARBATUS* L.

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The effects of irrigation regimes on yield and agronomic characteristics of *Dianthus barbatus* L. were studied at Koohpanj area near Bardsir of Kerman province during years 2010 to 2011. A complete randomized block design (CRBD) with three replications was used. The treatments comprised four irrigation times (control, 5, 10 and 15 interval days without irrigation). The evaluated characteristics include: plant height, 1000 grains weight, number of capsule per plant, number of seed per capsule, seed weight/ capsule weight ratio and seed yield. Results showed that irrigation times in each of two years significantly affected on plant height, number of capsule per plant, number of seed per plant and seed yield. The five-day irrigation interval had the highest seed yield. Differences between treatments effect on 1000 grains weight and grain weight/ capsule weight ratio were not significant. However, in water deficit and non-irrigate conditions, plants were resistant to drought and produced crops with minimum soil moisture of the measured parameters. In this condition, a significant correlation between yield, plant height, number of capsule per plant and number of seed per capsule were observed.

STUDY THE EFFECT OF DIFFERENT HARVESTING AREAS AND THE METHOD OF DRYING OF" *MYRTUSE COMMINUS*" AND ITS IMPACT ON THE AMOUNT OF ESSENTIAL OIL AND THE COMPONENTS OF EXTRACTED ESSENTIAL OIL AND COMPARING IT WITH FRESH PLANT

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Habitat areas and ways of drying are among the factors influencing the amount and type of components of most medicinal plants. To study the effect of different growing regions and methods of drying myrtle with scientific name *Myrtus communis*, family of Myrtaceae, an experiment in a completely randomized design with three replications in the harvesting time was conducted in 2011. For this purpose samples of *Myrtus communis* in September, 2011 from areas like Nurabad Fars (wild & cultivated) Khoram Abad (wild) collected and by three methods (sun, shade and oven at 45°) were dried. To determine the amount of essential oil in fresh and dried leaves of the *Myrtus communis* from 100 grams of sample, the essential oil with three replicates was extracted by Clevenger. Mean of the essential oil Percentage was used for each zone. For the identification of essential oil components, GC and GC / MS were used. In results obtained from statistical comparisons was observed that the most percent of essential oil are for the plants collected from the Nurabad deserts. And the lowest percent of extracted essential oil is from the Khorramabad region. Results also showed that the harvest area has influenced on essential oil compounds and the way of drying has no effect on the amount of essential oil compounds. But the essential oil from young branches and leaves have different compounds. In comparison of extracted essential oil is determined that the percentage of leaf essential oil is more than young branches and this is due to that the stem itself does not have essential oil. Dried leaves compared to fresh leaves have more essential oil (about 2 times) .Way of drying has no effect on the amount of essential oil.

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AGRONOMIC AND PHYSIOLOGY ICAL RESPONSE OF PEPPERMINT (*MENTHA PIPERITA* L.) UNDER WATER STRESS

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Because the roots of plants in the genus *Mentha* printers are sensitive to water deficit stress in different regions, but the reaction to the occasion in particular geographic "relative humidity varies. Peppermint (*Mentha piperita* L.) species in order to evaluate the response to deficit irrigation stress test a complete block design "with three replications was conducted under field conditions in Shahrekord area. Plants exposed five days (no stress) rather nhne days (mild stress) and 12 days (intense stress) and were in various stages of growth Traits were removed. Traits including total biomass, WUE, RWC, LAI, CGR, specific leaf weight (SLW), diffusion coefficient of light extinction coefficient of the level of proline. The results showed that different irrigation had a significant effect on all traits have so that moisture 9-day and 12-day total biomass relative to the control (water for 5 days) decreased. Morphological characteristics such as: WUE, SLW, RWC, LAI and CGR with reduce moisture severely "reduced. extinction coefficient rand Light also under water stress conditions very impressed groups. proline treatments 9 days and 12 days strongly" increased so that the treatment of 12 days of its 2.6 mM g ml reached. Irrigation is 5 days to get maximum Mlkrdtvsyh. Studies to better understand the peppermint plant response to water deficit than in other regions would be useful.

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PHENOLIC AND FLAVONOID CONTENT IN TWO *ELAEAGNUS ANGUSTIFOLIA* L. FRUIT VARIANTS

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Fruits of *Elaeagnus angustifolia* contain phenolic and flavonoid compounds [1]. These compounds have antioxidant properties that protect cells from oxidative damage [2]. An infusion of the fruit has been used in Iranian traditional medicine as an analgesic agent for alleviating pain in rheumatoid arthritis patients [3]. The aim of this study was to determine and analyze total phenolic and flavonoid content of fruits (flesh and seed) in two *E. angustifolia* variants using ethanol solvent. Ethanolic extracts of the flesh and seeds were prepared. Experiments were carried out to measure total their phenolic and flavonoid content. Data were analyzed using Instat-N software. Results showed that the Fariman variant seeds had the highest amount of phenolic and flavonoid compounds (7.44±0.15mgGAE/100gFW and 3.29±0.01mgQE/100gFW, respectively) and Mashhad variant flesh was the lowest (2.51±0.20 mgGAE/100gFW and 0.67±0.08mgQE/100gFW, respectively). In both varieties, the amounts of phenolic and flavonoid compounds in seeds were higher than flesh. In addition, the phenolic and flavonoid compounds were higher in Fariman compared to Mashhad variants.

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THE INFLUENCES OF BIO-STIMULATORS AND CHEMICAL FERTILIZER ON GROWTH TRAITS AND ESSENTIAL OIL OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.)

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Rosemary (*Rosmarinus officinalis* L.) is one of the most important medicinal plants. To investigate the effects of bio-stimulators and chemical fertilizers on growth traits and essential oil of Rosemary (*Rosmarinus officinalis* L.), an experiment was conducted on the basis of randomized complete blocks design in three replications at Medicinal Plants Institute (MPI), ACECR. Foliar application of bio-stimulators in eight levels (commercial formulations were consisted of aminolforte, humiforte, kadostim, and fosnutren, for each one at 0.75 and 1.5 $L.ha^{-1}$ concentration), 120 $kg.ha^{-1}$ chemical fertilizers (N.P.K, 15:8:15%), and control treatment (without any bio-stimulators and chemical fertilizer applications). The results showed that the effects of bio-stimulators and chemical fertilizers were significant ($p<0.01$) on all of the traits (including plant height, stem diameter, number of leaves per plant, leaf length, leaf width, number of branches per plant, chlorophyll content (SPAD value), content of essential oil, total dry weight). The maximum value of plant height (42.94 cm), leaf length (34.92 mm), leaf width (4.2 mm), number of leaves per plant (465 $leaves.plant^{-1}$), leaf chlorophyll content (56.1 SPAD), essential oil (1.4%), total dry weight (246.78 $kg.ha^{-1}$) was obtained by foliar application of 1.5 $L.ha^{-1}$ fosnutren. Also, the highest amount of stem diameter (10.77 mm) and number of branches per plant (24.63 $branches.\ plant^{-1}$) was caused in chemical fertilizers treatment and 1.5 $L.ha^{-1}$aminolforte, respectively. In contract it, the least amount of traits were observed in control treatment. In conclusion, we could expect a suitable growth for plant by the use of bio-stimulators application based on amino acid due to role in metabolites biosynthesis [1, 2].

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THE EFFICACY OF *DUCROSIA ANETHIFOLIA* ESSENTIAL OIL IN ANXIETY STATE: A RANDOMIZED, PLACEBO-CONTROLLED, DOUBLE-BLIND CLINICAL TRIAL

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Anxiety disorders constitute the most common psychiatric disease in the general population. It included 15 to 20 percent of referrals to psychiatric clinics. Due to the chronic nature of anxiety disorders, and problems that lack of appropriate treatment creates in daily affairs and training of patients, it is very important to achieving a herbal medicine with minimal side effects in the treatment of disease. According to a study in mice, *Ducrosia anethifolia* essential oil has anti-anxiety effect without sedative effect. Therefore, the present study was carried out to investigate the effect of *Ducrosia anethifolia* essential oil in anxiety state. In a randomized, placebo-controlled, double-blind clinical trial on 86 students of kashan university of medical sciences that their appearance were anxious, the Beck anxiety inventory test were performed, then they visited by psychiatrist and randomly assigned to *Ducrosia anethifolia* essential oil (n=35), placebo (n=28) or control group (n=23) to consume 20 drops three times a day for 2 months. Anxiety assessment was performed every two weeks by psychiatrist. The anxiety scores is determined before and after treatment periods in each group and statistically compared using paired t-tests and analysis of covariance. The results of this study showed that in terms of underlying variables, no significant differences were found between the three groups ($p<0.05$). In *Ducrosia anethifolia* essential oil group, the score of essential oil in the baseline was 27.6±10.1 that reached to 18.5±9.2 at the end of the study ($p<0.05$). A significant reduction was observed in the placebo group ($p<0.05$). The rate of effectiveness in *Ducrosia anethifolia* essential oil group was 61.9% and in placebo and control groups was 25% and 16.7%, respectively. The results of the study on anxiety-absent were also the same and the effect of the treatment groups showed significant. The researchers concluded that *Ducrosia anethifolia* essential oil was effective on anxiety-present and anxiety-absent scores of participants and has significant difference with reduction in anxiety scores in the other two groups. Therefore, it recommended as an effective drug in the treatment of anxiety disorders.

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EFFECT OF EGE EXPLANT ON HAIRY ROOT INDUCTION BY *AGROBACTERIUM RHIZOGENES* IN *DRCOCEPHALUM KOTSCHYI*

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Dracocephalum kotschyi Boiss, belonging to Labiatae family, is an herbaceous wild plant native to Iran. Recent pharmacological studies have confirmed some medicinal properties of *D. kotschyi* including antinociceptive cytotoxic effects. It is also a source of essential oils, valuable flavonoids, monoterpene glycosides and trypanocidal terpenoids. The effects of explants age including (1, 2 and 4 weeks old leaves) on hairy roots induction in *D. koteschyi* were investigated. All explants infected with 15834 strains of *Agrobacterium rhizogenes* for 5 min. The experiment was designed to be completely randomized with three replicates. Hairy roots were emerged within 11 to 15 days of incubation in all explants. The roots were then established on MS basal medium without plant growth regulators. The highest frequency of hairy root induction (56.66%) was obtained in 1 weeks old leaves with petiole explants and The lowest frequency of hairy root (15%). was obtained in 4 weeks old explants.

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FOUR MATHEMATICAL MODELS COMPARISON TO DETERMINE GERMINATION CARDINAL TEMPERATURES OF MILK THISTLE AS A MEDICINAL PLANT

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Milk thistle *(Silybum marianum*) is a plant growing wild in Iran in the most of area, belong to Asteraceae family. The seeds of this plant have been used in medicine, for liver diseases. An experiment was carried out for determining of cardinal temperatures (T_{base}, T-opt and T-ceiling) [1] of *S. marianum* germination in the laboratory of Plant Production College. The effects of temperature on plant development are the basis for models used to predict the timing of germination. Three cardinal temperatures (base, optimum and maximum) describe the range of temperature over which seeds of a particular species can germinate. Given experiment included seven temperatures in a randomized completely design with four replications. Temperatures were 5, 10, 15, 20, 25, 30 and 35ºC. The seeds with 2 mm radicles were counted as germinated seeds. The germination rate percentage and cumulative seed germination percentage were calculated for each given temperatures [3]. We compared 4 non-linear regression models consist of dent-like, segmented, beta and curvilinear to describe the germination rate-temperature relationships. Cardinal temperatures were estimated using four non linear regression models [2]. The effect of temperature on total germination percentage, time to 50% germination (D50) and germination rate based on 1/D50 was significant at 1% of probability level. Results indicated that by increasing temperature up to 15ºC germination increased and after that declined. Based on the highest R^2 and the lowest MAE and RMSE segmented model was determined as the superior among the models. Thus, Tbase, Topt and Tc for D50 (time to %50 germination) were estimated at 2.75, 31.51 and 38 using segmented model.

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MORPHOLOGICAL TRAITS OF *HYPERICUM PERFORATUM* L. IN TWO NATURAL HABITATS OF GOLESTAN PROVINCE

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The *Hypericum perforatum* (St. John's wort) products are available as teas, tinctures, juices, and oily macerates. It has a wide range of medicinal applications, including skin wounds, eczema, burns. This species grows widely in the north, north-west, west and northeast Iran, particularly in Ardebil, Astara, Gorgan, Kohgiluyeh and Boyr-Ahmad, Fars provinces and in rangeland and mountain hills of Alborz [2]. This work was aimed to evaluate two populations of *H. perforatum* using some morphological characteristics. This plant distributes in wide range of altitude from sea level to 2100 m in Golestan Province. Morphological characteristics were studied on *H. perforatum* in two natural habitats. These habitats are located in west (Drazno) and east (Tuskaestan) at 40 km from Gorgan. *H. perforatum* plants were sampled at elevations ranging from 150 to 1950 m. Plant samples at each of two sites were collected from 4 altitudinal range which were divided in four classes consists of: 1) 150-750, 2) 750-1350, 3) 1350-1650 and 4) 1650-1950 meter from sea level. Gathering samples in every site were divided into leaf and stem, and then they were separately dried at 65°C for 24 h. Some traits were measured in this study including plant height (cm), leaf size (length * wide) (cm), internodes length (cm), leaf and stem dry weight (leaf to stem ratio) and dry weight per plant (gr). Means of them was determined respectively 58.2, 1.28 * 0.59, 2.61, 0.63 and 1.68 for Derazno habitat and so on, 53.2, 1.39 * 0.73, 1.71, 1.23 and 1.74 for Tuskaestan habitat. Traits associated with each other were analyzed by Pearson correlation method. Correlation leaf to stem ratio by plant height and internodes length were significant negative -0.45 and -0.51 at 1% probability level respectively. Elevations more than 1500 meters above sea level reduce the seedling growth due to sever cool condition and less than 500 mm rainfall respectively [1- 3]. Our results showed that they are consistent with these researchers. Identifying ecotypes of *Hypericum* and habitats can help to finding a potential source of genetic variation for breeding.

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THE INFLUENCE OF FOLIAR APPLICATION OF NANO ZINC CHELATE AND ZINC SULFATE ON MORPHOLOGICAL TRAITS AND GLANDULAR TRICHOMES OF HOLY BASIL *(OCIMUM SANCTUM)*

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Holy Basil (*Ocimum sanctum*) belongs to plant Lamiaceae family. It has made important contribution to the field of science from ancient times as also to modern research due to its large number of medicinal properties. The leaves of this plant contain 0.7% volatile and main oil components are eugenol, methyl eugenol, estragol, eucalyptol [1]. Zinc (Zn) is one of the seven pillars of nutrition and is needed for the growth of plant. In order to evaluate the effect of foliar application of zinc fertilizer on morphological traits, distribution and size of glandular trichomes at both epidermal surface of holy basil, an experiment was conducted at research farm of faculty of agriculture, Shahid Chamran University of Ahvaz based on randomized complete block design, with three replications. The treatments were nano zinc chelate (0, 0.5, 1 and 1.5 $gr.lit^{-1}$) and zinc solfate (1 and 1.5 $gr.lit^{-1}$) fertilizers. Foliar application of fertilizer was done at six to eight leaf stage and was repeated with interal 15 days until the end of the study.Morphological traits, distribution and size glandular trichomes of adult leaves were measured at full bloom stage. The results showed that the effect of foliar application of zinc fertilizers on morphological traits such as plant height, branche number, leaf number, leaf size (length and width), leaf area, stem diameter, inflorescence length, inflorescence number , fresh and dry weight of areal parts, distribution and size of glandular trichomes of holy basil were significant ($p \geq 0.01$). The highest values of mentioned traits were obtained in plant sprayed with 1.5 $gr.lit^{-1}$ nano zinc chelate. For example, the highest values of glandular trichomes number (21.67, 17.37) and glandular trichomes size (0.25, 0.26 mm^2 at lower and upper epidermis, respectively) were obtained in plant treated with 1.5 $gr.l^{-1}$ nano zinc chelate. According to the results foliar application of 1.5 $gr.lit^{-1}$ nano zinc chelate, increased morphological traits of holy basil.

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EFFECTS OF FOLIAR APPLICATION OF NANO IRON CHELATE AND IRON CHELATE ON DISTRIBUTION AND SIZE OF GLANDULAR TRICHOMES OF HOLY BASIL (*OCIMUM SANCTUM*)

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Holy Basil (*Ocimum sanctum*) is an aromatic plant belong to the Lamiaceae family [1]. The aim of this study was to investigate the effect of iron fertilization on the distribution and size glandular trichomes of holy basil. A field experiment was conducted at the research farm of Shahid Chamran university of Ahvaz based on randomized complete block design with three replications. The treatments were foliar application of nano iron chelate (0, 0.5, 1 and 1.5 gr. l^{-1}) and iron chelate (1 and 1.5 gr. l^{-1}). The first foliar application was done at the 6-8 leaf stage and was repeated with interal 14 day until the end of the study. The plants were harvested at the full bloom stage and the distribution and size of glandular trichomes at both epidermal surface of adult leaves were measured by light microscope. The results showed that the distribution and size of the glandular trichomes at both epidermal surface were significantly increased with nano iron chelate and iron chelate in comparison with control plants. The plants were treated with nano iron chelate 1 gr. l^{-1} showed the maximum number of glandular trichomes (19.76). The maximum size (0.22 mm^2) of the glandular trichomes was observed in plant treated with nano iron chelate 1.5 gr. l^{-1} at lower epidermis. At the upper surface of the leave, the maximum number (17.33) and size (0.26 mm^2) of the glandular trichomes were also recorded in plants treated with nano iron chelate 1.5 gr. l^{-1} in comparison with control (8.33 and 0.06 mm^2). In total, foliar application of plant with 1.5 gr. l^{-1} nano iron chelate was increased distribution and size of glandular trichomes of holy basil leaves.

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TOXICITY OF NICKEL AND ALUMINUM ON GERMINATION AND SEEDLING GROWTH OF MEDICAL PLANT, *PORTULACA OLERACEA* L.

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The effects of aluminum (Al) and nickel (Ni) toxicity on root shoot and seedling length, seed germination and seedling dry biomass of *Portulaca oleracea* L. was investigated. Experimental treatment includes 4 levels of Al and Ni concentrations (o, 75, 125, 150 and 200 mL). The results showed that nickel treatment at 175mg/L significantly affected growth of root and seedling dry biomass as compared to control ($p<0.05$). Also, Aluminum treatment from 75 to 200 mg/L significantly affected the seed germination, root, shoot and seedling length and seedling dry biomass of this species ($p<0.05$). Al treatments showed negative effects on seedlings of *P. oleracea* as compared to Ni. The lowest percentage of tolerance in seedlings of *P. oleracea* was observed at 200mg/L concentration of Al and Ni.

IDENTIFICATION OF ROOT-PARASITIC NEMATODES OF THYME IN CHAHARMAHAL & BAKHTIARY PROVINCE

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Nematodes are one of the main group factors that cause damage on medicinal plants. Studies that carried out in pests and diseases of thyme research design, during **2**008-2010, sampling were conducted from 6 regions from rangelands on (*Thymus danaensis* and *T. kotchyanus*) and 6 farm stations on (*T. vulgaris*) and 120 soil samples were collected and transferred to laboratory. Separation of nematodes were conducted by (DeGriss, 1969) method and after this, the microscopic slides were prepared. End body morphological and morphometric characteristics were the main tools for nematodes identification. Between the nematodes that identified, *Meloidogyne javanica* Treub. had the highest distribution on these thyme species and the highest important damage on thyme. This root- knot nematode identified as the most important limiting nematode in culture of thyme in farms and threat wild thyme in rangeland in this province, therefore performance of control programs for this root- parasitic species are very necessary in protection of thyme as a valuable medicinal plant.

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EFFECT OF *AGROBACTERIUM RHIZOGENES* STRAINS AND EXPLANT AGE ON HAIRY ROOT INDUCTION IN *HYOSCYAMUS RETICULATUS*

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The medicinal plants are the most important resource for drug preparation. Lattice henbane (*Hyoscyamus reticulatus* L.) is one of the most important medicinal plants of solanaceae family. Hyoscyamine and scopolamine are the most important tropane alkaloid compounds which were found in Lattice henbane [1, 2]. In this study the effects of 2 various strains of *Agrobacterium rhizogenes* (A13, 15834) on hairy roots induction of different leaves old (1 week, 2 weeks and 4 weeks age) as explants were investigated. Results of study indicated that there is significant difference between treatments. 15834 strain was more efficient for hairy root induction in this plant. Highest hairy roots induction rate (60%) was observed in 15834 strain, and lowest hairy roots induction rate (9.16%) was obtained in A13 strain. Although results showed that hairy roots induction depend on explant age. The maximum hairy roots induction rate (26.6 and 25%) was obtained in 2-old weeks and 1 old week respectively. Minimum rate of hairy root induction was observed in 4 old weeks explants.

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ASSESSMENT OF ANTIBACTERIAL ACTIVITY OF *ALOE VERA* L.

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The antibacterial activity of *Aloe vera* L leafs extract (ALE) against four Gram-negative and one Gram-positive bacteria were evaluated with the agar disc diffusion and MIC methods. *Pseudomonas aeruginosa* and *Acinetobacter lwoffii* were resistant to cephalosporin and hexane (0.01 mg/ml) as control drugs but sensitive to ALE. ALE also exhibited antibacterial activity against *Klebsiella pneumoniae*, *Enterobacter aerogenes* and *Staphylococcus aureus*. The saponins in *Aloe vera* L. leafs extract maybe the cause of this antibacterial effect.

POTENTIAL OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.) LEAVES AND BRANCHES TO ENHANCE STORAGE LIFE OF ONION (*ALLIUM CEPA* L.)

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Application of natural products due to health and environmental protection for the management of postharvest fungal rotting of fruit and vegetables has been developed in recent years. Onion (*Allium cepa* L.) is an important vegetable that a considerable amount of the product is lost in the storage process. Onion is as a second vegetable after tomatoes in the world's [1]. Storage condition is one of the most important issue in maintaining quality in postharvest. Accelerating this issue could lead to improving the postharvest quality of fruit and vegetables. To achieve this, a factorial experiment based on randomized complete block design (RCBD) with two factors and three replicates was carried out on the storage life of onions. The factors were storage conditions using Rosemary fresh leaves and branches with five levels and the storage times with ten levels. The storage feedbacks of onions in terms of weight loss and sprouting of onions were analyzed by exposing to different storage conditions and times. The results revealed that keeping the onions at 25 ^{o}C using Rosemary fresh leaves and branches resulted in the lowest weight loss and sprouting (the average bud length). Treating the onions with Rosemary fresh leaves and branches showed that 25 ^{o}C for 10 weeks significantly controlled the postharvest fungal rotting and improved the storage life of onions. In agreement with the reports of Tripathi and Dubey [2], the findings of this study indicated that the high potential of Rosemary fresh leaves and branches can be considered as an alternative strategy to control postharvest fungal rotting of fruit and vegetables to improve the storage life of onions considering its simplicity and efficacy in decreasing the storage cost, the weight loss and sprouting without causing any environmental toxicity.

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SALT TOLERANCE IN SOME MEDICINAL PLANTS (CASE STUDY: HOZ-E-SULTAN OF QOM)

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Qom province with space about 1238000 ha and containing 4 salt lakes is located in saline regions in central of Iran. This research was carried out in order to recognition of ecologic and vegetation characteristics of medicinal halophytes on salt lands of Qom. After preparate vegetation map, the sampling points were selected in the plant types in which dominant species that were halophyte and medicinal plants. The results indicated that from 8 identified species, Salsola kali and Salicornia europaea were annual and other species were perennial. Also Seidlitzia and Alhaji had the most distribution and canopy cover percentage. Seidlitzia, Salsola and Alhaji had most resistant to salinity and Tribulus had lowest resistant to salinity.

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IN VITRO ACTIVITY OF *PULICARIA VULGARIS* LEAF EXTRACT AGAINST *LEISHMANIA MAJOR* PROMASTIGOTES

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The aim of this study was to search the *in vitro* activity of *Pulicaria vulgaris* leaf extract against *Leishmania major* promastigotes and compare it with glucantime. Extract was prepared by percolation method. The leaf extract was dried and dissolved in DMSO 1% solvent. *Leishmania major* promastigotes treated with 6 concentrations (3, 6, 12, 24, 48, 96 mg/ml) of the extract. As control positive group glucantime 85 mg/ml and additional untreated control group were included in this study. All cultures were performed in triplicate. The promastigotes were also counted and their flagellate's motilities were assessed microscopically. Ethanolic extract of *Pulicaria vulgaris* showed significant leishmanicidal activity against *Leishmania major* promastigotes in different concentrations. Notably there was a concordance in anti-leishmanial effect of the ethanol extract with the increasing of the dosage (3, 6, 12, 24, 48, 96 mg/ml). In comparison with glucantime the mean alive promastigotes in 12 mg/ml concentration of *Pulicaria vulgaris* was almost as same as 85 mg/ml glucantime and higher *Pulicaria vulgaris* extract concentrations were higher effective than glucantime. Our study revealed a novel pharmacological activity against promastigotes of *Leishmania major* and suggests that *Pulicaria vulgaris* extract has the potential of being used in leishmaniasis but more studies are needed to find out its activity against amastigote and appropriate route of application.

EFFECT OF DIFFERENT ORGANS ON THE AMOUNT AND COMPOUNDS OF THE ESSENTIAL OIL IN "*ROSA DAMASCENA*"

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Rosa damascena is a deciduous shrub and among them, perhaps rarely evergreen can be found. The importance of Rose is in its essential oil and Perfume. Rose flower is a shrub with prickly branches, flowers are pink and flowering is in late April to early July. The most valuable product of Rose is essential oil that this essential oil is obtained from distillation of fresh flowers. Rose shoots at harvest time in late May with the research field Barij Essence Pharmaceutical Company (Farm Khaveh) took and fresh samples were tested. To determine the total amount of essential oil from different parts of Rose including young branches with and without flowers (length 20 cm) and flowers with the receptacle, according to Pharmacopoeia method for taking essential oil Clevenger was used. The essential oils and obtained distillates were stored in a refrigerator until required analysis. To identify the components of the extracted essential oil, GC and GC/MS were used and according to references, and comparing the results with the library of GC/MS and Adams book, essential oil compounds were identified. Results showed that the young branches without flowers didn't have any essential oil that could be extracted. The maximum amount of linalool is related to flowering shoot and in remaining ones is almost the same and in one range. The maximum amount of 2 - phenyl ethanol distilled from the young branches without flowers is as much as 80/34 percent. Another important component in rose essential oil is Geraniol that the maximum amount belongs to the essential oil of flower with the receptacle and the minimum amount belongs to the distillate of young branches without flowers and this issue suggests that the Geraniol compound mostly obtained from flowers. According to the comparison of the compounds in essential oil and essential oil of distilled, following results are obtained: Young branches without flowers of rose has no essential oil and extracted essential oil just belongs to the complete flower and by decreasing the percentage amount of flower in shoots, the amount of extracted essential oil decreases too. Comparison of extracted essential oil components from three distilled samples indicate that the differences in extracted essential oil is too much, especially in the amount of 2 - phenyl ethanol that has the range of 33/80 to 80/34 and also in essential oils of shoots without flowers, there are components that cannot be identified and had influenced on the quality of taste and smell of distillate.

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COMPARISON OF ESSENTIAL OIL COMPOSITION OF *SALVIA OFFICINALIS* AND *SALVIA VIRGATA* INVESTIGATION ANTIBACTERIAL PROPERTIES

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Salvia genus belongs to the subfamily Nepetoicleae of Men- thcae tribe in Lamiaceae family. This genus is represented in the Iran flora by 58 species, its top flowering branches was widely used in medicinal & food usage. In this search for competing the compounds of Essential oil in *Salvia virgate* L. and *salvia officinalis* L., In March 2008 we planted them in Estahban, Fars about 1700 m above sea level. Crop and storage conditions of both plants was the same. Essential oil of the top flowering branches was gained by water-distill. GC & GC/MAS were the used technique for analyzing the compound of Essential oil. 42 compounds were identified in the essential oil of *Salvia officinalis*. Including 98.94% formed essential oil of compounds. The main Essential oil of *Salvia officinalis* compound are α -Thujone (37.18%), 1,8-Cineole (12.71%), β-Thujone (9.10%), Camphene (5.54%) and Viridiflorol (5.33%), and 2.4 % is Essential oil percentage for *Salvia officinalis* in dried herbs weight. 29 compounds were identified in the essential oil of *Salvia virgata*. Including 98.81% formed essential oil of compounds. The main combination of Essential oil *Salvia virgata* are: Caryophyllene oxide (30.23%), β- Caryophyllene (22.63%), Sabinene (11.82%), 1- Octen -3-Ol (6.64%) and α-hujene (6.24%), percentage of Essential oil for *Salvia virgata* was calculated 1.6%, antibacterial properties of essential oil of two methods, disk diffusion, and the well-established, against some bacteria include *Estaphyllococus epidermidis* PTCC NO.1435 and Escherichia coli were investigated. Result show that *Salvia officinalis* generally more typical compared to the anti-bacterial properties of Salvia virgate. And essential oil of this plant has a significant antifungal effect against the fungus Escherichia coli.

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COMPARISON OF ESSENTIAL OIL COMPOSITION OF *SALVIA OFFICINALIS* AND *SALVIA VIRGATA* INVESTIGATION ANTIFUNGAL PROPERTIES

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Salvia genus belongs to the subfamily Nepetoicleae of Men- thcae tribe in Lamiaceae family. This genus is represented in the Iran flora by 58 species, its top flowering branches was widely used in medicinal & food usage. In this search for competing the compounds of Essential oil in *Salvia virgate* L. and *salvia officinalis* L., In March2008 we planted them in Estahban, Fars about 1700 m above sea level. Crop and storage conditions of both plants was the same. Essential oil of the top flowering branches was gained by water-distill. GC & GC/MAS were the used technique for analyzing the compound of Essential oil. 42 compounds were identified in the essential oil of *Salvia officinalis*. Including 98.94% formed essential oil of compounds. The main Essential oil of *Salvia officinalis* compound are α -Thujone (37.18%), 1,8-Cineole (12.71%), B-Thujone (9.10%), Camphene (5.54%) and Viridiflorol (5.33%), and 2.4 % is Essential oil percentage for Salvia officinalis in dried herbs weight. 29 compounds were identified in the essential oil of *Salvia virgata*. Including 98.81% formed essential oil of compounds. The main combination of Essential oil *Salvia virgata* are: Caryophyllene oxide (30.23%), β- Caryophyllene (22.63%), Sabinene (11.82%), 1- Octen -3-Ol (6.64%) and α-hujene (6.24%), percentage of Essential oil for *Salvia virgata* was calculated 1.6% , Antimicrobial properties of essential oil of two methods, disk diffusion and the well established against *Alternaria alternate* PTCC NO.5224، *penicillium funiculosum* PTCC NO. 5169 and *Penicillium funiculosum* PTCC NO.5301 were investigated. Result show that *Salvia officinalis* generally more typical compared to the anti-microbial properties of *Salvia virgate*. And essential oil of this plant has a significant antifungal effect against the fungus *Alternaria alternate* PTCC NO.5224.

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PHYTOHEMICAL VARIATION OF THE ESSENTIAL OILS IN THYME POPULATIONS (*THYMUS KOTSCHYANUS* BOISS. & HOHEN) FROM IRAN

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Thymus (belonging to Lamiaceae family) is a large genus and widely distributed in the world. Among 215 species of this genus grown in the world, 14 species are distributed and one of the native medicinal plants in Iran. The thyme populations that were collected during the full flowering phase, were analyzed by gas chromatography (GC) and gas chromatography coupled to mass spectrometry (GC–MS). The populations with three replications were arranged in a randomized completely block design (RCBD). The results of analysis of variance showed that were significant ($p<0.01$) differences between populations for all of chemical compositions except of Carvacrol. It could be indicated wide variation in the most chemical compositions of essential oils in the wild populations. Also, the results demonstrated that the most phytochemical variation due to genetical and geographical origin factors. There were identified 21 chemical compounds in the essential oils, the majority including Carvacrol, Thymol, Borneol, 1.8-cinole, Cymne (ortho), Carvacrol methyl ether, (z) Caryophyllene, Camphor and Linalool, that these compounds were found in most populations. The compositions of the essential oils were studied by GC and GC-MS. The content of the essential oils from the 15 populations were obtained from 1.4 to 8.5% based on dry weight. The major essential oils were identified in populations of Tehran (0.85%), Azarbayejangharbi-I (0.85%) and Azarbayejangharbi-II (0.84 %). The highest percentage of Monoterpene Hydrocarbons (MH), Oxygenated Monoterpenes (MO), Sesquiterpene Hydrocarbons (SH) and Oxygenated Sesquiterpenes (SO) in population of Gazvin-I (45.62%), Zanjan-I (82.99%), Zanjan-II (21.4%) and Kordestan (5.59%) were observed, respectively. The lowest of these compounds were observed in population of Azarbayejangharbi-III (2.48%), Zanjan-II (31.72%), Kerman (3.08%) and Zanjan-II (2.32%), respectively. Therefore most of the compounds belonged to the Oxygenated monoterpenes groups. The results showed that with increasing altitude populations' situ growth, monoterpene compounds reduced. Many studies on composition of essential oils from different Thymus species have been carried out and Oxygenated monoterpenes were the main group of constituents in all populations of *T. villosus* subsp. *lusitanicus* (67.2-75.4%) reported .

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EFFECT OF *ARTEMISIA DRACUNCULUS* L. AND *THYMUS ZYGIS* ESSENTIAL OILS ON GREENBUG, *SCHIZAPHIS GRAMINUM* (HEMIPTERA: APHIDIDAE)

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Among insects, aphids are considered as important pests of crops worldwide and severe control strategies have been used against them because of their resistance [1, 4]. Nowadays, chemical insecticides are used for aphid control. Essential oils are considered as alternatives to chemical pesticides duo to their lower toxicity to mammals and low persistence in the environment [2, 3]. In this study, the effect of essential oils from tarragon (*Artemisia dracunculus*) and thymus (*Thymus zigis*) was studied on green bug, *Shizaphis graminum* (Hemiptera: Aphididae) in plant protection laboratory of University of Miyaneh in 2013. Essential oils was extracted using a Clevenger. To calculate the 50% lethal concentration (LC_{50}) of essential oils, preliminary tests were carried out to select20-80percent mortality causing concentrations for bioassay tests. Experiments were conducted at 25 ± 1 ^{oC}, 60-70% relative humidity and a photoperiod of 16 hours light and 8 hours of darkness with 10 replications and 10 aphids were placed in each Petri dish (as a replicate) on filter paper [5]. $LC_{50}$was calculated using Probit procedure. Based on results, LC50 of tarragon and thymus was estimated as high as 16844 and 15659 ppm, respectively. Results showed insecticidal effect of the studied essential oils and essential oils of thymus leaves was more effective than that of tarragon.

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EFFECTS OF MEDIA AND SALICYLIC ACID ON ROOTING AND ROOT GROWTH OF LEMON BALM (*MELISSA OFFICINALIS* L.)

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Lemon balm (*Melissa officinalis* L.) is a medicinal plant with a long history in traditional medicine that contains an essential oil [2]. This experiment was conducted to investigate the effect of salicylic acid and media on rooting and root growth of lemon balm in *in-vitro* culture condition. Salicylic acid is produced by stem cells and plays an important role in plant growth, ion uptake, photosynthesis and seed germination [1]. In this experiment, different concentrations of salicylic acid (0, 0.1, 0.3, 0.5, 1 mili molar (m.M)) and MS and B5 medium concentrations (50% 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, the percent of rooting, root growth, aerial roots, dry and fresh weight of roots was measured. The combined analysis of variance based on completely randomized design was used for data analysis. The results showed significant difference between media based on all traits (except rooting percentage). Different concentration of salicylic acid had significant effects on fresh and dry weight of roots and aerial roots percent. Except rooting percent and root growth significant interaction effect was observed between the media and the salicylic acid concentrations based on fresh and dry weight of roots and aerial roots. The highest number of aerial roots was observed in MS and 1/2MS in 0.3, 0.5 and 1 mM of salicylic acid concentrations. MS medium at all concentrations of salicylic acid had the highest root fresh weight. Root dry weight in MS medium with different concentrations of salicylic acid had high levels compared with other treatments. In this research rooting rate and root growth on MS medium was much higher than B_5 medium.

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PHYTOCHEMICAL INVESTIGATION AND ANTIOXIDANT ACTIVITY OF THE FRUIT EXTRACTS OF THE *RIBES KHORASANICUM* ASSADI AND SAGHAFI. ENDEMIC SPECIES FROM RAZAVI KHORASAN PROVINCE

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Ribes khorasanicum Saghafi and Assadi is valuable plant species. *R. khorasanicum* is belonging single species *Grossulariaceae* family, the shrub form and have different usage. Long years *R. khorasanicum* was known as *R. oriental* that exist in Iran but for first time in 1996 identified by assadi and saghafi and was named *R. khorasanicum* [1]. The present study was carried out to investigate some phytochemical parameters. For this purpose, plant was extracted by six different solvents (Methanol, Ethanol, Acetone, Water, Ethyl acetate and Chloroform) and then evaluated for their antioxidant activity using 2,2- Diphenyl-1-pycrilhydrazyl (DPPH) [2] and Ferric Reducing Antioxidant Power (FRAP) [3] assays to find the most effective extract. Results were expressed as Methanolic extract in DPPH method with IC_{50}=85µg/ml and FRAP method 34.17mMFe^{2+}/mg sample had the highest antioxidant effects and Chlroformic extract in DPPH method with IC_{50}=755.96 µg/ml and FRAP method 2.85 mMFe^{2+}/mg sample had the lowest antioxidant effects. Butyl Hydroxyl toluene (BHT) and Ascorbic acid were used as standards that showed IC_{50}=4.85µg/ml and 60.75 mMFe^{2+}/mg sample respectively. In addition, the amount of Total phenol [4] was estimated using Folin-Ciocalteu photometric method and Gallic acid (GAE) was used as standard. The result was showed 7.24 mg GAE /g D.W. This study suggests that according to amount of Total phenol and antioxidant outcomes *R. khorasanicum* have the potential to be used as food antioxidants and it might be helpful in preventing the progress of various oxidative stresses.

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INVESTIGATION OF ANTIOXIDANT ACTIVITY AND DETERMINATION OF TOTAL PHENOL CONTENT OF THE LEAVES EXTRACTS OF *RHAZYA STRICTAL*. FROM SARAVAN

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Because of increased safety concerns about synthetic antioxidants, exploitation of cheaper and safer sources of antioxidants based on natural origin is the focus of research nowadays. *Rhazya Stricta* is a medicinally important plant native to south Asia [1]. Rhazya genus of an apocynaceae comprises of two species namely *Rhazya stricta* Dencne and *Rhazya orientlis*. *R. stricta* has been used in indigenous medicinal drugs to cure different types of ailments in Pakistan, India, Afghanistan, Saudi, Arabia, Qatar, United Arab Emirates (UAE), Iran and Iraq [2]. Antioxidant activity of leaves in Methanol, Ethanol, Aqueous, Acetone and Chloroform extracts and the Total phenol (TP) content were studied. The Total phenol content was determined using Folin-Ciocalteu method [3] while antioxidant activity were determined using 2,2-diphenyl-1-picryl hydrazyl (DPPH) method [4]and Ferric reducing antioxidant power (FRAP)assay. [5]The Methanol extract was showed highest and Chloroform was showed lowest antioxidant activity in both methods. In DPPH method, IC50 for Methanol and Chloroform extracts were 57.77 and 155.3 µg/ml and in FRAP assay antioxidant activity for Methanol and Chloroform extracts were 49.06 and 24.89 mMFe2+/mg sample respectively. Butyl Hydroxyl toluene (BHT) and Ascorbic acid were used as standards that showed IC50=4.85 µg/ml and 60.75 mMFe2+/mg sample respectively. In addition, the amount of Total phenol was estimated and Gallic acid (GAE) was used as standard, that the contain of Total phenol to be 17.27 mg GAE/g D. W. Therefore according to amount of Total phenol and antioxidant outcomes, the *R. stricta* 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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PHYTOCHEMICAL INVESTIGATION OF THE FLOWER EXTRACTS OF THE *CALENDULA OFFCINALIS* L.

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Calendula officinalis of the family *Asteraceae* that used medicinally in Europe, China and India amongst several places in the world. It is used in traditional medicine, especially for wound healing, jaundice, blood purification, and as an antispasmodic. The present study was carried out to investigate some phytochemical parameters. In this assay, plant was extracted by five different solvents (Methanol, Acetone, Ethanol, Water and Chloroform).For estimated antioxidant activity two methods,2,2-diphenyl-1-picrylhydrazyl (DPPH) and Ferric reducing antioxidant power (FRAP) were used. DPPH test was obtained higher antioxidant activity in Methanolic extract (IC_{50}= 56.44µg/ml) and FRAP method (30.54 mMFe^{2+}/mg sample), and Chlroformic extract was showed lowest results in DPPH method (IC_{50}=199.39 µg/ml) and FRAP method (7.86 mMFe2+/mg sample). Butylated hydroxyl toluene (BHT) and Ascorbic acid were used as standards which showed IC_{50}= 4.85 µg/ml and 60.75 mMFe^{2+}/mg sample respectively. Also, the content of Total phenols was measured, by Folin-Ciocalteu photometric method and Gallic acid (GAE) was used as standard. The result was founded4.048 mg GAE/g D. w. As a result, due to the high contents of amount of Total phenol and antioxidant activity, *C. officinalis* 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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DETERMINATION OF ANTIOXIDANT ACTIVITY AND AMOUNT OF TOTAL PHENOL OF THE EXTRACTS OF *PERIPLOCA APHYLLA* L., *CAPPARIS SPINOSA* L. AND *LAVANDULA ANGUSTIFOLIA*

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Periploca aphylla L. belongs to family *Asclepiadaceae*. It is commonly used for the treatment of tumors [1]. *Capparis spinosa L.* belongs to family *Capparidaceae* [2]. *Lavandula angustifolia* belong to family *Lamiaceae* Recently, aromatherapy and alternative medicine frequently involve the use of lavender essential oil [3]. The present study was carried out to measurement of the amount of Total phenol and investigate the antioxidant activity for both extracts (Aqueous and Ethanolic) of these plants. Measurements have been done in four different concentrations (100, 500, 1000 and 2000 µg/ml) but some of them were disregarded due to following the Beer-Lambert's rule. The Ethanolic extracts were showed higher antioxidant activity than the Aqueous extracts according to both 2,2-diphenyl-1-picryl hydrazyl (DPPH) and Ferric Reducing Antioxidant Power (FRAP) tests. In DPPH test for Ethanolic extracts the antioxidant activity were IC_{50}= 3.2 for *P. aphylla* (in concentration 100 µg/ml), IC_{50}= 4.10 for *C. spinosa* and IC_{50}=490.81µg/ml for *L. angustifolia* (in 2000 µg/ml) respectively and in FRAP test, for Ethanolic extracts were 33.72 for *P. aphylla* (in 100 µg/ml), 26.41 for *C. spinosa* (in 1000 µg/ml) and 13.07 mMFe^{2+}/mg sample for *L. angustifolia* (in 1000 µg/ml) respectively. Ascorbic acid was used as standard for Ethanolic extract, IC_{50}=3.2 µg/ml (in 100 µg/ml) and 33.72 mM Fe^{2+}/mg sample (in 100 µg/ml). The amount of phenolic compounds in *P. aphylla*, *C. spinosa* and *L. angustifolia* were found to be 22.92, 18.39 and 3.33 mgGAE/g D. w respectively and Gallic acid was used as standard. As a result of the study it is suggested that the use of *P.aphylla* and *C.spinosa* because of their high antioxidant capacity and also high amount of total phenol is useful for treatment of the diseases which are due to various oxidative stresses.

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RANDOMIZED CLINICAL TRIAL OF SWEET FENNEL SEEDS EFFECTIVENESS IN PATIENTS WITH PEPTIC ULCER CAUSED BY HELICOBACTER PYLORI

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Foeniculum vulgare Miller seeds (Apiaceae family) are frequently used as carminative and flavoring agent in Iranian culinary and food industry. In Iranian folk medicine fennel seeds have been also used as an analgesic, stomach disorder, cold pain and for treatment of digestive disorders. However, the sweet fennel seeds effectiveness in patients with peptic ulcer caused by Helicobacter pylori has never been tested in a randomized clinical trial. The aim of this study was to evaluate this effect of this herb [1-3]. This randomized, single-blinded trial included 20 patients presenting with peptic ulcer caused by Helicobacter pylori according to the criteria of the American Association of Gastroenterology. The order of treatments was counter balanced across subjects: half of the subjects received fennel seeds (500mg, BD) and standard triplicate therapy (Clarithromycin, Amoxicillin, Omeprazole) for a 7-day period, whereas the other half received only standard triplicate therapy for the same period. The findings of this randomized controlled trial allow concluding that the sweet fennel seeds assessed has a synergist efficacy whit standard triplicate therapy in patients with peptic ulcer caused by Helicobacter pylori and is a safe alternative option for the treatment of peptic ulcer.

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STUDY OF ANTINEPHROTOXICITY EFFECT OF *BRASSICA RAPA* L. HYDROETHANOLIC EXTRACT IN MALE DIABETIC RAT INDUCED WITH GENTAMICINE

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Aminoglicosids are widely used in renal and liver disorders. Gentamicine has some side effects in kidneys as nephrotoxicity and hepatotoxicity especially in diabetes. The aim of this study is to investigate the effect of *Brassica rapa* extract (BRE) on treatment of nephrotoxicity and hepatotoxicity which induced by gentamicine in rat. Method and matherials: The 42 male rats were divided in 6 groups randomly: control (taking normal salin), diabetic (STZ 60mg/Kg), treated 1(low dose BRE 300mg/ Kg/ day+ gentamaicine+ STZ), treated 2 (high dose BRE 600mg/Kg/ day+ gentamicine+ STZ), gentamicine only and gentamaicine treated with high dose 600mg/Kg/day BRE. All drugs and extract administrations were done intraperitunally. After the examination the urine samples and blood samples were collected from heart directly and AST, ALT and AP, LDH enzymes were analyzed and the microscopic studies of hepatic tissue were done. The all data were expressed as mean ± SEM. Statistical significance was accepted at $P<0.05$. Results: Our data showed that the gentamicine has nephrotoxicity effects in kidney's rat. The diabetic rats have infected severity in kidneys with gentamicine ($P<0.01$) compared with gentamicine treated alone. The BRE can inhibit the hepatotoxicity progressing in rats which induced with carbon tetrachloride ($P<0.001$). The serum liver enzymes in rats induced with carbon tetrachloride were increased compare control group ($P<0.001$) and in treated rats byBRE were decreased significantly compared with toxic groups ($P<0.01$). The BRE has anti-inflammatory and antinephrotoxicity effects in diabetic and gentamicine induced rats ($P<0.001$). The Brassica rapa has antioxidant and anti-inflammatory effects in male rats which induced by gentamicine .

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ANTIMICROBIAL ACTIVITY AND CHEMICAL COMPOSITION OF ESSENTIAL OILS OF FLOWER OF *PULICCARIA GNAPHALODES* FROM IRAN

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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 flower of *P. gnphalodes* were determined. Flower of *P. gnphalodes* were subjected to hydrodistillation in a Clevenger – type apparatus until there was no significant increase in the volume of the oil collected. The yield of the oil was 0.21 (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. 42 components were identified constituting more than 95.3% of the oil. α-Pinene (15.1%), germacrene D (5.3%), β-pinene (4.5%), myrcene (9.4%), β-phellandrene (5.5%), hexadecanoic acid (12.5%), spathulenol (6.3%), β-cadinene (6.1%) and caryophyllene (6.1%) were major components in oil of flower 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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PHYTOTOXIC POTENTIAL OF LIMONENE

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Limonene is from a family of hydrocarbons produced by plants-known as 'terpenes' possessing a strong smell of oranges. Limonene is an orange terpene. Terpenes are present in essential oils, especially citrus oils. Limonenes have anti-inflammatory effects. In this study, the inhibitory effects of Limonene on the germination and growth of *Lactuca sativa* were evaluated. Limonene was dispersed by twen20 and different concentrations of it (1, 0.1, 0.01, 0.001 mg/ml) were prepared with dissolving in deionized water. Our result indicated that limonene reduced root and shoot growth of seedling at the concentration higher than 0.1 mg/ml ($p<0.05$).the compound significantly reduced the shoot and root growth of lettuce seedling at 2 tested concentrations (1 and 0.1). It was concluded that Limonene a natural compound, can be condidated for synthesis of a bioherbicide. Due its considerable phytotoxic activities.

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EFFECTS OF POLYPLOIDY ON CHLOROPHYLL CONTENTS AND BIOMASS RESULTING OF MEDICINE HERB HENBANE LATTICE (*HYOSCYAMUS RETICULATUS* L.)

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Henbane lattice (*Hyoscyamus reticulatus* L.), as important medicinal herb, belongs to solanaceae family is native of Europe. *Hyoscyamus* species are rich sources of tropane alkaloids, mainly hyoscyamine and scopolamine [1, 2]. Tropane alkaloids compounds found in plant structures. Today using *In vitro* induction of polyploidy techniques by used chemical mutagen such as colchicine, widely used in medicinal plant breeding programs. Flow cytometry is the pre-eminent method for evaluation of the induced polyploidization. However, alternative confirmation methods, such as Chlorophyll contents and biomass resulting, are also used. Since polyploidization has many consequences for plant growth and development, morphological observations have been studied intensively over the years and have found its way to several applications in plant breeding. In this study, we examined the Chlorophyll contents and biomass resulting of *Hyoscyamus reticulatus* L treated with different concentrations of colchicines. For the measurement of Chlorophyll contents, twenty well expanded leaves of each plant were removed from both control and treated plants. ANOVA Results showed that Chlorophyll contents per unit leaf area are significantly different between tetraploid and diploid plants ($P<0.01$). Also, there is significant difference between both control and treated plants in wet weight. So, final analysis of polyploid candid plants by flow cytometry indicated that Chlorophyll contents can used as an index to detect polyploid plants.

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COMPOSITIONS AND THE IN VITRO ANTIMICROBIAL ACTIVITIES OF THE FLOWERS ESSENTIAL OIL OF *ACHILLEA MICRANTHA* FROM IRAN

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Achillea is a one of the most important genera of the Asteraceae family with regard to the number of species. Some species of this genus are important medicinal plants and their essential oils and extracts have been used for medicinal purposes. In this investigation flowers of *Achillea micrantha* Willd., known to has medicinal activity, collected from Neyshabur, Northeast of Iran, was subjected to hydrodistillation (HD). Chemical compositions of the essential oil isolated from flower of plant was analyzed by GC/MS method, resulted in the identification of 48 constituents representing 96.9% of the total contents, respectively. In the oil of flower camphene, borneol, p-cymene, geraniol, piperitone, terpinen-4-ol, bornyl acetate, β-caryophyllene, β-damascenone, germacrene D, β-bisabolene, γ-cadinene and caryophyllene oxide were the major constituents. While amongst the components of the oil oxygenated monoterpenes (40.8 %) were predominant, sesquiterpene hydrocarbons were in second place in oil of flower (35.1 %). Hence, chemotype of the essential oils from flower of *A. micrantha* was determined, which belongs to germacrene-D/ borneol. *In vitro* antimicrobial activity of essential oil of flower of *A. micrantha* were investigated against a panel of seven strains of bacteria (gram-positive and gram-negative) by disc diffusion method and the minimum inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) determination. The studied sample was active against gram (+/-) bacteria.

THE EFFICACY OF BRONCHOBARIJ® COMPARE WITH DEXTROMETHORPHAN IN COUGH: A RANDOMIZED, DOUBLE-BLIND CLINICAL TRIAL

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Cough is the most common symptom of lung and airway disease. Cough incidence in cold is 83% in the first 48 hours to 26% in 14 days after. In phytotherapy expectorant and mucolytic effects of plants such as thyme, fennel, eucalyptus, marshmallow and ivy has a special position for the relief of cough. Avishan-e shirazi (*Zataria multiflora*) and marshmallow (*Althaea officinalis*) are used to treat respiratory tract infections. Therefore, the present study was carried out to compare the effects of bronchobarij® that contains extracts of avishan-e shirazi and marshmallow, with dextromethorphan in the treatment of acute cough. In a randomized double blind clinical trial, patients with cough were allocated randomly in two therapeutic groups of bronchobarij® syrup (G1, n=78) or dextromethorphan syrup (G2, n=79) and asked them to take these medicine 5 ml every 8 hours for 4 days. Plan executive has been obliged 24, 48 and 96 hours after starting treatment. The cough improvement evaluated by VAS. Wilcoxon and paired t-test were used for analyzing the results and Mann-Whitney U and T tests were used for comparing the effects of two medicines. Finally, to analyze the severity of cough at different times of study, ANOVA with repeated measurement was used. According to results of this study, there was no significant differences between two groups in terms of sex, age, job, education, duration of cough and VAS score in the baseline($p>0.32$). After 24 hours, cough improvement in G1 and G2 was 79.4% and 79.7% and after 48 hours was 65% and 58.3% and after 96 hours was 38.9% and 49.3%,respectively ($p>0.5$). There was no statistically difference between efficacy of two drugs in the treatment of cough. Therefore, the researchers concluded that bronchobarij® syrup can be prescribe as an effective herbal medicine and an alternative choice for dextromethorphan in the treatment of acute cough.

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CHEMICAL COMPOSITION AND YIELD OF ESSENTIAL OIL FROM GREEN LANDRACE OF BASIL UNDER DIFFERENT DRYING METHODS

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Basil (*Ocimum basilicum* L.) belongs to the Lamiaceae family, 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]. Drying of basil is an effective method that inhibits the growth of microorganisms and delays the onset of some biochemical reactions in the final product. Hotair-drying, however, can cause heat damage and severely modifies the physical and chemical characteristics of the marketed plant [2, 3]. Although freeze-drying can be used to circumvent heat damage and produce a product with superior physical and chemical qualities, it is considered a costly process [3]. The leaves of *O. basilicum* L. (green landrace) were dried by drying methods, including shade-drying, sun-drying, oven-drying, and freeze–drying. The essential oils of fresh and dried samples were obtained by hydro-distillation and, were analyzed by using gas chromatography–mass spectrometry (GC–MS). The highest essential oil yield was obtained by shade-drying and freeze–drying. The main components in essential oils of basil were methyl chavicol, geranial, and neral. Generally, drying treatments of aerial parts of *O. basilicum* L. (green landrace) changed some main constituents in the essential oil.

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THE EVALUATION OF THE ANTIOXIDANT ACTIVITY AND TOTAL PHENOL CONTENT OF ARTEMISIA DRACUNCULUS L. AND *PEGANUM HARMALA* L.

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The genus *Artemisia* is a small shrub from the Asteraceae family. In Iran, Tarragon (*Artemisia dracunculus* L.) is called "Tarkhon" and as a traditional medicinal plant is used for the treatment of stomach pains, pyrexia, diabetes and parasitic or bacterial infections [1]. *Peganum harmala* (known as harmal) belongs to family Zygophylaceae and is a multipurpose medicinal plant. *P. harmala* has great variety of pharmacological and biological activities such as antibacterial, antifungal, anticancer, analgesic and anti cholesterol lowering [2]. In this study, the total phenol content and antioxidant activity of two different extracts (Ethanol and Aqueous) from the whole herb of *Artemisia dracunculus* L .and *Peganum harmala* L. were determined using spectrophotometric methods. Antioxidant activity of extracts were expressed as percentage of DPPH radicals inhibition and IC_{50} values (µg/ml) [3] and in the FRAP assay the antioxidant activity reported following to concentration of the Fe^{2+} per milligram of the samples ($mMFe^{2+}$/mg sample). In both methods, and in each plants, the Ethanol extract was showed higher antioxidant activity. In DPPH, antioxidant activity were IC_{50}= 38.99 and 53.13µg/ml for *A. dracunculus* and *P. harmala* and in FRAP test, they were 58.47 and 50.75 $mMFe^{2+}$/mg sample for *A. dracunculus* and *P. harmala* respectively. Butylated hydroxyl toluene (BHT) and Ascorbic acid were used as standards that showed IC_{50}=4.85 µg/ml and 60.75 $mMFe^{2+}$/mg sample respectively. For measurement of the Total phenol content, Folin- Ciocalteu method was used and Gallic acid (GAE) was tested as standard. The result was showed 7.57 and 5.73 mgGAE /g D. W for *A. dracunculus* and *P. harmala* respectively. The high contents of phenolic compounds and antioxidant outcomes indicated that these compounds contribute to the antioxidant activity. The *A. dracunculus* and *P. harmala*can be regarded as promising candidates for natural plant sources of antioxidants with high value.

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EVALUATION OF KNOWLEDGE, INSIGHT AND PREFERENCE OF PEOPLE TO MEDICINAL PLANTS APPLICATION IN QOM CITY

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In order to evaluate knowledge, insight and preference of people to medicinal plants consumption in Qom city, a case study was conducted during the years of 2011-2012by using questionnaires and interview with three groups of people (common people, pharmacists and herbal shopkeepers). Different questions were asked from 30 randomly selected pharmacies, herbal shops and people in different parts of the city. Results indicated that in general, pharmacist and people believed to herbal drugs not very strongly and among supplied herbal drugs in pharmacies, Sylax (as a laxative drug) was the best seller drug. The price of herbal drug was more than chemical drug and in average around 25-50 type of herbal drugs were supplied in pharmacies. The main problems for selling herbal drugs were limitation of this kind of drug in doctor's prescriptions, their high price and less information of people about them. Herbal shopkeepers believed strongly to herbal drugs and most of them had chosen their job based on their interest to medicinal plants and their products. People preferred to buy herbal drugs (in form of raw material) from herbal shops compared to pharmacies (in form of processed material). Most herbal shopkeepers prepared their needs from rural people and wholesalers. The most requested herbal drug was for stomachache remedy in herbal shops and also borage was the best seller medicinal plant in herbal shops. The trend of medicinal plants consumption was accelerated during the last 5-10 years because of lesser side effects of them compared to chemical drugs. People have learned from indigenous knowledge of their elder family about medicinal plants application. However, the long period for remedy with herbal drugs caused less consumption of them between people in spite of their belief to herbal drug. In comparison of different family classes in the city (up and down town) results showed that preference and belief of people to traditional medicine and application of medicinal plants was higher in people that settled in down-town compared to up-town.

INVESTIGATION ON SPECIES DIVERSITY AND ETHNOBOTANY OF NEGLECTED MEDICINAL VEGETABLES IN IRAN: A CASE STUDY OF THEIR SUPPLIED MARKET IN TEHRAN AND KARAJ

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Overutilization of indigenous vegetables from natural habitats because of nutritional value and income generation for rural communities, cause a serious threat for biodiversity. In this regard, an investigation was conducted to study species diversity and ethnobotany of indigenous vegetables in Tehran and Karaj during the years of 2010-2011 and 2011-2012 via semi-structured questionnaire distribution and interview with people both suppliers and consumers. Results showed that in average 18 plant species belonging to 8 plant family were identified which collected from natural habitats of Norht-West, West and North region of Iran. Early spring till late spring collection from the wild was a normal practice by the local people. Leaves and stem were the main plant parts used and in some cases bulb. Food application was more important than medicinal application. The main mode of usage was cooked form and in some cases as fresh usage or aromatic water. Indigenous knowledge of indigenous medicinal vegetables was transferred to people via elder people experiences. It seems primary results of this study can provide proper information for domestication and cultivation of indigenous vegetables (in order to nutritional or medicinal importance) till help to sustainable supply of mountainous medicinal vegetables and conservation of their natural habitats.

EFFECT OF IRON CHELATE AND POTASSIUM FERTILIZER ON MORPHOLOGICAL CHARACTERISTICS OF PSYLLIUM (*PLANTAGO PSYLLIUML.*)

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Psyllium (*Plantago psyllium* L.) is an herbaceous annual medicinal plant. Nowadays, it is used in medicinal industry [1]. This experiment was designed to study the effect of iron chelate and potassium fertilizer on morphological characteristics of psyllium. This factorial experiment was carried out on randomized complete blocks design with three replications. Three levels of iron chelate (0, 1 and 2 $g.L^{-1}$) and four levels of potassium (0, 2, 3 and 4 $g.L^{-1}$) were sprayed on aerial part of psyllium. The results showed that the iron chelate had significant effect on leaf dry weight and pod number ($P< 0.05$), and also the effects of potassium fertilizer on plant height and pod dry weight ($P< 0.01$), shoot dry weight and stem dry weight were significantly different ($P<0.05$). The highest amount of shoot dry weight, leaf dry weight, pod dry weight and pod number were found in foliar application of iron chelate (2 $g.L^{-1}$). Also, the highest amount of plant height, shoot dry weight, stem dry weight, pod dry weight and root dry weight were observed in 2 $g.L^{-1}$ potassium. In conclusion, these compounds had positive effect on morphological characteristics of psyllium.

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THE EFFECT OF DIFFERENT CONCENTRATIONS OF JASMONIC ACID ON SOME AGRONOMIC TRAITS OF PEPPERMINT (*MENTHA PIPERITA* L.)

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The experiments to study the effect of different levels Jasmonic acid on some traits Peppermint Farm Branch University in the summer of 1391 was performed. Its pilot was conducted in a completely randomized block design. Treatments Jasmonic acid at levels of 50, 100, 150 and 200 ml, control treated with distilled water and ethanol, respectively. Maximum shoot length, inflorescence, leaf dry weight, dry weight and root dry weight of inflorescences were treated micro Jasmonic acid. Microliters Jasmonic acid treatment effects on plant growth was significant at the 1% level. Based on these results Jasmonic acid 100 ml of was the best treatment for Peppermint. Jasmonic 50 and 200 ml ethanol and treatments on dry matter and length ($p < 0/05$) had a significant influence. Maximum length (37 cm) in 50 ml Jasmonic acid treatment was found to be statistically not significantly different from control treatment. Minimum length (20 cm) in 200 ml Jasmonic acid treatment was observed. Jasmonic acid application on the condition of not using Jasmonic acid and 50 ml Jasmonic acid had the greatest length and the use of ethanol and 200 ml Jasmonic acid reduced shoot length were observed [1-3].

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COMPARING EFFECT OF THE GHICH (*ZYGOPHYLLUM EURYPTERUM*) WATER EXTRACT AND PHENYTOIN CREAM (1%) ON THE CUTANEOUS WOUND HEALING IN THE MOUSE (*MUSE MUSCULUS*)

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Ghich (*Zygophyllum eurypterum: Zygophylaceae*) is a shrub plant with woody branches that can be seen in the tropical and temperate communities scattered in the sagebrush plains. Ghich in ash form is used traditionally by Rafsanjan mountain village peoples for accelerates wound healing. Comparing the effect of the *Z. Eurypterum* water extract and Phenytoin cream 1% on the cutaneous wound healing in the mouse (*Mus musculus*) was the main purpose in this study. Seven groups of the adult male mice (*Mus musculus*) were tested in this experimental study. In this work, after anesthetizing the mice, 7/85 mm^2 area of the skin at dorsal part of the mice was removed in full thickness. From the first day of the operation wound, water extract and phenytoin 1% were applied at 0.1، 0.2 and 0.05 (mice/day) to the wound in water and Phenytoin groups respectively. The control group only received physiological saline. The percentage of the wound healing in 3th, 6th, 9th, 12th and 14th days, also wound surface every day were measured. The time needed for complete wound healing was determined. The mean wound surface on 6th, 9th, 12th and 14th days after operation wound, for all three groups of the water extract was lower than the cream and control groups. Also the mean wound surface of 50 and 100 extracts on 12th and 14th days was lower compared to control groups. The percentage of wound healing showed a significance difference between cream and water extract 100 on 6th, 9th, 13th days ($p<0.001$) and 14th day ($p<0.01$). The required time for complete wound healing was lower significantly than control group in 4.73, 1.73 and 0.47 days respectively in 100, 50 and 200 water extract and 1.58 day for Phenytoin ($P \leq 0.001$). Water extract of the *Z. eurypterum* rises cutaneous wound healing and decreases the time required for wound healing in mice. Further research is needed to determine the mechanisms of the *Z. eurypterum* water extract on the wound healing.

THE EFFECT OF PRIMROSE OIL ON THE PREMENSTRUAL SYNDROME AMONG THE FEMALE STUDENTS IN LORESTAN OF MEDICAL SCIENCES UNIVERSITY

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Premenstrual syndrome is a stage with one or more symptoms which happens before the Menstruation period. This disturbs the person's daily activities. Different assumptions exist as the cause of the disease. Among these assumptions Central Serotonin and Dopamine Reduction is the most prominent one .In fact, using anti-depressant drugs like venlafaxine and Fluoxetine and other drugs can absorb Serotonin and help this disorder. In addition to the chemical drugs, herbal drugs are considered important in curing this disease. Gamma- linolenic acid (GLA) is one of the scare kind of fat which exist in limited kinds of herbs. Most texts agree that 73% of (omega 3) Linoleic acid exits in primrose oil. Since primrose oil is a rich source of omega 3, the researcher tries to examine the effect of primrose oil are the treatment of primrose oil syndrome. The present study is a clinical- trial which includes 80 female university students living in the hostels. In order to select the sample ,a questionnaire based on the DSM IV-TR used for premenstrual syndrome .After selecting the subjects ,they were put in two groups(experiment and control) randomly .For the experimental group ,primrose oil (1500 mg) daily was given and for the control group placebo was used . First, the whole grade of the symptom (the scale of 0-10 for pain scale) was computed .Then the subjects (in a three-month period) were examined by a specialist for the symptoms of control group. At last, the symptom grades were computed and compared. Grades were 53.50 in experiment group and 53.38 in control group. There was no significance difference between the pain grades of the two grades of both groups were in the first, second and third month. The measure showed a significant difference in the pain grade during three periods in experimental group while there was no significant difference in decrease in pain grades of the control group. Also the findings don't show any significant difference between the grades of two groups. This indicates that primrose oil tablet had an important effect on the decrease of the pain grade of the experiment group. Based on the findings which show the impact of primrose oil and its harm on the sick, we can propose this drug for the treatment of premenstrual syndrome as the first alternative.

THE EFFECT OF *ZYGOPHYLLUM EURYPTERUM* LEAVES ON THE CUTANEOUS WOUND HEALING IN THE MOUSE (*MUS MUSCULUS*)

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Ghich (*Zygophyllum eurypterum: Zygophylaceae*) is a shrub plant with woody branches that can be seen in the tropical and temperate communities scattered in the sagebrush plains. Traditionally, the Ghich ashes are used by indigenous people at Rafsanjan mountain villages. In this study we compared the dough of the Ghich leaves and the Phenytoin cream 1% on the skin wound healing rate in the souri mouse (*Musmusculus*).This experimental study was performed on the seven groups of male mice (*Musmusculus*). After mice anesthetizing, the skin lesion area with7/85 mm^2 was created on the animal back.From the first day, phenytoin cream 1% and leaves dough were applied to the wound in cream and dough groups respectively. The control group received no treatment and only received physiological saline. The wound surface every day and the percentage of wound healing in 3th, 6th, 9th, 12th and 14thdays were measured. Also the time needed for complete wound healing was determined.The mean wound surface on 6th, 9th, 12th and 14th days after operation wound, for the leaves dough was lower than the Phenytoin and control groups. Wound healing Percentage by phenytoin was significantly lower than dough leaves on 6th, 9th and12thdays ($P < 0/001$). The required time for complete wound healing was 6/33 and 1/58 days by dough leaves and Phenytoin respectively that it was less than the control group. The required time for complete wound healing was significantly lower in Phenytoin and control groups compared to the dough leaves ($P \leq 0.001$). The leaf dough of *Z. eurypterum* raises the cutaneous wound healing in mice and decreases the required time for wound healing. Although further research is needed to determine the mechanisms of the *Z. eurypterum* leaves on the wound healing.

EFFECTS OF NITROXIN, HUMIC ACID, FLUVIC ACID ON QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF PEPPERMINT (*MENTHA PIPERITA* L.)

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Today, having a sustainable farming system, using factors that improve the ecological aspects and reduce environmental risks is necessary. In this regard, a test in a randomized complete design with three replications were applied. The treatments included, no fertilizer (control), Humic acid (1000 mgl), Fluvic acid (1000 mgl), Nitroxin (4 L/h), Humic acid: Fluvic (50-50), Humic acid: Nitroxin (50 -50), Nitroxin: Fluvic acid (50-50) were used as a foliar application and irrigation water. The results showed there were significant effects on many traits in comparison with control, such as, essential oil production , number of nodes, number of lateral branches, shoot dry weight, root dry weight, total chlorophyll, chlorophyll-a and chlorophyll-b. The maximum, essential oil production, number of nodes and secondary stem, root and shoot dry weight, plant height, chlorophyll (a, b, t) were obtained by Nitroxin, Humic acid, Humic acid and Fluvic acid (50-50) and Fluvic acid fertilizer treatments . So it seems that the application of fertilizer, manure and Humic acid and Fluvic, Nitroxin had significant effects on some growth characteristics and yield of Peppermint.

EFFECTS OF SALICYLIC ACID ON MORPHOLOGICAL CHARACTERISTICS AND ESSENTIAL OIL OF PEPPERMINT (*MENTHA PIPERITA*) UNDER IRRIGATION SCHEDULES.

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Application of Salicylic acid (SA) as a phytohormone has been increased for resistance induction to some to stresses such as drought. The main goal of this experiment was to evaluate the effects of morphological characteristics of peppermint under irrigation schedule. For this purpose a factorial trial based on completely randomized design was conducted with 4 irrigation schedules, daily irrigation (control) and stopping irrigation for 1,2,3 days with 2 levels of SA (0 (control) ,60 mM) with 3 replications, foliar application of salicylic acid. The results showed that with increasing irrigation schedules decreased significantly in height, number of secondary stem, secondary stem length, stem and root fresh weight, root and stem dry weight, percentage of essential oil was observed. Foliar application of salicylic acid in 60 µM concentration has also significantly increased all parameters under irrigation schedules. But had no significant effect on the percentage of essential oils. The interactions between SA and irrigation schedules, the application of salicylic acid significantly increased the root dry and fresh weight.

ESTIMATION OF ANTIOXIDANT ACTIVITY AND TOTAL PHENOL CONTENT OF THE FRUIT EXTRACTS OF *SAMBUCUS EBULUS* L. FROM MAZANDARAN

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Sambucus ebulus L. (Dwarf elder), from the family Caprifoliaceae, extensively grows in the northern region of Iran. There are several reports concerning the anti-inammatory, and antinociceptive effects of the plant *S. ebulus* in Iranian traditional medicine. A literature survey of medicinal plants used as analgesics and anti-rheumatics was carried out amongst Iranian people living on the coast of the Caspian sea [1]. Also the Fruits of *S. ebulus* are used fresh or as a tea, and are applied treatment of inflammatory gastrointestinal disorders [2]. The present study was carried out to evaluate the amount of Total phenols content using Folin-ciocalteu method [3] and antioxidant activity by 2.2-diphenyl-1-pycrilhydrazyl (DPPH) [4] and Ferric Reducing Antioxidant Power (FRAP) assays. For antioxidant activity tests, six extracts (Methanol, Ethanol, Aqueous, Chloroform, Ethyl acetate and 2-propanol) were used and the Aqueous extract in both DPPH and FRAP showed highest antioxidant activity (IC_{50}=153.43 µg/ml, 60.77 $mMFe^{2+}$/mg sample) compared with other extracts, an other hand the Chloroform extract was lowest antioxidant activity in DPPH and FRAP assay. Butylated hydroxytoluene (BHT) and Ascorbic acid were used as standard that showed IC_{50}=17.43 µg/ml and 60.75 $mMFe^{2+}$/mg sample respectively. Also the amount of Total phenol was measured and it was founed to be 22.92 mg GAE /g D.W. Gallic acid (GAE) was used as standard in this method. The results suggest that antioxidant activity and possible related to it beneficial effects of *S. ebulus* extracts are primary due to its Total phenol content and *S. ebulus* 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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STUDY OF PROTECTIVE EFFECT OF *MALVA NEGLECTA* L. HYDROETHANOLIC LEAF EXTRACT IN MALE RAT INDUCED WITH CARBON TETRACHLORIDE

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In some renal damages the inflammation and necrosis in kidney were seen when induced with toxins. Medicinal plants have protectivity effects and can inhibit the nephrotoxicity progress in kidney. In this study the protectively effect of *Malva neglecta* hydroethanolic extract (MHE) were investigated. 35 male rats with 230-250 gr body weight were divided randomly in 5 groups (n=7): control (taking normal saline,0.5 ml/day, IP), sham(taking olive oil, 0.5ml/single dose, IP),carbon tetrachloride 1:1 with olive oil,0.5ml single dose, IP), treated 1&2 (carbon tetrachloride 1:1 with olive oil, 0.5ml single dose and 300mg/Kg and 600mg/Kg MHE /day for 96 hrs, IP). After the examination the blood samples were collected from heart directly and AST, ALT and AP enzymes were analyzed and the microscopic studies of kidney tissue were done. The all data were expressed as mean ± SEM. Statistical significance was accepted at $P<0.05$. Our results showed that the carbon tetrachloride has toxicity effect in kidney and it can inflammation and necrosis in kidney tissue ($P<0.01$). The MHE can inhibit the nephrotoxicity progressing in rats which induced with carbon tetrachloride ($P<0.001$). The serum enzymes in rats induced with carbon tetrachloride were increased compare control group ($P<0.001$) and in treated rats by MHE were decreased significantly compared with toxic groups ($P<0.01$).

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STUDY OF DEVELOPMENTAL STAGES 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. The plant has a wide range of adaptation to soils with different conditions and help to improve the acidic soils by means of cautions absorption. 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. In order to evaluation of phenological traits and genetic diversity of chamomile, seeds of 15 landraces 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. For this study, mainly the phenological observations were measured. Number of days and cumulative growing degree-days from planting to developmental stages were recorded. Univariate statistical analysis including coefficient of variations, means, maximum and minimum were measured. Analysis of variation was used to demonstrate the interaction between various factors in affecting the traits. The cluster analysis was performed using Ward's method with Euclidean distance squared for standard variables by SPSS software. Analysis of variation showed that there was very significant difference between all traits in two years. Growth degree-days were 842.57°C, 570.55°C and 1413.12°C for vegetative phase, Reproductive phase and perfect flowering, respectively. Results showed that flowering duration had minimum coefficient of variation in both of year, end of flowering in first year and 50% flowering in second year had maximum coefficient of variation. Correlation between flower yield with 50% flowering and End of flowering were positive and significant. According to the cluster analysis, 15 populations were classified into 4 groups. Phenological studies are as important to our understanding of species interactions and community function as the weather aspects. The phenology of plant communities can be study by dealing with particular life-history stages separately, such as germination, leafing, and flowering. Each of these events occurs in its own calendar, but there is clearly some interdependence between them. Changes in the timing of life-history stages of crops could be of great economical importance, because they could have direct impacts on yield formation processes and final crop yield.

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THE EFFECTS OF EVENING PRIMROSE OIL ON DEPRESSION DISORDERS ON PATIENTS AT PSYCHIATRY CLINIC OF KHORAMABAD

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Introduction: Depression disorder is one of the most common mental diseases which cause frequent disabilities. As it has been proved that there exists a relationship between Omega3 and depression, the present study was designed to investigate the therapeutic effects of evening primrose oil on depression. The present study was a clinical trial which included 80 patients selected randomly. The subjects were interviewed by a psychiatrist and Beck inventory was administered to measure the degree of their depression .The data were collected and analyzed. The findings indicated that the average grade obtained from Beck inventory in all the three groups under study with primrose and Nortripytilin during a 3- month's period decreased remarkably. Also, the patients 'performances improved during this period. Statistical analysis showed a significant relationship among average grades in Beck inventory and performance level gained by the patients. Based on the research findings and the proved effects of primrose on the treatment of depression, it is recommended that these should be prescribed for non-psychotic depression as the first stage of treatment.

INVOLVEMENT OF HISTAMINERGIC SYSTEM IN ANTINOCICEPTIVE EFFECT OF *ANTHEMIS TRIUMFETTIL* L. ESSENTIAL OIL IN RAT

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The Essential Oil (EO) which is produced by different plants confirms analgesic and anti inflammatory activities which affects by different ways. Therefore, in the present study were studied the antinociceptive effects of *Anthemis triumfettil* L. essential oil on somatic model of nociception and involvement of histaminergic system in this response in rat. Somatic model of nociception was induced by subplantar injection of formalin (50 µL, 1%) in right hind paw in rat. The EO (7.5, 15, 30 and 60 mg/kg), chlorpheniramine (20mg/kg) were administered intraperitoneally (i.p). Subplantar injection of formalin (50 µL, 1%) that is called formalin test, produced a biphasic pain response (first phase: 0-5 and second phase: 15-40 min after injection). EO in all doses demonstrated analgesic effect to compare with control group and specially EO at dose 30 mg/kg significantly ($p < 0.05$) reduced second phases of formalin test. Also, i.p injection of chlorpheniramine (20 mg/kg) reduced the second phase (inflammatory phase) of formalin test. Moreover, pretreatment with chlorpheniramine (20 mg/kg) before EO (30 mg/kg) significantly ($p < 0.05$) suppressed the second phase. The results show that EO produced antinociceptive effect in formalin test in rat. Also, pretreatment of chlorpheniramine (H_2-receptor antagonist) before EO were caused inhibition of inflammatory phase of somatic model of nociception. This results suggested that, at least, involvement of the histaminergic system in antinociceptive response of *Anthemis triumfettil* L. essential oil in rat. Further studies are in progress in order to enable us to understand the precise action mechanisms of *Anthemis triumfettil* L. essential oil.

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COMPARISON OF SEED PRODUCTION IN SELF-POLLINATED YARROW (*ACHILLEA MILLEFOLIUM* L.) POPULATIONS COLLECTED FROM DIFFERENT REGION

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Yarrow (*Achillea* L.) belongs to Asteraceae family and comprised more than 100 species. Among the species, *A. millefolium* is widely distributed all around the world. Yarrow has a corymbs inflorescence and achene fruit. This species have different ploidy levels from diploid to octaploid. In this study, ten populations of yarrow (*A. millefolium*) collected from the northern hemisphere, including Iran (IRI), Austria (AUS), Slovenia (SLO), Japan (JPN), USA (US9 and US11), England (UK), Spain (ESP), Lithuania (LIT), Canada (CAN), were planted in a randomized complete block design (RCBD) with three replications. In this study, the inflorescences of a plant divided into two parts and then half of them was covered with a bag (for self-polination) and the others let to have open-pollination. After physiological seed ripening, some characteristics such as number of seeds produced by self-pollination and open pollination were counted. ANOVA analysis revealed a high variation for the studied traits among the populations. Population from UK produced the highest number of self pollinated seeds (554), while the lowest one counted for population from CAN (0). High number of open pollinated seeds were observed in populations of US11 (11463) and Uk (10831seeds), while the low numbers obtained in populations SLO (887) and CAN (180seeds). The results showed that the highest ratio of self-pollinated seed to open pollinated one was obtained for population UK (3.1%), however, the low ratio belonged to population CAN (0%). Self-pollinated seeds can be used in breeding programs to produce more pure seeds in this species [1, 2].

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DOSE DEPENDENT EFFECT OF ALOE VERA CRUDE EXTRACT ON GROWTH PERFORMANCE AND HEMATO-IMMUNOLOGICAL INDICES OF *ONCORHYNCHUS MYKISS*

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There is a growing interest in using medicinal herbs as immunostimulants in aquaculture (1). Although Immunostimulating effects of many herbal medicines in various fish species were reported, but there are few work done on effect of *Aloe vera* on immune response of fish (1, 2 and 3). Then in this study the effect of oral administration of *Aloe vera* crude extract on growth indices, hematological parameters and immune responces of rainbow trout were investigated. One thousand five hundred rainbow trout fingerling (21.3±2.4 g, Mean±SD) were divided in five groups, each in triplicate, in farm scale. Groups 1 were fed with non-supplemented food, group2 were fed with 0.05% *Aloe vera* supplemented food, group 3 were fed with 0. 1% *Aloe vera* supplemented food, group4 were fed with 0.2% *Aloe vera* supplemented food and group5 were fed with 0.5% *Aloe vera* supplemented food. Experiment last for 60 days and growth indices calculated in day 30 and 60ofexperiment. At the end of experiment blood samples of 5 fish in each replicate were taken and hematological parameters (PCV, Hb, RBC, WBC, MCH, MCV, MCHC) and immunological indices (serum lysozyme and bactericidal activity) were compared among the groups. Results showed that growth indices (SGR, FCR, PWG and PER) and some immunological parameters were significantly increased in fish fed with 0.2% and 0.5% *Aloe vera* supplemented food compare to control group. Hematological parameters including HB, RBC, WBC and PCV showed a significant enhance in Aloe treated groups compare to the control group ($P<0.05$) but MCV, MCH, MCHC showed no significant change among the groups ($P>0.05$).Based on this study it can be concluded that oral administration of 0.2% and 0.5% *Aloe vera* not only enhance the growth performance indices but, stimulate immune responses and hematopoetic power of rainbow trout so it can be a proper candidate as growth and immune stimulating agent in aquaculture.

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INTERACTION OF IRON AND ALUMINUM ON GROWTH AND SOME ANTIMICROBIAL PARAMETERS *MELISSA OFFICINALIS*

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Melissa officinalis is an important medicinal plant in worldwide and this plant that have antioxidative property [1]. Iron and other nutrients have essential role in the growth and production of secondary compounds in medicinal plant [3]. Therefore, optimal nutrition of medicinal and aromatic plants had significant role in quality and quantity of production in these group of plants. Aluminum is a heavy metal and toxic levels of this causes oxidative stress in plants and human [2]. In this study the effect of 3 type of iron ($FeCl_3$, chelate and nano iron) (Nano iron producted by khazra company) against Al (0 and 50 µM) toxicity were studied. This experiment was carried out in complete randomized design with 3 replicate hydroponically and some morphologhical and antimicrobial parameters were studied. Antimicrobial activities of the extracts against bacteria were studied by disc diffusion and serial dilution methods. Results showed that in plant that treated with aluminum reduced growth factors. But in plants that treated with $FeCl_3$, chelate or nano iron these parameter increased especially in chelate or nano iron. In addition, plant extracts studied did not showed significant changes in antimicrobial activity. From these results we concluded that different types of iron had significant changes in the growth parameters compared to the control group that did not treated with iron. Substitution of iron fertilizer that making by nano technology and iron chelate in comparision with $FeCl_3$ can rise the quantity and quality of growth in *Melissa officinalis* plants.

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COMPARISON OF ORAL AND INJECTION ADMINISTRATION OF *ECHINACEA PURPUREA* EXTRACT IN GRASS CARP (*CTENOPHARHYNGODON* IDELLA)

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Antibiotic therapy as an important route for treatment of fish disease produces undesirable side effects (1). Certain herbal drugs are having antimicrobial properties as well as potent effect on growth, survival and immune response of aquatic organisms (2 and 3). In this study, effects of administration of *Echinacea purpurea* in oral and intraperitoneal routs on some hematological factors of grass carp (*Ctenopharhyngodon idella*) were investigated. Apparently healthy juvenile grass carp were divided into 4 equal groups: 1- received 400 mg/kg *Echinacea purpurea* in interaperitoneal route (i.p treatment). 2- received 0.5% Echinacea powder in their daily food (oral treatment). 3- received normal saline in i.p route (control i.p). 4- without any treatment (control oral). Blood samples were taken from each i.p treatments in 0, 3, 6, 9 and 12 days after injection, versus in 0, 10, 20, 30 and 40 days after administration in oral treatments. All samples were assayed for Immunological indices: lysozyme activity and serum anti bacterial power and hematological parameters: Packed Cell Volume (PCV), Hemoglobin (Hb), White Blood cells Count (WBC), Red Blood cells Count (RBC), and Differentiation count of leukocytes. Immunological parameter shows lack of statistically significant difference in lysozyme activity in oral treatment and significant increase in i.p treatment ($P<0.05$). Serum bactericidal power increased in both treatments ($P<0.05$). Hematological assay shows no significant differences in PCV, Hb and RBC values at each sampling period, not only in oral treatment but in injection treatment compare to controls ($P>0.05$). WBC values and ratios of leukocytes show significant differences in i.p treatment and control ($P<0.05$). Administration of *Echinacea purpurea* in oral routes didn't change the hematological parameters, but increased WBC value and heterophilratio in injection treatments were seen. Effect of *Echinacea purpurea* in immunological parameters and WBC in i.p route supports hypothesis of immunostimulatory effects of this plant in fish. Based on this study it can be concluded that administration of *Echinacea purpurea* in i.p route stimulate the immune responses of grass carp without adverse effects on hematological parameters, so it can be used as an immunostimulant in aquaculture.

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EFFECT OF *ECHINACEA PURPUREA* CRUDE EXTRACT ON GROWTH PERFORMANCE AND SOME HEMATOLO-IMMUNOLOGICAL INDICES OF *ONCORHYNCHUS MYKISS*

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Administration of commercial antibiotics for disease treatment produces undesirable side effects and looking for proper alternatives seems essential in aquaculture (1). The medical use and immunostimulant effect of *Echinacea purpurea* in mammals has been documented, but few work were done on effect of *E. purpurea* on hematological parameters and immune response of fish (2, 3 and 4). Then in this study the effect of oral administration of *E. purpurea* extract on growth indices and immune responses of rainbow trout were investigated. One thousand two hundred rainbow trout fingerling (20±2g, Mean± SD) were divided in two equel groups, each in triplicate, in farm condition. Groups 1 were fed with food supplemented by 0.5% *E. purpurea* whereas group 2 fed with free extract basal food. Experiment last for 60 days and growth indices calculated in day 30 and 60of study. At the end of experiment blood samples of 6 fish in each replicate were taken and hematological parameters including: PCV, Hb, RBC, WBC, MCH, MCV, MCHC and immunological parameters including: Serum lysozyme and bactericidal activity, serum total protein and globulin were compared between groups. Results showed that growth indices (SGR, FCR, FER and PER) and some immunological parameters were significantly increased in fish fed with Echinacea extract supplemented food compare to the control group, But hematological parameters and serum total protein and globulin didn't show any significant difference between two groups(P>0.05). It can be concluded that Although oral administration of *E. purpurea* to rainbow trout in farm scale stimulate some growth and immunological indices, hematological parameters didn't affect by this supplementation, then *E. purpurea* extract can be evaluated as a growth and immune stimulating agent in trout culture.

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FACTORS INFLUENCING THE USE OF HERBAL PLANTS IN THE PATIENTS CANDIDATE FOR HEART SURGERY IN SELECTED HOSPITALS IN MASHHAD IN 2013

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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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THE ASSESSMENT OF MORPHOLOGICAL TRAITS OF DIFFERENT *MYRTUS COMMUNIS* L. POPULATIONS IN ALBORZ PROVINCE

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In order to investigate the morphological characteristics of different myrtle (*Myrtus communis* L.) populations, this research performed by using randomized complete blocks design with 3 replications in 2013 in Alborz research station, Research Institute of Forests and Rangelands, Karaj, Iran. Treatments were including five myrtle populations from the region of Isfahan, Shiraz, Shah reza, Yasooj and Mamasani. The two years old shoots were taken from the above region in 2012 and transported to the field in spring 2013. Cultivation practice such as regular irrigation and weeding were taken during growth period. In the autumn of 2013, the morphological information such as diameter stem, height of the shrubs, number of lateral branch, number of sub lateral branch, the number of sucker, number of leaf on shrub, weight of leaf at each shrubs, weight of leaves in a hectare, leaf area of each shrubs, area of a leaf, specific area of a leaf, mean length of leaves and mean width of the leaves were measured. The results of variance analysis showed that there is no significant statistical difference between different myrtle populations. The mean measured traits were as diameter stem (0.39mm), shrubs height (37.14cm), number of lateral branch (5.01Number/shrubs), number of sub lateral shrubs (2.14n/bs), sucker (1.39 number/plant), Number of leaf on shrub (109.04), weight of leaf on shrub (1.96g), weight of leaves a hectare (2.2 kg), leaf area of each shrub (228.95 cm^2), leaves area in a hectare (25.44 m^2), area of a leaf (2.36 cm^2), specific area of a leaf (0.22 m^2/kg), mean length of leaves (2.58 cm) and mean width of a leaf (1.16 cm). The results indicated that either the extensive compatibility of *Myrtus communis* in the climate of Alborz Province or common genetic source of the shrubs.

INVESTIGATION OF GEOGRAPHICAL DISTRIBUTION AND MORPHOLOGICAL FEATURES OF VARIOUS VEGETATION OF *ANTHEMIS TRIUMFETTIL* L. IN EAST- AZARBAYJAN PROVINCE

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Medicinal plants are found in the vallies, heels, add some particular areas wildly or naturally. One of those significant medicinal plants is *Anthemis Triumfettil* L. [2]. With the genus of *Anthemis* which is from the family of Asteraceae, and about 130 species of them are distributed in the world. Also, this genus has 39 species of annual, and perennials plants in Iran [3]. Ecological condition has an essential role in the effective substance of medicinal plants [1]. This study was done in order to identify its distributional areas and the features of genus *Anthemis*, and also, to study the variety of its morphological features in this province in June of 2013. This experiment was done in the form of a "systemic–random" design, with the five features of, bush height, number of subsidiary stem, flowering stem height, leaf length, number of stem diameter, number of tracks in stem were measured and assessed. To analyze the obtained data, SAS software was used, and then, in order to compare the means, Duncan test was done at ($p \leq 0.05$). The obtained results from the analysis of various morphological features showed that there were meaningful differences among those vegitation regarding all of the feature of "leaf length".

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SENSITIVITY OF RUMEN ANEAEROBIC MICROORGANISMS TO *SILYBUM MARIANUM* EXTRACT

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This study was conducted to investigate the toxicity of *Silybum marianum* on mixed rumen anaerobic microorganisms using gas production technique. 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 substrate used for fermentation consisted of 15% alfalfa and 85% concentrate mixture. 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]. Treatments were control (no additive) and addition of 300, 600 and 900 mg per liter dry extract of *Silybum marianum*. The extract was pharmaceutical grade with a content of active ingredients greater than 85%. Cumulative gas production significantly decreased ($P<0.01$) with increasing level of *S. marianum* addition in 4, 6, 8, 12, 24, 48, 72 and 96 h after incubation. Also, there was a significant linear decrease ($P<0.01$) in potential gas production (a+b) parameter with addition of the *S. marianum* extract to the culture media. The rate of gas production (c) and dry matter digestibility linearly decreased with increasing level of the extract addition ($P<0.01$). These data suggest that *S. marianum* extract and its flavonolignans (silymarin) has strong inhibitory potential on mixed rumen microorganisms and could be used to manipulate the fermentation process.

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PHYTOCHEMICAL AND ANTIOXIDANT EXTRACT EVALUATION OF THE AERIAL PARTS OF *MENTHA LONGIFOLIA* L. IN TWO HABITATS OF GOLESTAN PROVINCE

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Natural bioactive compounds like flavonoids are the important secondary metabolite. This compounds posses biological properties like antioxidant, anti-aging, anti-carcinogen**.** *Mentha longifolia* L. is an important source of flavonoids compounds. The antioxidant and antibacterial flavonoid compounds have been introduced. In this research, aerial parts of *M. longifolia* were collected in two locality 1) Afratakhte 1540 m and 2) Ziyart 790 m. Phytochemical survey of total flavonoid was determined by Spectro-photometrically and antioxidant activity of ethanolic extract was measured by the antioxidant capacity (TAC) and reduces power (RP) methods [1,2]. Results showed that plants at the higher altitudes have more phytochemical and better antioxidant activity, so that the total flavonoid of ethanolic extract content in aerial parts in Afratakhte region was determined 33.18 $mgQUEg^{-1}$. Total flavonoid comparison between two locals showed that its content in Afratakhte region was more than Ziyart. The antioxidant activities of ethanolic extract in both methods was higher in Afratakhte so that were measured IC50=490 $\mu g\ mL^{-1}$ and IC50=537 $\mu g\ mL^{-1}$ for RP and TAC methods respectively. Our results suggested Afratakhte region has a potential for *Mentha longifolia* cultivating with higher quality.

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EVALUATION AND COMPARISON OF THE ANTIMICROBIAL EFFECTS OF *ECHINACEA PURPUREA* L. AND *SILYBUM MARIANUM* L. FLOWERS AND LEAVES ON SOME BACTERIA SUCH AS *ESCHERICHIA COLI*, *PSEUDOMONAS AERUGINOSA*, *ENTEROCOCCUS FAECALIS* AND *ASPERGILLUS NIGER*

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Leaves and flowers of *Echinacea purpurea* L. and *Silybum marianum* L. species were prepared from Mashhad's Botanical Garden. In this study; antibacterial and antifungal effects of aqueous extract, ethanol and methanol solutions were established using disk diffusion method. The Minimum Inhibitory Concentrations (MIC) and Minimum Concentration (MBC) were determined utilizing tubular dilution procedure. Halo diameter measurements were recorded. Then, antibacterial and antifungal properties of the extracts were compared with various antibiotics. Bacteria were more sensitive than fungi in disk diffusion method. Antibacterial and antifungal extract demonstrate the best consequence in disk diffusion. *Pseudomonas* was the most sensitive bacterium and water extract had the lowest antibacterial and antifungal influence. Leave's antimicrobial activities were greater than that of flowers. As a result, we concluded that susceptibility of bacteria depends on the type of bacterium and its extract [1, 2].

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INVESTIGATION OF *MENTHA LONGIFOLIA* L. MORPHOLOGICAL TRAITS AND INTRODUCTION OF PLANT SPECIES LIFE FORMS IN SOME NATURAL HABITATS OF GOLESTAN PROVINCE

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Menthe longifolia L. is belonging to family Lamiaceae is considered as an important medicinal plant in the world and also in our country which has considerable secondary metabolites, especially essential oils.This research, was performed in three natural habitats consists of: 1) Shahkoh 2300m, 2) Afratakhte 1540m and 3) Ziyrat 790m. Shahkoh and Ziyrat are located in Gorgan and Afratakhte is located in Aliabad. Plants samples were collected during the flowering stage in each habitat mentioned above. Samples identification was done according to studies library and herbarium. Number of families, genera and species were in Shahkoh (16, 19, 25), Afratkhthe (16, 26, 26), and ziyrat (17, 25, 26) respectively. Studying of plant life forms using Raunkiaer's [1] life-form classification showed that geophytes are the most frequent life forms in Afratakhte and ziyrat with 65 and 45 percent respectively and therophytes with 34 percent in Shahkoh. Life form of chamaephytes with 31 percent was only in the Shahkoh. Therefore, these life forms are the most important in these regions. Based on climatic stations annual precipitation amount is reported for Shahkoh 472 mm, Afratakhte 552 mm and Ziyrat 513 mm. Life forms identification is important because it help to recognize environmental conditions. Also, in order to study of the morphological traits of *Mentha* in each habitat, plants at flowering stage were collected. These traits were consists of flowering stem length, leaf length and width, internodes length, inflorescence, leaf to stem weight ratio [2]. The highest and the lowest measured traits were flowering stem length in Afratakhte 61.2, leaf length in Shahkoh 2.63 cm, leaf width 1.31 cm in Afratakhte, the highest and lowest internodes length in Ziyarat 2.50 cm, inflorescence length 2.33 cm in Shahkoh, and leaf to stem weight ratio 0.67 in Afratakhte.

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STUDY OF LIFE FORMS AND CHOROTYPES OF *LAUNAEA ACANTHODES* (BOISS.) O. KUNTZE ELEMENTS IN PASTURAL REGION AS AN IMPORTANT MEDICAL MEDICINE IN XORASAN PROVINCE- NEISHABOOR

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Asteraceae (Compositae) is a vast family of flowering plants, distributed in all parts of the world. It comprises 800 genera and nearly 20,000 species. *Launaea acanthodes* (Boiss.) O. Kuntze is known as one of the most important species of this family. This plant is generally credited with galactagogue and as well as soporific, diuretic and aperients properties. Some are also used in the treatment of infected wounds, as a substitute for *Taraxacum* and applied to the suffering children in fever. Hence, as a consequential medical plant we decided to know its ecological characteristics. The region of Neishaboor is located at east- northern of Iran. This project conclude some about 7 hectare of this region. The average annual precipitation is 91 mm and mean annual temperature is 37/6 ˚C. Density, frequency, abundance, diversity indices and some other ecological properties were measured for *L. acanthodes*. Therefore, some certain companion species traits were determined as follow: A total of 1 genus and 1 species belonged to monocotyledons, 12 genera and 15 species to dicotyledons. The most families were fitting to Asteraceae (6 species) and Fabaceae (3 species). Study of chorology indicated that the most plants were Irano- Turanian floral elements (67%). In this research, hemicryptophytes (53%), therophytes (27%), Champhytes (13%) and Geophytes (7%) made up the most important life forms, respectively [1, 2].

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EFFECT OF SALINITY STRESS ON THE UPTAKE OF SODIUM AND POTASSIUM IN BLACK CUMIN (*NIGELLA SATIVA*)

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High percent of medicines are used in developed countries have herbal origin. With regard to the development of saline lands and the shortage of agricultural lands, it comes into great importance to make use of salt tolerant plant. Cultivation of plants in hydroponic conditions is a reliable and economical methods in order to select the tolerant plant. A greenhouse experiment was carried out in order to study the effect of different salinity levels on uptake of sodium and pottasium with black cumin (Nigella Sativa) in a complete block disign with three replication in 2011. The experiment treatments consisted of four salinity levels (0, 3, 6 and 9 ds/m).The results showed that Concentration of Na increased with increasing salinity. So that concentration of Na in 9 ds/m was more than three times compared with control plants. But, K concentration decreased significantly in high salinity levels. K^+/Na^+ ratio decreased with increasing salinity.

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APPLICATION OF CENTRAL COMPOSITE DESIGN FOR THE OPTIMIZATION OF MICROWAVE-ASSISTED EXTRACTION OF ACTIVE COMPOUNDS FROM *MYRTUS COMMUNIS* L. LEAVES

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Microwave-assisted extraction (MAE) is widely employed in the analysis and the extraction of active compounds from plants. This study demonstrated promising results for microwave-assisted extraction (MAE) of active compounds from leaves of a medicinally important plant, *Myrtus communis* L. The effects of experimental conditions, such as solvent composition, temperature, irradiation time, and sample mass to solvent volume ratio, on MAE efficiency, have been studied using a central composite design. The chemical compositions of the MAE extract were identified by GC–MS and determined by GC–FID. The extraction efficiencies were compared with those obtained by soxhlet extraction. It was also proved that microwave-assisted extraction is a more effective technique compared to the conventional method. The extraction time was reduced, less solvent was used and the amount of extracted active compounds was increased.

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FABRICATION OF CURCUMIN CONTAINING POLYMERIC NANOPARTICLE WITH ELECTROSPRAY METHOD

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Curcumin (1, 7-bis (4-hydroxy-3-methoxyphenyl)-1, 6-heptadiene-3, 5- dione) is a natural based compound which found in the lipophilic extract of the rhizomes of turmeric (*Curcuma longa*). Numerous reports have assigned therapeutic benefit such as anti-tumor, anti-inflammatory and anti-oxidant activities to this compound. However, clinical tests have shown Curcumin has low bioavailability in aqueous systems. For fulfill this deficiency, development of an efficient drug delivery system is of considerable interest. Recent studies show that, by using Nanotechnology based systems can specifically make water soluble formulation of curcumin [1]. Several nano-sized carriers such as phospholipid vesicles (liposomes), micelles, solid lipid nanoparticles, polymeric nanoparticles, emulsions, proteins and other molecular complexes have been developed for the efficient delivery of curcumin. Among them, using polymeric nanoparticle has gain great attraction in last few years. Poly hydroxy alkanoat polymer such as Poly lactic acid (PLA), poly Lactic-co-glycolic acid (PLGA) and polyε-caprolactone (PCL) have more consideration due to there biocompatibility and biodegradability as drug delivery systems. Electrospray method, uses high electric field force to atomize a fluid to producing nanosized particulate systems. These methods is safe and are suitable for drug containing nanoparticle synthesis. In this research, Curcumin containing PCL nanoparticle was fabricated by electrospray method. Experiments were designed based on surface response method. Pretest results show that, optimum polymer concentration for nanoparticle synthesis is 3 %wt. Fabricated nanoparticles was characterized with Scanning electron microscopy (SEM). Obtained data showed that particles size are in range 100-300 nm. Furthermore, using curcumin as active ingredient in polymer solution, led to increased size of nanoparticles. Addition of curcumin increase polymeric solution viscosity and finally make bigger particle rather than pure PCL solution

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THE EFFECT OF NITROGEN CHEMICAL FERTILIZER ON INDEX OF GROWTH AND BIOLOGIC PERFORMANCE IN MIXED CULTIVATE OF HERB OF *RICINUS COMMUNIS* L. AND *HYSSOPUS OFFICINALIS* IN MARKAZI PROVINCE

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Herbs such as agricultural plants are very important. Today, production more than product has special importance in level unit. The castor which its scientific name is (*Ricinus communis* L.) belongs to Euphorbiaceae family. Hyssop herbs which its scientific name is (*Hyssopus officinalis*), is a wood herb. The amount of available essence in growing body of hyssop is different from 0/3% to 1%. There is most amount of essence of this herb in its flowered small branches. Pinocamphone is the most important combination of essence which is 50% of amount of essence. Other important essence are “alpha and beta pinenae”, “comphone” and siscoe alcohol. In these experiments, effects of nitrogen chemical fertilizer on cultivating 2 herbs of *Ricinus communis* L and *Hyssopus officinalis* are investigated simultaneously. Biologic fight with aphid in castor by cultivating hyssop and investigating effect of nitrogen chemical fertilizer on product’s performance and essence in castor and hyssop is the purpose of this research. This experiment is conducted in a land about 800 m^2 in form of randomly experimental design in three frequencies. Experimental care include: chemical care (N1)or without fertilizer consuming(N2), chemicalfertilizer of urea about 150kg/hu, nitroxinbiologic fertilizer (N3) about 5 l/hu, the care of consuming mixed chemical fertilizer of urea about 75kg/hu (N4). Obtained results of table show variance analysis in hyssop herb. There are significant effect of biological and chemical fertilizer on quality of bush height , the length of flowered small branches, the number of stalk flowering , the weight of wet and dry flowered small branches. This significant effect is about 1%. The most important flowered small branches length and flowered small branches performance and floral tribute are showed in care of chemical fertilizer of urea which was about 150kg. Also the results of variance analysis in castor herb showed that the most height of bush , number of leaf in bush , number of seeds in bush and the weight of each seed was about 150 kg/hu in care of chemical fertilizer of urea and about 5 L/hu in nitroxin biological fertilizer. It is noticeable that mixed cultivate of hyssop and castor lead to annihilation of available aphid in castor leaves that this annihilation was about 80%. Generally, simultaneous two cultivates can be obtained better economic performance in one farm, according to performance of flowered small branches in hyssop herb and performance of seed in castor herb.

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THE VARIATION OF TOTAL PHENOL CONTENT OF *CYNARA SCOLYMUS* CALLUS AFFECTED BY METHYL JASMONATE AND SALICYLIC ACID

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Phenolic compounds are naturally occurring substances in plants. Physiological roles of these compounds such as antibacterial, anticancer and radical scavenging make them important. Methyl jasmonate (MeJA) and SA as phytohormones, regulate synthesis of secondary metabolites in a wide range of plant species. They play a central role in regulating the biosynthesis of many secondary metabolites [1]. Nowadays researcher tries to increasing secondary metabolites production by in-vitro culture. In fact it could be a useful method for production of secondary metabolites in bioreactor scale. The present work was aimed to study the effect of MeJA and SA on the total phenolic accumulation in callus of *Cynara Scolymus*. MeJA and SA in concentration of 0, 50,100,200&250 µM added to MS medium containing 2 mg/l BA and 5mg/l NAA for callus induction. Four weeks after treatment application, the content of total phenol was determined. Results showed that the callus which was treated with 50 µM MeJA produced the highest amount of total phenol and calluses which were treated by 100 µM SA was at the highest rate of total phenol. The production of poly phenolic antioxidant agents using simple phenol as precursor could be the reason why total phenol reduced as the concentration of MeJA increased from 50 to 250 µM and SA from 100 to 250 µM.

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CHEMICAL COMPOSITIONS OF ESSENTIAL OIL FROM THE ROOT AND RHIZOME OF *VALERIANA SISYMBRIIFOLIA*

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Mountainous valerian (*Valeriana sisymbrifolia*) wildly grows in different areas of Iran, including East Azerbaijan, Lorestan, Hamedan, North Khorasan, Markazi, Isfahan and Charmahalva Bakhtiari provinces [1].The plant is a perennial medicinal herb which the root and rhizome of this plant is mainly used in traditional medicine [2].The main chemical constituents of the roots and rhizomes contain compounds called Valpotryat [3]. This study was doneto identify of phytochemical characteristics of the essential oil from the root and rhizome of *Valeriana sisymbrifolia* collected from Tang-eSayadregion, National Park in ChaharMahalva Bakhtiari province in August 2012 at full flowering stage. Results of analysis of essential oil by gas chromatography-mass (GC /MS) indicated that the main compounds in the essential oil were borneol acetate and valeric acid. According to the results, suggest further research to be performed on secondary compounds, essential oils, using different methods, phytochemical analysis.

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ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OILS FROM DIFFERENT POPULATIONS OF *MYRTUS COMMUNIS* L.

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Myrtus communis L (myrtle) (Myrtaceae) is an evergreen shrub which grows mainly in Mediterranean climates and, has long been used by locals for its culinary and medicinal properties [1]. In Iran, the species commonly known as ‘‘Mord or Mort’’ is abundant in the Zagros Mountainous Range of the country [2, 3]. *M. communis* L is an important medicinal and aromatic plant, because of the high essential oil content in its leaf, flower and fruit glands [4].Wild populations of *M. communis* L collected from Khuzestan and Lorestan Provinces, Southwest Iran, were examined for antibacterial activity. The*in-vitro* antibacterial activity against four pathogens including *Klebsiella pneumoniae, Erysipelothrix rhusiopathiae, Streptococcus faecalis* and *Escherichia coli* was performed by agar disc diffusion and micro-dilution assays. The essential oils of *M. communis* L have strong antibacterial against four pathogens in both assays. The inhibition zones and MIC values for bacterial strains which were sensitive to the essential oils of *M. communis* L were in the range of 14.5–35.0 mm and 0.031-0.50 mg/ml, respectively. This study demonstrates that products with valuable antibacterial activity can be produced from leaves of *M. communis* L against *K. pneumoniae, E. rhusiopathiae, S. faecalis* and *E. coli.*

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SALICYLIC ACID EFFECT GROWTH, ESSENTIAL OIL AND CHEMICAL COMPOSITIONS OF THYME (*THYMUS DAENENSIS* CELAK.) UNDER REDUCED IRRIGATION

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Thymus daenensis Celak is an endemic aromatic and medicinal plant of Iran belonging to the family Lamiaceae family [1, 2].Salicylic acid (SA) may reduce the negative impact of water deficit on growth and metabolite yield of *Thymus daenensis Celak* subsp. *daenensis Celak* [3]. The effect of foliar application of SA and reduced irrigation on growth, oil yield, chemical components, and antibacterial and antioxidant activities of *T. daenensis* in field condition were investigated. Treatments comprised 0.0, 1.5 and 3.0 molar SA applied to plants under normal irrigation and stressed conditions. Results indicated that irrigation regime had a significant effect on growing degree days (GDD) required to reach early flowering and full flowering. Foliar application of SA influenced GDD from early growing stage to 50% flowering and full flowering, minimum radius and canopy diameter. The highest values of oil content (3.2% v/w) and oil yield (14.9 g m^{-2}) were obtained from application of 3.0 molar SA. Percentage of some chemical constituents in the essential oil extracted from the plants under stress was higher than non-stressed plants. Thymol content was significantly reduced under stressed condition. Foliar application of SA significantly improved carvacrol, *α*–thujene, *α*–pinene and *p*–cymene contents in the oils, but reduced thymol and β–caryophyllene amounts. Our results showed that foliar application of SA reduced the negative effect of water deficit on thymol content in the essential oil of *T. daenensis*. The essential oils of *T. daenensis* exhibited antioxidant and antibacterial activities when plants were sprayed with 1.5 and 3.0 molar SA, respectively.

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AN INVESTIGATION ON THE EFFECT OF GIBBERELLIC ACID AND ORGANIC PHOSPHORUS FERTILIZER ON YIELD AND ESSENTIAL OIL CONTENT OF *MELISSA OFFICINALIS* IN CLIMATIC CONDITION OF ABHAR CITY

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To achieve self-sufficiency in production of agricultural products, yield per surface unit needs to be higher than current yield. Consumption of appropriate fertilizer types is the most important and fundamental way for maintenance and improvement of soil fertilizing condition and thereby an increasing in the agricultural product yields. To dates, organic fertilizers are considered as an alternative for inorganic fertilizers aiming for increasing of soil fertilizing capability and generation of by-products in sustainable agriculture system. At present, plant hormones and organic fertilizers are globally used to increase the yield of plant by-products and to decrease the consumption of inorganic fertilizers. Similar to growth hormone, gibberellic acid is affected on immature plants predominantly on specific and important parts of plant including, floral parts, young leaves, and germinating seeds. The aim of present study was to investigate the effect of phosphorus organic fertilizer, phosphorus inorganic fertilizer and gibberellic acid on the yield and essential oil content of *Melissa officinalis* L. In this study, a triplicate completely randomized statistical block design was implemented in a research farm of Abhar Azad University, (Abhar city, Zanjan Province, Iran). Obtained results revealed that differential (either single or combined) treatments by organic fertilizer, inorganic fertilizer and gibberellic acid has a significant impact on length, wet weight, and axillary branch no, dry weight of root and aerial organ, wet weight of aerial organ, essential oil content ($P<0.05$) [1-3].

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EVALUATION OF THE EFFECT OF HUMIC ACID AND ORGANIC NITROGENOUS FERTILIZER ON VEGETATIVE TRAITS, BIOLOGICAL YIELD AND ESSENTIAL OIL CONTENT OF *MELISSA OFFICINALIS* IN CLIMATIC CONDITION OF ABHAR CITY

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Global approach to application of medicinal plants and natural compounds in pharmaceutical, cosmetic, food and healthcare industries, along with the interest of society, government and domestic industries in utilization of aromatic and medicinal plants enlighten a necessary demand for basic and applied research in this field. The aim of present agriculture system which may be originated from traditional agriculture is not to use inputs with inorganic origin. In this regards, organic fertilizers are gradually found a position among inorganic inputs already used for fertilizing purpose. Nitrogen fixing organic fertilizers not only improve nutrition condition for the plant but also improve the soil characteristics. To dates, application of different types of organic fertilizer is rising. Humic substances are consisted of a mixture of different type of organic compounds which are remnant of animals, plants and humic acid. One of the main advantages of humic acid is chelating of various nutrient elements such as, sodium, potassium, magnesium, zinc, calcium, iron, copper, and etc. to overcome shortage of nutrient elements which is led to an increasing in length and weight of the root and appearance of lateral roots. The aim of present study was to investigate the effect of humic acid and organic nitrogenous fertilizer on vegetative traits; biological yield and essential oil content of *Melissa officinalis*. In this study, a triplicate completely randomized statistical block design was implemented in a research farm of Abhar Azad University, (Abhar city, Zanjan Province, Iran). Obtained results exhibited that application of humic acid and organic nitrogenous fertilizer accompanied with inorganic fertilizer has significant effect on the vegetative traits like shrub length, stem no., LAI, canopy cover, essential oil and biological yield, but not on essential oil percentage. In respect to obtained results, it is recommended that simultaneous application of humic acid and organic nitrogenous fertilizer (nitroxin) with the least inorganic fertilizer would lead to more appropriate yield and prominent decrease in the consumption of inorganic fertilizer.

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THE EFFECT OF ISABGOL (*PLANTAGO PSYLIUM*) MUCILAGE AND *ZATARIA MULTIFLORA* ESSENTIAL OILS ON MICROBIAL LOAD AND IMPROVING SHELF LIFE OF FRESH CUT CARROT

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The research was carried out in two separate experiments on fresh-cut carrot: The first experiment: the effect of different concentrations of *Plantago psyllium* mucilage (0, 100, 200, 400 mg/L) and four concentrations of essential oil of *Zataria multiflora* (0, 100, 250, 500 mg/L), separately and in combination in a factorial experiment on the basis of completely randomized design with 16 treatments and three replications was studied. The second experiment: the effect of essential oil and mucilage on the microbial load of fresh-cut carrot in the form of a split plot randomized complete block design with six treatments and three replications. The application of *Zataria multiflora* essential oil (500 mg/L), *Plantago psyllium* mucilage (400mg/L), and untreated control was considered as the main factor, while the time of microbial test in both the beginning and the end of the storage period was regarded as the minor one. Treated samples were packaged in polyethylene trays (175 ml) and were stored at 4°C. After 10 days of storage different parameters such as weight loss, total soluble solids (TSS), titratable acidity (TA), pH, color, and microbial contamination were investigated. The microbial load was evaluated in different aspect including mesophilic aerobic bacterial contamination, coliforms contamination, yeast and mold contamination, and the presence of *E. coli*. The results showed that the treatments had a significant effect on weight loss and increased carotenoid content. Different concentrations of essential oil and mucilage singly affected significantly titratable acidity, soluble solids and pH. Combination of treatments of 100 mg/l essential oil and 100 mg/l mucilage significantly reduced skin whitening of carrot fresh cut. Different treatments in terms of microbial contamination in all cases tested did not differ significantly. Only mold and yeast contamination increased significantly during storage, which was due to the interaction effect of treatments more pronounced in mucilage treatment. *E. coli* contamination was not observed in any of the samples. In essence, results of this study showed that the application of natural compounds of medicinal plants as edible coatings on fresh-cut carrot improves the quality and increases the shelf life. Also, these treatments, particularly the application of mucilage, have no effect on microbial contamination increasing.

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EVALUATION OF PHYTOCHEMICAL, ECOLOGICAL AND BIOLOGICAL ACTIVITY *TANACETUM KOTSCHYI* BOISS, *TANACETUM CHILIOPHYLLUM*

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Tanacetum chiliophyllum and *Tanacetum kotschyi*, belong to the family Asteraceae, are herbaceous perennial grow naturally at the alpine area of Zagros Mountains (2700–3000 meters above sea level) in Southwest Iran. The essential oils of *Tanacetum* species have been the subject of interest to phytochemists due to biological activity as insect antifeedants, antitumor agents, antimicrobial actions, and a host of other health related possibilities due to the content of terpenoids. Essential oils of *Tanacetum kotschyi* inflorescences, and various aerial parts of *T. chiliophyllum* collected from alpine area of Zagros Mountains in Chaharmahal va Bakhtiari province, Southwest Iran, were analyzed by GC, and GC–MS. The yields of the essential oil were 0.30% (v/w) for *T. kotschyi* and respectively for *T. chiliophyllum* leaves, stem, and flower were 0.52, 0.25 and 0.55% (v/w), respectively. Results of analysis of the essential oils indicated significant differences among the two *Tanacetum* species for main constituents. The highest values of main constituents of the essential oils of the two *Tanacetum* species were linalool (13.44%), camphor (12.14%), *trans*–chrysanthenyl acetate (10.54%), carvacrol (15.17%) *cis*– chrysanthenol (7.51%), and thymol (6.95%) in *T. chiliophyllum*, α–bisabolol (9.66%) in *T. kotschyi*. The essential oils of the two studied *Tanacetum* species sourced in alpine region of southwestern Iran were rich in oxygenated monoterpenes. Generally, the plants species proved to be relatively good sources of chemical products and medicinal compounds, such as, 1, 8–cineole, camphor, *α*–bisabolol, borneol, and carvacrol that are widely used in food and drug industries. The current study indicates the essential oil components of the two species of *Tanacetum* vary with species and chemotypes. Variation in oil composition and yield of *Tanacetum* can result from genetic diversity. In addition, a comparison of our results with other reports on essential oil constituents and oil yield of *Tanacetum* demonstrated these species have considerable variation in essential oil compositions and oil yield. Anti bacterial properties of the essential oils *T. chiliophyllum* on four pathogenic bacteria were determined by using broth dilution and well diffusion agar methods. The essential oil showed the maximum anti bacterial effect on *Bacillus cereus* and *Kelebsiella pinumanie* and the minimum on *Staphylococcus aureus*. The essential oil content of aerial parts was 0.55% (v/w) based on dry weight. The amount of camphor and carvacrol which are the main constituents of the oil and as an antiseptic. In conclusion the results of this study showed that the essential oil is rich of camphor and is considerable as an anti-bacterial agent in drug and food.

SIMULTANEOUS DETERMINATION OF THEARUBIGIN AND THEAFLAVIN CONTENT DURING THE FERMENTATIN REACTIONS IN BLACK TEA PRODUCTION

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Tea is one of the most popular beverages worldwide. The variety of tea and tea extracts in the market has different thearubigin and theaflavin profiles, which are the bioactive chemical entities. Black tea is consumed in Iran as one of the most popular and traditional non-alcoholic beverage. Also, Black tea is receiving considerable attention for specific health claims and because of the presence of functional constituents, such as polyphenol profiles, caffeine, ascorbate and catechins [1]. Treatments involving Lacase enzyme resulted in the significant release of gallic acid, due to its hydrolytic activity, leading to greater solubility besides favourably improving thearubigin and theaflavin ratio [2]. In this study we present a systematic investigation of affecting parameters for preconcentration of thearubigin and theaflavin by designed experiments according to the methodology of central composite design (CCD). Effect of four experimental factors: temperature, time, pH and amount of lacase enzyme were studied and optimized by using the analysis of variance (ANOVA). The obtained results were analyzed by Design Expert software and the optimum conditions for thearubigin and theaflavin profiles were concluded as follow: time: 112 min, temperature:77ºC, pH: 6.8, lacase enzyme:1125 unit.

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EFFECT OF NACL SALINITY ON SOME MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERISTICS OF TWO OLIVE CULTIVARS

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Salinity is a major environmental stress that limits plant growth and productivity in Iran. Olive (*Olea europea* L.) is one of the most valuable and widespread fruit trees in the Mediterranean area. In the last years the surface of olive orchards has increased considerably in Iran. Furthermore, cultivars used in these orchards are often foreign that little is known about their behavior under Iran conditions, and especially about their tolerance to salinity. Hence, to study the effects of NaCl salinity on some morphological and physiological characteristics of one-year old rooted cuttings of two olive cultivars (Mission (a foreign cultivar) and Mary (one of the most important Iranian cultivars)), a pot experiment was conducted in factorial based on randomized complete blocks design with four replications. Saline treatments were imposed by irrigation with water containing 0, 25, 50, 100 and 200 mM/l of NaCl. The results showed that NaCl salinity has significant effects on evaluated parameters. As the NaCl concentration in irrigation water increased plant height, number and area of leaves, fresh and dry weight of leaves and stems, relative water content (RWC) and leaf chlorophyll content decreased but proline and total soluble sugars (TSS) accumulation and concentration of Na and Cl in leaves increased. Overall, the findings of this study showed that cv. Mission because of lower concentration of Na and Cl in leaves, lower growth reduction and higher accumulation of proline and TSS was more tolerant to salinity than cv. Mary.

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EVALUATION OF PHYTOCHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITY OF *TANACETUM POLYCEPHALUM* IN CHAHARMAHAL AND BAKHTIARI PROVINCE

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Tanacetum polycephalum Schutz. Bip, a member of Asteraceae family, is a medicinal plant of Iran. This study evaluated phytochemical properties and antibacterial activity of essential oils of populations of *T. polycephalum*. The essential oil obtained from dried aerial parts of *T. polycephalum* from four different regions of Chaharmahal and Bakhtiari province, Iran by hydro-distillation using a Clevenger- type apparatus [1]. The essential oils were analyzed by GC and GC/MS [2]. The antibacterial activity of the essential oil was tested by agar disc diffusion assays [3] against four pathogens (*Bacillus cereus, Streptococcus agalactiae, Staphylococcus aureus* and *Listeria monocytogenes*). The data was statistically analyzed using one-way ANOVA by the program SPSS (19.0). In phytochemical analysis essential oil, 90–95% of total oils components were identified. The results revealed distinct differences in the content of compounds depending on region of sample collection. The major constituents of the essential oils were 1, 8-cineole, camphor, p-cymene, α-pinene and Linalool. Most of the essential oils showed relatively high antibacterial activity against all the tested bacteria with the diameter of inhibition zone ranging between 12 and 32 mm. It can be said that the essential oil of *T. polycephalum* could be used as natural antimicrobial agent in food preservation.

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ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF ARIAL PART OF *TANACETUM POLYCEPHALUM* SCHUTZ. BIP. AS A MEDICINAL PLANT IN CHAHARMAHAL AND BAKHTIARI PROVINCE

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Tanacetum polycephalum Schutz. Bip from Asteraceae family is as medicinal plant in Chaharmahal and Bakhtiari province. In this study, antibacterial and antioxidant activity of the essential oil aerial parts of *T. polycephalum* from four different regions of Chaharmahal and Bakhtiari province were investigated. The essential oil obtained from dried aerial parts of *T. polycephalum* by hydro-distillation using a Clevenger- type apparatus [1]. The antibacterial activity of the essential oil was tested by agar disc diffusion assays [2] against four foodborne pathogens *(Listeria monocytogenes, Salmonella typhimurium, Proteus vulgaris* and *Staphylococcus areus*). Antioxidant activity of essential oil of the plants was evaluated by DPPH assays [3]. The results revealed distinct differences in the antibacterial and antioxidant activity depending on region of sample collection. Most of the essential oils showed relatively high antibacterial activity against all the tested bacteria with the diameter of inhibition zone ranging between 11 and 25 mm. Also results of analysis of variance DPPH inhabitation by four populations of the essential oils show the scavenging effect of samples on DPPH radical. This herb can also be served as a valuable source of natural antibacterial and antioxidants for further isolation and purification. However, further toxicological studies should be carried out to ensure their safety *in vitro* and *in vivo*.

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ASSESSMENT OF MORPHOLOGICAL CHARACTERISTICS AND CHLOROPHYLL CONTENT UNDER DIFFERENT CONCENTRATION OF METHYL JASMONATE ON DIFFERENT MEDIA CULTURE

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St. John's wort or *Hypericum perforatum* is a valuable medicinal plant from hypericaceae family. this study was performed on different concentration of methyl jasmonate (0, 300, 600 and 900 µM) in four media cultures (½Ms, Ms , ½ Bs, Bs) in a completely randomized design with three replication. Methyl jasmonate treatments were applied (by spraying) after 40 days from seeds culture. Fourteen days after the treatments, Morphological characteristics like number of shoot length, node number in longest shoot and chlorophyll -content was measured. The results showed that between culture media based on shoot length and node number there was significant difference Methyle jasmonate had significant effect on all characteristics that was measured. There was not significant interaction effect between mediums and methyl jasmonate based shoot characteristics except chlorophyll - content. Based on our results, chlorophyll - content in B_5 media was more than MS media. Node number and shoot length on ½ Ms had the maximum amount, and minimum shoot length was in B_5 media. The results of this research showed that the ½B_5 medium was more effective than B5 on *Hypericum perforatum* in-vitro culture [1, 2].

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EVALUATION OF ROOT AND SHOOT GROWTH UNDER EFFECT OF DIFFERENT CONCENTRATIONS OF SALICYLIC ACID IN DIFFERENT MEDIA CULTURES

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Hypericum perfpratum belong to hypericaceae is a valuable medicinal plant that from the past had applied for medicinal purposes. Its active ingredients include Hyprforin and Hypericin have an important properties. In this experiment, different concentrations of salicylic acid (0, 200,400, 600 micro molar (µ.M)) and MS and B5 medium concentrations (50 % and 100%) was used in *Hypericum perfpratum* to study the shoot growth characteristics. Seeds sterilized by 96% ethanol and sodium hypochlorite (50%) and then were cultured in different culture media. Salicylic acid treatments were applied after 40 days. Experiment was conducted in a completely randomized design with three replications. Fourteen days after the treatments, root and shoot growth and were assessed. The results showed that between culture media and salicylic acid based on root and shoot growth there was significant interaction effect. Fresh and dry weight of shoots In MS medium (in average 0.1, 0.57 gr) was higher than B_5 medium (in average 0.03, 0.22 gr). Increasing salicylic acid concentration in MS, B_5 and ½ B_5 medium resulted in root dry weight increasment. In ½ MS medium root dry weight was decreased with increasing of salicylic acid concentrations. The highest amount of dry and fresh weight of shoots was in MS medium supplemented with 400 micro molar of salicylic acid [1, 2].

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INFLUENCE OF *ARBUSCULAR MYCORRHIZAL* FUNJI ON GROWTH AND TOTAL PROTEINS AND PEROXIDASE ENZYME CONTENTS IN FENUGREEK (*TRIGONELLA FOENUM-GRAECUM* L.)

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Trigonella foenum-graecum L. (Fenugreek) is a plant from the family Fabaceae that grows anywhere around the world. Fenugreek leaves and seeds have been used extensively to prepare extracts and powders for medicinal uses (1). (AM) fungi colonize the root of most terrestrial plants, forming a very common symbiosis (2). In the present paper, the effects of *Glomus intraradices* on shoot growth, total proteins and peroxidase enzyme contents of *Trigonella foenum-graecum* L. were evaluated. Total proteins and peroxidase enzyme contents were determined by Bradford and Bates methods, respectively. *Glomus intraradices* significantly increased total dry mass of shoot, total proteins and peroxidase enzyme contents in comparison with control plants.

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EFFECT OF DIFFERENT SULPHURIC ACID CONCENTRATION AND SOAKING TIME ON SEEDS DORMANCY BREAKING AND GERMINATION OF *ERMOSTACHYS LACINIATA* L.

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Eremostachys laciniata L. is a special species in West North. This species has special important with considering of aspects of pharmacy (1). The conservation of this species is necessary as gene source thus, seed production and theirs using is essential in maintain pastures programming. Current study carried out due to investigation of different treatments for dormancy breaking and germination of seeds of this plant. For this purpose, mature seeds were collected from Miandoab (west North of Iran). Experimental was conducted completely randomized design with gibberellic acid As pre-treatment, 9 treatments, one Control treatment (96% sulfuric acid) and three replications (2).The concentration of sulfuric acid was used in three different levels and in different times. The results show that between treatments applied to the on germination were significant differences.

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STUDY OF GENETIC DIVERSITY IN SEVERAL ROMAN CHAMOMILE LANDRACES (*ANTHEMIS COTULA* L. AND *ANTHEMIS ALTISSIMA* L.) BASED ON MORPHOLOGICAL TRAITS

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Anthemis are native to the Mediterranean region and southwest Asia east to Iran. A number of species have also become naturalized in the United Kingdom and other parts of the world. *Anthemis* are a flowering annual plants with a noticeable and strong odor. The essential oil obtained from the flowering parts of *Anthemis altissima* showed a broad-spectrum antibacterial activity. Also, *Anthemis cotula* is considered a weed due to its propensity for invading cultivated areas. In order to evaluate the genetic diversity of different Roman chamomile landraces based on morphological traits, 20 landraces were collected from different area of Iran. Twenty different landraces of Roman chamomile including 10 landraces of *Anthemis cotula* L. with 10 landraces of *Anthemis altissima* L. were selected for morphological assessment. 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. Results showed that the flower yield, the number of flowers in plant, and the essential oil content had maximum variance coefficient. The phenological traits had minimum variance coefficient. According to the cluster analysis on morphological traits, 20 landraces were classified into 2 main clusters. According to the cluster analysis, 10 landraces of *Anthemis cotula* L. were located in first group and 10 landraces of *Anthemis altissima* L. Were located in second group. Results of cluster analysis showed that the morphological traits were able to separate the two anthemis species. Iranian chamomile landraces have a long history of use as tea and several applications in the traditional and industrial pharmacy. These plants maintain an important genetic conservation that can be used in plant breeding. Due to continental and geographical conditions, Iran is a suitable location for growth of many weedy plants that are compatible with different area and are genetically valuable resource in fundamental and application research in plant breeding. In plant breeding, recognition of the genetic diversity is the base of breeding programs, initial for the development and evaluation and suitable for selection of plant genotypes.

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EFFECT OF SALICYLIC ACID AND ASCORBIC ACID FOLIAR SPRAYING ON LEAF CHARACTERISTICS OF LEMON BALM (*MELISSA OFFICINALIS* L.) IN FIELD CONDITIONS

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Lemon balm is herb plants in the family Lamiaceae, Due to the soothing attributes of antioxidant and anti-virus is essential [2].Salicylic acid, a phenolic compound that are useful for plants, Produced by root cells and plays a central role set the process in plant[1]. In this experiment effect of ascorbic acid (50, 100, 150mgl^{-1}), and salicylic acid (50, 100, 150mgl^{-1}), pure water with control (without foliar spraying) were assessed on leaf characteristics of lemon balm in field conditions. The experiment was conducted in a randomized complete block design with four replications. Application of treatments were done in two steps (step1: before flowering and step2: 14 days after step1) by foliar spraying. Fourteen days after the second foliar spraying, Leaf characteristics including: leaf length, leaf width, leaf area and number of leaves per plant were studied. Analysis of variance showed that foliar spraying of salicylic acid and ascorbic acid had significant effect on the leaf width, leaf length and leaf area. Maximum leaf length observed in foliar spraying salicylic acid and ascorbic acid (150 and 100 mgl^{-1}), respectively. The salicylic acid in 150 mgl^{-1} concentration resulted the highest leaf width and was significant compared to other treatments. Also the leaf area in 150 mgl^{-1} of ascorbic acid had the highest value.

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GENETIC ANALYSIS OF ESSENTIAL OIL AND YIELD PRODUCTION IN IRANIAN CUMIN ECOTYPES UNDER DROUGHT STRESS

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Cumin (*Cuminum cyminum* L.) is one of the annual medicinal crops belonging to Apiaceae family, native to Iran and cultivates in arid and semi- arid regions. Scarcity of water is a severe environmental constraint to plant productivity. Drought-induced loss in crop yield probably exceeds losses from all other causes, since both the severity and duration of the stress are critical. To evaluate the effects of drought stress on seed yield and essential oil of cumin, 26 ecotypes collected from 8 regions of Iran were evaluated under normal and drought environments. The measured traits were yield, its components and essential oils. The range of observed essential oils and seed yield were 2.17-6.31% and 40-140g, respectively. Significant increase (76.25%) and decrease (58.59%) in the essential oil and seed yield was observed under drought stress, respectively. Significant negative correlation was found between seed yield and essential oil indicating that independent selection for improvement of these traits may be useful. The highest essential oil and seed yield under drought stress were related to Natanz and Kerman ecotypes, respectively. The lowest values for these traits belonged to Kerman and Kashmar ecotypes, respectively. Results of this study indicate that high variation among Iranian cumin for seed yield and essential oils can be used to develop superior varieties especially under drought conditions.

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THE ASSESSMENT OF MORPHOLOGICAL TRAITS OF DIFFERENT POPULATION OF OLIVE (*OLEA EUROPEA*) IN ALBORZ PROVINCE

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In order to investigate the morphological characteristics of different olive populations, this research was performed by using randomized complete block design with three replications in Research Institute of Forests and Rangelands in 2013. The populations included five regions: Tehran 1, Tehran 2, Gazvin 1, Gazvin 2 and Ghilan. Two years old shoots of olives were taken in 2012 from the above regions and transported to the field in 2012. Cultivation practices such as irrigation and weeding were taken during the growth period. In the autumn of 2013, the morphological information such as number of lateral branches on the main branch, height of the tree, number of suckers, diameter of main stem, number of leaves on a shoot, length of a leaf, width of a leaf, fresh leaf weight of a shoot, dry leaf weight of a shoot, weight of fresh leaves in a hectare, weight of dry leaves on a hectare were considered and 5% significant effect was noticed. From statistical point of view, there was not any significant difference between various populations considering the following traits: number of lateral branches (17.8 cm), number of suckers (np.25), number of leaves on a shoot (863.60n/p), leaf width (0.98 cm). Comparing means indicated that the highest of main branch (133.73 cm), the longest leaf (3.9 cm) belonged to Ghilan population. The longest diameter of the stem (1.3 mm), the highest weight of fresh leaves of a shoot (202.57 g), the highest weight of dry leaves of a shoot (102.78 g), highest weight of fresh leaves in a hectare (81.03 g/ha), and the highest weight of dry leaves in a hectare (41.11 g/ha) belonged to Ghilan population. Tehran 1 population showed the lowest numbers considering the length of the main branches (64.77 cm), stem diameter (.9 mm), leaf length (2.82cm), wet leave weight of a shoot (57.60 g), dry leaf weight of a shoot (32.46 g), wet leaf weight in a hectare (23.04 g/ha), and dry leaf weight in a hectare (12.98 g/ha).The preliminary results indicated that in a similar situation there were statistical differences in many characteristics between cultivated populations, which show the possibility of genetic diversity between the above populations.

MULTIPLE SHOOT FORMATION IN *HYPERICUM PERFORATUM* L. NATIVE TO IRAN

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Hypericum perforatum L. (St. John´s Wort) is a medicinal plant widely utilized for the treatment of depression. The anti-depression activity is mainly attributed to the phenolic compounds hypericin and hyperforins[1]. The objective of this study was to establish an in vitro tissue culture for *H. perforatum*. Distal part of the 25-30 day seedling was used as an explant on Murashig and Skoog minimal organics medium supplemented with benzyl amino purin (BA: 1.5, 1, 0.5, 0.45, 0.35, 0.25, 0.1 $mg.l^{-1}$). Shoot regeneration occurred on all supplemented BA tested and was significantly highest in medium suplemented with0.1 $mg.l^{-1}$ (14.5 shoots/ explant). Shoots which were developed on the medium containing 1.5, 1 and 0.5 $mg.l^{-1}$BA were abnormal. Based on this experiment is was found that Iranian *H. perforatum*, Azadshar population are sensitive to BA concentration higher than 0.1 $mg.l^{-1}$, but if the aim is the production of biomass, a lot of biomass can be produced.

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THE EFFECTS OF SESAME OIL ON SERUM TRIGLYSERIDE, TOTAL CHOLESTEROL, LDL-CHOLESTEROL AND HDL-CHOLESTEROL IN 18-25 YEARS OLD GIRLS

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Sesame oil is one of the vegetable oils that has been used in traditional medicine for ages. Regarding to nutritional properties of sesame oil and many studies that suggested sesame oil induces beneficial changes in risk factors related to cardiovascular disease and other disorders such as hypertension, hypercholesterolemia, cancer, oxidative stress, and neurodegenerative diseases like Alzheimer's disease, this study was designed to investigate the effects of sesame oil on reducing serum lipids in 18-25 years old girls. For all individuals (40 intact girls) along the 30 days of study period, the same treatments were considered to eat 10 g sesame oil daily, and instead of these 10 g of other oils was removed from their diet. Before and after 30 days of study period all individuals total cholesterol, LDL-cholesterol, HDL-cholesterol, and triglyceride levels were measured in the serum. Statistical analysis of data showed that the diet with sesame oil significantly decreased the levels of serum total cholesterol ($p<0.001$) and low-density lipoprotein cholesterol ($p<0.0001$). There were no significant changes in HDL-cholesterol and triglyceride levels after consumption of sesame oil. The results suggested that the high degree of unsaturation of sesame oil and the presence of linoleic acid may be important factors to lowering effect of sesame oil on serum total cholesterol and LDL-cholesterol.

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EFFECT OF DIFFERENT HORMONAL COMBINATIONS ON CALLUS INDUCTION IN COTYLEDON EXPLANTS OF *ORIGANUM VULGAR* SSP. GRACILE

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Oregano (*origanum vulgar*) is a perennial medicinal plant and belonging to the lamiaceae family [1]. Callus induction mainly used for obtaining protoplast, somatic embryos, and production secondary metabolites. For the first time callus induction in Oregano as important medicinal plant was conducted. In this study the effect of different concentrations of 2, 4-D (0, 1, 3, 5 mg/l) alone or in combination with 0.1 mg/l BAP on callus induction from cotyledon explant was evaluated. The experiment was layed out based on completely randomized design with three replications. The analysis of variance showed that media combination had significant effects on callus induction. ANOVA results indicated that the highest callus induction rate (% 66) was achieved on MS medium supplemented with 1 mg/l 2, 4-D and 0.1 mg/l BAP. Significant different was not observed between 3 and 5 mg/l 2, 4-D treatments on callus induction rate % 42, %44 respectively. The induced calli were friable and yellow. On MS media containing only 0.1 mg/ml BAP callus induction was not detected.

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CHEMICAL COMPOSITION OF THE ESSENTIAL OILS EXTRACTED *STACHYS LAVANDULIFOLIA* VAHL IN IRAN

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The genus *Stachys* (Lamiaceae) consists 34 species present in Iran 13 of them are endemic. *Stachys lavandulifolia* used as a Stomach, anti septic too. The volatile constituents of the oil extracted from the leaves and flowers of *Stachys lavandulifolia* were through hydrodistillation method and then analyzed by GC and GC-MS. The essential oil was found to contain 40 components. The major constituents of the leaf oil were germacrene-D, β-phellandrene, β-pinene, myrcene, α- pinene and Z-β-ocimene .

CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF ESSENTIAL OIL OF AERIAL PART OF *SALVIA CHORASSANICA* BUNGE

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In view of the reputation of genus Salvia in folklore medicine and its existence as a native plant in our region [1] the chemical composition, the possible in vitro antimicrobial of essential oil of aerial part of *Salvia chorassanica* Bunge, were evaluated. Chemical analysis, using GC and GC/MS [2]. In vitro antimicrobial activity of essential oil of aerial part of this plant were investigated by disc diffusion method and the MIC and MBC/MFC determination against five strains of bacteria (gram +/-). Chemical analysis, using GC and GC/MS has resulted in identification of 38 constituents, comprising about 98.1% of the total constituents in oil of leaves; additionally sesquiterpenes (73.8%) were the major components. The main constituents in the oil of aerial part of *S. chorassanica* were Decane 2.4%, p-Cymene 6.4%, Alpa.-Terpinolen 15.5%, Linalool 6.3%, Camphene 0.2%, Thymol 9.2%, alpha-Copaene 2.2%, beta- Bourbonene.2%, trans-Caryophyllene 18.5%, Calarene8.5%, bicyclogermacrene 4.0%, Caryophylleneoxide 6.5%Spathulenol 3.5 and The oil exhibited a stronger effect against tested gram (+) than gram (-) bacteria. The studied sample demonstrated comparatively moderate to strong activities against.

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DAIDZEIN AND ETHANOLIC EXTRACT OF RED CLOVER DISTURB THE STEROIDOGENESIS INLEYDIG CELLS OF RATS

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Steroidogenesis in Leydig cells is regulated mainly by LH. The conversion of cholesterol into the final product is begun by the entrance of cholesterol into the inner mitochondrial membrane and then is followed by activities of various enzymes including cytochrome P450 CYP11A1, 3β-HSD, P450c17 and finally 17β-HSD, which mediate the production of pregnenolone, progesterone, and rostenedione and testosterone, respectively (1). Phytoestrogens are naturally occurring plant compounds that are structurally similar to17β- estradiol and have the ability to cause estrogenic or/and antiestrogenic effects (2). The presence of phytoestrogens in human and animal diet due to having a significant plasma concentration may cause an interaction in function of reproductive system including leydig cells in males. We in this study aimed to evaluate the effect of daidzein (DZN) and various dose levels of ethanolic extract of red clover on steroidogenesis in Lydig cells of rats. Additionally the serum level of DZN in DZN-treated and also in extract-treated animals was determined by means of HPLC technique. The concentration of final product (testosterone) of steroidogenesis also was determined. Our results showed that the administration of ethanolic extract dose-dependently increased the serum level of daidzein. We also found that the total Leydig cells distribution significantly ($P<0.05$) decreased in the animals which received ethanolic extract of red clover (16.4 ± 3.4 cells/mm^2), when compared to control group (32.2 ± 9.1cells/mm^2).The fluorescent analyses for Leydig cells steroidogenic foci showed a remarkable ($P<0.05$) decrease in percentage of cells with positive intra-cytoplasmic steroid accumulation in the DZN- and extract-treated animals. Testosterone level of serum was dose-dependently declined in extract-treated animals and DZN-received group. In conclusion, the present study suggests that exposure to phytoestrogens such as DZN may affect male reproductive function. This study provides a better understanding of the potential relationships between endocrine disruptors and reproductive abnormalities.

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IMPACTS OF PLANTING DATES ON ESSENTIAL OIL, PHENOLIC COMPOUNDS AND SOME MORPHOLOGICAL TRAITS IN NURUOZAK

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Nuruozak *(Salvia leriifolia* Benth) is a perennial herbaceous plant that grows exclusively in south and tropical regions of Khorasan and Semnan provinces, Iran. Salvia is an important genus of the Lamiaceae family that includes more than 700 species which are spread throughout the world. In this study one population collected from south Khorasan province was evaluated for essential oil, phenolic compounds and some morphological traits in 3 different planting dates. Measured morphological traits were leaf area, number of leaf per plant, fresh leaf weight, spread diameter, and plant height. Biochemical traits included essential oil and phenolic compounds. The range of essential oil and phenolic compounds were 0.1-0.2% and 40.47-61.32 g/kg dw respectively. A significant different in essential oil and phenolic compounds was observed for different sowing dates. Significant positive correlation was found between sowing dates and biochemical traits. Numbers of leaves per plant, and spread diameter showed a decreasing trend with later planting. There was a negative correlation between sowing dates and both spread diameter and number of leaf per plant. Although biochemical trait increased in the third sowing date, this treatment is not recommended because of its negative effect on other parameters.

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INVESTIGATION ON THE EFFECT OF PGRS (NAA AND BA) ON THE IN VITRO CALLUS INDUCTION OF FENUGREEK AS A MEDICINAL PLANT

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Trigonella foenum-graecum L. is an annual plant from the family of papilionaceae, leguminosae and has been used for centuries as natural remedy for many medicinal properties. According to its significant medicinal properties, biotechnological studies especially, *in-vitro* culture of this plant would be important. The present study performed in order to determine the optimum concentration of plant growth regulators (auxin and cytokinin) for producing of *in vitro* callus induction using cotyledon as an explant. The experiment was performed factorial based on completely randomized design in four replications. In this experiment, the effects of different concentrations of NAA (0, 0.1, 0.5, 1 mg l^{-1}) and BA (0, 0.5, 1.5, 2.5 mg l^{-1}) were studied. Callus production percentage, rooting percentage, average number of rooting and average weight of callus were evaluated. All Data were analyzed using statistical software spss16, and comparison of treatment means was performed with duncan's multiple range test. The results showed that the highest callus production percentage were obtained in the medium included 0.1mg l^{-1} NAA and 2.5 mg l^{-1} BA, 0.5mg l^{-1} NAA and 1.5 mg l^{-1} BA, 1mg l^{-1} NAA and 0.5 mg l^{-1} BA, 1mg l^{-1} NAA and 1.5 mg l^{-1} BA, 1mg l^{-1} NAA and 2.5 mg l^{-1} BA. The highest average weight of callus was obtained in the medium included 1mg l^{-1} NAA and 1.5 mg l^{-1} BA. And the highest rooting percentage and average number of rooting were obtained in the medium included 0.5mg l^{-1} NAA and 0.5 mg l^{-1} BA.

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THE EFFECTS OF AZOTOBACTER, NITROGEN, PHOSPHOROS SOLUBILIZING BACTERIA ON GROWTH AND ESSENTIAL OIL CONCENTRATION OF BASIL

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To investigate the effects of different levels of nitrogen (0, 50, 100, 200, 400 kg/ha) biological fertilizer containing phosphorus solubilizing bacteria (0 ،5 and 10 g/pot) and inoculation with azotobacteria (with and without inoculation) on growth and essential oil con centration of basil , a factorial experiment with randomized complete block design was conducted in research form of Abhar Islamic Azad University using three replications.. In this experiment, plant growth factors indices including plant height, fresh and dry weights of aerial parts, the number of lateral branches and concentration of essential oil were measured. The results analysis of variance of data showed that the main effects of nitrogen and phosphorus solubilizing bacteria were significant on measured traits at 1% level. The highest values for measured traits were obtained from the application of 100kg/h nitrogen and 5 g/pot biological fertilizer phosphorus solubilizing bacteria.

EFFECT OF DROUGHT STRESS AND SALICYLIC ACID ON ACCUMULATION OF SOLUBLE SUGARS, PROLINE AND TOTAL PROTEIN CONTENT IN *SATUREJA HORTENSIS* L. ON HYDROPONIC CULTURE

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Drought stress is a major factor in reduce growth, development and production of plants[1].Salicylic acid (SA) is a potent signaling molecule in plants and is involved in eliciting specific responses to biotic and abiotic stresses [2, 3].The *Satureja horensis* L. is anannual herb plant belonging to the Labiatae family. It is an aromatic plant with many uses in food, perfume industries and folk medicine [3].The specific aim of this study was to determine, combination effect of salicylic acid and water stress treatment on *Satureja hortensis* L. The experiment were base on hydroponic culture in a randomized complete block design with three replications plants were treated with 5levels of water stress (0, -3, -6, -9, -12 bar) by using PEG. The levels of proline, soluble carbohydrate and protein content were determinded using spectrophotometric methods, for salicylic acid treatment, the leaves were sprayed with 10^{-4}mol salicylic acid lasted for three days. Our results showed the amount of proline, protein and soluble carbohydrate were increased specially in sever treatment (-12 bar) while Combination treatment of salicylic acid and water stress caused significant reduce oxidative damages of drought stress. According to our results, it can be concluded that the percentage of the main constituent of proline, protein content, carotenoid revealed significant changes and salicylic acid can be used as an antistress agent to reduce water stress damages.

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EFFECT OF HIGHNESS ON ANTIOXIDANT ACTIVITY IN *MELISSA OFFICINALIS* L.

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Plant rich source of phenolic compounds are the most important natural antioxidants have been reported to prevent oxidative damage caused by free radical [1, 2]. lemon balm (*Melissa officinalis* L.), member of Lamiaceae (formerly Labiatae) family, is one of the important medicinal plant species, this species originates from southern Europe, Asia Minor and southern parts of North America[3,4]. The aerial parts of *Melissa officinalis* L. were collected from 4 regions (Nashtarod, Tosakoti, Emamzadeh Ghasem, Balas Dohezar) in mazandaran and they were dried. In this study, the antioxidant activity of methanol extracts was prepard from aerial parts of *M. officinalis*. The antioxidant activity was measured by DPPH assy. Our results have showed that the higher level of antioxidant activity was in 500m (Tosakoti) and lower level of antioxidant activity was in 1500m (Balas Dohezar). There were significant differences in different highness in antioxidant activity ($p<0.01$).

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EFFECT OF HIGHNEES ON ANTIOXIDANT COMPOUNDS AND HYPERCIN CONTENT IN *HYPERICUM PERFORATUM* L. (ST. JOHN'S WORT)

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Hypericum perforatum L. belong to the Hypericaceae family that it widely distributed in north of IranandIt has an important role in various and bacterial diseases [1, 3]. There are bright and dark spots on leaves of *Hypericum perforatum* L. that the bright spots are the site of accumulation of essential oil and the dark spots are the site of make and accumulation of hypericin. Hypericin is a multiring chemical compound [2, 4, 5]. Pure extracts of *Hypericum perforatum* L. were prepared by soxhelt extraction method with different solvents such as methanol and acetone. Extracts were subjected for the measurement of hypericin content and antioxidant/ radical scavenging activity (DPPHº).The aim of this study was effect of highness on antioxidant compound and amount of hypercinin *Hypericum perforatum*L. Plant flowers and leaves were collected from 4 different regions (ramesar, javaherdeh, tonekabon, dohezar). The results indicated that antioxidant activity of leaves in javaherdeh region were more than of other regions (Tonekabon, Ramesar and Dohezar). There were higher antioxidant activity in leaves and flowers of javaherdeh region. The results of this study showed that amount of hypericin in flowers and leaves of dohezar region were more than other regions (Tonekabon, Ramesar and Javaherdeh).

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THE APPLICATION OF HUMIC ACID AND BIOLOGICAL NITROGEN FERTILIZERS AS WELL AS ALGAE ON THE GROWTH AND OPERATION OF FLOWER IN *CARTHAMUS TINCTORIUS* L.

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Nowadays, users of medicinal plants, as the manufacturers of the effective substances in a myriad of chemical compounds, have gained sufficient reputation since major pharmaceutical companies such as Bayer produce about 35% percent of their total drugs through utilizing medicinal plants which enjoy pure natural origin. *Carthamus tinctorius* L. is subcategorized as Astraceae. Annusl agricultural *Carthamus tinctorius* L. is categorized as of chicory flowers family. In the past, crop cultivation of *Carthamus tinctorius* L. aimed to create jobs in producing the red pigment is extracted from florets of this plant. Moreover, the oil quality of this plant is remarkable. Also, the amount of the linoleic acid of its oil is between 73 to 85 percent. The linoleic acid, which exists in the oil of *Carthamus tinctorius* L., enjoys such properties as lowering blood fats, cholesterol and hardening of the arteries. The present study aims to investigate the application effects of Humic acid and nitrogen fertilizer, hundred seed weight, number of bolls per plant, plant height, branching height, total pure weight and physiological maturity of stem diameter, length of branches, number of branches, the essence percentage and efficiency. The experiment was carried out in the city of Arak to implement the experimental treatments including Humic acid in 2 levels, biological Nitrogen fertilizer in 2 levels, seaweed extract (*Ascophyllum nodosum*) in two level. The project included the design of 24 plots in three replications and utilized a factorial design with reference to randomized complete blocks. The results of the analysis of variance table showed the application of hundred seed weight , number of bolls per plant , number of seeds per boll , total plant height, stem diameter, length of branches affected by biological nitrogen fertilizer and Humic acid was significant at 1 percent level. Furthermore, the concomitant use of Gibberellic acid, biological fertilizer, as well as Humic acid together were reported significant on seed yielding, hundred seed weight , number of bolls per plant, plant height, branching height, total dry weight within physiological maturity, stem diameter , number of infertile bolls per plant, the length of branches, number of branches, number of secondary branches. Also, the infertility of seed was reported to be under the impact of different amounts of Urea [1, 2].

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EFFECTS OF SALICYLIC ACID ON PROLINE AND SOME ANTIOXIDANT ENZYMES IN SALT STRESSED *FOENICULUM VULGARE*

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Medicinal plants that are economically important plants, raw or processed form of traditional medicine and modern technology are utilized and productivity [1]. Studies have shown that salicylic acid (SA) improves the resistance of the plant to environmental stress (2). In this study, effect of sodium chloride and SA interaction on content of proline, and changes in activity of antioxidant enzymes such as peroxidase, guaiacolperoxidise and polyphenol oxidase in *Foeniculum vulgare* were investigated in greenhouse condition. This experiment was conducted in randomized design based on three replications. Plants were exposed to different concentrations of sodium chloride (0, 50, 100 and 150 mM) and Salicylic acid (0.5 and 1 mM). The results showed that Proline content and enzymes activity were significantly increased with increasing salt stress. Foliar application of SA especially at 0.5 mM resulted in greater peroxidase and guaiacol peroxidase activity of *Foeniculum vulgare* plants under salt stress. The result showed that spray of SA as an antioxidant caused resistance against salt stress and decreased side effects of sodium chloride in *Foeniculum vulgare*.

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A NEW DIHYDROFURANOCOUMARIN FROM *OPOPANAX HISPIDUS*

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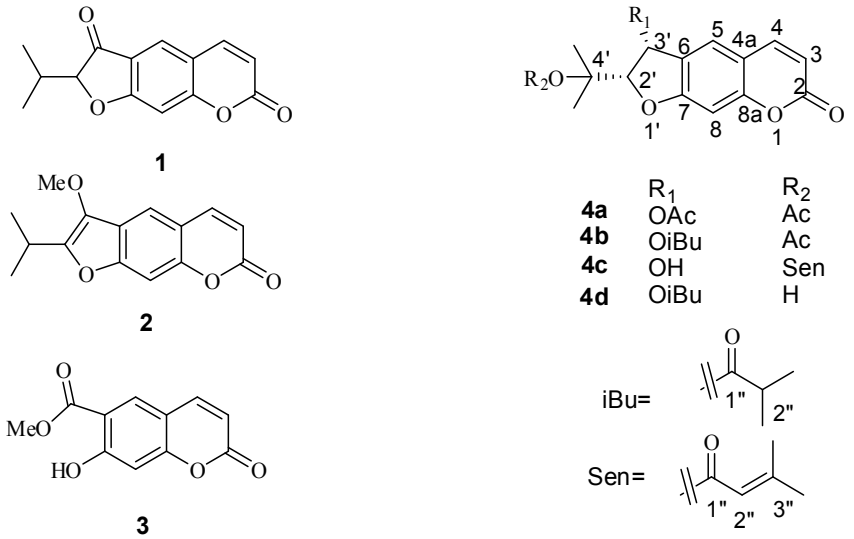
One of the major groups of secondary metabolites commonly found in a number of plant of the Umbelliferae family, are coumarin compounds [1]. Coumarins are a very large and diverse group of biologically active compounds with widespread pharmacological properties [2, 3]. A phytochemical investigation of the aerial parts of *Opopanax hispidus* afforded a new dihydrofuranocoumarin, 3'-isobutyryl-3'-hydroxymarmesin (**4d**), together with six known coumarins **1-4c**. The structures of compounds were deduced from their comprehensive spectroscopic analysis including IR, EI-MS, ^{1}H NMR, ^{13}C NMR, and comparison with literature data.



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COMPARISON OF MORPHO-AGRONOMIC TRAITS OF DIFFERENT GENOTYPES OF APIACEAE FAMILY

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The Apiaceae *Family* provides a large number of plants that can be used for both medicinal and alimentary purpose and are also called nutraceutical plants. A plant-breeding program, to be success, needs a system to conservation of genetic reservoirs (3). Both variation and selection are requisites of each plant breeding program as we can say, having diversity and wide amplitude of genetic pool is necessary to breeders (2). In addition, progressions in genomics have given means to raise value of breeding programs (4). The aim of current investigation was to evaluate genetic diversity between 30 Apiaceae family accessions, collected from various regions of Iran and Afghanistan, based on morpho-agronomic traits. In the middle of April, seeds of thirty Apiaceae family accessions were sown in growing season 2012-2013 at the field of Campus of Agriculture, Esfahan University of Technology, Iran. In the field experiment, 16 accessions were removed because of very low germination rate and do not having appropriate plant density so 14 accessions in field experiment were tested. The laboratory experiments were performed in the Breeding Laboratory of Esfahan University of Technology, for comparative evaluation of the phenolic compounds antioxidant capacity and antioxidant activity to several kinds of seeds from the Apiacea family, to which belong: *Klusium odoratisima* (Odoratisima), *Ferula ovina* (Boiss.), *Dorema ammoniacum* (Dorema), *Dorema aucheri* (Bilhar), *Foeniculum vulgare* (Fennel), *Heracleum persicum* (Persian Hogweed), *Ducrosia anethifolia* (boiss), *Ferulago angulata* (Schlecht) Boiss, *Pimpinella anisum* (Anise), *Ferula gumosa* Boiss (Galbanum), *Bunium Persicum* Bois (Black Cumin) and Asafoetida Ferula assa-foetida (Asafoetida) were carried out. The total phenolic contents of the Apiaceae family seeds varied between 10.08 mg GAE/100g (*Ducrosia anethifolia*) and 123.16 mg CE/100g (*Ferula ovina*). In the field experiment of this study, results showed significant differences among accessions based on measured traits such as Number of branch, Plant height, number of umbel per plant, number of seed in umbel. Plant height varied from 58 cm (*Heracleum persicum* (Persian Hogweed)) to 110 cm *Foeniculum vulgare* (Fennel). In a similar study, Bahraminejad et al. (1) indicated a significant diversity among and within populations derived from nine provinces of Iran for all the measured phenotypic traits. In conclusion, the present morpho-agronomic traits analyses have the potential to be a complementary tool for agro-morphological markers in studying the genetic diversity in apiace germplasm.

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EFFECT OF CHEMICAL AND ORGANIC FERTILIZERS ON SOME OF PHYTOCHEMICAL ATTRIBUTES AND NUTRIENTS CONTENT IN ST. JOHNS WORT (*HYPERICUM PERFORATUM*)

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Nowadays, most of medicinal plants are harvested from natural fields, which if harvesting continued with the trade aims would lead to lack of these species in their own habitats and the lack of their raw materials for dependent industries. Based on medicinal attributes of St. Johns wort, an investigation was carried out in the factorial experiment (3×3) with three replicates based on completely randomized block design. Treatments consisted of potassium sulfate (K_x) at three concentrations (0, 60 and 100 kg.h-1) and humic acid (H_x) also at three concentrations (0, 20 and 40 l.ha-1).Studied parameters consisted of essential oil content, antioxidant activity determined by two methods (FRAP and DPPH), macro elements such as N, P and K. Results showed that essential oil content achieved the highest amount in treatments $H_{20}\times K_{100}$ and$H_{40}\times K_{100}$and were significantly different with other treatments. EC_{50} was used to express the antioxidant activity of this plant, so that the lower EC_{50} value expressed the higher antioxidant activity. Plants treated with the highest levels of potassium sulfate and humic acid possessed the highest antioxidant activity. These finding was as the same in two antioxidant activity evaluation methods. Macronutrient uptake analysis also showed that the levels of phosphorus and nitrogen in the plant were not significantly affected by potassium sulfate, while the potassium content affected significantly. Regarding the humic acid, phosphorus was not affected by this treatment; while nitrogen and potassium showed significant difference. The interaction effect of these two fertilizers was not significantly different for phosphorus content but significantly affected the nitrogen and potassium content. However, application of organic humic acid and chemical potassium sulfate fertilizers could improve the phytochemical and nutritive attributes of this medicinal plant [1, 2].

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EVALUATION OF SOME PHYSIOLIGICAL CHARACTERISTICS OF LEMON BALM (*MELISSA OFFICINALIS* L.) EFFECTED BY FOLIAR SPRAYING OF SALICYLIC ACID AND ASCORBIC ACID IN FIELD CONDITIONS

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Lemon balm (*Melissa officinalis* L.) is one of the most important medicinal plants in the world trade that contains essential oils and has many applications in drug and flavoring industrials [1]. Today, the use of salicylic acid and ascorbic acid as a plant hormones, improvement in physiological traits has increased and has been used extensively in medicinal plants [1].This study was carried to investigate the effect of foliar spraying of salicylic acid and ascorbic acid on some physiological characteristics of lemon balm. The assessed treatments was including: ascorbic acid (50, 100, 150 mgl^{-1}), and salicylic acid (50, 100, 150 mgl^{-1}), pure water with control (without foliar spraying). The experiment was conducted in a randomized complete block design with four replications. Application of treatments were done in two steps (step1: before flowering and step 2: 14 days after step 1) by foliar spraying. Fourteen days after the second foliar spraying, physiological traits including chlorophyll index, electrolyte leakage and relative humidity, were examined. The results showed that the maximum chlorophyll index was observed in the application of 150 mgl^{-1} salicylic acid and ascorbic acid. The maximum of electrolyte leakage was observed in 150 mgl^{-1} of salicylic acid and there was a significant difference with other treatments. Application of 150 mgl^{-1} of salicylic acid resulted on the highest relative humidity with significant difference with other treatments. Our results showed that foliar spraying of salicylic acid and ascorbic acid had a significant effect on chlorophyll index, electrolyte leakage and relative humidity.

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EFFECT OF SALICYLIC ACID FOLIAR SPRAY AND TIME ON LEAF AREA INDEX, NODE NUMBER AND CHLOROPHYLL CONTENT OF IN VITRO GROWN PLANTLETS OF *STEVIA REBAUDIANA* BERTONI

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Stevia rebaudiana Bertoni (natural sweetener) belongs to Asteraceae family that has some kind of diterpenoid steviol glycosides with no negative effect on blood sugar level. Stevia produces few seeds; therefore, micropropagation is a prevalent method to obtain sufficient amount of uniform and free-disease plants. Salicylic acid (SA) is one of numerous phenolic compounds found in plants with numerous important physiological events. This investigation aimed to study the improving effect of salicylic acid foliar spray levels (0, 0.1, 0.3, 0.5 and 1 mM) on leaf area index, node number and chlorophyll content of stevia in *in-vitro* conditions. Shoot tip and nodal segment were used as explants and they were cultured on Murashige and Skoog (MS) medium. Experiment was carried out as Factorial based completely random designed with three replications. After 7 and 14 days results showed that application of salicylic acid affected leaf area index and node number of stevia and increased them. The best results were obtained from 0.5 mM salicylic acid concentration for node number, time and salicylic acid showed the best effect on leaf area index but results showed that salicylic acid different concentrations and time had not a significant effect on chlorophyll content.

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MORPHOLOGICAL TRAITS REACTION AND NPK UPTAKE OF TWO SAVORY OF (*SATUREJA HORTENSIS* L.) CULTIVARS TO DIFFERENT VERMICOMPOST CONCENTRATION

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In this research, the effect of different amount of vermicompost on morphological and traits and npk absorbance of two *Satureja hortensis* L., were studied. The pot experience was conducted on factorial (include two factors) based on randomized complete block design (RCBD) with 10 treatments and 4 replications in controlled conditions. The first factor, vermicompost concentration includes 5 levels: 20, 40, 60, and 80% vermicompost and control (common soil without vermicompost) and the second factor, two savory cultivars include local and improved (Saturn) cultivar. At the end of experiment, at full flowering stage, plant height, lateral shoot number, lateral shoot length, leaf number, fresh and dry weight of shoot and npk absorbance were determined. The results showed significant effect on some measured factors. In most cases relation to yield indexes, the highest content belongs to 80% vermicompost and the lowest amount was observed to control treatment. In totally, application of 40% vermicompost fertilizer for *Satureja hortensis* recommends.

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THE EFFECT OF DIFFERENT COLCHICINE CONCENTRATION AND SOAKING TIME ON TETRAPLOIDY INDUCTION ON TWO *MENTHA MOZAFFARIANII* ECOTYPES

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Mentha mozaffarianii Jamzad, is an endemic mint species from Iran. Six species and several sub species of this genus are found in Iran, among which just *Mentha mozaffarianii* is endemic. In this research, an experiment was conducted as factorial, based on randomized completely design with three factors and three replications that rhizomes were used for treatment. The first factor including different colchicine concentrations (0, 0.025, 0.05, 0.1 and 0.2% that 0 as control). The second factor including two *Mentha mozaffarianii* ecotypes (Ecotype A: Kamarej region and Ecotype B: Pirmohlat region) and the third factors consist of two soaking time (6 h and 12 h). At the end of experiment, survival rate and tetraploidy percentage (by morphological change, stomata traits, flow cytometery and chromosome counts) were measured. The results showed that different treatment had significant effects on survival percent and increasing of colchicine concentration caused decreasing plants survival on two ecotypes. On the other hand, tetraploidy changes were observed only in 0.025% colchicine treatment with 6 h soaking time on ecotype A (Kamarej region). 12.66% tetraploidy was identified in this treatment. Totally, it is seems that *Mentha mozaffariani* hardly response to colchicine for tetraploidy induction.

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THE STUDY OF BIOCHEMICAL VARIATION AMONG 25 SPERMINT (*MENTHA SPICATA* L.) POPULATION

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A pot experiment was conducted to evaluate the extract biochemical variations among 25 spearmint population. The experiment was a randomized complete design (RCD) with 25 treatments (population) and three replications. For this purpose, three rhizomes with 5 cm length were selected and planted in each pot. All pots were kept out side. The plant samples of all treatments were harvested at full flowering stage and the most important extract biochemical factors such as flavone and flavonol, total flavonoide, total phenolic compound and antioxidant activity were measured. Moreover, correlation between factors was determined. There were significant differences among population in all studied factors. Among studied population, Isfahan 2, Mazandaran-Qaemshahr, Mazandaran-Nour and Yasouj were superior in extract biochemical valuable properties like antioxidant activity, total phenolic compounds and total flavonoides. Furthermore, a positive correlation was detected between antioxidant activity, phenolic compound, and total flavonoides.

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IN VITRO AN IN VIVO STUDIES ON EFFECTS OF WALNUT PACKING TISSUE EXTRACTS ON SEGREGATED BACTERIA (*E COLI*)

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Nowadays, the worldwide effects emphasis has been focused on the use of natural materials for the control and treatment of various infections, due to chemically synthesized drugs have harmful side effects. *Juglans regia* L. (walnut) is widely distributed all over the world. This work compares the antimicrobial activities of hexane, chloroform and methanol extracts of nut shells of *Juglans regia* against three Gram positive bacteria (*Staphylococcus aureus*, *Staphylococcus epidermidis*, *Bacillus cereus*), three Gram negative bacteria (*Escherichia coli*, *Klebsiella pneumonia*, *Pseudomonas aeruginosa*) and one fungus (*Candida albicans*) by disc diffusion method. Microorganisms studied in this article are extracted from the feces of quail based on the local bird disease in Maragheh city. The inhibition zone of the extracts was compared with ciprofloxacin (antibacterial) and ketoconazole (antifungal). In this study, the extract with no solvent of Iranian walnut packing tissue was examined for antibacterial activities on *E coli* using the Disc diffusion method. These findings show that Iranian walnut packing tissue has antibacterial effects on the 6 examined bacteria and one fungus and may be a suitable alternative remedy for protection. The fiber of walnut packing tissue absorbs the water of squirt and tannin of that has antibacterial activities against *E coli.*

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DETERMINATION OF ANTIOXIDANT ACTIVITY IN DIFFERENT EXTRACTS OF *HIBISCUS SABDARIFFA* L. AND AMOUNT OF TOTAL PHENOL

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Hibiscus Sabdariffa L. is an annual plant that cultivated largely in tropical and subtropical areas of both hemispheres. In Iran, It grows in the region of Sistan and Baluchestan. This plant is used for its fiber; especially for its calyx, which is of three types: green, red and dark red. The red calyxes are the most used and are characterized by their concentration of anthocyanin. Organic acids, minerals and amino acids are also present in the calyx [1]. There are many uses for different parts of *H.sabdariffa L.* Both in food industry and in traditional medicine. The most widely used part of these plants is the calyx because of its high concentration of acids, vitamin C and specially anthocyanins. Moreover, the calyx of the *Hibiscus Sabdariffa L.* plant has long been recognized as a source of antioxidants [2]. The present study was carried out to measure the amount of total phenol and investigate the antioxidant activity for extracts (Aqueous, Methanolic and Ethanolic) of this plant. These measurements have been done in concentration of 2000 µg/ml of extracts. The Methanol extract proved to have the highest antioxidant activity the Aqueous and Ethanol extract according to both 2,2-diphenyl-1-picryl hydrazyl (DPPH) and Ferric Reducing Antioxidant Power (FRAP) tests. According to the DPPH test, the amount of IC_{50} measured for Methanolic extract is 104.36 µg/ml, for Ethanolic extract is 114.65 µg/ml and for Aqueous extract is 226.849 µg/ml. In FRAP test the amount of mM Fe^{2+} per milligram of sample measured to be 40.68, 39.99 and 32.54 for Methanol, Ethanol and Aqueous extracts respectively. The BHT and Ascorbic acid was as standard for DPPH and FRAP test. For measurement of the Total phenol content, Folin-Ciocalteu method was used and Gallic acid (GAE) was tested as standard. The amount of phenolic compound in *Hibiscus Sabdariffa L.* Was found 8.06 mg GAE per gram in dried sample weight.

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IN VITRO ANTIOXIDANT ACTIVITIES OF HERBAL FORMULATION CONTAINING YARROW, TURMERIC, AND MILK AS A TRADITIONAL REMEDY

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Medical plants have chemical compounds that are called phytochemicals. That most of them are flavonoids and phenolic compounds and alkaloids that all of them have anti-inflammatory properties. Huge use of herbal potions to cure various disease in old and heavenly books are reported. yarrow herb has anti-inflammatory and antioxidant effects. Turmeric is also used as apotion of cure disease. This study was designed with target of checking of paste of drug combinatory antioxidant properties. From these two herbs and milk that used as a traditional mixture. At beginning aqueous extracts of two plants were extracted, their antioxidant properties And milk as a main component of mixture were investigated. then to preparation of traditional mixture, two gr turmeric,30 gr yarrow, 220 mililitr milk and 10 mlit sunflower oil and a little of flour are used and its antioxidant properties was examined by examination of total phenol, total flavonoids, nitric oxideradical and DPPH. Yarrow antioxidant activity in neutralizing test of nitric oxide radical and DPPH test has the maximum amount. Although turmeric also has had varying degrees of antioxidant activity. Significant differences between the two plant samples were found in all experiments. Also significant differences between the antioxidant activity of both milk and water mixture with two baseline (water & milk) was observed. The protective role of plants often was due to their antioxidants. That mainly they are flavonoids and phenolic compounds. In addition to antioxidant property, phenolic compounds have anti-inflammatory properties. In this study, boiled aqueous extract of turmeric-yarrow have the most inhibition powerful of nitric oxide radical. And are the best presenting anti-inflammatory material and in result, consumption of them can prevent inflammatory diseases and tissue injury. Although flour had a minimal rate of neutralizing activity of nitric oxide radical itself, other constituent elements of mixture didn't have inhibition properly of nitric oxide radical, in this way, mixture at baseline of milky and watery didn't have inhibition properly that is contrary to what was expected. That perhaps is because of the pasty structure of mixture and resultant of accomplished reactions in pasta. Also all of constituent elements of mixture and mixture at every baseline had antioxidant activity that milk mixture had high level activity although milk didn't have antioxidant property itself.

EVALUATION OF WATER STRESS AND HARVEST TIME ON BIOLOGICAL FUNCTION AND PERCENT OF ESSENCE HERB AT (*MENTHE PIPERITA* L.)

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Herbs refers to a wide range of plants that contain specific ingrediance or treatment disease prevention has been effective it, *Mentha piperita* L. is one of the most-used of all herbs are the most popular herbs in order to evaluated water stress and different harvest time and research in section quantitative and qualitative performance herb (*Mentha Piperita* L.) research on 2 section afield and laboratory in 1998-1999 years levels of irrigation treatment including 25mm, 75mm, 100mm evaporation pan evaporation class A was applied and harvest time include stage of before from flowering during flowering and after flowering. Also according the Anova table showed that the leaf dry weight between harvest and irrigation levels and different time stage there was significant different at step possibility 1% and interaction between surface of irrigation and harvest at probability level 5% and dry leaf weight there was significant between stage of different irrigation and harvest and different time stage at step of possibility according to Anova table plant fresh weight was determined by level of different irrigation harvest and stage of different time and interaction between surface irrigation and harvest at level of possibility 1% there is significant statistically.as a result the best harvest time in order to obtain max dry biologic function be long to treatment after flowering with amount 6127.9kg/hc and lowest dry function harvest at before stage of flowering with amount was 1180kg/hc.

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THE EFFECT OF SODIUM NITROPRUSIDE AND HEMATIN ON SECONDARY METABOLITES AND ANTIOXIDANT CAPACITY OF *ECHIUM AMOENOUM* UNDER SALINITY STRESS

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Nitric oxide (NO) is a widespread messenger in many physiological process and different plant responses to biotic and abiotic stress such as salinity (1). Also Heme oxygenase (HO) is an important cellular defense enzyme that mediates plant resistance reactions (2,3). The aim of this study was to investigate of effect of sodium nitropruside (SNP as a donor NO) and Hematin (H as an inducer of Heme oxygenase) in alleviating of salinity stress symptoms in *Echium amoenoum*. The results in grown plants in greenhouse showed that under 100 µM NaCl, SNP and Hematin increased fresh and dry weight of roots and shoots. SNP and Hematin also increased production of flavonoids, anthocyanin, mucilage and phenolic materials in leaves under salinity and improved DPPH scavenging activity in leaves.

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A VIEWPOINT TOWARD MEDICAL PLANT OF (*ACANTHE PHYLUM BRACTEATUM*) AND ITS INDEGENOUS KNOWLEDGE AND MEDICAL USAGES IN SOUTH KHORASAN PROVINCE

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Choobak (in Persian) plant or the soap-root (*Acanthe phylum bracteatum*) plant were used as reducing and stabilizing cold and winter disease agents, diabetes and blood pressure and etc. in South Khorasan Province in east of Iran in traditional customs of people specially villagers in the last night of autumn season (Yalda night in Persian) and beginning of winter season, people making a traditional candy (Kaf in Persian) from the roots of *Acanthe phylum bracteatum* plant with their indigenous knowledge and skills. In this article, author state a viewpoint toward studying medical usages, indigenous knowledge and traditional customs of *Acanthe phylum bracteatum* in South Khorasan Province.

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THE EFFECT OF SOME MEDICINAL PLANTS ON WEED DENSITY AND DIVERSITY

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In order to investigate the effect of some medicinal plants on weed density and diversity, an experiment was conducted based on a complete randomized block design with 3 replications at the agricultural research station, Ferdowsi University of Mashhad, Iran, during 2012 and 2013. Treatments included 13 medicinal species (*Origanum vulgar*, *Hyssopus officinalis*, *Tanacetum parthenium*, *Echinaceae purpurea, Ruta graveolens*, *Althaea officinalis*, *Hypericum perforatum*, *Trigonella foenum-graecum*, *Oenothera erythrosepala*, *Malva sylvestris*, *Securigera securidaca, Achillea millefolium*, *Digitalis purpurea)*. The results indicated that the effect of medicinal species on total weed density and weight was significant. The highest total weed density was observed in *Digitalis purpurea*. The lowest total weed density was obtained in *Tanacetum parthenium* and *Trigonella foenum-graecum*. Also the highest and the lowest total dry weight of weeds were observed in *Digitalis purpurea* and *Trigonella foenum-graecum*, respectively. The most important weeds in *Digitalis purpurea* and *Trigonella foenum-graecum* plots were *Convolvulus arvensis* and *Solanum nigrum*. Shannon and Margalof indices of weeds were affected by plant species, significantly. The highest Shannon and Margalof indices were observed in *Malva sylvestris* and *Digitalis purpurea*.

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EFFECT OF SOIL APPLICATION OF VERMICOMPOST EXTRACT AND IRON NANOCHLATED ON QUALITY AND ANTIOXIDANT CAPACITY OF SAFFRON

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Conventional farm systems have been characterized by high input of chemical fertilizer, leading to quality deteriovatin of both soil and edible products. Literature review showed that fertilizers influences yield, essential oil composition total phenolic content and antioxidant activity in plants (3). It is reported that potassium, zinc and iron foliar application or vermicompost enhanced the production of saffron (*Crocus sativa*) [1, 2]. Therefore, this research was conducted in order to evaluate of effect of vermicompost extract and iron nanochlated soil application on quantity and quality of saffron. The results showed that ratio 1: 5 vermicompost extract and 8 kg/h nano iron chlated produced the highest flower no, and biomass, Fresh and dry weight and length of stigma. Also saffranal, crocin and picrocrocin contents in stigma and antioxidant activities in stigma (DPPH scavenging and Frap) and in Tepal and leaf (DPPH scavenging and Frap and Fe-chlating activity) were higher in this treatments.

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A STUDY ON THE AUTECOLOGY OF *DOREMA KOPETDAGHENSE* PIMENOV (APIACEAE) IN KHORASAN RAZAVI PROVINCE

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Dorema kopetdaghense Pimenov is one of the seven species of the genus *Dorema* (Apiaceae) which in *Flora Iranica* (Rechinger, 1987) treated as a synonym of *D. hyrcanum* Koso-Pol. Phylogenetic analysis of nrDNA ITS sequences showed that these two species should be retained as separate species (Ajani et al, 2008). Since the two species, *D. ammoniacum* D. Don and *D. aucheri* Boiss., are a part of valuable Iranian medicinal plants and also for the other species of this genus, medicinal properties have mentioned, it is likely that the *D. kopetdaghense* would be a valuable medicinal plant which its properties is almost unknown. In this study; the ecological, anatomical and phenological properties of *D. kopetdaghense* were investigated. At first, based on the previous studies, the distribution of the plant was identified and three regions, viz. dorbadam, karimabad and kalat were chosen. Climate, soil characteristics, and topography of the habitat, along with cover, density, frequency, associated species and regeneration strategy and phenology of the species were investigated and anatomical properties of root, stem and leaves were studied. The soil texture of the habitat was Sandy Clay Loam, Sandy Loam, Loamy Sand, Loam and Clay Loam. EC and pH values of the soils were 0.67-1.03 dS/m and 7.48-7.73, respectively. Vegetative growth started in the late March followed by flowering in June and seed ripening in July. Plant reproduction is done mainly through seeds.

ENHANCEMENT OF PHYTOCHEMICAL AND MORPHOLOGICAL ATTRIBUTES OF *BORAGO OFFICINALIS* BY SALICYLIC ACID

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Borage (*Borago officinalis* L.) is an herbaceous annual plant belonging to the family Boraginaceae. Dried flower of borage is responsible for this plant pharmacological activity and can be valuable source of inflammation removal substances and promotion of the regeneration of the skin. Plant growth regulators stimulate growth and secondary metabolites biosynthesis in various aromatic plants. Salicylic acid is one of the plant growth regulators, which is involved in various physiological processes in plants. The objective of this study was to determine the response of borage phytochemical and morphological attributes in relation to application of different levels of salicylic acid. Borage planted in pots 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. Results showed that salicylic acid application significantly affected some phytochemical attributes such as chlorophyll a, b, carotenoid contents and antioxidant activity. Morphological traits such as shoot height, aerial plant weight, flower dry matter, also significantly affected by different concentrations of salicylic acid. Therefore, application of suitable concentration of this growth regulator to raise the concentration of secondary metabolites in plants could be taken into consideration.

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ZINGIBER OFFICINALE (GINGER) EXTRACT REVEALS IN VITRO ANTIOXIDANT ACTIVITY

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Ginger (*Zingiber officinale*) is one of the most popular of all the spices. It is also of the top five antioxidant foods. Numerous studies investigating ginger's medicinal properties have also shown it to be effective in conditions such as motion sickness and the prevention and treatment of diseases such as Alzheimer's disease, cancer, cardiovascular disease, diabetes, inflammatory diseases and stomach ulcers. Ginger is a source of a large number of important antioxidants that, amongst other activities, reduce lipid oxidation by enhancing the activities of crucial internally produced antioxidants, such as superoxide dismutase. Melatonin, in particular, is not only a highly effective free-radical scavenger itself, but also stimulates production of the main antioxidant enzyme of the brain, glutathione peroxidase. Oxidative stress plays an important etiologic role in the development of alcoholic liver disease. Alcohol is known to cause oxidative injury. This study revealed that the antioxidant activities of a plant extract of *Zingiber officinale* using various in vitro radical scavenging assays by using liver slice cultures as a model system. Ethanol was used as an inducer of oxidative stress in liver slice culture and cytotoxicity was estimated by quantitating release of the liver marker enzymes: such as lactate dehydrogenase (LDH) g-glutamyl transferase (GGT), alkaline phosphatase (ALP). Biomarkers such as, superoxide dismutase, catalase, glutathione peroxidase, and glutathione reductase were also estimated. The whole aqueous extract significantly reduced LDH, GGT and ALP release along with reduction of lipid peroxidation compared to ethanol treated slices. *Zingiber officinale* extract may become a promising candidate for the treatment of oxidative stress.

PREDICTION OF CHICORY WATER USE EFFICIENCY AS AFFECTED BY NITROGEN AND IRRIGATION USING NEURAL NETWORKS GMDH TYPE

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GMDH algorithm is self organizing approach by which gradually complicated models are generated based on the evaluation of their performances on a set of multi-input-single-output data pairs (Xi, yi) (i=1, 2 M). The main idea of GMDH is to build an analytical function in a feed forward network based on a quadratic node transfer function whose coefficients are obtained using regression technique. In this paper, chicory water use efficiency (WUE) is being modelled and predicted using GMDH-type neural networks based on some experimental data. The aim of such modelling is to show how chicory WUE changes with the variation of nitrogen and irrigation levels. The field experiment was conducted as a split plot design based on a randomised complete block with three replications in Birjand. Three irrigation levels (irrigation after 60, 120 and 180 mm evaporation from pan) and four nitrogen levels (0, 60, 120 and 180 $kg.ha^{-1}$) were as main plot and sub plot, respectively. The GMDH type neural networks was used for input (nitrogen and irrigation levels)- output (WUE) data to find the polynomial model of chicory WUE in respect to their effective input parameters. In order to demonstrate the prediction ability of evolved GMDH type neural networks, the data had been divided into two different sets, namely training and testing sets. The result showed that evolutionary methods for designing generalized GMDH type networks had been proposed and successfully used for the modelling and prediction of chicory WUE in different levels of irrigation and nitrogen.

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EVALUATION OF GENETIC DIVERSITY USING MORPHOLOGICAL METHODS IN MEDICINAL WILD ROSE

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Rose is one of the most important ornamental plants in the world. Rose has a long history of breeding. A number of species of wild roses that are famous to *Rosa canina*, and in various parts of Iran, scattered. But unfortunately, comprehensive information about this species no available .Wild Rose is one of the most important shrub that contains vitamin c. Roses grow in many areas of the country as wild. Wild roses for having high potential for tolerance or resistance to environmental stress and various disease-causing soils to be fitted, as one of the rootstock of optimal and suitable for commercial rose growing to be used. This research in order to assess the genetic diversity of wild rose was down. 27 genotype studied wild rose from three different Maragheh County areas was collected and genetic diversity of this genotypes using morphological markers was evaluated. Morphological traits could mean for somewhat significant differences between genotypes. The length of the petals and the width attribute of the petals, the flower petal length diameter maximum diameter flowers with seed number the lowest positive correlation at the level of 1%. In a cluster analysis, based on Euclidean square distances, genotypes divided to five groups. RG7 genotype was in the extreme distance from other genotypes that indicated distinction of this genotype of the other genotypes. The geographic position of the genotypes almost no effect on cluster analysis of genotypes. Because the genotype of the area from the same collection, a collection of separate group were. Analysis of the main component, eight main factors could total 9/82% of the total variance to justify. In General, analysis of the main component of qualitative and quantitative traits, 11 in the form of two main components I and II, the greatest share (33.5 %) justify. A specific difference in the plot bypass was that cluter analysis test, RG9 alone in a group was located and in close distance of genotype 8RG and 11RG. Cluster analysis of the formation of a group of genotypes showed farthest 7RG. In biplot analysis, genotypes RG1 was located the farthest distance of other group. But in a cluster analysis, 1RG genotype group was very near 12RG.

DETERMINATION OF AMINO ACIDS IN SOYBEAN MEAL

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Nutrients generally include carbohydrates, fats, proteins, minerals, vitamins, water and additional ingredients. Proteins are composed of units called amino acids. Some amino acids are created by transferring of amino groups of the other amino acids. But some of them, called essential amino acids, cannot be synthesized enough in the animal's bodies. These amino acids are: Arginine, Methionine, Leucine, Isoleucine, Glutamine, Histidine, Phenylalanine, Lysine, Tryptophan, Threonine and valine. Plants and animals are main sources of proteins. Nowadays, due to the problems of providing protein rich foods from animal sources, the vegetable protein supplements that are byproducts of oil seedmealsare used. In terms of the balance of amino acids, plant proteins are poorer sources. Among the most important sources of plant proteins; distilled dried grains, soybean meal, cotton seed meal, rapeseed meal, sesame seeds, and etc can be mentioned. Among those commonly used plant proteins, soybean meal is more important based on lysine. The precise determination of amino acids in soybean meal. In this study, the exact amount of amino acids in soybean meal was measured using near infrared spectrometry (NIR). The table below shows the soybean mealamino acids based on dry matter content of89.58and crude protein percentage 47.61.

amount	0.622	0.680	2.898	1.845	0.637	3.521	2.161	3.629	2.250	1.279	2.456
Amino acid	Methionine	Sisteine	Lysine	Threonine	Tryptophan	Arginine	Isoleucin	Leucine	valine	Histeine	Phenylalanine

Having the exact amount of soybean meal helps us to have a complete understanding about the richness of the essential amino acids in available soybean meal. These results indicate that soybean meal is considered optimal in terms of amino acid.

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THE EFFECT OF VERMIWASH CONCENTRATION AND APPLICATION FREQUENCY ON GROWTH CHARACTERISTICS OF *MENTHA PIPERITA*

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In this research, some growth parameters of *Mentha piperita* in response to vermicompost extract and application frequency were studied. In this purpose, experimental factorial designs based on randomize completely with two factors and five replications were arranged. The first factor including different vermicompost extracts consist of five levels (E1: the first extract, E2: the second extract, E3: the third extract, E4: the forth extract and E5: control). For extraction, vermicompost and water, ratio of 1 to 5, were soaked for 24 hours. The following extract of the vermicompost was the fourth time here as extracts are labeled E1 to E4. The second factor was application frequency including two levels (Once a week and once every two week). Some growth traits such as plant height, shoot number, leaf number, plant fresh weight and yield dry matter were measured. The results showed significant effect of treatments on some factors measured. The highest plant fresh weight and yield dry matter (36.15 and 6.35 g/pot) belonging to E1 while the lowest content (23.18 and 4.44 g/pot) related to E4. The plant height of the plants treated with extract 3, once each two weeks application frequency (26.1 cm) were significantly differed with other treatments and the minimum value (19.9 cm) was obtained at extract 1, with once a week application frequency. Totally, extract 3 and control treatments have maximum plant height and extract 1 and extract 4 treatments have minimum content. Dry weight was significantly influenced by different extracts and application frequency, so that the highest level (7.44 g per pot) was reached in extract 1 with once each two weeks application frequency and didn't have significant difference between other treatments.

BIOACTIVE REARRANGED ABIETANE FROM ROOTS OF *SALVIA RHYTIDEA*

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Salvia rhytidea is an endemic species in Iran. The essential oil composition of this species has been studied so far [1]. A number of biologic properties like antimicrobial and antioxidant properties of crude extracts of *S. rhytidea* have been introduced in literature, but no records of study on chemical compounds of this species has been recorded yet [2]. A great variety of terpenoids are introduced as constituents of Salvia genus which rearranged abietane skeleton is one of them [3]. In this study, petroleum ether extract of *S. rhytidea* roots was subjected to different purification methods like column chromatography and flash column chromatography and sahandinone, a rearranged abietane, purified and identified with ^{1}HNMR, ^{13}CNMR and MS data as the major component of the extract. This compound has been reported from *S. sahendica* root extract so far and it has reported as an antifungal and cytotoxic compound [4, 5].

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CHEMICAL COMPOSITIONS OF HEXANE EXTRACT OF LEAVES OF *ARTEMISIA KOPETDAGHENSIS* FROM IRAN

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The genus *Artemisia* (Asteraceae) is the largest and most widely distributed one of the approximately 60 genera belonging to the tribe Anthemideae. This genus comprises a variable number of species, ranging from 200 to 800, which are predominantly distributed in the northern temperature region of the world in the 0-50 cm precipitation area [1]. Thirty four genera of them are reported in Iran of which two are endemic [2, 3]. *Artemisia kopetdaghensis* is a common perennial herb growing wild in Iran. In this study *Artemisia kopetdaghensis* were collected from Neyshabur area in Khorasan-e-Razavi province, Iran. Chemical constituents of essential oil of flower of *Artemisia kopetdaghensis* were determined. Dried flowers of plant were subjected to hydrodistillation in a Clevenger–type apparatus until there was no significant increase in the volume of the oil collected. The yield of the oil was 0.80% (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 [4]. Fifty-four compounds were identified constituting more than 99.2% of the oil. β-Myrcene (3.5%), linalyl alcohol (2.1%), terpinolene (2.5%), camphor (8.7%), (Z)-citral (3.5%), β-citral (12.9%), geranyl acetate (24.1%), and camphene (2.1%)were major components in essential oil of flower of *Artemisia kopetdaghensis*. Amongst them oxygenated monoterpenes and monoterpene hydrocarbons were predominant components.

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EFFECT OF EXPLANT TYPE ON CALLUS INDUCTION FROM *WITHANIA COAGULANS*

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Panir-bad (*Withania coagulans*) is a shrub medicinal plant belongs to Solanaceace family. In Iran, the plant distributed in mountainous area of Baloochestan and Bam. The fruits are able to coagulate milk and produce cheese. The ethanolic extract of the fruit showed antifungal activity and that of the leaves and stem antibacterial activity. The results of callus induction from different explants of this plant on MS media supplemented with plant growth regulators have been investigated. The results showed that not only light and darkness condition, but also type of explant and callus inducers effects on morphological callus characteristics. The MS free hormone media were used after callus induction as control. Results show that the explant derived calli on MS free media have endogenous auxins and show more suitable calli.

ANALYZING SOCIO-ECONOMIC ADVANTAGES OF HERBAL IN IRAN BASED ON CHAIN VALUE

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Sailing of herbal and its extracts significantly increase in the last decades. Usage of these kinds of products has become popular among 12 percent of people in the world. This situation led to make a tremendous market in herbal manufacturing which be growth 6.5 annually. Iran consisting of 8000 spices which including 2500 ethnopharmacology and most of them are spices cosmetic and sanity. Among these number, 1730 spices are indigenes which growth particularly in Iran. This capacity is typically there. Herbal are including several socio-economic advantages but also are existing significant rotes at health and sanity sectors. These advantages consist of potential capability to make new jobs, expand nonoil export and improve farmers' life style. Understanding the level of this effectiveness is required scientific and systematic survey. Herbal chain value is an appropriate tool for this aim. The article present chain value cope with herbal then analyzed its socio-economic relevant advantages I Iran.

ANTIOXIDANT ACTIVITY AND NPK UPTAKE OF *MENTHA PIPERITA* INFLUENCED BY VERMICOMPOST EXTRACT AND APPLICATION FREQUENCY

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Antioxidant activity and NPK uptake of *Mentha piperita* in response to vermicompost extract and application frequency were studied. In this purpose, experimental factorial designs based on randomize completely with two factors and five replications were arranged. The first factor including different vermicompost extracts consist of five levels (E1: the first extract, E2: the second extract, E3: the third extract, E4: the forth extract and E5: control). For extraction, vermicompost and water, ratio of 1 to 5, were soaked for 24 hours. The following extract of the vermicompost was the fourth time here as extracts are labeled E1 to E4. The second factor was application frequency including two levels (Once a week and once every two week). Antioxidant activity including DPPH radical scavenging, total phenolic content and NPK uptaking were determined. The results showed significant effect of these factors. The maximum and minimum antioxidant activity (88.08 and 82.88%) related to E1 with once a week application and E2 with once every two weeks application, respectively. The highest and lowest total phenolic content (525 and 274.2 mg Gallic Acid/ 100g DW) were observed in E4 with once every two weeks application and E2 with once a week application, respectively. The maximum NPK uptake was observed on extract 1 treatment and the minimum content related to control treatment.

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THE EFFECT OF SEPARATE AND COMBINED APPLICATION OF ORGANIC, CHEMICAL AND MYCORRHIZA FERTILIZERS ON THE YIELD OF *ALTHAEA OFFICINALIS* IN DIFFERENT HARVESTINGS

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Althaea officinalis L. is one of the valuable medicinal species from Malvaceae family and using its flower is recommended for treatment of constipation, respiratory diseases, eliminating dry cough, relieving sore throat. The roots of this plant can relieve skin irritations and soften skin and it's been used to lower fever, regulate blood sugar, treatment for Diarrhea and dry cough in traditional medicine. In order to study the effects of managing combined organic, chemical and mycorrhiza fertilizers on the yield of *Althaea officinalis* L. flower in different harvestings, an experiment was performed at research farm of Ferdowsi University of Mashad in a factorial fashion and randomized design with three replications in crop year of 1391-92. The first factor included application of Farmyard manure (F1), Municipal solid waste compost (F2), blood (F3), chemical (F4), and control (F5) and the second factor was inoculation with mycorrhiza (*Glomus intraridices*). All the fertilizers were added before planting and also at the time of preparing the land. The chemical fertilizer was added to the irrigation water at the beginning of flowering stage in the form of top dressing. Flowers were collected every three days from mid August. The studied traits were the performance of dry and wet flowers from 5 different harvestings. The results showed that different fertilizers and inoculation with mycorrhiza had a significant effect on the yield of *Althaea officinalis* L. in different harvesting. The most yields observed in first, second, third, fourth and fifth harvestings for F2, F1, F4, F3 and F4 was 0.007, 0.005, 0.014, 0.006 and 0.010 grams per square meter, respectively. In comparison to Non-inoculated, inoculation with mycorrhiza also improved the yield in different harvestings. Thus, we can consider the use of different fertilizers to improve the yield of valuable medicinal plants like *Althaea officinalis* L.

DETERMINE THE AMOUNT OF VALERIAN ESSENTIAL OIL BY STEAM DISTILLATION METHOD

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The natural essential oils in perfumery, cosmetics, pharmaceutical and sanitary industry have many uses. These materials are extracted by various methods Steam distillation is one of the common methods that steam after removing essential oil from herbal cover will be exits with The amount of oil extracted, related to the hydrodynamic parameters such as speed, volume and operating conditions such as temperature and pressure steam Nardostachys Jatamansi or Cat Grass (Scientific name: *Valeriana officinalis*) is a plant that have a strong and perennial bush. In this research essential oil of Nardostachys Jatamansi or valerian that have a sedative-hypnotic, anticonvulsant, depression, digestion of food and anti-cramping affection Was extracted by steam distillation and vapor volumetric rate effect on the extraction rate were studied. The survey results indicated that the speed reduction of volume of steam, extraction generally increases due to this, the higher the residence time of vapor extraction column and according to the Pharmacopoeia of Iran, the amount of essential oil of valerian should not be less than W/ V 1/ % of total oil volume in the R/ 3. % W/ V is obtained.

ANTIOXIDANT ACTIVITY AND TOTAL PHENOL CONTENT OF *CHELIDONIUM MAJUS* L.

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Greater celandine (*Chelidonium majus* L.) is one of the most widespread and well-known medicinal plants of the family Papaveraceae [1, 2]. Cytotoxic, antiviral, antifungal and anti-inflammatory effects are known for crude extract of this herb which dues to a number of alkaloids [3, 4]. According to the medicinal importance of *C. majus*, and its anti-inflammatory effects, a number of papers reported antioxidant and total phenolic contents of this herb growing in different zones [5]. Here, antioxidant and phenolic contents of extracts of *C. majus* which was collected from Galugah city in Golestan, Iran are investigated with DPPH and Folin-Ciocalteu methods respectively. Among acetone, ethanol and aqueous extracts, ethanol extract of roots with IC_{50}=39.6 mg ml^{-1} showed the best antioxidant character and ethanol extract of aerial parts with IC_{50}=57.2 mg ml^{-1} was the best antioxidant between aerial parts extracts. Total phenol contents of roots and aerial parts were 9.3 and 3.9 mg g^{-1} respectively.

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ANTIOXIDANT ACTIVITY OF HYDROALCOHOLIC EXTRACT OF *SALVIA REUTERANA*

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Genus *Salvia* with Sage Common name is one of the largest genuses of Lamiaceae family. It has about 900 Species and it is palmate in all over the worlds [1].It is effective against some diseases such as stomach ache, wound, headache, cold [2]. Some investigation showed it`s biological activity such as antibacterial, antitumor, anti-inflammatory, antidiabetic [2, 3]. *Salvia reuterana* is the type of this genus that was collected from west of Iran. The dried and powdered aerial parts of plant (200g) were extracted with Ethanol 80%, three times (3×48) at room temperature. The solvent was evaporated. Hydroalcoholic extract was analyzed to investigate the antioxidant activity [4], and then study has shown that this extract has the effect of BHA.

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THE STUDY OF FLAVONOIDS AND TOTAL PHENOLIC COMPOUNDS IN LEAVES AND BRANCHES OF MYRTLE (*MYRTUS COMMUNIS* L.) IN KHORASAN JONOOBI

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Myrtus communis L. is an aromatic evergreen perennial shrub or small tree, 1.8-2.4 mheight with small foliage and deep fissured bark. It is a protected species in Boshroyeh, Khorasan Jonoobi. The leaves contain, tannins, flavonoids, coumarins, myrtucommulone A & B, semimyrtucommulone, galloyl-glucosides, ellagitannins, galloyl-quinic acids, caffeic, gallic and ellagicacids [1].In this study the content of total phenolic compounds in different crude extracts in leaves and branches of the Myrtle were compared together using folin–Ciocalteu (F-C) method. The F–C assay relies on the transfer of electrons in alkaline medium from phenolic compounds to phosphomolybdic/phosphotungstic acid complexes, which are determined with UV-Visible Spectrophotometric Method at 765 nm [2]. We also determined the content of flavonoids in the same extracts in leaves and branches in terms of rutin standard in 415 nm [3]. For the leaves EtOH extract and for the branches $CHCl_3$extract were containing maximum value of flavonoids. The maximum values for total phenolic compounds in leaves and branches were in EtOH and MeOH extracts respectively.

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EVALUATION OF ADAPTABILITY AND CHEMICAL AND BIOLOGICAL NITROGEN FERTILIZERS EFFECTS ON SOME MORPHOLOGIC AND PHYSIOLOGIC PARAMETERS OF STEVIA (*STEVIA REBAUDIANA*) IN AHWAZ CLIMATIC CONDITION

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The Stevia plant is part of the Compositae family. The natural sweetener (Stevioside and Rebaudioside A) of this plant is 300 times sweeter than traditional beet or cane sugar but with none of the calories. Stevia plant is enormous opportunity to reduce sugar in products to help the obesity crisis. In Ahwaz conditions, a field experiment was conducted experimental field of Ramin Agriculture and Natural Resources University in Ahwaz, south-west of Iran, during 2013 growing season. Treatments were arranged as a split plat experiment based on randomized complete block design with three replications. The sub plot was included of four levels of different sowing dates (March 10, March 25, April 10 and 25 April) and main plot was included three types of fertilizer consumption (Urea fertilizer, Nitroxin biological fertilizer and Urea fertilizer + biological fertilizer).The results showed significant differences among fertilizer treatments and different sowing dates on some parameters included Spad number, plant height, stem diameter and number of branches. Interaction between fertilizer treatments and different sowing dates on number of branches had significant difference. The results showed that the best yield obtained to used Nitrogen fertilizer and sowig date of March 10.

DETERMINATION AND COMPARISON OF TOTAL PHENOLIC AND FLAVONOIDS COMPOUNDS IN FRESH AND FROZEN SAMPLES OF RED CABBAGE (BRASSICA)

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Phenolic compounds make up one of the major families of secondary metabolites in plants, and they represent a diverse group of compounds. Phenolics can be broadly divided into non-soluble compounds such as condensed tannins lignins, and cell-wall bound hydroxycinammic acids, and soluble phenolic such as phenolic acids, phenylpropanoids, flavonoids and quinones [1]. Among these compounds, flavonoids constitute one of the most ubiquitous groups of plant phenolics. Owing to their importance in food organoleptic properties and human health, a better understanding of their structures and biological activities indicates their potentials as therapeutic agents and also for predicting and controlling food quality [2].Cabbage is leafy vegetable that is currently used in human nutrition. In addition, it contains active compounds with antifungal, antibacterial and anticancer activities [3]. In this study we have determined and compared Phenolic compounds and Flavonoids in four different ethanolic extracts in fresh, one week, tow week and one month frozen cabbages. Phenolic compounds and Flavonoids investigated by UV-Vis spectrophotometry method in 765, 420 nm respectively. The maximum amount of Phenolic compounds and Flavonoids were found in fresh sample.

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EVALUATION OF ANTIOXIDANT AND TOTAL PHENOLIC COMPOUNDS OF DIFFERENT *EUPHORBIA HEBECARPA* EXTRACTS

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Euphorbiaceae is a large family of flowering herbs including 300 genus and over 5000 species and Euphorbia with 2000 species is the largest genus in the family [1, 2]. Many biologic activities like Cytotoxic, phytotoxic, hepatoprotective and DNA-damaging activities are introduced for the compounds purified from this genus so far [3-6]. In this study, total phenolic content of methanol extract and radical scavenger properties of acetone, ethanol and aqueous extracts of E. hebecarpa which was collected from Lalezar province in Kerman, Iran was determined using Folin-Ciocalteu and DPPH methods respectively.[7,8] The total phenol content of E. hebecarpa aerial parts and roots extracts was 5.0 mg g^{-1} and 25.2 mg g^{-1} respectively. The best antioxidant property of aerial parts was due to ethanol extract with IC_{50}=123.9 mg ml^{-1} and the highest antioxidant effect in root extracts was shown in acetone extract with IC_{50}=51.9 mg ml^{-1}.

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CARDINAL TEMPERATURE IN *THYMUS DEANENSIS* POPULATIONS

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Seed germination is a complex biological process influenced by various environmental and genetic factors. In order to find the optimum germination temperature in Thyme, the seeds of 10 populations of *Thymus deanensis* were planted in different constant temperatures of 5, 10, 15, 20, 25, 30 and 35˚C in a factorial experiment based on completely random design with three replications. Germination percentage and germination rate were measured. There was a significant population × temperature interaction indicating that optimum germination temperature varies among populations. In Isfahan and Semirom populations, the highest germination rate was observed in 35˚C while in Feraydan, Markazi and Kordestan populations it was 25 ˚C. The optimum germination temperature in other populations appeared to be 30 ˚C. The populations showed the lowest germination rate in 5˚C. The broad cardinal temperature range among different thymus populations indicated that thyme evolved an adaptation mechanism to germinate in various climates

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PHOTOSYNTHESIS, TRANSPIRATION AND STOMATAL CONDUCTANCE RESPONCES OF *SALIX EXCELSA* SEEDLING UNDER DROUGHT AND FLOODING STRESSES

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The purpose of this study was to investigate the physiological characteristics of *Salix excelsa* plants under different irrigation periods (Flooding, 2, 4, 6, 8 and 10 days).The experiment was performed in a completely random design on outdoor condition (with shelter) for 2 month. The measured parameters in this study are photosynthesis, transpiration and stomatal conductance. Results showed that increasing irrigation period caused significant decreasing in all measured traits (the lowest level is 10 days irrigation period time). The highest level of transpiration showed in 2 days and the lowest was in 10 days irrigation. The highest level of stomatal conductance showed in flooding and 2 days irrigation period and the lowest was in 10 days irrigation. Generally, this research identified that *Salix excels* the better response to soil moisture conditions and dry condition will cause physiological stress problems.

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EFFECT OF DIFFERENT LEVELS OF COMBINED ESSENTIAL HERBAL OILS ON BODY BIOCHEMICAL COMPOSITION AND DIGESTIVE ENZYMES IN FINGERLINGS OF *BARBUS GRYPUS*

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In aquatic industry patronage stress factors and disease generator of the factors decrease. As far as some of the plants have a wide range of useful properties of the provocative treatment and strengthening immune system. This research was conducted in this matter. The relying on the history of consumption and herbs benefits of using. In this study Iranians Eucalyptus plant, Mary rose, mint Pepper and thyme decoction with 0, 0/1, 0/5, 1% concentration of synthetic oil is ready, combination food and added to the amount of 3% weight of the body two times a day feeding. 85 number of fish with the average fish weight 50/3 swimming pool for addaption conditions in laboratory and with oxygen and same temperature for about a week to try to adapt were kept in fish then in attendance with 4 in a completely random design for 56 days with food containing a combination essence were fed .Chemical factors such, fat, ash and lipase and amylase enzymes are examined. The results showed the amount of protein. Moisture and ash incrseced in, 1% concentration of synthetic oil, but amount of fat decreased (P0≤/05). The weight of liver, visceral, are decreased with meaning amount with control treatment. Amylase decreased but lipase increased (P 0≤/05) in 1% concentration of synthetic oil.

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THE APPLICATION OF *ZATARIA MULTIFLORA* EXTRACT IN IMPROVING OF SUPERFICIAL WOUNDS IN CULTUREDHUSOHUSO

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Zataria multiflora is one of the mint plants that is considered in Iranian traditional medicine as dis infective and anesthetic material. The oil of this plant has antibacterial, antivirus, antioxidant and anti-inflammatory effects. Sometimes in skin diseases, *Zataria multiflora* extract is used by bath method cure in order to enhance the capabilities of skin and improving of superficial wounds. In order to control the secondary infections of surface wounds in *Husohuso* species ,using herbal medicines compared to chemical drugs can be helpful to accelerate wound ‘s cure so that at last these worthy commercial fishery fish will undergo less effects of infection and stressfulness. In this research,15 *Husohuso* with the average weight of 5300g after laparoscopy, that treated with three dose of 10, 20 and 30 ppm of *Zataria multiflora* and NaCl at a dose of 2%, were treated by bath method cure and some blood factors comparing to controlling one were evaluated and also the related pictures to healing process were assessed. We couldn’t observe meaningful statistical difference among lymphocytes, neutrophilis and monocytes. In Eozinophils in the second stage of salt treatment, an increase of 2% salt *in Zataria multiflora* treatments of 20,3o of AlT and AST, we observed meaningful increase compared to first stage. Therefore *Zataria multiflora* and sodium chloride have some effects on certain blood factors during improving of superficial wounds.

EVALUATION OF YIELD AND ESSENTIAL OIL CONTENT IN IRANIAN THYMUS POPULATIONS

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Thyme essential oil is among 10 most important ones in the world. The yield and percentage of total essential oil was studied in 22 populations of *T. lancifolius, T. pubescence, T. deanensis and T. kotschyanus* collected from different areas of Iran and planted in completely randomized block design with three replicates. *Thymus vulgaris* was planted as control. Essential oil extracted by Clevenger from one year old plants. Highest and lowest essential oil percentage observed in *T. deanensis* (Ilam population, 3.72%) and *T. kotschyanus* (Ghazvin population, 0.72 %), respectively, compare to *T. vulgaris* having 1.7 %. *T. vulgaris* and *T. lancifolis* showed the highest essential oil yield with 243 mg/pot, 143 mg/pot. Among populations studied, Varcheh and Feriedonshahr populations had maximum (183 mg/pot) and minimum (60 mg/pot) essential oil yield, respectively. The results indicated that some of Iranian populations such as Ilam are potential candidates for breeding programs and might yield even better than *Thymus vulgaris*.

VERMICOMPOST AND MYCORRHIZAL FUNGI COULD ALLEVATED SALT AND DROUGHT STRESS IN *MELISSA OFFICINALIS*

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Salinity and drought are two dangerous problem in world wide and agriculture. *Melissa officinalis* is an important medicinal plant in world and this plant have secondary metabolites and antioxidant property [1] .In this study the effect of vermicompost and mycorrhiza fungi (*Glomus mossea*) on salt and drought stress in *Melissa officinalis* were studied and experiment was carried out in complete randomized design with 3 replicate. Plants grown in perlit hydroponically. Results shown that salinity and drought reduced growth but vermicompost and mycorrhiza increased this parameter and the effect of mycorrhiza was better than vermicompost. In the other hand the results of ion content showed that vermicompost and mycorrhiza fungi alleviated K, Ca, P, Na ,Mg and Fe in plants that affected by salinity and drought. From this investigation we concluded that mycorrhizal fungi and vermicompost resistant this plant against stress such as salinity and drought. These results reported in other investigation with other investigators [2, 3]

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DIVERSITY IN ANTIOXIDANT ACTIVITY AND CHEMICAL COMPOSITIONS OF ESSENTIAL OIL FROM *MENTHA LONGIFOLIA*

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Mentha longifolia (L.), belongs the family Lamiaceae, is an herbaceous perennial plant [1]. This herb grows in many of the Iranian surrounding plains natively. It is one of important medical plants with wide applications in the food and pharmaceutical industries [2]. In Iran, the dried aerial parts of the plants are used as flavouring agent, especially in yogurt and cheese [3].In present study, ecological factors such as altitude, side and slope percentage, latitude and longitude, as well as soil characteristics and associated species were recorded. Hydro-distillated essential oils of wild populations of *Mentha longifolia* aerial parts collected from various natural habitats in the alpine regions, three provinces, Iran were investigated for their chemical components and oil yield diversity. Strong chemical variability, the essential oil yield, and antioxidant activity (DPPH assay) depending on the origin of the samples, was observed. The main constituents of the essential oils were menthol, pulegone and isopulegone.

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CHANGES IN OIL YIELD AND CHEMICAL COMPONENTS OF THE ESSENTIAL OIL OF *MENTHA LONGIFOLIA* UNDER DRYING METHODS

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Drying process increases the shelf life by slowing microorganisms growth and preventing certain biochemical reactions that might alter the organoleptic characteristics [1]. *Mentha longifolia* (L.), belongs to the family Lamiaceae, is an herbaceous perennial plant [2]. This herb grows in many of the Iranian surrounding plains natively. It is one of important medical plants with wide applications in the food and pharmaceutical industries [3]. In Iran, the dried aerial parts of the plants are used as flavouring agent, especially in yogurt and cheese [4]. The aerial parts of *Mentha longifolia* were dried by five drying methods including: sun-drying, shade-drying, oven-drying at 40 °C and 60 °C and freeze–drying. The essential oils of fresh and dried samples were obtained by hydro-distillation and, were analyzed by using gas chromatography–mass spectrometry (GC–MS). The highest essential oil yields were obtained by shade-drying. The main components in essential oils of fresh and dried *Mentha longifolia* aerial parts were menthol, pulegone, isopulegone. In finally, drying of aerial parts of *Mentha longifolia* in shade-drying is most suitable and is recommended for high-oil yield.

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EFFECT OF DIFFERENT FERTILIZERS ON OIL YIELD AND CHEMICAL COMPONENTS OF GREEN LANDRACE OF BASIL

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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 quality and quantity characteristics of *O. basilicum* L. (green landrace) in a field in Saman, southwestern Iran at 2013 was investigated. 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). The highest essential oil yield was obtained by the application 20 ton/ha organic fertilizer (cow manure).The highest dry matter yield was obtained by the application chemical fertilizer (N, P, K).The main components in essential oils of basil were methyl chavicol, geranial and neral. In finally, the application of cow manure is most suitable and is recommended for high-oil yield in *O. basilicum*.

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IN VITRO MICROPAGATION OF PANIR-BAD (*WITHANIA COAGULANS*) BY ROOT EXPLANTS

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Panir-bad is a medicinal plant belongs to Solanaceae family. It is distributed in Sistan and Balochestan province and Gonbaki Mountain of Kerman province(.Mozaffrian,1386). The locals use the yellowish fruits for cheese production(Msdv mikta,1997). The objective of this study was to establish a tissue culture system for basic studies and also the most suitable protocol for regeneration of this medicinal plant. Callus initiation started with culture of root explants on MS medium. Two groups of callus inducers including phenoxy auxins (2, 4-D and picloram) and non-phenoxy auxins (IBA and IAA) were added to MS medium separately. The results showed that the presence of light is more important than type of callus inducer. Moreover, the highest indirect regeneration rate studied from culture of 100 mg/culture of root-derived callus on MS medium supplemented with different concentrations of kinetin and BAP. The results showed that the root-derived callus on MS medium with picloram had maximum potential of shoot regeneration. Also results showed that BAP influenced indirect regeneration of explants more than kinetin.

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NUMERICAL TAXONOMY OF THE GENUS *OROBANCHE* L. (OROBANCHACEAE) IN NORTHEAST OF IRAN

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Orobanche L. is the largest genus within the Holoparasite family or Obanchaceae. According to the Flora Iranica, this genus has five species distributed in the Khorassan area including *O. aegyptiaca, O. pulchra, O. cernua, O. amoena and O. camptolepis*. These species are morphologically very similar and there are few differentiable characters among them. Fleshy, lack of chlorophyll, little herbarium sampling, color changing, brief and equivocal descriptions, use of non-differential characters such as stem and bracts, sweeping generalizations and deletion of keyharacters, incomplete and difficult identification keysinfloras, and finally use of qualitative terms such as little, much, many, etc., have caused having a complicate genus in Northeast of Iran. In this study we used 41 and 37 quantitative and qualitative morphological characters, respectively. We did not use equivocal characters such as corolla color. Results of this study showed that flower and calyx traits, length and width of middle lobe of lower lip, distance between base up to curvature and the latter up to corolla tip, corolla width, width of lower and upper lip, the length of longest and shortest calyx teeth, the length of bract related to the calyx tube and many differentiating characters which were ignored in the most floras are useful in differentiating the *Orobanche* species in Khorasan area [1- 4].

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STEM AND PETIOLE ANATOMICAL STUDY OF THE SPECIES COMPLEX *PHLOMISHERBA-VENTI* (LAMIACEAE) IN NORTHEAST OF IRAN

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In this study, we investigated stem and petiole anatomical features of the complex species *Phlomisherba-venti* including *Ph. herba-venti* subsp. *pungens*, *Ph. herba-venti* subsp. *Lenkoranica* and *Ph. herba-venti* subsp. *kopetdaghensis* distributed in Northeast of Iran. These subspecies are morphologically very similar where it is difficult to identify them using the identification keys. In this study we tried to construct an identification key based on anatomical characters. Samples were collected from various regions of Northeast of Iran followed by fixing in the FAA solution. Anatomical sections were made by hand. The sections were stained using Tolouidene blue and they were studied by the Light Microscope. Results showed that many anatomical characters such as sectional diameter, vessel distribution and their placements, the number and thickness of vessel layers, and the number of parenchymatous layers of stem and petiole are useful in differentiating the subspecies under study.

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

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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. Induction of polyploidy is an important technique for breeding of medicinal and aromatic plant. The effects of various colchicin concentrations (0, 0.05, 0.1, 0.2 % w/v) for 12, 24, 36 and 48 hours on polyploid induction of seed of *Salvia lerrifolia* under *in vitro* condition were studied. The survival rates of seeds were affected by the colchicin concentration and duration of treatment. All of the explants treated with 0.2 % colchicine concentrations demonstrated lower survival rates whereas 0.05 % colchicine concentrations showed higher survival rates. In comparison to the control plants, tetraploids showed morphological differences such as an earlier induction of enhanced growth of lateral branches and smaller leaflets and multiple shoots per single cultured seed.

MORPHOLOGICAL VARIATION IN SUPERIOR POPULATION CULTIVATED *THYMUS DAENENSIS*

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Thymus daenensis endemic of Iran is an aromatic and medicinal plant. This is a valuable pharmaceutical composition Because of Being rich *Thymus daenensis* of thymol so it must be imported in to agricultural production systems. In the first step of domestication of plant, populations were investigated from different ecological regions then were identified a superior population of thymol-rich and extension of essential oil. Superior population was sampled and transferred into the field. After the establishment and adapting of field conditions, was done investigation morphological of the various Genotypes over three years that were identified superior genotypes in following. Means comparison of study showed over three years that population of Ilam have a considerable variation in the morphological characteristics of the study population. The highest obtained coefficient of variation in the 3-year of research belonged to the dry weight of leaves, flowers, number of branches, inflorescence and the inflorescence internode length. The correlation results of research showed that fresh weight, plant height, plant width, number of branches per plant and dry weight have a significant positive correlations; moreover Plant length, width, plant fresh weight, leaf and flower weight and internode length and number of flowers showed a significant positive correlation with plant height in every three years. Respects to the existence diversity in the population studied were selected 59 genotypes according to traits for further breeding programs. According to the results of mean comparison, the main difference between the two groups has been seen in the bracteole length and width, length and width of the plant, number of branches and weight leaves and flowers and per the principal component analysis; four main factors could explain a 52.07% of the total variation.

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ASSESSMENT OF GENETIC DIVERSITY OF 59 GENOTYPES OF SUPERIOR *THYMUS DAENENSIS* USING ISSR MARKERS

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Thymus species are well known as medicinal plants because of having biological and pharmacological properties. Thyme is one of the most important medicinal plants with wide distribution in Iran. *Thymus daenensis* is an endemic aromatic medicinal plant to Iran. Essential oil of *Thymus daenensis* is a rich source of thymol which gives high antimicrobial and antioxidant activity to this plant. In this research, genetic diversity 59 genotypes of superior *Thymus daenensis* were investigated. At the evaluation of genetic diversity, a total of 127 bands were generated using 12 ISSR primers, of which 103 (81.45 %) band were polymorphic. The number of polymorphic bands ranged from 7 to 13 with a mean of 8.58 bands .Cluster analysis was used based on Jaccard coefficient and UPGMA method. By using cluster analysis of the similarity index 0.55 genotypes were classified two main groups. After the molecular analysis of level their diversity and similarities between that exist between individuals of considerable diversity.

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REGENERATION OF *WITHANIA COAGOLANS* FROM SHOOT DERIVED CALLUS

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Withania coagulans belongs to Solanaceae family. The plant not only is a medicinal and industrial plant but also is a useful plant for protection of soil erosion in mountainous area. The area of distribution in Kerman, Sistan and Balochestan [1] is decreasing yearly. The fair of extinction and benefits of fruits in production of organic plant rennet is the reason of more attention to this plant in Iran. In this study the shoot explants with five mm length were used for direct regeneration from shoot derived callus. In this study the shoot explants were cultured on MS media supplemented with different concentrations of auxins. The most suitable callus with higher dry weight was cultured on 0.5, 1.0 and 2.0 mg/l kinetin and or BAP. Results showed that the number of plantlets/culture was more on MS media suppleme Ahmadabad nted with BAP than kinetin. The inoculums were 100 mg of shoot derived calli.

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ANTIMICROBIAL PROPERTIES OF THE ETHANOLIC EXTRACTS OF *ZINGIBER OFFICINALE* (GINGER) ON *SALMONELLA TYPHI*

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The hydrochloric acid found in the stomach is a powerful defense against ingested pathogens and rapidly destroys almost all organisms that are taken in with food. Once established, this bacteria causes a range of problems including indigestion, esophagitis, gastritis, stomach and duodenal ulcers, and stomach cancer. Ginger (*Zingiber officinale* Roscoe) has been used widely as a food spice and an herbal medicine. In particular, its gingerol-related components have been reported to possess antimicrobial and antifungal properties, as well as several pharmaceutical properties. However, the effective ginger constituents that inhibit the growth of oral bacteria associated with periodontitis in the human oral cavity have not been elucidated. Ginger can eliminate all strains of Helicobacter pylori, the bacteria that are the principal cause of stomach cancer. This study evaluated that the ethanol extracts of ginger exhibited antibacterial activities against *Salmonella typhi* causing periodontal diseases. The antimicrobial properties of various extract of *Zingiber officinale* (ginger) against *Salmonella typhi* were investigated using the Agar and tube diffusion method. The results obtained revealed that ethanolic extract of ginger gave the widest zone of inhibition against *Salmonella typhi.* It was also observed that the solvent of extraction affected the of mouse's superficial ulcer caused by *Salmonella typhi*. The plant extract showing that ginger has antimicrobial activities on the test organisms due to its inhibitory effect, thus confirming its use in folk medicine.

TO COMPARE THE EFFECT OF HYDROCOLLOID DRESSING WITH 1% SILVER SULFADIAZIN DRESSING IN DIFFERENT ASPECTS OF HEALING PROCESS AND PAIN IN SECOND –DEGREE BURN WOUNDS

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The present study in a Quasi- experimental study which has been done in department of emergency, Imam khomeini hospital, Hamedan. The aim is to study effects of hydrocolloid dressing as compared to 1%silver sulfadiazine in healing process of the second degree burns. In this study we selected 30 patients every one well two burn lesions, One lesion as a test group(with tragacanth gel dressing) and the second lesion as control group (with 1% silver sulfadiazine dressing). The burn wound, check list to determine the percentage of burn area, check list to determine amount of healing and check list to elaborate degree of pain and we completed for each dressing session. For analysis we used T-pair test and ki-square (x) and fisher test. According to results duration of healing of the wound in test group was 8.06 days and in control group it was 13.2 days, using T-pair test there was significant difference between two groups (P=0.000) that indicates shorter periods of healing in second stage burns of test group as compared to control group also indicates meaning number the mild degree of pain (1.97) in test group as compared to moderate degree of pain (3.64) in control group, using T-pair test there was significant difference between two groups (P=0.000) that indicates test severe pain in test group as compared to control group. One of the important finding was the score of wound healing in test group was 23.8 and in control group it was 20.7, using T-pair test there was significant statistical difference between two groups (p=0.000). Additionally for all criteria of burn healing there was significant difference $p<0.05$ between two groups indicates better healing process & second degree burns in test group compares to control group.

SALT TOLERANCE EVALUATION OF FIVE *SATUREJA HORTENSIS* POPULATION (MORPHOLOGICAL AND PHYSIOLOGICAL TRAITS)

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In order to evaluation of salt tolerance of savory ecotypes an experiment was conducted on factorial (include two factors) based on completely randomize design (CRD). The first factor was salinity levels (0, 25, 50 and 100 mM NaCl) and the second factor was savory population (Mashhad, Isfahan, Tabriz, Shiraz and Markazi). The important traits measured including: plant height, stem diameter, shoot number, leaves number, plant fresh weight, plant dry weight, root fresh weight, root dry weight, proline, total carbohydrate, potassium and sodium. The results showed that there were significant differences between various levels of salinity and population. Stem diameter decreased with increasing salinity in all population. The minimum stem diameter was observed on Mashhad population and the maximum stem diameter was related to Isfahan and Shiraz population. Salinity concentration reduced plant height and the highest and lowest plant height calculated in control (51.86 cm) and 100 mM NaCl (34.86cm) treatments, respectively. The most shoot number (15) was measured in Isfahans population and the lowest shoot number (6.33) belonging to Tabriz population. Salinity decreased leaf number at all NaCl treatments. Salinity also caused significantly reduced in plant fresh weight and dry weight. Increasing in Salinity caused a significant reduction in dry weight as maximum dry weight obtained in 0 Mm NaCl (5.18 g) in Shiraz population and the minimum obtained in 100 Mm NaCl (0.81 g) in Mashhad population. In addition, root fresh weight and root dry weight decreased with increasing salinity. Totally, the highest and lowest fresh weight and dry weight of root related to control treatment (0 mM NaCl) in Tabriz population and 100 Mm NaCl treatment in Shiraz population respectively. Our results also showed that proline content was varied from 2.04 (mgr/g fw) to 13.47 (mgr/g fw), in Isfahan and Markazi population, in 0 mM and 100 mM treatments, respectively. The total carbohydrate content was increased with increasing salinity in all ecotypes. The highest accumulation of carbohydrate content was obtained with 100 Mm NaCl application (194.8 ppm) and lowest accumulation was obtain with 0 Mm NaCl treatments (91.85 ppm). With increasing in salinity levels, potasium was reduced and sodium increased. Among the ecotypes highest rates of potassium reported by mean 4.06 (mgr/g) in ecotype Mashhad and least amount of potassium was obtained 3.39 (mgr/g) in Tabriz ecotype. Among ecotypes, the highest rates of sodium reported by mean 2.34 (mgr/g) in Tabriz ecotype and least amount of sodium obtained by mean 1.94 (mgr/g) in Esfahans ecotype.

EFFECT OF SOME SEED PRIMING TREATMENTS ON GERMINATION QUALITY OF ARTICHOKE SEEDS

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Seed priming is a technique by which the treated seeds obtain the physiologically and biochemically readiness for germination. This treatment normally results in various biological and physiological changes in germinating seeds as well as on subsequent seedlings. This has positive effects on seed germination, seedling development and establishment, earliness and improvement of yield and product quantity. In this study effects of osmo-priming and hydro-priming on seed germination and seedlings growth of artichoke was investigated. The treatments were potassium nitrate, calcium nitrate and calcium sulfate each with equal concentration of 10 mM/L, dH_20, PEG 6000 with osmotic potential of -0.5 MPa and control. The Analyzed traits in this study were root and stem lengths, fresh and dry weights of roots, stem and whole seedling, percent and speed of germination, and the number of abnormal seedlings. The multivariate analysis of variance showed the best time period for priming in both *laboratory and* Greenhouse (soil experiment), was 12 hour. Furthermore results indicated that the best priming treatment in laboratory experiment was potassium nitrate and for soil experiment (pot) was PEG 6000.

COMPARISON OF LEUCOREX® AND METRONIDAZOLE ON TREATMENT OF BACTERIAL VAGINOSIS, TRICHOMONIASIS AND MIXED VAGINITIS

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Vaginitis is the most common female genital tract problems that women seek treatment. Over ten million outpatient visits occurs due to Vaginitis annually. *Trichomonas vaginalis* is the most prevalent nonviral sexually transmitted infection, affecting an estimated 3.7 million people. Bacterial vaginosis (BV) is a condition characterized by an imbalance in the vaginal flora: the number of lactobacilli morphotypes are reduced and the number of anaerobic bacterial morphotypes are increased. *Zataria multiflora* Boiss. is a thyme-like plant belonging to the Lamiaceae family that grows wild only in Iran, Pakistan and Afghanistan [4]. Antibacterial and antifungal effects of *Zataria multiflora* (*Z. multiflora*) have been demonstrated in vitro and in vivo. This study is comparison of *Zataria multiflora* vaginal cream (Leucorex) effect and metronidazol oral tablet on the results of *trichomona vaginalis* therapy, bacterial vaginiosis and these two infections are with each other. This study was done on 174 stricken women to bacterial vaginosis, *trichomonas vaginalis* or both of these infections with each other, that were accidentally placed in 3 groups of 58.The diagnosis criteria are wet smear and gram stain .In the experiment groups *Zataria multiflora* vaginal cream and placebo oral tablet and in control groups metronidozal oral tablet and placebo vaginal cream were advised for 7 days. The comparison of laboratory findings and clinical signs therapy percent in each three vaginitis groups do not show important statistic difference after using *Zataria multiflora* vaginal cream and metronidozal oral tablet. *Zataria multiflora* vaginal cream have affected, similarly to metronidozal oral tablet, on the therapy of vaginitis and it could be an proper remedy in treatment of them.

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EFFECT OF APPLICATION PLANT GROWTH REGULATORS ON MORPHO-PHYSIOLOGICAL AND AGRONOMICAL CHARACTERISTICS FENUGREEK (*TRIGONELLA FOENUM-GRAECUM* L.)

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In order to investigate the effect of application of plant growth regulators on morpho-physiological characteristics of fenugreek (*Trigonella foenum-graecum* L.), an experiment was conducted on randomized complete blocks design (RCBD) with 13 treatments and 3 replications in 2012 at the research greenhouse in Institute of Medicinal Plants (IMP), ACECR. The treatments were consist of control (soaking the seeds before planting and after planting sprayed with distilled water), GA_3 25 and 50 ppm, NAA 25 and 50 ppm (soaking the seeds before planting, spray after planting, soaking seeds before planting with spray after planting). Measurements were plant height, stem diameter at crown, root dry weight, stem dry weight, leaf dry weight, pods dry weight, shoot dry weight and SPAD value. Analysis of variance indicated that the application of plant growth regulators on plant height, stem diameter at crown, root dry weight, stem dry weight, leaf dry weight and pods dry weight were significantly difference at $P \leq 0.05$ and shoot dry weight were significantly difference at $P \leq 0.01$ and also application of plant growth regulators had no significant effect on the SPAD value. Mean comparisons showed that the highest plant height, stem diameter at crown, root dry weight, stem dry weight, leaf dry weight was in NAA 50 ppm (soaking seeds before planting and spray after planting) and were obtained the highest pods dry weight in GA_3 50 ppm (soaking the seeds before planting, spray after planting) and also highest shoot dry weight in NAA, GA_3 50 ppm (soaking seeds before planting and spray after planting).

ETHNOBOTANY OF MEDICINAL PLANTS FROM NEISHABOUR CITY, IRAN

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Nowadays medicinal plants, due to a special place in their community health are considered scientific and research centers. In drug discovery, it is important to refer to the historical experience. By reviewing the history of traditional medicine is characterized which and traditional healing more than new chemical components provide a suitable ground for the discovery of new drugs. With regard to the use of medicinal plants in different locations with customs, traditions and different ways; therefore, methods and uses of these medicinal plants is also different in different regions. The purpose of this study, research and review some medicinal plants from various plant families in the city of Neishabour so as to identify and understand how to use native plants in this area. The desired area, about indigenous knowledge and traditional herbal medicine by trusted and experienced and knowledgeable, with completion of the questionnaire, interview techniques, was collecting and documenting. Organize information, including identification, local name, and adapt to Persian and scientific names, parts used, and how to use the healing properties in that area.

PHYTOCHEMICAL ANALYSIS OF *PINUS ELDARICA* BARK

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Bark extract of *Pinus pinaster* contains numerous phenolic compounds such as catechins, taxifolin, and phenolic acids. These compounds have received considerable attentions because of their anti-inflammatory, antimutagenic, anticarcinogenic, antimetastatic and high antioxidant activities. Although *P. pinaster* bark has been intensely investigated in the past; there is comparably less information available in the literature in regard to *P. eldarica* bark. Therefore, the aim of this study was to determine the chemical composition of *P. eldarica* commonly found in Iran. A reversed-phase high pressure liquid chromatography (RP-HPLC) method for the determination of catechin, caffeic acid, ferulic acid, and taxifolin in *P. pinaster* and *P. eldarica* was developed. A mixture of 0.1% formic acid in deionized water and 0.1% formic acid in acetonitrile was used as the mobile phase, and chromatographic separation was achieved on a Nova pack C18 at 280 nm. The two studied *Pinus* species contained high amounts of polyphenolic compounds. Among four marker compounds, the main substances identified in *P. pinaster* and *P. eldarica* were taxifolin and catechin, respectively. Furthermore, the composition of the bark oil of *P. eldarica* obtained by hydrodistillation was analyzed by gas chromatography/mass spectroscopy (GC/MS). Thirty-three compounds accounting for 95.1 % of the oil were identified. The oils consisted mainly of mono- and sesquiterpenoid fractions, especially α-pinene (24.6%), caryophyllene oxide (14.0%), δ-3-carene (10.7%), (E)-β-caryophyllene (7.9%), and myrtenal (3.1%).

GEOGRAPHICAL LOCATION AND SOIL CHARACTERISTICS OF NATURAL HABITATS OF NOWRUZAK (*SALVIA LERRIFOLIABENTH.*) AS MEDICINAL PLANT IN KHORASANRASAVI PROVINCE

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In this study geoposition (latitude, longitude, elevation) of natural habitats of Nowruzak (*Salvia lerrifolia* Benth.) as medicinal plant in six cities of Khorasan Rasavi province includings Torbatheidariyeh, Kashmar, Bardeskan, Bajestan and Gonabad were determined using GPS devise. For this purpose apparent plant coverage, phonological stage and type of associated species were recorded. Composite soil samples were taken in order to evaluate some chemical and physical soil properties. The average height of natural habitats was 1059 m (844 to 1269). Among different measured soil characters, the highest and the lowest coefficient of variation equal to 122 and 2 belonged to soil organic matter and sand percentage. The mean values of soil pH was 8.08 (6.90 to 8.40), electrical conductivity; 1.00 (0.59 to 2.25); Calcium carbonate: 13.1% (7.5 to 22.0); organic matter: 1.66% (0.23 to 6.63); sand: 52.1% (39.2 to 82.5), clay: 16.7% (4.17 to 27.5); silt by 31.2% (13.3-44.3), N by 0.05% (0.02-0.15), Zn by 0.33 $mgkg^{-1}$ (0.16-0.66), Fe by 4.30 $mgkg^{-1}$ (5.42-7.98), Cu by 0.39 mg kg^{-1} (0.18-0.6) and Mn by 9.71 $mgkg^{-1}$ (5.36-14.6). It seems that soil texture especially sand and silt percentage, pH, calcium carbonate, microelement nutrients (Mn, Fe, Zn and Cu) and electrical conductivity of soil extraction were respectively important stable characteristics in natural habitats that should be considered during the domestication procedure of *S. lerrifolia*.

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COMPARISON THE EFFECT OF LEUCOREX® + PROPOLIS AND METRONIDAZOLE TABLET ON TREATMENT OF TRICHOMONIASIS AND MIXED VAGINITIS

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Vaginitis is the most frequent genital tract problems that women seek medical care [1]. Bacterial vaginosis (BV) is the most prevalent type of vaginitis and trichomonas vaginalis (TV) as sexually transmitted diseases protozoan is the most global of the urogenital system that simultaneously exist in 60% of cases [2]. Leucorex ® is a herbal vaginal cream that its efficacy is proved in a variety of TV [3], BV [4] and Candidia [5]. In this study the efficacy of Leucorex ® + Propolis for treatment of trichomonas and mixed vaginitis were compared with metronidazol tablet. 80 patients with 2 vaginitis types (in equal groups) were selected and then divided into 2 treatment groups that each groups randomly received metronidazol tablets and placebo cream or placebo tablet and Leucorex® + Propolis. Diagnosis of vaginitis was based on clinical and laboratory symptoms. All patients underwent an initial check again after one week of treatment. Cure by wet smear and Gram stain were considered. Clinical and laboratory symptoms of vaginitis decreased in 2 groups after treatment ($p.v < 0.05$). Improvement of both types vaginitis in group that receiving leucorex+ propolis were more than metronidazol tablets group. These results indicate that leucorex + Propolis are more effective than metronidazol tablet in treatment of trichomonas and mixed vaginitis.

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CHEMICAL CHARACTERIZATION OF THE ESSENTIAL OIL OF WILD *SALVIA SAHENDICA* BOISS. & BUHSE (LAMIACEAE) POPULATIONS FROM IRAN

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Salvia sahendica Boiss. & Buhse (Lamiaceae), with the common Persian name of "Maryamgoli-Sahandi", is an endemic species which grows wild, in some regions around Sahand Mountain in northwest Iran [1, 2]. The plant is traditionally used as spasmolytic, astringent, antiseptic and treatment of Dyspepsia. In addition, the essential oils and various extract of *S. sahendica* were found to have biological properties such as antibacterial and antioxidant activities and hepato-protective potential [3]. In the present study, the variation of the essential oil composition among seven wild populations of *S. sahendica*, collected from different geographical regions (Kassaei, Akhmaghayeh, Eil goli, Sahand, Shibli, Kandovan and Sardrood), was assessed by GC-FID and GC/MS analyses, and their intraspecefic chemical variability was determined for determining valuable characteristics for future breeding programs and medicinal purposes. The essential-oil content (% w/w) of the studied populations ranged from 0.7 (Sardrood population) to 1.1% (Shibli population). In total, 26, 38, 61, 53, 50, 49 and 43 compounds were identified and quantified in Kasaei, Akhmaghayeh, Eil goli, Sahand, Shibli, Kandovan and Sardrood populations, representing 99.1, 99.7, 99.6, 99.3, 99.4, 99.5 and 99.2 of the total oil, respectively. The major components of all samples were α-pinene (5.4-16.9%), β-pinene (4.0-11.1%), *trans*-meta-mentha-2,8-diene (6.4-21.3%), 1,8-cineol (8.5-14.3%), germacrene D (0.2-8.0%), bicyclogermacrene (0.2-14.6%), and spathulenol (1.3-17.3%). For the determination of the chemotypes and the chemical variability, the essential-oil components were subjected to cluster analysis (CA). The three different chemotypes characterized were *Chemotype I* (1,8-cineol/ *trans*-meta-Mentha-2,8-diene) including Akhmaghayeh, Shibli, Kandovan and Sardrood populations, *Chemotype II* (1, 8-cineol/spathulenol) including Eil goli and Sahand populations, and *Chemotype III* (*trans*-meta-Mentha-2,8-diene/spathulenol) including Kasaei population. The high chemical variation among the populations according to their geographical and bioclimatic distribution imposes that conservation strategies of populations should be made appropriately, taking into account these factors.

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INTERACTION OF ENDOPHYTIC TAXOL-PRODUCING FUNGUS (STEMPHYLIUM SEDICOLASBU-16) WITH CELL SUSPENSION CULTURE OF ITS HOST (*TAXUS BACCATA*) ON TAXOL PRODUCTION

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Taxol (paclitaxel), a complex diterpene, is arguably the most important anticancer drug which is widely used for chemotrapeutic applications throughout the world. It was originally isolated and characterized from the bark of *Taxus brevifolia* [1]. Traditional extraction of taxol from raw material, total chemical synthesis and semi-synthesis from its precursor are quite expensive with unstable production and difficulty in purification. In recent decades, production of taxol by cell suspension cultures of *Taxus* species and their endophytic fungi has been extensively considered [2]. Endophytic taxol-producing fungi are interesting not only as an alternative taxol production way but also as an elicitor. In the present work, the interaction of *Stemphylium sedicola* SBU-16[2] as an isolated endophytic taxol-producing fungus and cell suspension culture of its host (*T. baccata*) on taxanes production has been studied. A co-cultivation system of *T. baccata* cells with endophytic fungus was developed for studying their interactions during taxol accumulation. *T. baccata* cells were co-cultured with *S. sedicola* SBU-16 in a shaking dual flask system which has been divided by a nitrocellulose membrane filter (0.45 µm). *S. sedicola* SBU-16wasinoculated into the co-culturing system when *T. baccata* cells had grown in co-culture flask for 12 days. The plant cell suspension and endophytic fungus cultures were separately considered as control. The cells co-cultivated with endophytic fungus displayed a significant ($P< 0.05$) decrease in growth compared with the control cells, while the biomass of endophytic fungus significantly ($P< 0.05$) increased during co-cultivation period. Total taxol content (0.266 mg/l) produced by the co-cultivation system (cultivation time of 21 days) was 2-foldhigher than by control culture (0.123 mg/l).Our results clearly show that the endophytic fungus has substantial effect on taxol productivity and release in cell suspension culture of *T. baccata* as its host.

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AN ECONOMIC ANALYSIS OF APPLICATION OF MANURE - CHEMICAL FERTILIZER ON AGOWEN IN SISTAN

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This experiment was conducted to find the influence of drought stress, organic and chemical fertilizers on Ajowan plant (*Carum copticum*) at the of Pardis, University of Zabol, Iran, to evaluated the economic viability of application manure – chemical fertilizer on Ajowan. The treatment consisted of three different watering levels, irrigation and 50, 70, and 90 % of field capacity were used. Also different type of fertilizers were considered as secondary factor in six levels including control, chemical fertilizer, bestial fertilizer (25t/ha), compost of rural dump (40t/ha), chemical fertilizer (50%), chemical and bestial fertilizers (50 and 50%) + compost fertilizer (50%). Result showed that the most profitable practice was chemical fertilizer and 50% chemical fertilizer + 50% manure. The treatment produced a favorable 8.3 and 9.7 benefit: cost ratio.

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ANALGESIC EFFECTS OF *ROSA CANINA* L. FRUITS EXTRACT IN THE RAT MODEL OF FORMALIN-INDUCED PAIN

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Medicinal plants are widely employed in many countries specially, Iran. *Rosa Canina* L. is a medicinal plant, largely used in traditional folk medicine as a dietary supplement and a herbal remedy for the treatment of various disease including cold, flu, inflammation, osteoarthritis, rheumatoid arthritis and chronic pain, but not demonstrated precise action mechanisms. Therefore, the aim of the present study was to investigate the analgesic effects of ethanolic extract of *Rosa Canina* L. fruits (ERC) on formalin-induced pain in rat. Ethanolic extract of *Rosa Canina* L. (ERC) from fruits were obtained by maceration method. Nociception was induced by intraplantar injection of formalin (50 µL, 1%) in right hind paw in rat and time spent for paw licking and biting was measured at 0-5 min (first phase) and 15-40 min (second phase) after formalin administration. ERC (25, 50, 100 and 200 mg/kg, i.p.) and morphine (5 mg/kg, s.c.) were administered 1h and 20 min before formalin injection, respectively. Injection of formalin (50 µL, 1%) in plantar surface of right hind paw produced a biphasic nociceptive behavior (first phase: 0-5 min and second phase: 15-40 min). ERC (100 and 200 mg/kg) significantly ($p<0.05$) reduced both phases of formalin test. Also, morphine (5 mg/kg) significantly ($p<0.05$) inhibited both phases of pain. ERC analgesic effect at doses 100 and 200 mg/kg was similar to morphine 5 mg/kg. The results of present study indicate that ERC produced analgesic effect in formalin-induced pain and this effect was similar to morphine. These results suggest that analgesic effects of ERC is probably due to interaction with opioid system. Further studies are needed to elucidate the analgesic mechanism of *Rosa Canina* L.

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SALINITY IMPACTS ON SEED GERMINATION INDICES IN MEDICINAL PLANT LEMON BALM (*MELISSA OFFICINALIS* L.)

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Lemon balm (*Melissa officinalis* L.) is an important medicinal plant in the family Lamiaceae that is blessed with bioactive compounds [1]. Germination is a critical stage in the life cycle of weeds, medicinal and crop plants. Seed germination and early seedling growth are critical stages for the establishment of the plant populations under saline conditions [2]. The objective of present study was to investigate the salinity effects on seed germination indices of *Melissa officinalis*. In this regard, an experiment was carried out based on randomized complete block design with five salinity levels (control, 3, 6, 9 and 12 dsm^{-1}) and four replicates. The results indicated that salinity levels had significant effect on the seed germination percentage (GP), mean germination time and germination rate. After two days of salt exposure the highest (48.5%) and lowest (0%) germination percentage were obtained from the control and 12 dsm^{-1} salinity level, respectively. Exposing the seeds with salt showed that increasing the salinity levels led to decrease in germination percentage and rate as well as the primary shoot and root length. Although, the high salinity caused delay on seed germination, but during the experimental period germination percentage increased but no significant differences were observed among the treatments in terms of GP after two weeks. The mean comparison of treatments showed that the mean germination time in control was the lowest (1.89 days) and in 12 dsm^{-1} salinity level was the highest (4.97 days). The primary shoot and root length significantly decreased with increasing salinity levels. In agreement with the reports of Siti Aishah et al. [3] and Cuartero et al. [4], the findings of this study indicated that salinity caused delay on germination rate of the *Melissa officinalis* seeds, but no absolute inhibition was observed in total germination percentages of the seeds in different salinity levels.

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MORPHOLOGICAL STUDIES AND GENETIC DIVERSITY AMONG FOUR SECTIONS OF *STACHYS* L. (LAMIACEAE) SPECIES IN IRAN USING MORPHOLOGICAL AND ISSR MOLECULAR MARKERS

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Stachys L. is one of the largest genera of the Lamiaceae (Lamioideae sub-Family). It contains 275-300 species all over the world and 34 species in Iran. Because of enormous morphological diversity and high polymorphism in infra-specific taxa, morphological variations and genetic diversity of 20 accessions from five species and three subspecies of *Stachys* belonging to four sections i.e. *Eriostomum*: *St. spectabilis, St. cretica*, *Setifolia*: *St. setifera* subsp. *setifera, St. setifera* subsp. *Iranica, St. setifera* subsp. *daensis, Ambleia*: *St. inflata* and *Zietenia*: *St. lavandulifolia* were studied in Zagros regions of Iran. In order to morphological studies, 20 qualitative characters were used. DNA samples of leaves with ten ISSR primers were utilized to evaluate the genetic variations within and among *Stachys* accessions. PCR was carried out in the reaction mixture 25 µl [1]. The genetic diversity and morphological variations were surveyed using UPGMA cluster analysis, Jaccard similarity coefficient with NTSYS-PC (2.0) [1]. The results of molecular studies showed that 86 bands were produced from nine selected primers, of which 98/45% were polymorphic. Cluster analysis by using ISSR revealed variations among *St. inflata, St. lavandulifolia, St. spectabilis* and *St. cretica* accessions. In addition, *St. setifera* subsp. *daensis* was strongly separated from two other subspecies of *St. setifera*. The genetic diversity presented high gene flow within accessions. Also, the species belonging to sections *Ambleia* and *Zietenia* revealed highest genetic diversity. The morphological analysis was in accordance with molecular studies. Moreover, these characters as form and indumentum of leaf, stem, calyx, bract and bracteole indumentum exhibited high variability among *Stachys* accessions. In conclusion, ISSR molecular markers and morphological characters are relevant indicators to assess the variations within and among the *Stachys* accessions. Noticeably, these variations present genetic differentiation in *Stachys* species.

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QUANTIFICATION OF TANSHINONES AND ROSMARINIC ACID BY UPLC-PDA-MS IN ROOT EXTRACT OF *PEROVSKIA ABROTANOIDES* GROWING WILD IN IRAN

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The genus *Perovskia* Karel. belongs to the family of Lamiaceae comprises seven species of which three as *P. abrotanoides* are native to Iran [1]. The plant is an aromatic shrub which is also growing in central Asia such as Pakistan and Afghanistan. *P. abrotanoides*, with the common Persian name of "Brazambel", is used in Iranian folk medicine as an analgesic inrheumatic pains and treatment of fever. Bioactive tanshinones with leishmanicidal, antiplasmodial and cytotoxic activities have been also isolated and reported from the plant [2].Despite of activity and importance of these compounds in the plant a UPLC-PDA-MS method has been developed and validated as fast and reliable method for quantification of main constituents of in the root such as: cryptotanshinone,1-oxocryptotanshinone,1-oxomiltirone, rosmarinic acid and rosmarinic acid 3'-O-β-D-glucoside. The plant material collected from Bajestan, Khorasan-e- Razavi Province (34˚51' N, 58˚ 17' E, altitude 1256 m) in August 2013. The air dried plant roots grounded and extracted using accelerated solvent extraction (Dionex-ASE200) with ethyl acetate and methanol. The separation was performed on Kinetex 1.7 uXB-C18 column with gradient of acetonitrile/water contains 0.05% of formic acid. The standard samples have been used for analysis isolated from same plant. The validated method can be used for screening of plant material from different geographical regions in order to find rich genotypes for production tanshinones and rosmarinic acid.

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GENETIC DIVERSITY AMONG *ARTEMISIA DRACUNCULUS* ACCESSIONS USING ISSR MARKERS

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Tarragon (*Artemisia dracunculus*), also known as dragon's-wort, is an economically important perennial herb of the Asteraceae family. It has been cultivated for a long time by local gardeners. The aim of this study was to analyze the genetic diversity of 27 different cultivated populations of *A. dracunculus* using ISSR primers. In this communication, we report the optimization of primer screening and preliminary evaluation of genetic diversity. It was confirmed that ISSR fingerprinting technique is a reproducible and sensitive tool for the identification and determination of the correct starting material for plant breeding. By using ISSR primers, 82 bands were generated of them 59 (71.95 %) bands were polymorphic. The highest similarity coefficient (0.95) was between populations 16 and 17 and the lowest similarity coefficient was between 14 and 16 (0.14). Cluster analysis was performed based on Jaccard's similarity coefficient and UPGMA method. In this cluster populations were divided into two groups.

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EVALUATION OF ROSMARINIC ACID IN NATURAL POPULATION OF *SATUREJA RECHINGERI* JAMZAD

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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]. *S. rechingeri* was characterized by its yellow flowers, dense white villous hairs and a dense covering of punctate glands on both leaf surfaces. The distribution of *Satureja rechingeri*, an endemic species from Iran, is restricted to few dispersed localities at Ilam and Khuzestan provinces. *Satureja* spp. produce rosmarinic acid (RA), a naturally occurring and potent polyphenolic antioxidant, which plays a role in modulating inflammatory diseases including allergies, asthma and atherosclerosis [2].This study aimed to gather information on the domestication and cultivation of improved farming systems. Rosmarinic acid content among 69 individuals of seven natural populations was evaluated. The characterization by HPLC analyses revealed that content of RA of the MeOH extracts of *S. rechingeri* populations show a high level of variability (coefficient of variation (CV) 48.67%). Among populations RA content varied from 1.62% (w/w) in the Kaver population to 4.14% (w/w) in the Zarinabad population. The maximum amount of rosmarinic acid (7.29% w/w) in an individual from Lives population and minimum (0.54%) in an individual from Lali population were observed. This data can be useful in the domestication process to obtain a variety with high rosmarinic acid content.

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COMPARISON OF AMARANTH (*CALENDULA OFFICINALIS*) ON SKIN WOUND HEALING IN RATS

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Scientific name of marigold (*Calendula officinalis*) is a species of the family Asteraceae (Compositae) is. Marigold and perennial grasses and pharmacological properties. The aim of this study was to evaluate wound healing after topical *Calendula officinalis* extract of the aerial parts in rats., After induction of anesthesia in 40 male Wistar rats, each of them was wounded in the back of the box. Wound healing in 4 groups: control (A), 10% Ethanol extract (B), 20% Ethanol extract (C), 40% Ethanol extracts (D) was 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) better than 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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ANALYSIS OF VOLATILE ORGANIC COMPOUNDS OF *CINNAMOMUM* JUICE USING HEADSPACE SOLID PHASE MICROEXTRACTION (HS-SPME) GAS CHROMATOGRAPHY MASS SPECTROMETRY (GC/MS)

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Variation in chemical composition of essential oils, in particular and extracts of medicinal plants may be observed due to the origin the environmental conditions and the developmental stage of collected plant materials. Antimicrobial activity of an essential oil is attributed mainly to its major components, although the synergistic or antagonistic effect of one compound in minor percentage of mixture has to be considered [1]. Therefore, antimicrobial, antioxidant, and other biological activities may vary, based on the variations in the chemical composition [2]. The genus *Cinnamomum* comprises about 250 species distributed in Asia and Australia [3]. Indigenous *Cinnamon* (*Cinnamomum osmophloeum* Kaneh.) (*Cinnamomum*) is an endemic tree that grows in Taiwan's natural hardwood forests at elevations between 400 and 1500 m. It has been of interest to researchers because the chemical constituents of its leaf essential oil are similar to those of *Cinnamomum cassia* bark oil [4]. Studies have demonstrated that leaf essential oils from *C. osmophloeum* had excellent antibacterial, antitermite, antimite, antimildew, antipathogenic, antifungal, and antiinflammatory activities. Despite the huge analytical potential of these techniques they suffer some drawbacks: the need for highly sophisticated and costly samplers for automated injections, long preparation time, and often the need for sample heating to release volatiles. Heating accelerates further degradation of analyzed compounds. Solid phase microextraction technique (SPME) a solvent-free extraction technique eliminates some of these disadvantages. SPME is based on an absorption or adsorption of analytes onto a poly mer-coated silica fibre and their subsequent desorption in the hot injection port of a gas chromatograph. This technique proved to be an effective tool for detecting low levels of derived flavour compounds. The identification of the volatile compounds extracted by HS-SPME was confirmed according to their retention indices and mass spectra then the major constituents of each oil determined and match with else. The major constituents Cinnamomum juice were: Carvone (13.56%), 1, 8-Cineole (9.02%), Cis-Dihydrocarvone (6.09%), Borneol (6.03%).

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STUDY OF ESSENTIAL OILS SEVEN *THYMUS* (LAMIACEAE) SPECIES AND CLASSIFICATION BY PCA

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The genus *Thymus* (Thyme) is one of the most important genera of the Lamiaceae family. About 17 species exist in some areas of Iran according to Flora Iranica. The aim of this study was the identification of the chemical compound and assessment antioxidant activity of essential oils of seven thyme species, including *T. vulgaris, T. daenensis, Z. multiflora, T. serpylum, T. migricus, T. kotschyanus,* and *T. eriocalyx*. The essential oils obtained by hydrodistillation were analyzed using gas chromatography-mass spectrometry (GC-MS). The results showed that the essential oils yield was in the range of 0.11 to 4.71% v/w. The *T. daenensis* and *T. serpylum* had highest and lowest values, respectively. The essential oils antioxidant activity was evaluated by free radical scavenging activity. Antioxidant activity of *T. vulgaris* essential oil was found to be stronger than the other species. Principal component analysis (PCA) was used to classify the samples. The PC1–PC2 score plot showed that samples can divide into three groups comprising *Z. multiflora*, *T. daenens*is, and *T. kotschyanus*.

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ANTIMICROBIAL ACTIVITY OF ALKALOID EXTRACT OF *BARBERRY*

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Consumer demand for natural preservative has increased, whereas the safety aspect of chemical additives has been questioned. Moreover, Increased resistance to various antibiotics is considered as one of the most important challenges that occurs when taking antibiotics. Higher and aromatic plants have traditionally been used in folk medicine as well as to extend the shelf life of foods, showing inhibition against bacteria, fungi and yeast. The seedless Barberry plant is one of the commercial shrub trees from family of "Berberidaceae".The main component of barberry plant stem and root extract is berberine which is a quaternary ammonium salt drivated from the protoberberine group of isoquinoline alkaloids .Traditional extraction techniques (Soxhlet extraction) require long extraction times and high amount of samples, sorbents and organic solvents, of which the later are often costly to purchase and dispose. Novel extraction techniques such as Accelerated solvent extraction (ASE) are fast and efficient for extracting of chemicals from solid plant matrixes. Subcritical water extraction (SWE) is based on utilization of water as solvent at high pressures and temperature above the boiling point between 100-374°C. In this study, barberry roots were collected from Barberry gardens around Birjand, Southern Khorasan, at the final harvest season. The barberry root extract was obtained by Subcritical Water technique (Temperature: 170°C, Time: 50°C, pressure: 12 bar).Then Freezed- dried powder was used to evaluate the antimicrobial activity_against Staphylococcus aurous (gram positive bacteria), *E. coli* (gram negative Bacteria) and Candida Albicans. The amount of Berberine (µg/ ml) was measured by HPLC. The results showed, the powder has more antimicrobial activity against S. aurous (gram positive bacteria) than *E. coli* (gram negative Bacteria). The MBC (Minimum Bacteriostatic Concentration) against *E. coli*, and the amount required against *Candida albicans* was more than 80 mg / ml; while it was determined about 70 mg/ml against S. aurous. Investigating the Antimicrobial activity of Standard berberine (Merck) at similar concentrations of the extract, similar antimicrobial results were found. In fact, compounds combined with berberine in the extract, had no effect on the activity antimicrobial.

IN VITRO GERMINATION AND CALLUS INDUCTION OF *ONOSMA BULBOTRICHOM* KERMANSHAH

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Onosma speices (Boraginaceae) are pharmaceutical plants which produces some secondary metabolites such as naphthoquinone alkaloids. Shikonin and alkanin derivatives have been identified as the bioactive constituents of these plants. The roots of these medicinal plant are used as suitable medicine for treatment of many disorders such as tumors, bronchitis, tonsillitis, hemorrhoids [1, 2]. *Onosma bulbotrichom* is a membrane of them. Seeds of *onosma bulbotrichom* Kermanshah sp are used in order to germination and callus induction in vitro condition, that much less investigated. The seeds were sterilized with treatments such as H_2SO_4 and H_2O_2 in times of 5 and 10 mins and cultured in Murashige and Skoog hormone free and containing different concentrations of Kinetin and 2, 4-D medium for germination and callus induction, respectively. Then plates were kept in the dark at growth chamber [3]. Combinations containing various concentrations of kinetin and 2,4-D of hormones was used. germination and callus production were occurred After 7-10 days. The seed treatments with H_2O_2 in 5 min and the media containing 1 mg/l 2, 4-D + 2.15 mg/l kinetin found to be the best treatments for germination and callus induction from seeds.

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EFFECTS OF WATER STRESS ON THE ANTIOXIDANT ENZYMES ACTIVITY OF *ORIGANUM VULGARE* SSP. GRACILE

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Water deficit stress is one the most environmental factors that inhibits the growth of plants due to mainly disturbance of the balance between production of reactive oxygen species (ROS) and antioxidant defense mechanism and causing oxidative stress. The genus *Origanum* belongs to the family Lamiaceae and comprises 43 species and 18 hybrids widely distributed in Eurasia and North Africa. To study the effects of water deficit stress on total antioxidant and antioxidant enzymes activity (catalase, ascorbate peroxidase and guaiacol peroxidase) of *O. vulgare* ssp. *Gracile*, afield experiment as randomized complete block design with five replications was conducted. The treatments were irrigation at 4, 8, 12 and 16 days intervals. The results showed that irrigation treatments have significant effects on total antioxidant and antioxidant enzymes activity. As the irrigation intervals increased total antioxidant and antioxidant enzymes activity increased. The results showed that the ability of Oregano plant to up-regulate the enzymatic antioxidant system might be an important attribute linked to Water deficit tolerance.

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EFFECT OF THE THREE HERBAL EXTRACTS ON INTESTINAL SELECTED BACTERIAL POPULATION IN LAYING JAPANESE QUAIL

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The study was conducted to evaluate the effect of three herbal extracts (garlic, thyme and caraway) on laying Japanese quail performance throughout two month experimental period. Total of 48 laying Japanese quails which had been in production for 10 weeks were allocated in a completely randomized design considering four treatments with four replicates and three birds in each. Group one received a layer basal diet with no supplementation which served as control. The second, third and fourth groups received basal diet with1 mL of herbal extracts (garlic, thyme and caraway) / L in drinking water, respectively. The populations of total bacterial, *Escherichia coli* and *Streptococcus* were enumerated in ileo-cecum by conventional microbiological techniques using selective agar media. For determination of some selected micro-organisms in intestinal digesta from 16 birds (1 bird per pen), the contents of the distal part of the small intestine and whole caeca of one bird per replicate were separately collected, cooled and used for microbial assays. The populations of *Escherichia coli*, total bacterial and *enterococci* were then estimated as CFU g-1. Sterilized PBS (99 mL) was added (1:100) to 1 g of fresh material, and then subsequent dilutions prepared. *E. coli* was cultured on MacConkey agar (Merck, Germany) at 37°C for 24 hours, and the presence of *E. coli* then determined. Total bacterial was enumerated on plate count agar (Merck, Germany) after incubation under anaerobic condition for 48 hours at 30°C. *Enterococci* were cultured on KF Streptococcus Agar Base (Merck, Germany) at 25°C for 48 hours then they were enumerated. The colony forming units of *Escherichia coli* in digesta of ileo-cecum in the thyme and garlic herbal group showed significantly lower number compared with control group. However, the caraway group showed a lower number compared with control group but this was not significantly different ($P< 0.05$). Total bacterial in the control group increased as compared with garlic and thyme groups ($P< 0.05$). The colony forming of Enterococci in the thyme group showed a lower number compared with other groups ($P<0.05$).

INVESTIGATION OF JUJUBE MUCILAGE RHEOLOGICAL PROPERTY

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Ziziphus Jujuba is a thorny Rhamnaceous plant that is widely distributed in Europe and South –Eastern Asia. As a traditional drug, *Z. Jujuba* has pharmaceutical properties. Various functional components have been isolated from *Z. Jujuba* such as triterpenoides, flavenoids, saponins, tannins and polysaccharides. In recent years natural polymers such as hydrocolloids have evoked many interest due to their diverse applications. The components such as natural gums and mucilage are biodegradable, non-toxic and easily available. Plant derived polysaccharide hydrocolloids such as mucilage and gum represent the interesting source of additives for food and drug industries and most of them are important in food formulation. In this research mucilage was extracted from Jujube fruits and rheological property analysis of `mucilage solutions in concentration of 0.1% and 0.5% exhibited pseudoplastic (Shear thinning) flow behavior. The fruit was collected from Jujube Gardens, Birjand, Southern Khorasan and manually cleaned to remove all foreign matters. In brief, the ripe and dried fruits were crumbled somewhat and dispersed in deionized water at a water/fruit ratio of 7:1. In order to prevent the activation of enzymes the mixture heated to 85^0c for 3 minutes by Water Bath while it was being blended by blender. Then the temperature reached to 60^0c for 30 minutes. The mixture was filtered by vacuum Filter and filtered solutions concentrated by Rotary Evaporator. The concentrated liquid was precipitated in ethanol (96%) with ratio of 1:3 for 24 hours. The sediments centrifuged with 10000×g for 30 min, three times. The resulted sediment was dried in vacuum Oven, and then in free air for 2days.Rheological measurements were carried out by rotational viscometer *DV3ultra* Model. Our study indicated that the higher shear rate led to the higher shear stress as well as the lower viscosity of mucilage solutions. The pseudoplastic flow behavior can be used to enhance viscosity and stability in many food products, used as stabilizer in ice-cream, sauce and salad dressing.

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EFFECTS OF HEPATOPROTECTIVE *PORTULACA OLERACEA* EXTRACTION CARBON TETRACHLORIDE-INDUCED LIVER DAMAGE IN RATS

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Portulaca oleracea L. (purslane) is a green annual herb of the Portulacaceae family. *Portulaca* is a widely distributed weed. It has been used as a folk medicine in many countries as a diuretic, febrifuge, antiseptic, antispasmodic and vermifuge. In the present study, we investigated the protective effects of purslane ethanolic extract against carbon tetrachloride (CCl_4)-induced liver damage in rats. Purslane extract (5, 10, 50, 100 and 150 mg/kg b. wt.) was administered intragastrically for 28 consecutive days to male CCl_4-treated rats. The hepatoprotective activity was assessed using various biochemical parameters such as gamma-glutamyltransferase (GGT) and superoxide dismutase (SOD), aspartate transaminase (AST), alanine transaminase (ALT) and alkaline phosphatase (ALP) enzymes. Administration of CCl_4 increased the serum GGT but decreased liver SOD activities significantly lowered serum AST, ALT and ALP levels in rats. Treatment with purslane extract significantly attenuated these changes to nearly normal levels [1, 2].

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ANTIDEPRESSANT EFFECT OF *SALVIA OFFICINALIS* EXTRACT IN MALE MICE

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Depression is one of the most important problems in the world .There are many chemical medicines for the treatment of this disease. However, the use of herbal medicines seems more essential comparing its side effects with the chemical medicines. Among herbal medicines *Salvia officinalis* L. has numerous pharmacological effects such as analgesic and antiflatulent effects and also its effects against diarrhea, reduction of nocturnal perspiration and finally its tranquillisant effect have already been known. The aim of this study was to investigate the role of hydroalcohlic extract of *Salvia officinalis* L. on depression by using tail suspension, forced swimming and open field tests. To carry out the study, 112 male Syrian mice of Balb/c species were assigned to different groups including control group, sham group, fluoxetine receiving group (at a dosage of 10 mg/kg), the group receiving hydroalcoholic extract of *Salvia officinalis* accompanied by fluoxentine. Injection were done at different dosages of 100, 200, 400 mg/kg intraperitoneal for 5 days. Simultaneous injections were done by using 100 mg/kg of hydro alcoholic extract of *Salvia officinalis* combined by 10 mg/kg of feluoxentine. Motor behaviors of animals were studied by using Tail Suspension, Forced swimming and open field tests. Administration of *Salvia officinalis* L. extract separately and fluoxetine either separately or simultaneously reduced significantly the motionless of the mice in suspension and forced flotation tests comparing to the control group. In the open box test the administration of *Salvia officinalis* extract increased motor activities of the mice compared to that of control group. Moreover simultaneous injection of the extract and fluoxetine increased the motor activities of the mice compared the control group. The results indicated that bydroalcoholic extract of *Salvia officinalis* L. has antidepressant effect probably because of its tricyclene contents, antioxidation properties and compounds compositions.

EFFECT OF *ACHILLEA MILLEFOLIUM* L. ETHANOLIC EXTRACT ON PANCREATICT ISSUE REPAIR IN ALLOXAN-INDUCED DIABETIC RATS

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Achillea millefolium L. (Asteraceae) or yarrow has been used in popular medicine for its antihemorrhagic, healing, and analgesic properties. *Achillea millefolium* has been used in folk medicine against several disturbances including skin inflammations, spasmodic and gastrointestinal disorders, and hepato-biliary complaints. To determine the insulin releasing effect of yarrow, we investigated the effects of ethanolic extract of aerial parts of yarrow on alloxan-induced diabetic rats. The animals were made diabetic using by alloxan (150 mg/kg, i.p.). The ethanolic extract (10, 50, 100 and 200 mg/kg) was administrated orally for 28 days. The control groups were administrated water as vehicle of ethanolic extract. Blood samples were obtained from heart. Pancreas was excised, fixed in 10% formaldehyde and embedded in paraffin for sectioning. Pancreatic sections of 5 µm were processed for examination of Langerhan's islets. Histopathological changes in the pancreas of different groups were studied by Gomeri staining. The results showed that administration of the ethanol extract exhibited a significant elevation in serum insulin. Administration of alloxan decreased the number of beta cells in comparison with intact rats, but treatment with the yarrow extract increased significantly the number of the beta cells in comparison with the diabetic control rats. The extract decreased serum glucose in alloxan-induced diabetic rats and increased insulin release from the beta cells of the pancreas. In conclusion, the results have shown that the ethanolic extract of yarrow aerial parts possesses a hypoglycaemic effect on alloxan-induced hyperglycaemic rats and thus validates to some extent the folk use of this plant.

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EVALUATING ANALGESIC AND ANTI-INFLAMMATORY EFFECTS OF *ELAEAGNUS ANGUSTIFOLIA'S* WATER EXTRACT IN RATS

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Considering side effects of chemical drugs, several studies have been conducted to investigate the analgesic and anti-inflammatory effects of plantsiul. The water extract of *Elaeagnus Angustifolia* contains high levels of flavonoids and polyphenols. According to analgesic and anti-inflammatory effects of these compounds, this study was designed to estimate the analgesic and anti-inflammatory effects of water extract of *Elaeagnus Angustifolia* in rats. This experimental study was carried on 50 male Wistar rats were randomly allocated into 5 groups (n=10 for each): Groups received water extract of *Elaeagnus Angustifolia* (50, 100, 200 and 400 mg/kg) and control group. Water extract was administered through gavage every day for 4 weeks. Using routine pain evaluating tests, pain and Inflammation were evaluated. Our results showed that supplementation of *Elaeagnus Angustifolia's* water extract significantly reduced cold- and mechano-allodynia, thermal hyperalgesia and decreased inflammatory pain in rats ($P<0.05$). Water extract of *Elaeagnus Angustifolia* has a prominent analgesic an anti-inflammatory effect on rats.

INFLUENCE OF USING PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) AND MICRONUTRIENTS ON GROWTH INDICES OF AJOWAN (*CARUM COPTICUM*)

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Application of biological fertilizers, especially growth stimulants bacteria instead of using chemical fertilizers and micronutrient elements is one of the most important nutritional strategies in sustainable management of agroecosystems [1]. Moreover, fertilizer management has been considered as an important factor in successful medicinal plants cultivation and identification of environmental friendly and suitable fertilizers would provide beneficial effects on quantitative and qualitative plant traits [2, 3]. In this regard, to evaluate the effect of bio-fertilizers and micro-nutrients on Ajowan growth characteristics, a factorial experiment (based on RCBD) was conducted with three replications in the Birjand Agricultural Research Greenhouse in 2012. Experimental treatments consisted of Azospirillum and Azotobacter bio-fertilizers and seed enrichment using Fe, Zn, Mn, with three levels (1, 2 and 3 mM) as well as combined treatments of both bio-fertilizers and micronutrients. Non-treated plants were also included in the trial as the control treatments. Plant dry weight and Fe and P concentrations in plants were measured. Results showed that plant traits were affected by experimental treatments and had a significant difference with the control. The highest and lowest values of plant P concentrations were observed with the combined treatments (azospirillum plus Mn2) and (azotobacter plus Fe3), respectively. The maximum and minimum values of plant Fe concentrations were observed with the combined treatment of azotobacter plus Fe3 and azotobacter alone, respectively. Moreover, the combined treatment of Fe1 plus azotobacter provided the greatest increasing influence on plant dry weight, whereas application of Mn2 resulted in the lowest plant dry weight. According to the results of this study, application of bio-fertilizers and micronutrients on Ajowan seeds could be employed as an effective approach providing heavier seedlings and greater plant yield.

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DETERMINATION OF SOME IMPORTANT INORGANIC ELEMENTS IN FRUIT OF *MANILKARA ZAPOTA*

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Manilkara zapota of the plant family Sapotaceae, are species of *M. zapota* [1]. They are important sources of minerals that are essential part of many important enzymes and they also play roles as catalysts and antioxidants [1, 2]. The objective of the present study was quantitative analysis of the seven important in fruit of *Manilkara zapota* from Konarak and the soil of tree by flame photometeric and atomic absorption spectrometric methods. Fruits were dried in the oven for 24 hours and then were incinerated in the furnace at 700 ° C for 7 hours. Incinerated of the samples were dissolved in distilled water and hydrochloric acid and were filtered with whatman filter paper No. 42. The mineral element contents of samples were determined by calibration method. The limits of detection were (expressed in ppm) 2.31, 8.83, 0.04, 0.040, 0.59, 0.09 and 13.01 for Na, K, Mg, Fe, Zn, Ca and Li respectively. Moreover, the limits of quantitation and linearity for analysis of mentioned elements were determined. The results have shown in these samples of fruits, the concentration of Ca is more than Na, Mg, Fe, K, Li and the concentration of Li is less than the others.

Table1. The mineral elements content in fresh fruit of *Manilkara zapota* samples (Results are expressed as mg of element in 100 g of fruit)

Na	K	Fe	Ca	Mg	Li
416.7177	350.3931	4.6096	599.2509	166.522	4.4677

APPLICATION OF ESSENTIAL OILS OF SOME MEDICINAL PLANTS IN CONTROL BROWN SPOT DISEASE CAUSED BY *BIPOLARIS ORYZAE*

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The brown spot disease is one of the seed-borne diseases of rice, which is found in all stages of its growth from nursery to farm. It causes qualitative and quantitative damage on rice. In order to investigation the effects fungicide of five essential oils against brown spot disease (*Bipolaris oryzae)* an experiment was conducted in a factorial layout based on a completely randomized design with four replications. The treatment were included five essential oils: fennel (*Foenicolum vulgar*), savory (*Satureja hortensis*), eucalyptus (*Eucalyptus* sp.), clove (*Mentha piperata*) and thyme (*Thymus vulgaris*) and different concentrations of essential oils (i.e. 0-1000 ppm). The data of mycelium growth recorded at 7 days after inoculation at 27±1°C show that savory and thyme oils perfectly inhibited growth of *B. oryzae* fungus at concentration 400 and 800 ppm in PDA medium and clove, eucalyptus and fennel oils had no fungistatic effect. Results fungistatic and fungicidal activities showed that thyme oils at a concentration of 1000 ppm fungicidal have property against *B. oryzae*. These results indicate that essential oils after suitable formulation could be used for the control of brown spot disease caused by *B. oryzae* pathogens [1, 2].

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EFFECT OF REGULATED DEFICIT IRRIGATION (RDI) ON QUANTITATIVE AND QUALITATIVE TRAITS OF PEPPERMINT (*MENTHA PIPERITA* L.)

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Regulated Deficit Irrigation (RDI) is the strategy of reducing irrigation rates, during a specific period of growth and development, with the objective of conserving water and managing plant growth while maintaining or improving yield and quality [1]. To investigate the effect of regulated deficit irrigation on quantitative and qualitative traits of peppermint medicinal plant, the experiment conducted in four replicates in field of Sari Agricultural Science and Natural Resources University. In this experiment, the effect of irrigation in 5 level T1 (100%, Control), T2 (85%), T3 (70%), T4 (55%) and T5 (40%) of field capacity on traits such as Foliage and leaves yield and amount and percentage of essential oil of peppermint were studied. Time- domain Reflectometry (TDR) method, used to calculate water requirement in control treatment. Irrigation was performed separately for each of the treatments and the volume of water delivered to each treatment was measured by the volumetric flow meters. Plants were harvested in mid- flowering stage. The essential oil was extracted by steam distillation method and Clevenger apparatus. Results showed that with increasing drought stress, yield declined significantly. The highest yield achieved in the control treatment (T1) at a rate of 1942 kilograms per hectare. As a result of drought stress up to 55% of field capacity (T4), did not observed significant differences in yield. Essential oil percentage in 70% (T3) and 55% (T4) of field capacity, significantly increased. The highest essential oil percentage observed in 70% (T3) of field capacity by as much as 1.67%. Despite the high essential oil percentage in mentioned treatments, with increasing stress and decreasing leaves yield as a major source of essential oil, there was no significant difference in essential oil yield. The results showed that for production of Peppermint medicinal plant for using foliage or essential oil, mild drought stress up to 55% of field capacity (T4) can be used.

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DETERMINATION OF CARDINAL TEMPERATURES GERMINATION ON HYSSOP (*HYSSOPUS OFFICINALIS* L.) AND MOLDAVIAN BALM (*DRACOCEPHALUM MOLDAVICA* L.) MEDICINAL PLANTS

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Determination of cardinal temperatures during seed germination as well as the thermal time requirement is essential for each stage in crop management and modeling of plant growth and development. Two experiments were conducted to predict cardinal temperatures for germination of Hyssop and Moldavian Balm medicinal Plants in different temperature regimes included 2, 5, 10, 15, 20, 25, 30, 35, 40 and 45 °C in a controlled condition in a completely randomized design with four replications was carried out in the laboratories of agricultural college of Guilan University in 2013. Seed germination percentages and days to 50% germination (cumulative) were determined. Cardinal germination temperatures using non-linear regression between germination rate and temperature (R_{50} as y and T as x) were estimated. According to the results, the effect of temperature on rate and percentage of seed germination in both species was significant. Maximum seed germination occurred for Hyssop at 15 °C and Moldavian Balm in 15-20 °C. Also the lowest percentage of germination was observed at 40 and 45 °C. The highest germination rates were in 20 °C for Hyssop (3.74) and Moldavian Balm (3.44). Based on linear regression between germination rate and temperature in both species, the cardinal temperatures included minimum temperature (Tmin), maximum (Tmax) and optimum (To) were determined which were: 1.45, 42.3 and 15.4 °C for Hyssop and 2, 41.5 and 17 °C for Moldavian Balm, respectively.

ETHANOLIC EXTRACT OF *VITEX AGNUS-CASTUS* ATTENUATE MORPHINE WITHDRAWAL SIGNS IN MALE MICE

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The effect of *Vitex-Agnus-Castus* (VAC) ethanolic extract on morphine withdrawal signs in male mice was investigated. In this experimental study, forty male NMRI mice (20-30g) were used. Dependency was induced by injection of morphine (s.c.) three times daily at 50, 50 and 75 mg /kg, respectively, for 3 days. On day 4, after the last administration of morphine, normal saline (10ml/kg, i.p.), different doses of VAC (365, 465 and 565 mg/kg, i.p.) and levodopa (125mg/kg, i.p.) were administered 30 min before naloxone (5 mg/kg, i.p.) challenge [1]. Withdrawal signs recorded as number of jumping, and the sores of 0 to 3 for grooming, teeth chattering, rearing, writing, diarrhea, wet dog hakes and climbing during 30 min [2, 3]. Our results showed that different doses of VAC compared to control group significantly can attenuate morphine withdrawal signs such as number of jumping, grooming teeth chattering, rearing , climbing diarrhea, writhing and wet dog shakes($P<0.05$) and their effect similar to levodopa. In conclusion, it seems VAC ethanolic extract with dopaminergic activity (D_2 receptors) attenuate morphine withdrawal signs. Although, additional research will be necessary to investigate the exact mechanism of this extract [4, 5].

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INHIBITORY EFFECTS OF *SILYBUM MARIANUM* EXTRACTION BY-PRODUCT ON RUMEN ANAEROBIC MICROORGANISMS

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This study was conducted to investigate the inhibitory effects of *Silybum marianum* extraction byproduct on mixed rumen anaerobic microorganisms using gas production technique. 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 substrate used for fermentation consisted of 15% alfalfa and 85% concentrate mixture. 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]. Treatments were control (no additive) and addition of 300 mg byproduct of *Silybum marianum* extraction. The byproduct was obtained from Barij Essence pharmaceutical company. Cumulative gas production decreased significantly ($P<0.001$) with addition of *S. marianum* extraction byproduct in 2, 4, 6, 8, 12, 24, 48, 72, 96 and 120 hours after incubation. The volume of produced gas that is a very strong indicator of anaerobic microorganism's activity was 72.46 ml in control treatment in comparison with 22.13 ml with addition of the byproduct after 120 hours of incubation. Dry matter digestibility decreased with addition of the byproduct ($P<0.001$) (94.5 vs 55.1% respectively). Also, there was a significant decrease ($P<0.001$) in potential gas production (a+b) and the rate of gas production (c) parameters with addition of the *S. marianum* extraction byproduct to the culture media. *S. marianum* is one of the medicinal herbs that containing flavonolignan components as silymarin that could act as antimicrobial agent [2]. The results of this study suggest that *S. marianum* extraction byproduct also has strong inhibitory potential on mixed rumen microorganisms and could be used to manipulate the anaerobic fermentation process.

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COMPARISON OF THE EFFECT OF SUPPLEMENTATION DIET ANTIBIOTICS AND PEPPERMINT EXTRACT ON GROWTH PERFORMANCE AND SOME BLOOD PARAMETERS OF BROILER CHICKENS.

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This study was undertaken to evaluate the effect of dietary inclusion of peppermint extract as an antibiotic growth promoter substitution on performance in broiler chicks. This experiment was conducted in a completely randomized design with forty hundred one-day-old broiler chicks (copp-500) from 1 to 42 days in 5 treatment and 4 replicate (with 20 bird in each replicate) and included: 1) control group (without using extract and antibiotic, 2) antibiotic(20 mg virginiamycin kg^{-1} diet), 3) 0.1% of peppermint alcoholic extract, 4) 0.2% of peppermint alcoholic extract and 5) 0.3% of peppermint alcoholic extract that extracts using in drinking water. Results indicated that body weight, feed intake, and feed conversion ratio were not significantly influenced by antibiotic or peppermint extract supplementation ($P>0.05$). Dietary antibiotic and peppermint extract supplementation through drinking water levels significantly ($P<0.05$) decrease glucose, cholesterol, and LDL-cholesterol concentrations but triglyceride HDL-cholesterol concentration were not influenced.

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ANTIBACTERIAL ACTIVITIES OF BROWN MARINE ALGAE (*PADINA BOERGESENII*) FROM PERSIAN GULF

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Marine organisms are potentially prolific sources of highly bioactive secondary metabolites that might represent useful leads in the development of new pharmaceutical agents. Seaweeds serve as an important source of bioactive natural substances. They have some of the valuable medicinal value components such as antibiotics, antioxidant [1, 2] anticoagulants, anti-ulcer products and suspending anticoagulants, anti-ulcer products and suspending anticoagulants, anti-ulcer products and suspending agents in radiological preparations. The brown algae, *Padina boergesenii* was collected from Persian Gulf. The methanolic and Dichloromethane extracts were tested against *E. coli, S. aureus, P. aeroginosa*. and gave inhibition zones between 20 and 24 mm. The finding envisages that methanol and Dichloromethane extracts could be utilized as a good source of antimicrobial agent in pharmaceutical industry. The antibacterial activity could be attributed to the presence of different secondary metabolites such as phenolic compounds, and carotenoids.

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EVALUATION OF PHYSICOCHEMICAL PROPERTIES AND OXIDATIVE STABILITY OF WALNUT OILS EXTRACTED FROM THREE PERSIAN WALNUT CULTIVARS DURING STORAGE

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Three different cultivars of walnuts (*Juglan sregia L.*) were harvested in 2012 (Z53, 'Damavand', and 'Z67'). The nuts of each cultivar was subjected to oil extraction with hexane. An analytical study on the fatty acids, free fatty acids (FFA), refractive index (IR), peroxide value (PV), saponification number and the oxidative stabilities was conducted. The total oil content ranged from 55.2 to 71.7%. Result of the fatty acid compositions oils were analysed using gas chromatography, showing that linoleic acid (51.7-53.1%) was the predominant fatty acid, and stearic, palmitic, oleic and linolenic acids were ranged from (3.1-3.6%), (6.3- 6.9%), (23.8- 29.9%) and (8.9- 13.5%) respectively. The physicochemical analysis showed that refractive index was significantly higher in the 'Z53' than in the other two studied, and that the 'Damavand' cultivar had the highest FFA and the PV. The 'Z67' cultivar had the highest values for saponification number. This work tested the stability of oil walnut kernels stored up to 4 months at two different temperatures 4 and 25 °C. Progression of oxidation was monitored using tests for peroxide value and acid value every week during a four months storage. After 4 months, the oil showed very few changes. including a slight increase in acidity and peroxide value (PV) irrespective of storage temperature. According to these results, 'Z53'has more desirable characteristics and higher oil.

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EVALUATION OF VARIABILITY OF MORPHOLOGICAL TRAITS OF FENNEL (*FOENICULUM VULGAR* MILL.) AND DILL (*ANETHUM GRAVULENCE*) AT DIFFERENT PLANTING DATES

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Fennel (*Foeniculum Vulgar* Mill.) and Dill (*Anethum Gravulenc*) are two major aromatic and medicinal plants belonging to the Apiaceae family. In this study 9 selected fennel and 8 selected dill genotypes originating from Iran were tested for morphological variability at different planting dates. Results obtained showed that morphological character's among genotypes of both fennel and dill collections varied significantly. Trait variation included yield per plant (YPP), number of umbel per plant (UPP), number of lateral shoots (LSh), weight of a thousand seeds (TS) and plant height (PH). In fennel the YPP ranged from 2.98 g with Ebne Sina genotype to 10.26 g with Hamadan genotype having the highest value. A low UPP was observed for Nahavand genotype while Esfahan1 had the highest UPP. The LSh varied from 7.4 (Mashhad) to 15.4 (Esfahan2). The TS ranged from 3.16 g (Esfahan2) to 4.72 g (Bushehr). Hamadan was the shortest genotype (100.2 cm) and Isfahan2 was the tallest (157 cm). In dill the YPP ranged from 0.89 g (A1) to 2.37 g (Ghamsar). The UPP varied from 4.06 (A1) to 7.9 (Ghamsar). The LSh was from 7.4 (A1) to 9.5 (Delijan). The TS ranged from 1.18 g (Ghamsar) to 1.56 g (A2). The plant height varied from 70.9 cm (delijan) to 97.5 cm (Tehran). In fennel traits were not influenced by date of planting but in dill UPP and PH varied significantly at different planting dates. Furthermore correlation analysis in fennel showed a significantly negative correlation between YPP and plant height, as well as YPP and LSh. Also positive correlation was observed between UPP and PH, UPP and LSh, and also PH and LSh. In dill the only significant correlation was observed between YPP and UPP. The results obtained in this experiment will help making suitable selections for next breeding generations.

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COMPARISON OF THE EFFECT OF SUPPLEMENTATION DIETARY ANTIBIOTICS AND LEMON BALM (*MELISSA OFFICINALIS* L.) IN DAIT BROILER CHICKENS

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This study was undertaken to evaluate the effect of dietary inclusion of Lemon balm as an antibiotic growth promoter substitution on blood biochemical parameters and carcases terialls in broiler chicks. This experiment was conducted in a completely randomized design with forty hundred one-day-old mixed broiler chicks (*ROSS 308*) (male and female) from 1 to 42 days in 5 treatment and 4 replicate (with 20 bird in each replicate) and included: 1) control group (without using Lemon balm and antibiotic, 2) antibiotic (20 mg Lincomycin premix kg^{-1} diet), 3) 1% of Lemon balm, 4) 2% of Lemon balm and 5) 3% of Lemon balm that powder using in diet. Results indicated that (2% lemon balm powder), significant increase weight liver percentage and weight pancreas percentage, significant increase WBC (2% lemon balm powder) (0-42d), ($P<0.05$). But there was not significantly difference other blood parameters ($P>0.05$).

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EFFECT OF VARYING LEVEL OF BIOLOGICAL AND CHEMICAL PHOSPHORS ON SAME PHYSIOLOGICAL TRAITS SUMMER SAVORY (*SATUREJA HORTENSIS* L.) PLANT

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To evaluate the effect of chemical and biological phosphorus on Protein and nitrogen percent, leaf phosphorus, potassium, sodium and calcium of *Satureja hortensis*, a factorial experiment was conducted based on randomized complete block design with three replications in 2011. Treatments were chemical phosphorus (0, 50, 100 and 150 kg/ha P_2O_5 as triple super phosphate) and biological phosphorus (0, 100, 200 and 300 g/ha of *Pseudomonas putida* (Strain P13) and *Bacillus lentus* (Strain P5)). Results of analysis of variance (ANOVA) showed the significant interaction effect between chemical and biological phosphorus was significant at the one percent level. The maximum protein (28/082%) and nitrogen (4/49%) was obtained from 0 g/ha biological phosphorus + 100 kg/ha of chemical phosphorus, most leaf phosphorus (16/03 mg/g dry material) was obtained from 100 g/ha biological phosphorus + 150 kg/ha of chemical phosphorus, most potassium (48/71 mg/g dry material) was obtained from 200 g/ha biological phosphorus + 150 kg/ha of chemical phosphorus, most sodium (1/76 mg/g dry material) was obtained from 0 g/ha biological phosphorus + 100 kg/ha of chemical phosphorus and most calcium (4/8 mg/g dry material) was obtained from 100 g/ha biological phosphorus + 0 kg/ha of chemical phosphorus.

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IN VITRO FUNGISTATIC ACTIVITY OF THYME, PEPPERMINT AND CUMIN OILS ON THE GROWTH OF *ASPERGILLUS FLAVUS*

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Essential oils have been used in many cases because of their natural properties such as antifungal [1], antibacterial and insecticidal activities [2]. The study of the antifungal effects of the essential oils including *Thymus vulgaris* (thyme), *Mentha piperita* (peppermint) and *Cuminum cyminum* (cumin) were carried against strain of *Aspergillus flavus* (PTCC=5004), obtained as actively growing cultures from the Department of Plant Protection, University College of Agriculture and Natural Resources, University of Tehran, and identified as an aflatoxigenic strain. Disc Diffusion Method was used to evaluate the fungal growth inhibitory effects of the essential oils. The fungal suspension was spread onto the surface of Potato Dextrose Agar (Merk) using a sterile cotton swab in order to get a uniform microbial growth on both control and test plates. Filter paper discs (6 mm in diameter) were placed on the surface of inoculated plates, and then they were soaked with 50, 100, 200 and 500 µl/ml. After incubation, the diameters of the inhibition zones were measured in millimeters. Each test was carried out in triplicate. The concentration of 500 µl/ml showed 100% fungicide effect (completely inhibition) on all essential oils. Thyme oil was more effective than others. The results showed that the oil of this plant had inhibitory effects in concentration of 50, 100 and 200 µl/ml with average diameter growth of 4.7, 2.4 and 0.2 mm, respectively. Also, minimum inhibition observed in concentration of 50 µl/ml of peppermint essential oil.

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MAZARI PALM AND ITS INDIGENOUS KNOWLEDGE ON TRADITIONAL MEDICINE, LOCALLY HANDICRAFTS AND NUTRIENT DIET OF PEOPLE IN SISTAN AND BALUCHESTAN PROVINCE

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Mazari palm (*Nannorrhops ritchieana* Griffith) is one of the hardiest palms in the world and native to southwestern Asia, Iran, Afghanistan and Pakistan and grown naturally in southeastern parts of Iran mainly in Sistan and Baluchestan Province. This plant has clumping-fan leaf palm with blue-green leaves and is very slow growing. The species has two varieties locally called Daz and Pork. In addition to ecological importance in ecosystems of southeastern of Iran, they also are very important from ornamental point of view. They also have significant role in indigenous art crafts and consequently in local people income. This species has some medicinal and nutritional applications and also used for animal feeding. The objective of this study was to state and introducing various usages of Mazari palm (*Nannorrhops ritchieana* Griffith) in locally handicrafts and indigenous knowledge on traditional medicine and nutrient diet of people in Sistan and Baluchestan Province. In this paper, author state a viewpoint toward Mazari palm and its indigenous knowledge on traditional medicine, locally handicrafts and nutrient diet of people in Sistan and Baluchestan Province in east of Iran.

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GROWTH INDEX OF *THYMUS DAENENSIS* AS INFLUENCED BY NITROGEN AND CHEMICAL PHOSPHORUS FERTILIZERS IN DRY LAND

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Thymus daenensis is an aromatic medicinal plant endemic to Iran. Recent studies have showed that Thymus species have strong antibacterial, antifungal, antiviral, antiparasitic, spasmolytic and antioxidant activities. The effects of nitrogen and chemical phosphorus fertilizers on growth index of *Thymus daenensis* in dry condition were studied in research station of Ab-sard-e- Homandpasture. A factorial experiment based on randomized complete blocks design (RCBD) with three replications was followed in the study. Nitrogen fertilizer treatments in four levels: okg/ha, 50kg/ha, 100 kg/ha and 150 kg/ha and chemical phosphorus fertilizers in three levels: 0 kg/ha, 65 kg/ha and 130 kg/ha were considered in this study. Results indicated that crop growth rate, leaf area index, relative growth rate and total dry matter were significantly effected by utilization of nitrogen and chemical phosphorus fertilizers. The maximum of LAI, CGR, RGR and TDM were obtained by utilization of 150 kg/ha nitrogen fertilizers together with 130 kg/ha chemical phosphorus fertilizers. The trend of the total dry matter showed that utilization of 50 kg/ha nitrogen fertilizers and 65 kg/ha chemical phosphorus fertilizers didn't have significant difference in compare with control.

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THE EVALUATION OF ANTIOXIDANT PROPERTIES OF ROSELLE (*HIBISCUS SABDARIFFA* L.) CALYCES EXTRACTS

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The antioxidant activity was determined in Roselle (*Hibiscus Sabdariffa* L.) calyces extract. Dried Roselle calyces were collected from Fenooj Region in Systan & Baluchestan province of Iran. Liquid extracts of dried Roselle (*Hibiscus Sabdariffa* L.) calyces obtained using water, ethanol (50%), methanol (50%), ethanol- methanol (50-50%, v/v) to evaluate selected antioxidant characteristics (phenolic compounds and antioxidant activity using the β-carotene bleaching method, free-radical scavengering by DPPH). The phenolic compounds contents ranged from 2,436 (in water) to 4, 443 (in ethanol-methanol) mg of gallic acid $100g^{-1}$of dried calyces, and the antioxidant activity ranged from 39.45 % (in water) to 60.43 % (in ethanol-methanol). Free radical scavengering capacity of extracts by DPPH were obtained in range of 43.85%(in water) to 91.77%(in ethanol-methanol). The antioxidant properties of Roselle calyces make the extracts ideal for use in foods as a natural extract, concentrate, or powder.

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EFFECTS OF DROUGHT STRESS ON PHENOLIC COMPOUNDS AND PAL ENZYME IN *HIBISCUS SABDARIFFA*

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Drought is a multidimensional stress affecting the plant at different organizational levels [1] Plants are exposed to enzymatic and non-enzymatic defensive stress systems [5] Hibiscus is known as an opulent source of vitamin C [4]. Antibacterial effect is due to the flavonoids [2]_The lowering of blood pressure [3, 4] To evaluate the effect of drought stress on components Hibiscus sabdariffa firstly they was planted in greenhouse and was applied drought stress in four- five-leaf "s stages and treatments were contain 25%, 50%, 75% and 100% of field capacity . Then the Measurement of total phenol and enzyme phenylalanine amonyalas was done in three repeat that total phenol was maximum at the lowest level of stress in the control sample of the phenol sample decrease with increasing rate stress But the reduction of phenol "s sepals in 5% was not significance but the activity phenylalanine amonyalaz enzyme increase in the maximum stress and was highest level of the activity enzyme in the 25% Fc.

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EVALUATION COMBONED HORMONE AFFECTING THE ESTABLISHMENT OF *KELUSSIA ODORATISSIMA* MOZAFF. CELL SUSPENSION CULTURE

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Kelussia odoratissima Mozaff. Commonly known as "karaf-Koohi" is an endangered endemic medicinal plant in Iran which is widely used in regional distributions for several diseases treatment. Anti-inflammatory, cardiovascular and cerebrovascular effects contributed to Ligustilide compound which is found in essential oil from different plant parts. Continuous collection of plant materials from nature has led to its extinction. The purpose of this study was to establish the cell suspension culture of *Kelussia* which could be used for large scale production of active compounds. Inducted callus from sterile seedling explants was incubated in MS liquid basal medium for suspension culture establishment then suspended cells were cultured on liquid MS and B5 media supplemented with different combined hormones ((2mg/l) 2.4-D + (0.5 mg/l) kin, (2mg/l) 2.4-D+ (0.5 mg/l) BA, (2mg/l) NAA + (0.5 mg/l) BA and (2mg/l) NAA+(0.5 mg/l) Kin)) for 5weeks. Results showed that growth pattern of *K. odoratissima* cells is a general sigmoid curves and maximal cell growth was obtained when suspended cells were cultured in liquid MS basal medium supplemented with 2mg/l 2.4-D+0.5 mg/l kin.

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ASSESSMENT OF ANTIOXIDANT ACTIVITY USING TWO ASSAYS IN EIGHT IRANIAN ENDEMIC APIACEAE SPECIES

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Umbelliferae family is represented on Earth by approximately 3500 species from 220 genuses [3]. Antioxidants are substances that inhibit or delay the oxidation processes. Therefore, they are able to protect the human body, foods, and drugs from oxidative damages [1, 2]. In recent years, natural phenolic compounds are used as functional and nutraceutical ingredients and natural alternatives to synthetic antioxidants in food industry [4]. Thus, the objective of this study was to examine total phenolic content (TPC), and AA of few plants of Apiaceae family and to evaluate them as potential sources of natural antioxidants. Since the endemic medicinal species are considered as new natural sources of bioactive compounds, in this study, total phenolics and antioxidant activity of some endemic Apiaceae species (*Klusium odoratisima* (Odoratisima), *Ferula ovina* (Boiss.), *Dorema aucheri* (Bilhar), *Heracleum persicum* (Persian Hogweed), *Ducrosia anethifolia* (boiss),The *Ferulago angulata* (Schlecht) Boiss, *Ferula gumosa* Boiss (Galbanum), and *Ferula assa-foetida* (Asafoetida)) were compared with a synthetic antioxidant butylated hydroxyl toluene (BHT). Antioxidant activity (AA) of methanol extracts (ME) of the plants was evaluated by 1, 1-diphenyl-2-picryl-hydrazyl (DPPH), and ferric thiocyanate (FTC) assay. From two assays, comparing all the MEs for their IC values, *H. persicum*, had the highest AA. In DPPH assay, *H. persicum* showed the highest IC50 (12780 µg/ml), while *F. assa-foetida* possessed the lowest one (3090µg/ml). For reducing power, *F. assa-foetida* had the highest absorbance in 700 nm (2.638), while *F. gumosa* Boiss. possessed the lowest one (0.215). The results showed that eight studied endemic species had acceptable antioxidant activity and can be introduced as important sources of natural antioxidants for pharmaceutical and medical purposes. They are a basis for assessment of the role of Apiaceae family dry seeds against free radicals effect and antibacterial activity. Therefore the data found in this work might be used for further study of extracts of dry seeds from Apiaceae family on various applications such as health supplement and pharmaceutical benefits.

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SODIUM ALGINATE NANOPARTICLE ENCAPSULATION METHOD FOR PRODUCTION OF ARTIFICIAL SEEDS FROM *ARTEMISIA AUCHERI* GENETICALLY MODIFIED ROOTS

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This study established the *in vitro* culture of medicinal plant *Artemisia aucheri* genetically modified roots using Ri plasmid T-DNA [1] of MSU440 strain of *Agrobacterium rhizogenes* and then production of artificial seeds using hairy root inoculums. The shoots were cut in to segments and placed in to liquid MS medium containing a suspension of *A. rhizogenes* MSU440. After 5 min the explants transferred to co-cultivation medium. 2 days later the explants transferred on to the agar solidified medium supplemented with 400mg/l cefotaxime [2]. We used a 4 week-old culture of hairy roots grown in liquid medium for artificial seeds. The young portions of the roots were cut into 5mm long segments and about 100 segments were suspended in the MS medium supplemented with 3% sodium alginate nanoparticles. Such suspension was transferred to 70mM $CaCl_2$, Solution drop by drop using a sampler in order to replace sodium with calcium and encapsulate the root segments in calcium alginate. The capsules were incubated in the $CaCl_2$ solution for 10 min, and then artificial seeds were rinsed in distilled water transferred to the agar solidified B5 medium. Seeds were kept at 4°C and after 4 weeks were allowed to germinate on the MS medium at 25°C.

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ANTIOXIDANT ACTIVITIES AND BIOACTIVE COMPOUNDS FROM VOLATILE OIL OF *TRACHYSPERMUM COPTICUM*

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Trachyspermum copticum (L.) Link [Syn. *Carum copticum* (L.) C. B. Clarck, *Trachyspermum ammi* (L.) Sporague, *Ammi copticum* L.] is an aromatic plant belonging to the Apiaceae family [1] . Its fruit (ajowan) has been widely consumed as a food flavoring agent and spice. Besides, the fruits have several therapeutic effects and they have been used for the treatment of colic, flatulence, indigestion, dyspepsia, and diarrhea [2, 3] . Though the content of the volatile oil from *T. copticum* fruit has been investigated, little is known about the antioxidant activity of the oil [4] . This study was aimed to analyze and identify the antioxidant constituents of the volatile oil of ajowan (*Trachyspermum copticum*) fruit. The volatile oil was obtained by hydrodistillation and analyses by GC-FID and GC-MS. The oil was tested for antioxidant capacity in $ABTS^{\bullet+}$ scavenging and linoleic acid/β-carotene bleaching assays. The TLC-bioautography method based on $DPPH^{\bullet}$ assay and GC analyses were carried out to characterize the major antioxidant compounds in the oil. GC analyses showed the presence of eight compounds. The main constituents of the oil were thymol (43.7%), *p*-cymene (26.8%), and γ-terpinene (24.9%). The oil exhibited good radical scavenging [IC_{50} = 74.78 (64.58 – 86.60)] and antilipid peroxidation [IC_{50} = 221.90 (185.30 – 265.80)] activities. The bioautography screening and fractionation resulted in the separation of the main antioxidant compound which was identified as thymol.

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EFFECTS OF NANO ANATASE (TIO_2) ON SEED GERMINATION PARAMETERS AND SEEDLING VIGOR INDEX OF *SALVIA MIRZAYANNI*, AN ENDEMIC MEDICINAL PLANT TO IRAN

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Nanoparticles have been applied worldwide, posing substantial impacts on the environment and its living organisms. Plants as sessile organisms are always exposed to considerable fluctuations of nanoparticles concentrations in air, water, and soil. *Salvia mirzayanii* Rech. f. & Esfand, a perennial and bushy aromatic herb belonging to the family Labiatae, is a native medicinal plant to Iran, which grows wild on the limestone slopes and mountainous rock [1]. The aerial parts of *S. mirzayanii* are used in Iranian traditional medicine as antistomachache, antidiabetes and spasmolytic. One of the main problems that prevent sustainable use of medicinal plants, native to the arid lands is that they readily germinate within the native environment, but fail to show good germination under laboratory conditions or when cultivation is attempted [2, 3]. This study was done to determine the effects of different concentrations of nano-sized TiO_2 (0, 20, 40, 60 and 80 $mg.L^{-1}$) and bulk (10 mg. L^{-1}) on seed germination indices including germination percentage (GP), mean time germination (MTG), germination rate (GR), germination index (GI) and seedling vigor index (VI) of *S. mirzayanii* in a randomized completely design. The seeds were surface sterilized by soaking in 1% NaOCl for 10 min and subsequently rinsed thoroughly with sterilized water prior to applying any treatment. All germination experiments were conducted using three replications of 20 seeds per each treatment. Seeds were moistened with 7 ml of employed solution and distilled water for control in sterilized Petri dishes. After each treatment, seeds were transferred to germinators with 16/8 h photoperiod, constant temperature of 22 ºC and relative humidity of 70%. Germinated seeds were counted daily for 7 days. Results indicated that the highest and the lowest GP (71 and 47%), GR (0.39 and 0.28), VI (3.52 and 2.3) were obtained in 80 $mg.L^{-1}$ concentration of nano-sized TiO_2 and control, respectively. However, the lowest MTG (2.55 day) was observed in the highest TiO_2 concentration. Moreover, GI of the seeds was not significantly affected by treatments. Also, the effect of non-nanoTiO_2 (bulk) on the employed germination indices was not significant compared to control. Our findings possibly revealed the use of nano-TiO_2 (30 nm in diameter) increased the seed germination parameters of *S. mirzayanii* mucilage's seeds.

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INTRODUCTION OF THE FLORA, LIFE FORMS AND CHOROLOGY OF VEGETATION OF ESTEGHLAL-E- ABADEH FIRE CLAY MINE

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Floristic study of each region is very important. In this study the flora of Esteghlal-e-abadeh fire clay mine were investigated. With an area of approximately 15 square kilometers, the mine is located in Fars province, 218 kilometers South East of Isfahan and 10 km northeast of Abadeh city. The mine height is 2200 to 2320 meters above sea level. Mine plant species were collected with a survey method. Collected plants were recognized using of conventional plant taxonomic methods and necessary references. According to the results, flora of this region includes 81 genera and 36 families. Asteraceae, Fabaceae, Lamiaceae and Poaceae with 21, 9, 9 and 8 species, respectively had the highest number of plant species. Collected plants are kept in the Herbarium of Yasouj University. The life form of plant species was determined using of Raunkier's method. Based on the IUCN classification and Red Data Book of Iran, conservational class of plant species were determined. 19.67% of the plant species are phanerophyte, 8/9% are geophyte, 44.26% are hemicryptophyte, 6.55% are chamephyte and 21.31% therophyte. Of the 105 detected plant species, 1 species is Rare and 19 species are medicinal plant. chorotypes in this region were determined as: 1.78% Europe-Siberian, 85.7% Irano- Touranian, 3.57% Irano- Touranian/Mediterranean, 1.78% Mediterranean, 3.57% Irano- Touranian /Euro- Siberian 3.57% Irano- Touranian/ Saharao -Sendian.

EFFECT OF LEMON ESSENTIAL OIL ON WEIGHT AND BLOOD LIPID LEVELS IN MALE RATS

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Overweight and obesity are major risk factors for many diseases, including cardiovascular problems, diabetes, and hypertension [1]. The approved synthetic weight loss drugs have low efficacies and considerable adverse effects. Numerous approaches are used as alternatives to synthetic drugs to induce weight loss. One of the approaches is use of herbal medications [2]. In this study, 30 male Wistar rats, with body weights of 300 g were randomly assigned to three group with 10 rat per group: control, 200 and 400 mg/kg lemon peel essential oil that gavaged daily. Rats weighted at 0, 2 and 4 weeks. At the end of the study, the blood samples were collected and blood lipids were measured. Data were analyzed using SPSS software and one way ANOVA tests. Body weight decreased significantly in the group that received 400 mg/kg lemon peel essential oil after 2 and 4 weeks compared with the control group ($P<0.05$). Serum triglyceride decreased significantly in groups that received 200 and 400 mg/kg lemon peel essential oil compared with control group ($P<0.05$). Based on the results, lemon peel essential oil can reduce or maintain body weight besides dieting.

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YIELD AND PHYTOCHEMICAL CONTENT OF POT MARIGOLD (*CALENDULA OFFICINALIS* L.) UNDER SYMBIOSIS WITH *ARBUSCULAR MYCORRHIZAL* FUNGI AND HEAVY METALS STRESS

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Pot marigold (*Calendula officinalis* L., Asteraceae) is an annual herbaceous plant native to the Mediterranean region which its flower extract has many pharmacological properties. These days, heavy metal pollution of agricultural soils is a major environmental problem that can affect plant productivity, food quality and human health. In addition, *Arbuscular mycorrhizal* fungi (AMF) is known as a biological agent for alleviation of biotic and abiotic stresses such as heavy metals stress. In this regard, a factorial experiment based on a randomized complete block design with four replications was conducted at Research Greenhouses of Horticultural Sciences, College of Agriculture and Natural Resources, University of Tehran, in 2012. Two levels of AMF application (inoculation (M) and not inoculation (NM) with AMF) and five levels of heavy metals (without heavy metal (H_0), Pb150 (H_1), Pb 300 (H_2), Cd 40 (H_3) and Cd 80 (H_4) mg/kg soil) were applied. Flower number, fresh and dry weight of flowers, extract percentage and total flavonoid content were measured. The results showed that with increasing concentration of heavy metals in soil, flower number, fresh and dry weight of flowers reduced and the amount of these factors in mycorrhizal plants was significantly higher than non-mycorrhizal plants in which the highest amount of these factors were observed in MH_0. Application of Cd 40 mg/kg soil in non- inoculated plants caused the highest extract percentage (3.55%) while the lowest observed in MH_1 (1/55 %). The highest flavonoid content obtained in MH_1 although, it was not significantly differ from using MH_3. In the all heavy metal treatments, mycorrhizal plants showed more flavonoid content than non- mycorrhizal plants, significantly. Additionally, by application of Cd 80 mg/kg soil in non- inoculated plants, generative growth occurrence was prevented.

EFFECT OF METHYL JASMONATE ON CATALASE ACTIVITY AND TOTAL PROTEIN IN BASIL

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Basil (*Ocimum basilicum* L.) is one of the important medicinal plants belonging to the mint family used as fresh herb and spices as well. Methyl jasmonate (MJ) is a hormone signal and endogenous growth regulator involved in the regulation of defense responses and induces a broad range of physiological pathways in many plant species. In order to study the effect of MJ on catalase activity and total protein, a completely randomized design was conducted in greenhouse with three replications in cultivar Keshkeni luvelou. MJ with three concentrations of 0.0 0.1 and 0.5 mM was used in pre-flowering stage. Catalase activity and total proteins were measured in 0, 24, 48 and 72 hours after MJ application. Analysis of variance showed that the interaction of application time*MJ concentration is significant at level 0.01 ($P<0.01$). The highest activity of catalase achieved with .05mM MJ in 24, 48 and 72 hours after MJ spraying. The maximum amount of total protein also obtained with 0.5 mM MJ application. In conclusion, the results showed that the exogenous application of MJ could affect catalase activity and total amount of protein in basil.

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COMPARATIVE ANTIBACTERIAL EFFECTS OF ESSENTIAL OILS OF THYME AND EUCALYPTUS TWO PLANTS IN HEALING THE SKIN SURFACE AND REDUCE THE BACTERIAL LOAD OF GRASS CARP CHILDREN (*CTENOPHARYNGODON IDELLA*)

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Considering the importance of Herbal drugs in the health care and wellness of the societies in order to the therapy and the prevention This study conducted by the aim of this comparing antibacterial effects of the essence of two plants ”thyme and eucalyptus” in healing the superficial wounds and reducing the bacterial load of grass carp’s juvenile. 120 individuals of juveniles in the Dr. keyvan Fisheries sciences and Marine technologies Sciences Research Center, Islamic Azad University, in the summer of 1390. The effect of these essences were studied at the concentrations of 75, 100, 125 and 150 mg per liter of bath short time (30 minutes) on grass carp’s juveniles (average weight 15 ± 0/45 g) within 2 weeks (in 3 days consecutive weeks) with 3 replicates, compared to the treatment by salt concentration of 1% and the control group. After Anesthetizing juveniles by MS_{222} and picking up a few scales with a razor scalpel, some wounds were created in the caudal of the two parallel lines (length 4-5 mm) and then subjected to the above treatments. Sampling the skin wounds performed to assess bacterial load control. Before and after using drugs some physical and chemical parameters of water were compared. Also imaging the wounds by sterio microscope and comparing the conditions of wounds were performed by TS view software. Based on the results eucalyptus essence in inhibiting and reducing the total bacterial skin and wound antiseptic of grass carp’s juveniles in two stages had positive performance, but the greatest effect in reducing the bacterial load was due to the thyme essence at a concentration of 150 mg per liter, So that the total amount of bacteria were reduced in control groups in the second stage of disinfecting the 6.85 ± 0.34 to 3.12± 0.09 (log CFU/cm2) in the treatment of 150 mg per liter, The total amount of bacteria were reduced in the wound of control groups in the second phase of the disinfecting 7.17 ± 0/34 to 3.12 ± 0.09 (log CFU/cm2) in the treatment by thyme essence at 150 mg per liter and shows a statistically significant differences. However, the results showed the faster recovery in juveniles by eucalyptus essence, So that the wounds on Eucalyptus treatment after 3 weeks by considering the appearance (the formation of epidermis and scales) were restored, but a little bit of the wounds’ effects had been observed in the thyme treatment .But after 4 weeks still had not been achieved complete recovery In the control group.

THE COMPARATIVE IN VITRO STUDY OF ANTIPARASITIC EFFECT OF GARLIC AND METHRONIDAZOLE ON *TRICHOMONAS GALLINAE*

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One of the common diseases Trichomonias is in birds and poultry, which by flagellate protozoa called Trichomonas, occurs. The disease in turkeys, chickens love pigeons and birds can be seen in the mouth and cause gangrene pigeons are pigeons and chickens. Pigeon crop material from their semi-digested food to feed their chickens and contamination of the device is transferred to the chicks. Today, more than synthetic drugs such as Metronidazole are used for treatment of Trichomoniasis. Moreover, for the treatment of herbs such as fenugreek, mint, garlic and etc. also used. In this experimental study of plant collecting and confirming scientific name, essential oils were prepared as ethanol. After separation of protozoa feeding pigeons with PBS approach to pigeons and collecting fluid from the crop and centrifugal liquid Trophozoite living parasites were transferred to medium diamond. After successive passages, when the parasite count to 100000 ml in each receipt. The five categories, each culture tube containing 0.1 ml Metronidazole, *Trichomonas Gallinae* and 0.1 ml Dimethylsulfoxide, *Trichomonas Gallinae* plus 0.1 ml saline as a control and five tubes containing concentrations of 0.1 and 0.01 and 0.001 percent ethanol Essence Fenugreek and thyme, and mint in a solvent of distilled water Nanopure and *Trichomonas Gallinae* were prepared, all tubes at zero, containing 100000 numbers Trophozoite alive and moving in each ml were intervals 15 minute to 2 hours and then at hours 3, 4, 5, 6, 12, 24, 48 and 72 hours Total Trophozoite were counted. The results of counting the hours Live Trophozoite specified in the table that was organized and the results indicate the pipe containing Metronidazole suggests that after 120 minutes of all protozoa are destroyed. Also a different concentration of garlic is effective, but 0/1 mg/ml concentration is more effective than other concentration. Results of other studies show that garlic is the antiparasitic factor but it's requires further investigation.

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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 goal was investigate the effect of light with different frequencies on growth and the effect on the chemical composition of the plant *Artemisia aucheri*. After gathering information, the plant is desired, such as morphology, chemical composition, pharmacological properties, and the pharmacological effects of using different sources were considered, the overall picture of things that should be done. Culture was used, the solid medium Mvrashyng and Skoog, without growth regulators. Sequential subcultures were doing a lot of plants, 5 treatments, we considered, in terms of lighting, including luxury 1000, 2000, 3000 rays and UV and dark treatment. After collecting the samples and check the appearance, measurements of wet and dry weights the information entered in the software program SPSS version 17 and were compared together. The best lighting conditions in this experiment was 300 lux, which is transverse elongation and plant growth better and even has a great effect on root growth. With increasing light intensity decreased the time to reach maximum density.

RETARDING EFFECTS OF SENESCENCE ON THE ROSE (*ROSA HYBRIDA* L.) SECONDARY METABOLITES

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A short post-harvest longevity remains a major limiting factor for many crops. Separation from plant leads quickly to ripening of fruits and senescence of flowers. In order to assist in the survival of the plant species, a sequence of tightly regulated genetic events efficiently governs a plant's death. These events are observable in a variety of plant models and in the different plant parts such as leaves, petals, reproductive organs (stamens and style), root cap, cortex and germinating seed. In many species, ripening and senescence are ethylene regulated. Thus, attempts have been made to retard the post-harvest processes by applying chemicals that inhibit ethylene synthesis. The long-term solution will probably be based on genetically modified plants with genes that either suppress synthesis or reduce sensitivity to ethylene. Several genes that confer ethylene insensitivity are known, e.g. tomato Nr and dominant mutants of Arabidopsis ethylene receptor sensor genes, ETR and ERS. Several studies have examined the effects of senescence on secondary metabolite production of plants. Some secondary metabolites increase in response to senescence, while others decrease. The level of carotenoids is extensively reported to decline during leaf senescence induced by dark. When plants are stressed, secondary metabolite production may increase because growth is often inhibited more than photosynthesis, and the carbon fixed not allocated to growth is instead allocated to secondary metabolites. In this research the contents of secondary metabolites during longevity period of transformed roses (*Rosa hybrida* L.) by etr-1 gene was evaluated. Investigation of rose transgenic lines showed that secondary metabolites such as flavonoids and carotenoids were significantly preserved than those of the control ones [1, 2].

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CHARACTERIZATION OF ANTIOXIDANT COMPOUNDS FROM VOLATILE OIL OF *BUNIUM PERSICUM*

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Bunium persicum (Boiss.) B. Fedtsch. [Syn. *Carum persicum* Boiss., *Carum heterophyllum* Regel & Schmalh.] is an aromatic plant belonging to the Apiaceae family. Its fruit (wild caraway) has been widely consumed as a food flavoring agent and spice in Iran. Besides, the fruits have several therapeutic effects and they have been used for the treatment of colic, flatulence, indigestion, and dyspepsia [1, 2]. Though the content of the volatile oil from B. persicum fruit has been investigated, little is known about the antioxidant activity of the oil [3, 4]. On the other hand, there is no study on isolation and identification of active constituents from B. persicum oil having antioxidant activity. The present study was designed to study the antioxidant activity and to identify the main active components of the volatile oil of *B. persicum* fruit. GC and GC-MS analyses of the volatile oil showed the presence of sixteen compounds. The main constituents of the oil were p-cymene (31.1%), cumin aldehyde (22.2%), and γ-terpinene (11.4%). The antioxidant and free radical scavenging activities of the oil was evaluated by using $DPPH^{\bullet}$ and β-carotene bleaching assays. It exhibited a considerable dose-dependent free radical scavenging [$IC_{50\ (DPPH\bullet)}$ = 4.47 (3.96 – 5.05) mg/mL] and antilipid peroxidation [$IC_{50\ (\beta\text{-carotene bleaching})}$ = 0.22 (0.16 – 0.31) mg/mL] activities. Antioxidant activity guided fractionation of volatile oil was carried out by TLC-bioautography method based on the $DPPH^{\bullet}$ assay to screen and separate the main active constituents. The bioautography screening and fractionation resulted in the separation of four major constituents in the volatile oil of *B. persicum* which were identified as cumin aldehyde, p-cymene-7-ol, cuminyl acetate, and myristicin.

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CLINICAL EFFECTS OF MENASTIL ON PRIMARY DYSMENORRHEA IN UNIVERSITY STUDENTS IN SAVEH 2005

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Primary dysmenorrhea is a common gynecologic problem in women .it is defind as a menstrual pain that occurs in the absence of a pelvic pathology. Primery dysmenorrhea causes absence from school or work and restriction for many woman. Pain is the chief complaint of it but vomiting, diarrhea, faintness, irritability and dizziness and lower abdominal pain are common. Dysmenorrhea affects on different aspects of life. Many drugs have been used to manage dysmenorrhea, but most of them have side effects. Many gold is a plant which, in tradition medicine, has been used as an anti-spasmotic, anti-inflammatory, and anti-menstrual pain. Peppermint is also an antipyretic, plant which restricts menstrual blood and local –cold. In this study as a placebo –control, triple blind, randomized clinical trial, the effects of Menastil on reducing the severity of pain in primary dysmenorrhea was assessed. It was assessed at baseline and over two menstrual cycle , using validated questionnaires.72 un married woman, between 18-26, suffered from primary dysmenorrhea took part in the study (n=36 in experimental, n=36 placebo). A lotion contained 3.5 g mary gold oil and peppermint was applied in the experimental group, and same its placebo was applied in the control group as soon as the onset of pain or bleeding. Severity of dysmenorrhea was assessed with MC-GILL pain ruler .data analysis was performed by Friedman, Mann-Whiteny and ANOVA statistical tests. Results showed that severity of pain in the experimental group decreased ($p<0/001$), with no serious side effect. According to the results of this study, it seems that menastil is effective in decreasing the severity of dysmenorrhea pain. Herbal drugs have low side effects and be benefic for dysmenorrea treatment.

CHEMICAL CLASSIFICATION OF THE ESSENTIAL OIL OF *SALVIA SHARIFII*

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About 61 species of *Salvia* from the genus *Salvia L*, (sage) as mostly perennial plants are reported from Iran, of which 17 are endemic [1].The Iranian Sages are divided into four main groups, both *S. sharifii*, an endemic plant to Iran and *Salvia macrosiphon* which grows wild in Iran and in neighboring countries, belong to the botanical group III A [2]. The close morphological characters of *S. sharifii* and *S. macrosiphon* which may misguide people to distinguish them from each other promoted us to investigate them, particularity to understand if they are chemically identical or not. The Iranian sages categorized into four main chemotypes based on the chemical constituents of their essential oils (EO): groups 1-4 are those plants that are dominated in monoterpenoids; mono- and sesquiterpenoids; sesquiterpenoids and finally low molecular weight acids, aldehydes, esters and green leaf volatiles (GLVs), respectively [3]. we use this chemical classification proposed for the EO of the sage plants as an easy way to classify these two plants. In this study we analyzed the EO of *S. sharifii* by GC-MS and compared it to those previously reported for *S. macrosiphon*. The aerial parts of the plant were dried and subjected to hydrodistillation, then to GC-MS for identification of its chemical constituents. The yield of the oil was 0.2 v/w. Thirty-six compounds were identified in the oil of the plant among which caryophyllene (12.8%), germacrene D (9.5%), spathulenol (6.9%), bicycloegermacrene (5.6%) and caryophyllene oxide (5.5%) were the major sesquiterpenes, while α-pinene (3.2%), β-pinene (4.4%), *trans*-isolimonene (7.0%), and a mixture of 1,8-cineol and limonene (4.2%) were the major monoterpenes components of the oil. Two diterpenoids, abienol (3.9%) and sclareol (1.1%) as antimicrobial and cytotoxic constituents were the major diterpenoids detected in the oil of *S. sharifii* for the first time. we can consider *S. sharifii* in the second class which is consisted of almost equal or comparable quantities of monoterpenes and sesquiterpenes while the oil of *S. macrosiphon*, its isomorphic plant, is rich in GLVs and other low molecular weight acid derivatives (23.5%) by which it is classified in the fourth chemical group of the sages. Therefore, we can chemically classify them in different groups of the Iranian *Salvia* species and this may help us to use phytochemical analyses to differentiate similar plants from each other.

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EFFECT OF WATER STRESS ON ANTIOXIDANT ENZYMES ACTIVITIES IN *ACHILLEA KELLALENSIS* AND *A. FILIPENDULINA* LAM.

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Yarrow (*Achillea* L.) is one of the valuable genera of Asteraceae family. This plant has many medicinal and pharmaceutical applications. They are also grown as tolerant plants in arid and semi arid environments. In this research, *A. kellalensis* and *A. filipendulina* were used for drought stress treatments. After 7 and 14 days, leaf samples from two species were obtained and antioxidant enzymes activity (Superoxide dismutase (SOD), Catalase (CAT), Ascorbat peroxidase (APX) and Glutathion reductase (GR)) were evaluated. Results showed that increasing of osmotic stress lead to decrease the activity of SOD in two species, but GR activity was enhanced. Previous reports was also confirmed that increasing in GR activity resulted in the availability of NADP, which can accept electrons from ferrodoxin, thereby minimizing chances of superoxide formation, in addition to scavenging H_2O_2 [1]. This enzyme was the restriction factor of *Achillea* defense mechanism activities against the environmental stresses. Moreover, the activity of APX in *A. kellalensis* was higher than *A. filipendulina*. Nevertheless, the CAT activity was equal in two levels of osmotic stress in *A. filipendulina*, while it elevated in *A. kellalensis*. On the other hand, a decrease in APX activity in *A. filipendulina* seems to cause an increment in H_2O_2 content, despite the activity of CAT alone. Thus, with accumulation of reactive oxygen species, the key points of the metabolism and cell defense mechanisms were damaged. These factors resulted in the sensitivity of *A. filipendulina* to osmotic stress in contrary to *A. kellalensis*.

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CHARACTERIZATION AND SEQUENCING OF CATALASE (CAT) AND SUPEROXIDE DISMUTASE (SOD) GENES IN *A. MILLEFOLIUM*

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Plant antioxidant systems, both enzymatic and nonenzymatic, play an important role in balancing and preventing oxidative damage. Antioxidants are the compounds that delay or prevent oxidation process in low concentrations. In this repect, antioxidant enzymes including catalase, ascorbate and peroxidase, superoxide dismutase; can reduce Reactive Oxygen Species (ROS) damages in the cells. Gene predication, sequencing and assessment of gene expression of the gene underlying antioxidant enzymes activity can be considered as the fundamental steps for improving antioxidants in plants. There are some reports regarding the sequences of some antioxidant gene such as *apx, sod* in medicinal plants. Among medicinal plants yarrow (*Achillea* sp) is considered as the genus with high antioxidant capacity. There are no reports for these genes in *Achillea*. In this study, *A. millefolium* used for molecular study. As there were no reports concerning the use of *sod* and *cat* in *A. millefolium*, the Local Alignment Search Tool (BLAST) search was performed in NCBI (http://www. NCBI.nlm. nih.gov). The nucleotide sequences were applied to find amino acid sequences in yarrow. The forward and reverse primers were designed for the genes. Polymerase Chain Reaction (PCR) was used to amplify the fragments. The PCR repeated to find the best amplification for the product. Finally, the bands were isolated from the agarose gel and sequenced using Macrogene Company. Results revealed that the sequence obtained for *sod* gene in *A. millefolium* had relative similarity with different plant species. It had 98% similarity with the sequence gained for *Arabidopsis thaliana*, 92% similarity with *Arabidopsis lyrata subsp. Lyrata* and 87% with *Populous trichocarpa*. Cat gene also showed 98% similarity with *Arabidopsis thaliana*, 93% with *Solanum lycopersicum* and 85% with *Coffea arabica*. The length of *cat* and *sod* sequences were 804bp and 285bp, respectively. Finally, the results of this study represent the sequences and its similarity of two antioxidant genes in *A. millefolium*.

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EFFECT OF NANO-ENCAPSULATED HERBAL ESSENTIAL OILS ON PERFORMANCE IN BROILER CHICKEN

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The study was conducted to evaluate the effects of common and nano-encapsulated essential oils of Thyme, Oregano and Fennel in diet on the performance of broiler chickens. 240 Ross 308 broiler chicks were used in a completely randomized design with eight experimental groups (diets) and three replicates of ten chicks each (totally 24 pens). In each experimental period, common and nano-encapsulated essential oil of Thyme, Oregano and Fennel were added in amounts of 0.02, 0.025 and 0.05 percentage to starter, grower and finisher diets, respectively. So, the eight experimental treatments were consisted diets of control (no additives), antibiotic (bacytracin 500 grams per ton), common and encapsulated forms of Thyme, Oregano and Fennel essential oils. Adding herbal essential oil to diets had a significant effect on body weight gain in periods of 35-42 and 1-42 days ($P<0.05$). In 1-42 days period, high body weight gain obtained with diets containing nano-encapsulated and common essential oil of Thyme and nano-encapsulated Nettle root, respectively. There was no significant difference in feed intake between treatment groups in different periods ($P>0.05$). Also, only in 35-42 days periods, nano-encapsulated essential oil of Oregano caused best feed conversion in broiler chicks. In general, the extracts especially nanocapsulated kinds improved performance in broiler chickens.

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PHYTOCHEMICAL INVESTIGATINS AND DETERMINATION OF TOTAL ANTIOXIDANT ACTIVITY IN *PROSOPIS STEPHANIANA*

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Plants have formed the basis of traditional medicine systems that have been in existence for thousands of years. Even in modern times, plant-based systems continue to play an essential role in health care. [1]. recently antioxidants have attracted considerable attention in relation to radicals and oxidative stress, cancer prophylaxis and therapy, and longevity. *Prosopis stephanina* is a small plant belonging to the subfamily Mimosaceae. Many members of family Mimosaceae have seeds that have hard testas [2]. This plant is native to Khorasan jonoobi. In this study phytochemical investigations and determination of total antioxidant activity have done on *P. stephaniana*. Chemical qualitative tests have done on the water and ethanol extracts of the powdered leaves using standard procedures to identify the constituents. These tests include Molisch's test, Borntrager's test, Shinoda's test, Liebermann-Burchard test, test for tannins, test for terpenoids, and deragendorff's test for alkaloids [3]. We have determined the total antioxidant activity in leaves and seeds of *P. stephania* using DPPH and spectrophotometric method in 517nm wave length. DPPH is characterized as a stable free radical by virtue of the delocalization of the spare electron over the molecule as a whole, so that the molecules do not dimerize, as would be the case with most other free radicals [5]. Phytochemical screening in *Prosopis stephaniana* showed the presence of alkaloids, saponins, flavonoids, tannins, terpenoids and trace amounts of anthraquinons. We expect *P. stephaniana* to exhibit antioxidant activity because of the presence of flavonoids which are potential antioxidant phenolic compounds [6]. The results showed both seeds and leave have of antioxidant activity.

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EFFECT OF PLANT DENSITY ON GROWTH AND PHYSIOLOGICAL INDICES IN SEEDLING STAGE OF SAFFLOWER (*CARTHAMUS TINCTORIUS* L.) CV. GOLDASHT

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To study the effect of plant density on growth and physiological indices in seedling stage of safflower cv. Goldasht, this experiment was conducted in complete randomized block design with four replications in 2012 in greenhouse of Imam Khomeini Higher Education Center, Karaj, Iran. Plant density levels included: 2, 4, 6, 8 and 10 plant pot^{-1}. Analysis of variance showed that the effect of plant density was significant ($P<0.05$) on shoot length, seedling length (root +shoot), seedling fresh and dry weight in second harvest and plant growth rate. Mean comparison of plant characteristics showed that the highest seedling length (32.46 cm) was observed in 8 plantpot^{-1}in second harvest. However, the effect of pant density on root length was not significant. The highest seedling fresh weight (4.280 g plant^{-1}) and dry weight (0.740 g plant^{-1}) was obtained in two plant pot^{-1} in second harvest. The seedling growth rate which was influenced by the seedling dry weight was higher (0.11 g plant^{-1} day^{-1}) in two plant pot^{-1}. The trend of plant biomass was similar to the trend of plant growth rate, and the highest biomass duration (0.059 g plant^{-1} day^{-1}) was also observed in two plant pot^{-1}. Plant density had no significant effect on the root length growth rate. Results of this experiment indicated that two plant pot^{-1} was the best plant density for seedling growth and establishment of safflower cv. Goldasht.

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ISOLATION OF RHIZOBACTERIA STRAINS FROM *THYMUS DAENENSIS* RHIZOSPHERE, STUDY THEIR EFFECTS ON SEED GERMINATION AND SEEDLING VIGOR, AND CHARACTERIZATION OF PGPRS

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Since, cultivation of endemic species in agricultural systems could result in their protection and survival at their natural habitat and, also could provide economical benefits; therefore, the cultivation of *Thymus daenensis*, which distributed along the Zagrous Mountain of Iran, seems to be so important. One of the environmental factors that should be considered in the cultivation of endemic species is their root symbiotic microorganisms. A group of bacteria are now referred to "plant growth-promoting rhizobacteria" (PGPR) participate in many key ecosystem processes such as those involved in nutrient cycling and seedling establishment, and therefore deserve particular attention for agricultural or forestry purposes. Considering the importance of PGPRs as biofertilizer for cultivation and regeneration of medicinal plants, the objects of present experiment is first to isolating and identifying the rhizobacteria strains from rhizosphere of *Thymus daenensis* Sub spp. Daenensis; second, study their effects on seed germination parameters include: seed germination percentage, seed germination rate and vigor index, and third, characterizing PGPRs based on some physiological assays such as IAA (Auxin) production, phosphate solubilization, and Siderophore compounds production. To isolating the rhizobacteria, Soil samples were collected from the rhizosphere of *Thymus daenensis* Sub spp. Daenensis plants grown in "Buin va Miandasht" district of Esfahan province. IAA production and phosphate solubilization abilities of rhizobacteria isolates were measured according to Bric *et. al*. (1991) and Pikovaskya (1948) methods, respectively. Chrome azurol S test (CAS) was conducted to differentiate the isolates with respect to production of siderophores. To conduct the seed germination and seedling vigor tests, seeds were inoculated with each bacterium isolate suspension. 21 bacterial treatments and one control (no inoculation) were placed in 3 replications including agar (2%, w/v) plates with 20 seeds in each replication, arranged as a completely randomized block design. Seeds of each treatment were placed and incubated for 10 days with photoperiod of 16 h light and 8 h dark at 24°C and 80% relative humidity. The measurements were done according to International Rules for Seed Testing. Results of our study indicated that TDE3, TDE16 and TDE20 isolates have a good physiological attributes include phosphate solubilization and siderophores production abilities. Also, TDE4 isolate (*Achromobacter spiritinus*) could significantly improve both the SGR and VI of *Thymus daenensis* ($p<0.01$). It seems that these 4 isolate have the potential of PGPRs for applying as biofertilizer in regeneration and cultivation of *Thymus daenensis* Sub spp. Daenensis.

INTRODUCTION OF THE FLORA, MEDICINAL PLANT, LIFE FORMS AND CHOROLOGY OF VEGETATION OF HAJI ABAD –E-NEYRIZMN MINE

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Floristic study of each region is very important. In this study the flora of Haji Abad –E-NeyrizMn Mine were investigated. With an area of approximately 14.5 square kilometers, the mine is located in Haji Abad village in the center part of Neyriz city in Fars province. The mine height is 1795 meters above sea level. Mine plant species were collected with a survey method. Collected plants were recognized using of conventional plant taxonomic methods and necessary references. According to the results, flora of this region includes 52 genera and 20 families. Asteraceae, Poaceae and Fabaceae, with 18, 8 and 6 species, respectively had the highest number of plant species. Collected plants are kept in the Herbarium of Yasouj University. The life form of plant species was determined using of Raunkier's method. Based on the IUCN classification and Red Data Book of Iran, conservational class of plant species were determined. 11.76% of the plant species are phanerophyte, 48.58% are hemicryptophyte, 8.82% are chamephyte and 29.41% therophyte. Of the 63 detected plant species, 1 species is rare and 9 species are medicinal plant. Chorotypes in this region were determined as: 43% Irano-Touranian, 29% Irano-Touranian, Mediterranian and Euro-Siberian, 14% Irano-Touranian- Euro-Siberian and 14% Nebo-Sidnian.

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BERBERINE EXTRACTION FROM BARBERRY ROOT: A COMPARISON STUDY BETWEEN SCW AND SCF EXTRACTION TECHNIQUES

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Berberine has been used for over 2000 years in traditional Eastern medicine and is also effective in the prevention and treatment of some illnesses. The main component of Berberis Vulgaris (barberry) stem and root extract is berberine which is a quaternary ammonium salt drivated from the protoberberine group of isoquinoline alkaloids. Extraction of bioactive materials from herbal plants may be interesting due to the growing trend of using herbal remedies instead of chemical ones. In this study, the extraction conditions of berberine alkaloid from root of barberry shrub by subcritical water extraction (SCW) and Supercritical CO_2 extraction were compared together and optimized using Response Surface Methodolog. The extractions were carried out after grounding and sorting of barberry roots. In SCW method, the effects of extraction temperature, time and ratio of sample/ water on the yield of berberine were evaluated. The results showed that all three factors statistically have significant effects on the yield of extracted berberine concentration by subcritical extraction method. The yield of berberine was increased with increasing the temperature and time of extraction condition while the yield was reduced when the solvent/sample ratio was increased. Using SCW method with temperature: 170 ^{o}C, time: 70min and ratio of sample/solvent: 0.015 would lead to the maximum of berberine extraction (8340.41µg/gr (sample)). Also, dependency of Berberine extraction yield on Supercritical CO_2 extraction parameters, time and pressure, was studied by RSM. The effective factors on the extraction yield and adequacy of proposed model was investigated according to the experimental data and statistical analysis. Pressure has the most influence on yield of extracted berberine and the interaction term of Time –Pressure was statistically significant on the berberine yield. Using supercritical CO_2 method with pressure in the range of 300-400 bars and the time in the range of 40-75 minutes would lead to the maximum of berberine extraction (400 µg/gr). The results reveal that yield of berberine extraction in SCW technique is more than Supercritical CO_2 extraction.

CHEMICAL COMPOSITION OF *STACHYS LAVANDULIFOLIA* VAHL ESSENTIAL OIL IN ZANJAN PROVENANCE

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The most important objective in this research is to identify and introduce the constitution compositions of this plant's essential oil habitat conditions of Zanjan provenance being counted as one of *Stachys lavandulifolia* Vahl's natural habitats in country [2]. Collecting the samples was done in Zanjan. After sampling, the process of drying was done in the shade, and 30^0 temperatures. After that 200 gr of each sample was put in a jar water was added to it and extraction operation was performed for each sample by Clevenger type for 3 hours. Finally essential oils were analyzing by GC/MS [1]. The results of this research show that thymol, geranial and β -myrcene have devoted the greatest percent of essential oil ingredients to themselves. By use of the results of this research and other investigations about this plant in different areas the best area can be recognizing from the aspect of this chemical composition. By researching about the morphological and ecological features of the areas were these plants are grown, the relation between these factors and the amount of effective compositions in plants can be finding.

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STUDY ON ANTIOXIDANT ACTIVITY AND PHENOLIC COMPOUNDS IN IRANIAN HERBS

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Total equivalent antioxidant capacities (TEAC) and phenolic contents of 20 spices extracts from botanical families grown in Iran were investigated. The total antioxidant capacity was estimated by the following methods: $ABTS^+$ (2, 2' azinobis-(3-ethylbenzthiazoline- 6-sulfonic acid)), DPPH (1, 1-diphenyl-2-picrylhydrazyl radical) and ferric reducing/antioxidant power (FRAP) expressed as TEAC. The total phenolics were measured using a Folin–Ciocalteu assay. Qualitative and quantitative analyses of major phenolics by reverse-phase high-performance liquid chromatography (RP-HPLC) were also used. Many investigated spices had high levels of phenolics and exhibited high antioxidant capacity. The TEAC values of the spices ranged from 1.76 to 1406 µM trolox/100 g dw, from 25.8 to 2021 µM trolox/ 100 g dw, and 15.9 to 6933 µM trolox/100 g dw for $ABTS^+$, DPPH and FRAP, respectively. The total phenolic content, measured using a Folin–Ciocalteu assay, ranged from 0.07 to 15.15 mg of gallic acid equivalents (GAE)/100 g dw. The herbs with the highest TEAC values were *E. hirsutum* and the species belonging to the Labiatae and Compositae family. A positive relationship between TEAC ($ABTS^+$ and FRAP) values and total phenolic content, measured by HPLC, was found only in family groups with many representative herbs within Labiatae and Compositae.

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ON THE MEDICINAL PLANTS THAT BEES USE IN KOHGILOYE AND BOYERAHMAD

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Undoubtedly the texture of nectar and the hunches that bees use could highly affect the smell, color and quality of honey .the medical properties of honey is used in diseases due to medicinal plants and the hunches of used plants. Poisonous nectar and hunches could produce poisonous honey in return. Aristotle and (350 B. M.) and Divsequirid (50m) used honey of diverse areas, of diverse seasons to treat diseases for the first time. Medical Honey has always been the focus of attention over history and several attempts have been made to get medical honey. Nowadays, the honey of single plant is used to treat different diseases at large scale. The producers of honey of single plant sell their products much more expensive than their ordinal honey. In current research, an attempt at made at identifying medicinal plants that bees use to produce medical honey. Additionally, the regions and areas in which medical honey is produced in 2006-2013 were extensively studied. The samples of study were selected from all seasons of all over the province. Findings of the survey study showed that all in all bees use 421 plants species of 2100 (20/4%) species in Kohgiloye and Boyerahmad of 60 family and 201 Genus of plants. Further examinations showed that Asteraceae family with 28, Lamiaceae with 23, Papilionaceae with 19, Rosaceae with 15 and Apiaceae with 13 Genus are the largest quantity. Labiatae family with 69, Rosaceae with 52, Asteraceae family with 47, Apiaceae family ith 20 and Brassicaceae family with 19 species are the largest variety of medicinal plants used by bees. Moreover, the results indicated that 182 species of 421 Plants species (43/23%), 46 family of 60 plant, family (76/6%) and 114 Genus of 205 Genus of all plants in the province are Medicinal plants. The largest family of plants in terms of number and quantity (Medicinal plants) used by bees are Lamiaceae family with 44 (24/17%), Asteraceae family with 16 (8/79%), Apiaceae family with 13 (6/6%) and Papilionaceae family with 12 (6/6%) and Rosaceae with 12 (6/6%) species. Plants including *Ferula assa- foetida*, *Teuucium plium* L., *Thymus daenesis* L., *Zataria multiflora* Boiss., *Ziziphora tenuior* L., *Ziziphus spina-christii* (L.) Wild, *Glycyrrhiza glabra* L. are of the most important medicinal plants bees use. The conserved areas of eastern Dena and Western Dena, Shorom and Tarem Saverz and Nil are the most important areas for producing medical honey.

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INVESTIGATION ON PHENOLIC COMPOUNDS AND THEIR ANTIOXIDANT ACTIVITIES IN IRANIAN RICE VARIETIES BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHIC ANALYSIS

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The analytical method for the determination of phenolic compounds in Iranian rice varieties was developed. The method consisted of extraction of phenolic compounds from rice before analysis by high performance liquid chromatography (HPLC). Reversed phase HPLC equipped with photodiode array detection was used and the separation condition was optimized. Under the optimum condition, twelve phenolic compounds were separated within 24 min. Pressurized liquid extraction (PLE) was used to extract free phenolic compounds from rice with the optimum extraction condition of 70% methanol and extraction time of 15 min. While, bound phenolic compounds were extracted using alkaline hydrolysis for 15 min. Six varieties of Iranian rice including pigment and non-pigment rice in their brown and polished forms were investigated. All of 12 phenolic compounds were detected as free phenolic compounds in all samples. Ferulic acid was the most abundant free phenolic compounds in all samples, while ferulic acid and *p*-coumaric acid were found as bound phenolic compounds in some samples. The content of phenolic compounds, total flavonoid and antioxidant activity detected in pigment rice and brown form were higher than non-pigment rice and polished form.

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THE MEDICINAL OF PLANTS OF PRESERVED AREA OF AESTERN DENA IN KOHGILOYE AND BOYRAHMAD PROVINCE

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The conserver area of eastern Dena is a mountainous area in 30000 hectare located in north east of Yasuj in Kohgiloye and Boyer Ahmad province. This massive rough region is at least 2500 m and at most 4435 m above sea level. Examining medical herbs of this area was done from 1386 to 1390 using survey design. To be more specific, the local herbs were collected and identified in this survey. The findings of this study revealed the following herbs 152 plant species (of 410 plant species in this area) from 42 plant family and 108 plant Genus in sample of study grow. The most important medicinal plants Genus in terms of the quantity of Genus include Asteraceae and Labiatae each consists 14 Genus (12/96%), Umbelliferea 12 (11%), Rosaceae of 9 (8/3%) and Brassicaceae of 7(6/5%). It worth noting that Lamiaceae that has 26 species (17/1%), Asteraceae with 23 (15/3%) species, Apiaceae with 13 (8/6%) species, Rosaceae with 11 (7/23%) and Cruciferea with 7 (4/6%) species are the biggest groups of familes in this area. Moreover, *Ferula assa-feotida*, *Ferula gommusa* L., *Thymus daenesis* L., *T. lancifolius*, *Dracocephalum kotschyi* Boiss., *Hypericum perferatum* L., *Teucrium polium* L. and *Glycyrrhiza glabra* L. are the most important medical plants in this area. About 101 plants species of these medicinal plants are used in traditional medicine. The followings are the medical characteristics of some of medicinal plant: *Dracocephalum kotschyi* Boiss. (to treat malaises of digestion), *Ferula assa -feotida* and *Ferula gommusa* L. (to treat traumas in stomach and emphysema), *Thymus daenesis* L. (to teat cold and pneumonia) cat *Teucrium polium* L. (to treat Diabetes and fat blood), *Quercus brantii* Lindl. (to treat traumas in stomach and as an anti-squirt) and *Stachys lavandulifolia* vahl. and *Adianthum capillus-veneris* could be used to treat phlegm and cold.

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TRADITIONAL MEDICINE IN BOYER AHMAD COUNTY, KOHGILUYEH AND BOYER AHMAD PROVINCE

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The vast country of Iran has inherited two invaluable legacies of biodiversity and traditional medicine. Biodiversity or the biological treasure that has evolved over millions of years and made life possible on the planet earth needs to be protected as a heritage. The traditional medicine is considered as the intangible cultural heritage and the oral knowledge of the Iranian people. This treasure with a history of thousands of years that looks at nature as an integral part of human beings, needs to be safeguarded and studied scientifically. To this end a research was conducted in Boyer-Ahmad one of the counties of Kohgiluyeh and Boyer-Ahmad Province. After deciding the research zone on a Topographic map of 1:250,000, standard questionnaires were designed. The current study is conducted by means of 352 questionnaires administered to 72 out of 218 villages of Boyer-Ahmad county over the years of 2008-2012. The questionnaires were completed by rural well-informed people, plant samples were collected, pictures of the samples were taken and the research methodology was decided. The results of the questionnaires were analyzed and the samples were identified. It needs to be mentioned that Boyer-Ahmad county with an area of 5 thousand square kilometers is situated in a mountainous region in the north and northeast of Kohgiluyeh and Boyer-Ahmad Province. The research showed that in the study area, a total of 220 plant species are regarded as medicinal plants. It also made it clear that 75 percent of the local people use medicinal plants because of their cheap price, effectiveness and lack of side effects. In addition to medicinal use, the plants of these regions could be used for various purposes such as dying, washing, adding flavor or aroma, making handicrafts and ornaments. Some plants are edible and contain oil while some others are toxic. *Ferula assa-feotida*, *F. gummosa* Boiss., *Glycyrriza glabra* L., *Cichoryum intybus* L., *Teucrium polium* L., *Achillea* spp., *Mentha longifolia* L., *Thymus* spp. are among the most important medicinal herbs. *Zangbir*, *Cinnammum zylanica* Nees., *Curcuma longa* L. could be found in herbal shops. *Mentha longifolia* (L.) Huds., *Thymus daenensis* L., *Ferulago angulata* L., *Allium hirtifolium* Boiss., *Echinophora cinerae* Boiss. are used as spices. Herbs like *Daphne mucronata* Royle, *Juglans regia* L., *Prangos ferulacea* (L.) Lindl., *Heracleum lasiopetalum* Boiss. could be utilized for dying in many industrious. Mean while *Ferulago angulata* (schlecht.) Boiss. and *Thymus* spp. are used as food Preservatives.

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ALLELOPATHIC EFFECT OF JUNIPER (*JUNIPERUS COMMUNIS* L.) ESSENTIAL OIL ON GERMINATION AND SEEDLING GROWTH IN LETTUCE

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The aim of the research was determining the allelopathic effect of juniper essential oil (EO) on germination and seedling growth in lettuce. The experiment was conducted as a randomized complete design with four replicates. Five levels of essential oil (100, 200, 500, 1000 & 2000 ppm) were applied and distilled water as control treatment. The measured parameters were germination percentage (GP) and germination rate (GR), cumulative percentage, seedling length, fresh and dry weight. The result showed that GP in levels of 1000 & 2000 ppm significantly decreased and in other levels not significant differences was detected in comparison to control. GR in seeds treated with 100 & 200 ppm had not significant differences but in higher levels GR significantly decreased. Maximum length of shoot and root were observed in control (2/63 & 5/42 cm, respectively) and different levels of EO significantly decreased the seedling length in comparison to control. The fresh weight of shoot and root were significantly decreased with increasing in concentrations of EO, but the differenced was not significant in concentrations near to each other. With increasing level dry weight of shoot and root were significantly decreased, except in 100 ppm. In general it can be conclude that juniper essential oil had significant allelopathic effect on germination parameters of lettuce.

EFFECT OF THE CYCLE OF IRRIGATION AND THE BIOLOGICAL COMPOST, NITROXINE (*AZTOBACTERIA*, *AZOSPERILIUM*) ON SOME QUALITATIVE AND QUANTITATIVE CHARACTERISTICS OF *MATRICARIA CHAMOMILLA* L.

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The impressive substance of *Matricaria chamomilla* from the aspects of qualitative and quantitative is different in the variant geographical restricted areas. Also proper using of the soil humidity and the available nitrogen is very important to have an ideal operation. An examination was done during the agricultural years of 86-87 in the farm of the Technical and Vocational School of Neyshabur, In order to find the effect of the cycle of irrigation and source of nitrogen on the agricultural and medicinal characteristics of *Matricaria chamomilla*. The examination in three repetitions and with three levels of irrigation in the distance of 5, 7 and 10 days and with four levels of split plot nitrogen (140 kg in each hectare, 0.5 liter biological Nitroxine compost in each hectare, 0.25 liter biological Nitroxine compost with 70 kg Urea compost, 0.125 liter biological Nitroxine compost with 35 kg Urea compost) and in the shape of randomly districts was done in the farm. The analysis of obtained information shows, with the increasing of the irrigation distances until seven days all of the special characteristics increased and with the long irrigation distances, this procedure was reduced. The most operation of the flower was in the cycle of irrigation with the 7 days distances and with the attendance of 0.125 liter Nitroxine compost and also 35 kg Urea compost. According to the results, distances of irrigation didn't have any kinds of important effects on the number of capitul. The interaction between the distances of irrigation and the source of Nitrogen in the eight considering characteristics, the height of bush, number of capitul in main branch, number of capitul in the subsidiary branch, dried weight, chlorophyll a, the relationship between chlorophyll a to b and foliage proline, doesn't have any important effects in the plant.

EVALUATION OF IN VITRO WITHAFERIN A PRODUCTION FROM *WITHANIA COAGULANS* (STOCKS) DUNAL

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In recent years, *W. coagulans* has gained much attention owing to the presence of Withaferine A that 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 production in different Iranian accessions, adventitious root and cell suspension cultures. Total 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 roots (21.00-37.62 µg/g D. W). The Accession USB003 was found to have the highest Withaferin A content and selected for *in vitro* study. *In vitro* study showed that Withaferin A accumulation was higher in an adventitious roots (73.67±4.1 µg/g D.W) compared to *in vivo* roots (37.62±0.75 µg/g D. W) and cell suspension culture (17.61±2.01 µg/g D. W). Nearly, adventitious root possessed 4 and 2-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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EFFECT OF NITROGEN AND PHOSPHOROUS FERTILIZERS ON QUANTITATIVE AND QUALITATIVE TRAITS OF FENNEL

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Chemical fertilization play an important role in agricultural productivity. Fennel an important medicinal plant grows well under Iran conditions and plays an important role in foreign exchange earnings. A field experiment was carried out at the Shahai Rejaei camping site, Neyshabur, Northeastern Iran, during 2011 with an aim to evaluate the effect of nitrogen and phosphorous fertilizers on quantitative and qualitative traits of Fennel (*Foeniculum vulgare*) with a factorial arrangement of treatments in a randomized complete block design with 3 replicates. Factors were Nitrogen (0, 30, 60 and 90 kg.ha-1) as Urea fertilizer and phosphorus (0, 30, 60 and 90 kg.ha-1) as super phosphate fertilizer. Results revealed that nitrogen amount had significant effect on plant height, number of inflorescences per plant and seed weight. Increasing of nitrogen was increased economic yield on Fennel. The highest grain yield was observed in 90 kg.ha-1 and the lowest yield was observed in the control treatment. The same result was observed with phosphorus application. Seed yield was effected by nitrogen and phosphorus interaction. The maximum yield as obtained by 60 kg nitrogen and 60 kg phosphorus fertilizer application. Regression analysis showed that 78 percent of seed yield was explained by 1000 seed weight.

THE EFFECT OF THE PROCESSES OF WASHING, SOAKING AND COOKING ON THE RESIDUAL VALUES OF VEGETABLE PESTICIDES IN RICE

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The usage of pesticides has increased during the recent years. Although applying the pesticides in rice as a high Consumption food has increased grain production, but presence of harmful pesticides residue in rice and other food has caused a great concern among the consumers. Therefore, it is important to develop some pragmatic procedures to increase the food safety along with the reduction in consumption of pesticide residues. In this background present research has examined the some common rice processing operations along with the degree of residue removal in each process. A gas chromatography with electron capture detector was used to quantify three diazinon, butachlor, propiconazole pesticides residue in washed white rice, steeped white rice, cooked white rice to three cooking method. The average percent of loss for the diazinon pesticides in washed white rice, steeped white rice, boiled white rice, kateh white rice, abkesh white rice were 66.22%, 72.67%, 81.73%, 88.47% , 88.90% and 69.99% , 81.00% , 88.58% , 88.78% ,90.73% for butachlor and 66.22%, 72.67%, 81.73%, 88.47%, 88.90% for propiconazole respectively. The results of present study proved that rice processing treatments such as washing, steeping, cooking lead to a significant reduction of pesticides residue.

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EVALUATION OF ARSENIC DETOXIFICATION ALLEVIATE BY SALICYLIC ACID ON GERMINATION AND GROWTH SEEDLING OF AJOWAN (*CARUM COPTICUM* L.)

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Germination and seed establishment one of the most life cyling in plant, which was reduction under environmental stress. At the heavy metals present such as Arsenic which on of the most important of environmental stress, that to leading reduction of photosynthesis rate, germination inhibition, 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 against biotic and abiotic stresses in plant and effected on growth, germination, absorption and transduction of ions and chlorophyll content [2]. In order to Survey the Salicylic acid effects on Arsenic Toxicity alleviation in (*Carum copticum* L.), this research conducted in laboratory condition. The experiment was arranged as factorial based on completely randomized design with 3 replication. Experimental treatments includes Arsenic in five levels, (0, 0.5, 1, 2 and 4 mg 1^{-1}) and salicylic acid levels (0, 0.1, 0.5, 1 and 2.5 m molar). Simple and interaction effects were significant on: traits of percent and germination rate, length of Radicle and Plumule, Dry weight of radicle and Plumule and ratio dry weight radicle to dry weight Plumule. Analysis of variance showed that with increasing Arsenic concentration, germination rate, length radicle, and Plumule. Significantly reduced, as 4 mg 1^{-1} of Arsenic, germination rate, length of radicle and Plumule to control (64.5, 46.9 and 59.9 percent) was lower, respectively. Between salicylic acid treatments, the highest values of percent and rate of germination were recorded for 1 m molar with 74.6%and 6.2 seed per day, respectively. Under 2.5 m molar Salicylic acid, no significant difference was observed for traits.in the absence of arsenic, treatment with salicylic acid not affected on traits Compared to control, but with added of Arsenic , Salicylic acid caused significant increasing on all of traits.in conclusion, results showed that Salicylic acid can increase resistance of Ajowan in germination stage under arsenic stress.

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DETECTION *PAPAVER BIPPINARUM* A POTENTIALLY SOURCE FOR NEW ALKALOIDS IN NORTHWEST OF IRAN

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P. somniferum L. (*Papaveraceae*), is well-known for morphinan alkaloids and particularly the species in the section *Oxytona Bernh. (Syn. Macrantha Elk.)* named P. bracteatum is more important. This species produces an alkaloid known as thebaein (mainly in roots as well as leaves and capsules). Thebaein cannot be abused but easily converted to morphine, codeine and other semisynthetics in the laboratory. In latter section there is another species *P. bippinarum* it is related to the commonly cultivated Oriental poppy, *Papaver orientale*, but it is annual, and can be harvested with roots whereas the perennials cannot [1-3]. It is native to northwest of Iran and east of Turkey. Alkaloids mecambridine**,** Salutadimerine, Norsalutaridine, Salutaridine-*N*-oxide, Thebaine, salutaridine**,** Orientalidine reported in Turkish samples of the species. In this study 16 population of 16 locations aimed, the species identified when they were flowering in 2006. Way points and elevation recorded with GPS, then the matured capsules of the plants collected, dried in room condition, and their seeds obtained. Seeds germinated in Petri-dishes, and the end of germination roots used for cytogenetic evaluation. We found plants with 2n=14 chromosomes for *P. lasiothrix,* while in Turkish one reported 2n=28 chromosome. Since salutaridine is a substance of Thebaine biosynthetic pathway hence it is probably that the species *P. lasiothrix Fedde* may contain Thebaeine or other useful alkaloids. Especially it contain red alkaloids that seen rarely.

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COMPARING THE EFFECTS OF METRONIDAZOLE, TINIDAZOLE AND MANGO EXTRACT ON *TRICHOMONAS VAGINALIS* IN VITRO

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Trichomoniasis is the most common non-viral sexually transmitted human disease that caused by protozoan *Trichomonas vaginalis*. Metronidazole is the selective drug in trichomoniasis treatment. But the reported cases show the increasing trend of drug resistance. This study aims to evaluate the effect of Mango extract on *Trichomonas vaginalis*. *Trichomonas vaginalis* was cultured axenically in TYM (Trypticase Yeast Extract) medium supplemented with 10% bovine serum. The effect of Mango extract in 50, 100, 200, 400, 800 and 1000µg/ml on *Trichomonas vaginalis* were studied after 24 and 48 hours. The final numbers of parasite with a hemocytometer and Trypan blue were recorded. Then the value of IC_{50} [Half maximal inhibitory concentration] and the lethal percent were calculated. In the present study, the metronidazole is used as positive control. The IC_{50} value of Metronidazole and Tinidazole were calculated in the concentrations of 0.02, 0.04, 0.08, 0.16 and 0.32 µg/ml**.** The final results confirmed the significant effect of Mango extract concentrations on the reduction of parasite numbers ($P<0.05$). The extract concentrations of 1000µg/ml has the most effect on *Trichomonas vaginalis* growth inhibition after 24 hours. The IC_{50} values of Mango extracts, Metronidazole and Tinidazole were calculated as 110.8 and 0.042 and 0.02µg/ml respectively. Based on the obtained results, the different concentrations of Mango extract have a good anti *Trichomonas vaginalis* activities. It is better to carry out further studies on animal models and infected people as a recommendation.

EVALUATION OF INHIBITION OF BROWN SPOT DISEASE BY USING ESSENTIAL OILS OF SOME MEDICINAL PLANTS

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The use of secondary metabolites in plant extracts due to microbial control agents is developing. In this study the antifungal activity of essential oils of some medicinal plants were investigated. In order to investigation the effects fungicide or fungistatic of five essential oils against brown spot disease (*Drechslera oryzae*) an experiment was conducted in a factorial layout based on a completely randomized design with four replications. Brown leaf spot of rice caused by *D. oryzae* is one of the major fungal disease of rice which occurs in almost all the rice growing areas. The treatment were included five essential oils: fennel (*Foenicolum vulgar*), savory (*Satureja hortensis*), eucalyptus (*Eucalyptus* sp.), clove (*Mentha piperata*) and thyme (*Thymus vulgaris*) and different concentrations of essential oils (i.e. 0-1000 ppm). The data of mycelium growth recorded at 10 days after inoculation at 27±1°C show that savory and thyme oils perfectly inhibited growth of *D. oryzae* fungus at concentration 400 and 800 ppm in PDA medium, fennel oil was effective at concentration 800ppm and clove, eucalyptus and fennel oils had no effect. Results fungistatic and fungicidal activities showed that savory oil at a concentration of 1000 ppm fungicidal has property against *D. oryzae* but thyme oil has fungistatic property. Appear to be compounds of savory and thyme oils in biological control and reduce damage to many agricultural products are a good choice. Additional tests for the effect of compounds of savory and thyme on *D. oryzae* are being investigated. [1, 2].

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THE INSECTICIDAL EFFECT OF *ARTEMISIA DRACUNCULUS* L. (ASTERACEAE) ESSENTIAL OIL ON ADULT OF BREVICORYNE BRASSICAE L. (*HEMIPTERA: APHIDIDAE*) UNDER LABORATORY CONDITIONS

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To control cabbage aphid *Brevicoryne brassicae* L., essential oils of plant were noted as the suitable alternative to chemical pesticides. So, in this study, the insecticide effects of Tarragon plant oil *Artemisia dracunculus* L. on cabbage aphid adults were investigated. The essential oil of this plant was abstained using Clevenger by distillation with water [1, 2]. All bioassay tests were conducted at 27±2°C, 65±5 R. H and a photoperiod of 16:8h (light: dark). This research was performed with a completely random design with 6 treatments (5 different concentrations of essential oils plus control). Each concentration included 3 replicates and each replicate consisted of 20 adult pests. The LC_{50} of *A. dracunculus* on cabbage aphid was 23.54 µl/l airs. Results showed that mortality value increased via concentration increase [3, 4]. According to insecticidal effects of *A. dracunculus* oil on this pest, application of this essential oil as a less dangerous insecticide or as precursor will be suggested to make new insecticidal to control cabbage aphis.

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STUDY ON DORMANCY BREAKING OF *ERYNGIUM CAERULEUM* M.B. (APIACEAE) SEEDS BY DIFFERENT LEVELS OF KNO_3 AND SALICYLIC ACID

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One of the first steps toward domestication of wild endemic plants is to prepare the most suitable condition which could lead to enhancement in germination. In Iranian traditional medicine the species of *Eryngium* sp. genus have several medicinal properties including diuretic, laxative and appetizer. *Eryngium caeruleum* M. B. is a perennial herbaceous plant that has been distributed in the northern parts of Iran. Because of the young leaves' good taste and aroma, they are used in food preparation. The fresh seeds of *Eryngium caeruleum* M. B. usually have a deep dormancy and takes months to germinate. So it would be worthy to investigate its seed's Germination. Therefore in order to find out an effective method for this fact, a factorial experiment based on completely randomized design with three replicates was conducted to investigate the effects different priming treatments including KNO_3 (1 and 2%), Salicylic acid (0.5, 1, and 2 mm) and control (distilled water), in Ferdowsi University of Mashhad in 2013. The greatest amount of germination percent was observed by application of KNO_3 (78%) while the minimum amount was detected in control (57%). In comparison with control, SA in 0.5 mm increased germination percentage considerably (72%). Results revealed that both Kno_3 treatments reduced 34% germination time. To conclude, priming *Eryngium caeruleum*'s seed with KNO_3 is recommended in order to achieve the higher germination percentage in shorter time.

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INVESTIGATION OF INTERCROPPING OF BASIL AND *PIMPINELLA AFFINIS* WITH CORN, CORIANDER AND FENUGREEK BY CONSIDERING THEIR ALLELOPATHIC EFFECTS

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In order to investigate the allelopathic effects of essential oils of basil and pimpinella on germination and early growth stages of maize, coriander and fenugreek, a factorial experiment based on completely randomized design with three replicates were conducted at the University of Torbat heydariyeh. Two concentrations of basil and pimpinella oil (25 and 50% by volume) and control (distilled water) were tested. Germination percentage, shoot and root's wet and dry weight, shoot and roots length, allelopathic resistance index were measured. Data analyses were done by SAS software. Variance analysis showed significant differences for all studied traits. The maximum shoot growth inhibition was achieved in concentration 50% of both oils, these treatment reduced germination percentages remarkably. pimpinella essential oil in 25% treatments led to the highest reduction in germination percentage, shoot and root' s wet and dry weight in the examined plants. In 50% treatments of pimpinella oil, germination decreased relatively in higher amounts in comparison to basil oil in the same concentration. In general, pimpinella had more allelopatic effects, hence it could be concluded that not only these two plants had negative effect on other crops which must be considered in intercropping systems but it also showed that they could have potential to be used as organic Herbicides.

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EVALUATION OF ANTIBACTERIAL ACTIVITY OF *ECHINOPHORA PLATYLOBA* ESSENTIAL OIL ON MAJOR FOOD-BORNE PATHOGENS

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In recent years, there has been a raise in interest of using phytochemicals in food industries as a new source of antimicrobial agents in order to decline the use of synthetic preservative [1]. *Echinophora platyloba* D. C from *Echinophora* genus is an aromatic, mid-summer plant that wildly grows in Iran and used mainly for impartation of flavor and taste to the food, food preservation and treatment of diseases [2]. In this study, chemical composition and antibacterial effects of essential oil of aerial parts of this plant against four major foodborne pathogens were evaluated. The aerial parts of plant were collected from Maragheh city, West Azerbaijan, Iran. Dry aerial parts of *E. platyloba* D. C were subjected to the hydrodistillation and the chemical composition of obtained essential oil was evaluated using GC/MS. In the present study, antibacterial effects of *E. platyloba* D. C essential oil against *Salmonella typhimurium*, *Escherichia coli*, *Staphylococcus aureus* and *Listeria monocytogenes* were examined using Disk Diffusion and Microdilution methods to determine minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of essential oil. Chemical analysis showed that the major components of *E. platyloba* D.C essential oil were *Ocimene* (26.51%), *2, 3-Dimethyl-cyclohexa-1, 3-diene* (9.87%), *α-Pinene* (7.69%) and *γ-Dodecanolactone* (5.66%). Results illustrated that between these four bacteria, *S. aureus* and *L. monocytogenes* showed more sensitivity against *E. platyloba* D.C essential oil. Growth inhibitory zone for *L. monocytogenes* and *S. aureus* was 11.52 mm and 9.86 mm, respectively. Our results also showed that the MIC of *E. platyloba* D.C essential oil against *L. monocytogenes* and *S. aureus* was 6250 and 12500 ppm, respectively. In conclusion, regarding this study, it is clear that *E. platyloba* D.C essential oil indeed exhibits antibacterial activity. Its antibacterial activity against *L. monocytogenes* was the highest followed by *S. aureus* and *E. coli*. Therefore, it can be suggested to purify and evaluate the antibacterial effects of active substances of *E. platyloba* D.C essential oil for therapeutic or industrial utilization.

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EVALUATION OF ANTIOXIDANT ACTIVITY OF *ECHINOPHORA PLATYLOBA* USING DPPH METHOD AND B-CAROTENE BLEACHING TEST

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Plant derived antioxidants are aromatic and liquid compounds that shows biological effects and can inhibit oxidation by scavenging free radicals [1]. Thus, addition of these compounds as antioxidants could potentially increase the shelf life of foods by protecting food materials from oxidation [2]. Besides, consumption of natural antioxidants which added to food could be transmitted to the body and may inhibit reactive oxygen species (ROS) formed in human body cell and consequently oxidative damages [3]. *Echinophora platyloba* D.C is one of *Echinophora* species which grows natively in different regions of Iran and fresh and dried aerial parts of this plant are added to foods and dairy products for flavoring [4]. In this study, antioxidant activity of different concentrations of *E. platyloba* D.C essential oil was examined using DPPH and β-Carotene bleaching test and compared with BHT and acid ascorbic. All examinations were performed in triplicate. The results demonstrated that *E. platyloba* D.C essential oil had acceptable and strong antioxidant activity in every three concentrations used in this study which is totally comparable with BHT and Acid Ascorbic. The result of this study also revealed that *E. platyloba* D.C essential oil was more effective on inhibition of primary lipid peroxidation than secondary lipid peroxidation based on the result of DPPH method and β-Carotene bleaching test. In conclusion, it can be suggested to purify and evaluate the antioxidant effects of active substances of *E. platyloba* D.C essential oil for food preservation or industrial utilization.

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ENHANCED PRODUCTION OF SECONDARY METABOLITE, DOPAMINE, BY $AGNO_3$ AND ULTRASONIC IN THE TRANSGENIC HAIRY ROOTS OF PURSLANE (*PORTULACA OLERACEA* L.)

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Purslane (*Portulaca oleracea* L.) is one of the valuable medicinal plants that World Health Organization (WHO) called it Global Panacea and has important secondary metabolites such as dopamine and noradrenaline [1, 2]. In this study, hairy roots of Purslane were produced by using *Agrobacterium rhizogenes* strain AR15834. For confirming hairy roots transformation, the presence of the *rolB* gene in the hairy roots lines was performed by PCR and using *rolB* gene specific primers [3, 4]. The effect of silver nitrate and ultrasonic as abiotic elicitors on the growth and increase of dopamine on the top line of hairy roots were examined. Different concentrations (0, 0.5, 1 and 2 mM) of silver nitrate were added to liquid medium in the twenty eighth day of hairy root cultures [5-7]. The different time of ultrasonic (0, 30s, 2min and 5min) treatment was performed the same day [8, 9] and after 2 days the hairy roots harvested for measuring of dopamine and growth. The rate of dopamine in the hairy roots were measured by HPLC. The greatest effect of silver nitrate on dopamine rate was obtained in 2mM concentration that increased 4 times, in compared to the control (without silver nitrate). The greatest effect of ultrasonic on dopamine rate was obtained in 2 minutes, that increased 5/5 times, in compared to control (time zero). Silver nitrate reduced roots growth but ultrasonic has no effect on growth of hairy roots in compared to the control.

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THE EFFECT OF *COMMIPHORA MUKUL* ON ANTIOXIDANT STATUS

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Diabetes mellitus, a syndrome characterized by chronic hyperglycemia, has common complications such as atherosclerosis, nerve damage, renal failure, male impotence and infection. Oxidative stress an altered balance between active oxygen species production and antioxidant levels, plays an important role in the etiology of diabetes and its complications [1]. Diabetes mellitus, one of the most serious health problems worldwide, which an estimated 300 million people are affected by diabetes by the year 2025 [2].Recently, focus has shifted to the use of plant extracts for the treatment of diabetes mellitus and its complications. The WHO has estimated that approximately 80% of the world wide population relies on traditional medicine for their primary health care needs, and most of this therapy involves the use of plant extracts [3]. In this study *Commiphora mukul*a herbal medicine that has antioxidant properties, have been used as an exogenous antioxidant to determine whether it can improve oxidant/ antioxidant status impairments in diabetes. In present study, 32 male wistar rats divided into 4 groups: normal control (NC), diabetic control (DC), normal treated with extract (NE), diabetic treated with extract(DE). Diabetes induced by I.P. injection of 60mg/ kg of streptozotocin (STZ). Normal groups received normal saline. After confirming diabetes (plasma glucose level more than 250 mg/ dl) extract treated groups (NE, DE) received 300mg/ kg of *Commiphora mukul* hydroalcoholic extract for 60 days by gavage and the control groups (NC, DC) received normal saline in the same manner. At the end of experiment, rats were sacrified and the content of Vit C, MDA (malonaldehyde), and TAC (total antioxidant capacity), TOC (total oxidant capacity) were determined. Diabetes decreased Vit C, TAC and increased MDA, TOC. Surprisingly, *Commiphora mukul* hydroalcoholic extract increased Vit C, TAC and increased MDA, TOC. *Commiphora mukul* by improving antioxidant/ oxidant impairment can be an alternative or a supplement in alleviating diabetic complications.

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TOTAL PHENOLIC CONTENT, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF DIFFERENT EXTRACTS AND A CYTOTOXIC TRITERPENOID FROM *EUPHORBIA MICROSCIADIA*

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Euphorbia microsciadia (Euphorbiaceae) is a plant growing wild in different parts of Iran. The roots of *E. microsciadia* after grinding were extracted with dichloromethane, acetone, methanol and methanol-water (80:20) separately. These four extracts were screened for their antioxidant and antimicrobial properties. Total phenolic content of the extracts were also determined. The antioxidant activity of these extracts were determined by 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay. The 80% methanol extract had the highest antioxidant activity with IC_{50} value of 143.1 ± 31.2 µg plant extract/mL DPPH. Folin-ciocalteu reagent was used for determination of total phenolic content of the plant extracts. Like that measured for the antioxidant activity, the 80% methanol extract showed highest total phenolic content (16.65 ± 1.006 mg equivalent of gallic acid in 1g dry plant material (mg EG/g PM). The above mentioned extracts were examined for antimicrobial activity by agar disc diffusion (ADD) bioassays. The methanol extract showed antimicrobial activity against 2 out of 6 microorganisms including: *Escherichia coli* and *Staphylococcus epidermidis*. On the other hand the 80%. methanol extract showed antimicrobial activity against 3 tested microorganism including *E. coli, S. epidermis* and *Pseudomonas aeroginosa*. The results proved that the root of the studied plant can be a potential source of natural antioxidant and antimicrobial agent. The above mentioned extracts were also tested against three human cancer cell lines including: HL60 (human acute promyelocytic leukemia cells), K562 (human chronic myelogenous leukemia cells) and MCF-7 (human breast adenocarcinoma cells) for their cytotoxic activity using 3-(4, 5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) colorimetric assay and compared to standard anticancer agents.

PHYTOCHEMICAL OF ETHANOL EXTRACTS FROM THE FLOWERS OF *PUNICA GRANATUM* POPULATIONS

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Punica granatum Linn. (Punicaceae family), "Golnar-e-farsi in Persian", is an important medicinal plants in Iran and India whose flowers are used as astringent, hemostatic, antibacterial, antifungal, antiviral and as a remedy for cut wound, bronchitis, diarrhea, digestive problems, man sex power reconstituent, dermal infected wounds and diabetes in Unani medicinal (Iranian Traditional Medicine) literature [1-3]. Polyphenol compounds in *P. granatum* are pomegranatate; ellagic acid, 3, 3i, 4i-tri-O-methylellagic acid, ethyl brevifolincarboxylate, urolic and maslinic acids, and daucosterol [4]. In this study, the total phenolic content in each extract from different populations of *P. granatumwas* determined using the Folin–Ciocalteu method. Results indicated that there was a significant difference in amount of total phenol in the extracts of different populations. Our results indicated the ethanol extract of *P. granatum* could be an important dietary source of total phenolic content with high antioxidant capacity.

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DIVERSITY OF PHYTOCHEMICAL AND ANTIOXIDANT ACTIVITY OF ESSENTIAL OILS FROM *NIGELLA SATIVA* SEEDS

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The seeds of *Nigella sativa* Linn. (Ranunculaceae), commonly known as black seed or black cumin, are used in folk (herbal) medicine all over the world for the treatment and prevention of a number of diseases and conditions that include asthma, diarrhoea and dyslipidaemia [1]. The seeds of black seed which in Persian known as 'Siah Daneh' contain 36%–38% fixed oil, proteins, alkaloids, saponins and 0.4%–2.5% essential oil [2, 3].In present study, ecological factors such a saltitude, side and slope percentage, latitude and longitude, as well as associated species were recorded. Hydro-distillated essential oils of different populations of Nigella sativa seeds collected from various fields in Chaharmahal va Bakhtiari, Isfahan and Khorasan provinces, Iran were investigated for their chemical components and oil yield diversity. The essential oil yields ranged from 0.2–0.6 ml/100 g dry plants. Strong chemical variability, depending on the origin of the samples, was observed.

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MACROSCOPIC AND MICROSCOPIC STUDY OF ALCOHOLIC EXTRACT OF HENNA (*LAWSONIA INERMIS*) AND SALT BATH ON SKIN HEALING OF MACRO FISH (*LABIDOCHROMIS CAERULEUS*)

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One well-known medicinal herb in traditional medicine is henna (*Lawsonia inermis*). Due to the presence of compounds in the leaves, many properties including antimicrobial properties, anti inflammatory, wound healing, trypsin inhibitor and antioxidant role is reported. This study was designed to compare the effectiveness of two natural substances (Henna and salt) in experimentally induced wound healing process by removing scales and trypsin enzyme injection were performed. For this work, 54 pieces of aquarium fish (macro) divided into three groups. The fish were kept under laboratory conditions at temperature of 22-25 °C. After the injury, at days 2, 4 and 6 for 10 minutes in salted water with a concentration of 1%, the second group in the alcoholic extract of henna 0/5% and a control group without both was intended. The samples were taken from wounds in three stages, each sampling with an interval of one week. In macroscopic study, the color changes of scar in henna group were obvious. Histopathological results revealed that in the second week after injury, the use of henna as compared to salt, accumulation of inflammatory cells was significantly reduced. Finally in the third week of study, there were no inflamed lesions in salt and henna groups. It seems that henna extract can stop the influence of severe inflammation, also prevent skin damage, secondary infections and healing is faster and more effective.

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THE EFFECT OF *CALENDULA OFFICINALIS* ON ANTIOXIDANT STATUS

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Calendula officinalis (Asteraceae), commonly known as "gole- hamishe- bahar" in Persian, used in traditional medicine. It has various biological activities to treat diseases like analgesic, antidiabetic, anti-inflammatory, antiseptic, bactericide, in skin problems and as antifungal agent. It is also used in gastrointestinal, gynecological, eye disease, skin injuries and in some cases of burn. The plant is rich in many pharmaceutical active ingredients like auroxanthin, caretonoids, flavonoids, flavoxanthin, glycosides, triterpenoid esters, sterols and steroids [1]. Literature survey revealed that *Calendula officinalis* had a profound effect on the antioxidant defense system, but to our best of knowledge there was no report on effect of *Calendula officinalis* in oxidant/ antioxidant status in diabetic rats. Diabetes is associated with an increased production of reactive oxygen species (ROS), enhanced oxidative stress and changes in the antioxidant capacity [2]. In present study, 32 male wistar rats divided into 4 groups: normal control (NC), diabetic control (DC), normal treated with extract (NE), diabetic treated with extract (DE). Diabetes induced by I.P. injection of 60mg/ kg of streptozotocin (STZ). Normal groups received normal saline. After confirming diabetes (plasma glucose level more than 250 mg/ dl) extract treated groups (NE, DE) received 300mg/ kg of *Calendula officinalis* hydroalcoholic extract for 60 days by gavage and the control groups (NC, DC) received normal saline in the same manner. At the end of experiment, rats were sacrified and the content of Vit C, MDA (malonaldehyde), and TAC (total antioxidant capacity), TOC (total oxidant capacity) were determined. Diabetes decreased Vit C, TAC and increased MDA, TOC. Fortunately *Calendula officinalis* hydroalcoholic extract increased Vit C, TAC and increased MDA, TOC. *Calendula officinalis* by improving antioxidant/ oxidant impairment can be an alternative or a supplement in alleviating diabetic complications.

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PHYTOCHEMICAL INVESTIGATION ON THE ROOTS OF *EUPHORBIA MICROSCIADIA*

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The genus *Euphorbia* is the largest one in the family Euphorbiacea including about 2000 species. *Euphorbia microsciadia* (Euphorbiacea) is a perennial plant growing wild in Iran. The plants of the genus *Euphorbia* have been found to synthesize anti cancer macrocyclic and polycyclic diterpenoids and triterpenoids [1]. The roots of the plant after grinding were extracted with acetone. The extract was then subjected to different chromatography systems including column, flash-column and thin layer chromatography using various stationary and mobile phases. From the above extract three compounds were purified. The structure of the compounds were elucidated by different spectroscopy methods including 1 and 2D-NMR, ^{1}H NMR, ^{13}C NMR, MS, IR and by comparison of the spectra with the literature data and one of them identified as Eupha-8, 24-dien-3β-ol (Euphol). Euphol, showed moderate cytotoxic activity on three human cancer cell lines form the acetone extract of the plant.

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EFFECT OF GREEN TEA (*CAMELLIA SINENSIS*) EXTRACT ON WEIGHT AND BLOOD BIOCHEMICAL PARAMETERS IN MALE WISTAR RATS

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Obesity is one of the major health problems and is associated with the serious chronic diseases such as cardiovascular diseases and diabetes. Orlistat, a lipase pancreatic inhibitor, is the most common anti-obesity drug. Green tea (*Camellia sinensis*) has been recognized for promoting healthy and body weight control. In this study, we evaluated effect of hydroalcoholic extract of *green tea* on weight and blood biochemical parameters in male Wistar rats. This study was conducted on 40 male Wistar rats with an average weight of 300 g. They were under diet containing 4% added fat for one month, then divided into 5 groups of 10 including: normal diet, obese diet, and obesity diet along with 200 & 400 mg/kg hydroalcoholic extract of *green tea* and Venustat, randomly. Weight of rats were recorded in the beginning, at the end of the second, fourth, sixth and eighth week. Fasting blood sugar, triglycerides, Plasma levels of total cholesterol, serum liver enzymes and fat in feces were measured at the beginning and end of the study. *Green tea* extract in both doses compared to fat control, significantly caused weight loss ($p<0.05$). The effect of *green tea* on Fasting blood sugar lowering, triglyceride and cholesterol was also significant ($p<0.05$). *Green tea* had no effect on liver enzyme AST compared to the control group. Fecal lipids changed significantly throughout the experiment at green tea treatment. This study indicates that hydroalcoholic extract of *green tea* at doses of 200 and 400 mg/kg caused reduction in weight and Fasting blood sugar and it might be effective for the treatment of obesity and diabetes.

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MEDIA OPTIMIZATION FOR MAXIMUM BIOMASS PRODUCTION IN CELL SUSPENSION CULTURES OF *CROCUS SATIVUS* L.

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Saffron, *Crocus Sativus* L., contains pigments and valuable compounds with medicinal properties which can be used in industry as a medicine or food additive. Extracts of saffron (*Crocus sativus* L.) have been reported to inhibit cell growth of human tumor cells. Nowadays saffron production is lower than the demand. Cell suspension culture presents an alternative biotechnological for production of saffron secondary metabolites such as crocin, picrocrocin and safranal *in vitro*. One of the main steps in the establishment of cell culture is optimization of media to increase biomass. In this study, optimizing media was carried out by changing the autoclaving method of sucrose and vitamins amount in the cell suspension culture medium. The influence of 3 different liquid media in 6 replications including autoclaving medium with or without sucrose and changing the amount of vitamins were tested on biomass production over two month. Modified B_5 (Gamborg, 1962) was supplemented with 2,4-D (0.5 mg/L) and Zeatine (0.3 mg/L) as auxin and cytokinin respectively. The highest biomass was obtained with 3% sucrose which autoclaved separately and then added to the medium. It was also found that double amount of vitamins is more effective on biomass when compared to the control. The results of this study showed that the best method to prepare media for cell culture of saffron is autoclaving medium and sucrose separately and then mixed them together. Twofold B_5 vitamin mixture was found significantly better than normal formulation on biomass.

CYTOTOXIC EFFECTS OF METHANOL EXTRACT OF *CENTAUREA ALBONITES* ON DIFFERENT TUMOR CELL LINES

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Many species of the genus *Centaurea*, "GoleGandom" in Persian have long been used in Iranian traditional medicine and whole plant are well-known crude drugs in the treatment of mild eye inflammation, indigestion, Rheumatic pain, neuralgia and as a diuretic and cholagogic agent [1]. In this study we evaluated methanol extract of *Centaurea albonites* on MCF7, A549, HT-29, HepG2 and MDBK cell lines by 3-(4,5-dimethylthiazol-2-yl)-2, 5-diphenyltetrazolium bromide (MTT colorimetric assay) test [2]. Cancer cell lines were treated with the extract including from 6.125 to 100 µg/ml concentration for 72 hours. As a result, methanol extract of *Centaurea albonites* was shown cytotoxicity with $80>IC_{50}>20$ µg/ml; further investigations are run to better understand the mechanism of this activity and to identify the molecule/s responsible for this action.

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EFFECTS OF SALICYLIC ACID SPRAYING ON SOME MORPHOLOGICAL TRAITS, ESSENTIAL OIL PERCENT OF PEPPERMINT (*MENTHA PIPERITA*)

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Medicinal plants have specific value in preparing of societies health and hygiene for cure and prevention. *Mentha piperata* L. is one of the most important plants were related to Lamiaceae that today, cultivate in the whole of world. In developed agriculture, the most effort was carried out for increasing of area unit yield and decreasing of damage of undesired factors. Using of plant growth regulators have important role in regulating of many plant physiological processing and modern agriculture particularly horticulture. To evaluate the effect of salicylic acid on some morphological traits, essential oil percent of peppermint, completely randomized block design experiment based on three levels (zero, 0/1 and 1 mmM) with three replications in two Chin research farm of Tabriz University. Traits, including height, fresh and dry weight per plant, chlorophyll index, leaf essential oil percentage. Results of this project were shown that average of total traits in first pick, was significantly more than second pick. The results of variance analysis showed that the effect of salicylic acid on fresh weight, leaf chlorophyll index and essential oil percent was significantly And Acid salicylic effect on plant height and plant dry weight were obtained with non, however, the average yield per hormone treatments were higher than the control treatment. In addition, plant fresh weight, leaf chlorophyll index and, essential oil percent in treatment 0/1 and 1 mmM compared with the control group showed an increase.

EFFECT OF BREWING TIME AND TEMPERATURE ON MICROBIAL, PHYSICOCHEMICAL AND ORGANOLEPTIC CHARACTERISTICS OF IRANIAN TEA

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The aim of this study is to obtain the best Iranian tea brewing time and temperature in terms of the quality and sensory characteristics to be used. For this purpose, changes in physico-chemical, microbial and sensory properties of green and black tea in various conditions of temperature (90, 95, 100 ° C) and time (2, 4, 6, 8, 10 minutes) were examined. The results of the effects of time and temperature on the rate of change of microbial characteristics of the two types of tea showed that with increasing temperature and time, average number of coliform bacteria and mold and yeast in the tea drinks has declined. Results showed that after 6 minutes brewing time in the black tea, the number of coliform bacteria and mold and yeast reaches to zero, but even after 10 minutes of brewing in the green tea, microbial contamination in tea drinks was found. The results of the effects of time and temperature on the rate of change of physicochemical properties of the two types of tea showed that with increasing brewing time and temperature, rate of aqueous extract and tannins in both types of tea drink has increased. The data showed that each of the same brewing temperatures and times, the rate of outflow of aqueous extracts of green tea has been more than black tea and tannins output as well as the percentage change in the amount of tannins in green tea has been more than black tea. The pH levels and caffeine of both drink tea there was no significant change. The results of taste tests of two types of tea drink showed that whit increasing the brewing time from 2 minutes to 10 minutes, taste satisfaction has increased, but different brewing temperatures did not affect the flavor properties of tea drinks. In general, to achieve a proper brewed tea, it is necessary to use the 100 ° C water for 10 min. In these conditions, In terms of nutritional value, the best drink achieved from green tea.

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FOXTAIL MILLET (*SETARIA ITALICA*) EXTRACT AS PANCREATIC LIPASE INHIBITOR AND POTENTIAL NATURAL ANTI-OBESITY DRUG

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Obesity is one of the major health problems and is associated with the serious chronic diseases such as cardiovascular diseases and diabetes. Orlistat, a lipase pancreatic inhibitor, is the most common anti-obesity drug. Foxtail millet (*Setaria italica*) belongs to the family Poaceae has been recognized for high fiber and protein content. It is effective for improving lipid metabolism. In this study, we evaluated ability of Foxtail millet to *in vitro* and *in vivo* inhibit porcine pancreatic lipase (PPL) activity. Hence, we analyzed various concentrations hydroalcoholic (70%) dry extract. We used para-nitrophenyl palmitate (pNPP) as substrate to assay of lipase activity. The result implied that PPL noticeably inhibited by hydroalcholic Foxtail millet extract, at concentrations 200, 400 and 800 mg/ml by 45±0.63, 52±0.49, 57%± 0.25, respectively. It is concluded ethanolic Foxtail millet extract is a rich source of anti-lipase compound. Subsequently, effect of Foxtail extract was evaluated on weight in male Wistar rats. This study was conducted on 50 male Wistar rats with an average weight of 300 g. They were under diet containing 4% added fat for one month, then divided into 5 groups of 10 including: normal diet, obese diet, and obesity diet along with 200 & 400 mg/kg Foxtail millet extract and Venustat. Weight of rats were recorded in the beginning, at the end of the second, fourth, sixth and eighth week. Foxtail millet extract in both doses compared to fat and normal control, significantly reduced weight ($p<0.05$). The effect of extract on fat fetal was also significant ($p<0.05$). Fat in the faces in extract group was about 2 and ten times more than Venustat and fat control, respectively. It is concluded that hydroalcoholic extract of *Setaria italica* at doses of 200 and 400 mg/kg inhibited pancreatic lipase and caused reduction in weight. Foxtail Millet extracts may be as new and effective anti-obesity drug.

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BIOACTIVITY OF ENDOPHYTIC FUNGI ISOLATED FROM THYME, A TRADITIONALLY USED MEDICINAL PLANT

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Endophytes which reside asymptomatically in living plant tissues are believed to produce the compounds similar to their host [1]. Due to the antimicrobial properties of *Thymus*, its endophytic fungi are expected to have these properties too. In the present research the antimicrobial effect of endophytes isolated from *Thymus* as well as their extract was investigated on several plant (*Botrytis cinerea, Xanthomonas arboricola* and *Streptomyces scabies*) and human (*Escherichia coli* ATTCC 25922 and *Staphylococcus aureus* ATTCC 33591) pathogens. The effect of endophytes on *B. cinerea* showed that the greatest inhibition percentage was related to M24 isolate (*Fusarium subglutinans*) (61.33%) but there was no statistically significant difference between this isolate and isolates M22, M15, M12 and M73 belonging to *Fusarium* genus and M75 isolate (*Phoma*). Out of 89 endophytic isolates, only three isolates M32, M35 and M33 (sterile mycelia) affected *E. coli* and nine isolates showed biocontrol effect on human pathogenic bacterium *S.aureus* with a significant difference at 1% level. M35 (with antibacterial potential 1.1) showed high activity on *X. arboricola* in comparison to control ($P \leq 0.01$). Other isolates had no effect on this bacterium. In the case of *S. scabies*, all *Fusarium* isolates prevented from its growth. Among other isolates only M32 and M33, belonging to sterile mycelia, could affect the growth of this bacterium with a significant difference. The extracellular metabolites of endophytic fungi were used in 7 concentrations (0, 12, 48, 96 and 192 mg/ml) to control fungal and bacterial pathogens. The concentrations of 6, 12, 24, and 48 mg/ml had no effect on *B. cinerea* growth. In the concentration of 192 mg/ml, following the positive control, Fluconazole fungicide, M87 (*Alternaria alternata*) had the most effect on *B. cinerea*. In the concentration of 96 mg/ml, the extracts of M89 (*F. lateritium*), M32 (sterilemycelium), M29 (*Fusarium* sp.) and M24 (*F. subglutinans*) displayed inhibition halo. The concentrations of 6, 12, 24, 48 and 96 mg/ml had no effect on bacterial growth. In the concentration of 192 mg/ml, only the extract of M73 was able to form inhibition halo against E. *coli*. In the same concentration, the isolates M67, M29 and M89 produced inhibition halo against *S. aureus* and the extracts of six isolates were able to control *S. scabies* in which the extract of M75 was the best one. None of the extracts tested were able to control *X. arboricola* while no inhibition halo was formed.

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EFFECTS OF PUTRESCINE SPRAYING ON SOME VEGETATIVE TRAITS, ESSENTIAL OIL PERCENT OF PEPPERMINT (*MENTHA PIPERITA*)

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In present years, importance planting (cultivation), crop storage, Harvest and processing after the harvest of a medicinal plants for increasing value of effective materials were considered in order to their economical expolition in pharmacological industries. Peppermint (*Menta piperita*) is one of the most that is grown around the world today. To evaluate the effect of Putrescine on some vegetative traits, and essential oil percent of peppermint implemented completely randomized block design experiment in three levels (zero, 0.1 and 1 mM) with three replications in tow harvest in the research farm of Tabriz University. Evaluated traits were height, fresh and dry weight per plant, chlorophyll index, and leaf essential oil percentage. Based on the results of this study, the average of all traits in the first harvest was significantly higher than the second harvest. The results of variance analysis showed that the effect of putrescine on plant fresh weight, leaf chlorophyll index, dry weight plant and essential oil percentage was significant and the effect of on plant height and were non-significant, but the mean of the attributes in treated plants were higher than the control plants. In addition, plant fresh weight, leaf chlorophyll index, dry weight plant and essential oil percentage in 0.1 and 1 mM treatments increased compared with the control group.

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ANTIMICROBIAL EFFECTS OF *THYMUS* YEAST AND BACTERIAL ENDOPHYTES AGAINST PLANT AND HUMAN PATHOGENS

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Emergence and increasing incidence of antibiotic resistant bacteria, makes it of great importance to discover the useful compounds to reduce diseases [1] and natural products have played a great role in discovery and development of new drugs. *Thymus* is one of the most important plants of lamiaceae family and the plant essence has been known to be microbicide. Since the endophytes residing in their host plants are able to produce the compounds similar to their host [2], in this study the bio effects of yeast and bacterial endophytes residing in *Thymus* were studied. During spring, summer and autumn of 2011, healthy *Thymus* plants were collected and 6 yeast and 23 bacterial endophytes were isolated from different parts of these plants. Bacterial strains were identified as *Bacillus, Pseudomonas* and *Xanthomonas* in which the *Bacillus* was the predominant one. Bioactivity of the endophytes were investigated against *Botrytis cinerea, Xanthomonas arboricola* pv. *juglandis* and *Streptomyces scabies* as plant pathogens and *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 33591 as human pathogenic bacteria. None of yeasts isolates had antifungal or antibacterial effects. Among bacterial strains, MB27 (*Bacillus*) showed the most antifungal effect against *B. cinerea* but there was no significant difference between this strain and MB12 (*Bacillus*). Out of 23 bacterial strains two strains, MB20 and MB27 (*Bacillus*), affected *S. aureus* and *X. arboricola* in which there were significant difference between them in both cases. MB20 and MB27 along with MB13 also prevented *E. coli* growth and there were significant difference at 1% level. None of bacterial endophytes affected *S. scsbies.* Growth inhibition mechanisms of endophytic bacteria were evaluated and it seems that their antimicrobial effects are related to production of protease enzyme, siderophore, hydrogen cyanide and volatile compounds. Regarding the results it is worthwhile that the plants with pharmaceutical history be considered as promising sources of endophytes in which produce new bioactive compounds.

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IN VITRO EVALUATION OF THE ANTI ADHESION PROPERTIES OF ROSE WATER AGAINST CARIES PATHOGENS

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Natural products offer a rich source of structurally diverse substances with a wide range of biological activities, which could be useful for the development of alternative or adjunctive anticaries therapies. The use of natural products to prevent and/or treat oral maladies dates back several thousand years both in Western and Eastern societies [1, 2]. Antibacterial strategies targeting bacterial adhesion to substrates are considered a valuable alternative to traditional antibiotic therapy. From approximately the early 1980s there has been an increasing interest in natural biologically active compounds with potential therapeutic uses in medicine [3]. The aim of this study is investigating the antiadhesion properties of rose water on caries pathogens. In this study rose water as natural product and two strains of Streptococcus (*S. mutans*, *S. sobrinus*) were used as caries pathogens. Their adherence and biofilm formation were initially investigated by microtitre plate assay and then the effect of rose water on adhesion of pathogens was evaluated using microtitre plate assay [4]. *S. mutans* and *S. sobrinus* indicated strong and intermediate adherence respectively. Rose water reduced the adhesion of this pathogens; this reduction was for *S. mutans and S. sobrinus 18.66% and 12/3%* respectively. It should be noted that rose water mostly reduced the adhesion of *S. mutans*. Observations showed that rose water has anti adhesion effect on some caries pathogens.

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INVESTIGATE THE EFFECT OF VERMICOMPOST AND MYCORRHIZA FUNGI ON SOME PHYSIOLOGICAL CHARACTERS OF THYMUS (*THYMUS VULGARIS*)

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Although using of chemical fertilizers could be an effective practice on plant production increasing, however, because of related reduction of organic matter and accumulation of toxic matters in soil, diseases would be increase and plant productivity would be decrease. Organic fertilizers by positive effect on soil texture, water holding capacity and reduction of soil acidity, improved soil physical and chemical properties and condition. In this sense, an experiment with the aim of investigate the effect of vermicompost and mycorrhiza fungi and interaction of them on quality and quantitive properties of thymus (*Thymus vulgaris*) were conducted during 2011 on research field of faculty of agriculture, university of Shahrood, Iran. Experiment was arranged based on factorial in randomize complete block design in three replications. The treatments included vermicompost in 4 levels (0, 1/5, 3, and 6 ton.ha^{-1}) and mycorrhiza in 3 levels (without inoculation, inoculation with Glomus mosseae and Glomus intraradices). According to the results, interaction of vermicompost and mycorrhiza on chlorophyll a, chlorophyll b, carotenoids and total chlorophyll were significant ($P \leq 0.01$). Maximum chlorophyll content was observed in 6 ton.ha^{-1} vermicompost and the lowest were in control treatment. Mycorrhiza individually had significant effect on chlorophyll b and total chlorophyll. While in the medicinal plants cultivation no chemical fertilizers should be used, with regard to our results for increasing of thymus productivity it could be suggested that vermicompost could be used instead of chemical fertilizers in the way of sustainable agriculture and environment healthy.

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EFFECT OF APPLICATION OF ORGANIC AND BIOLOGICAL FERTILIZERS ON YIELD AND YIELD COMPONENTS OF BLACK CUMIN (*NIGELLA SATIVA* L.)

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Recent pharmacological investigations suggested its potential role, specifically for the amelioration of oxidative stress through free radical scavenging activity, the induction of apoptosis to cure various cancer lines, the reduction of blood glucose, and the prevention of complications from diabetes. Black cumin seeds have been used as herbal medicine by various cultures and civilizations to treat and prevent the number of diseases to ensure good health [1]. In order to evaluate the effects of different organic and biological fertilizers on yield and yield components of black cumin an experiment was conducted in a randomized complete block design (RCBD) with three replications at research farm of NourAbad in Lorestan, Iran, during 2013. The experimental treatments were 4 biological fertilizers and all combinations of T1- control (without any fertilizer), T2- bacterial strain Pseudomonas putida, T3- bacterial strain Azotobacter chroococcum, T4- compost, T5- vermicompost, T6- Ps. putida + A. chroococcum, T7- Ps. putida + compost, T8- Ps. putida + vermicompost, T9- A. chroococcum + compost, T10- A. chroococcum + vermicompost, T11- compost + vermicompost. There were significant differences between treatments in terms of plant height, seed yield, biological yield, and 1000-seed weight. The differences between treatments were not significant in terms of harvest index. Result also indicated that the highest plant height (32.1 cm) was obtained in A. chroococcum vermicompost treatment. Compost + vermicompost treatment had the highest seed yield (735 kg/ha), 1000-seed weight (1.9 g) and biological yield (1917 kg/ha) compared with other treatments.

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EFFECT OF BIOFERTILIZERS AND CHEMICAL FERTILIZERS ON YIELD AND YIELD COMPONENTS OF FENNEL (*FOENICULUM VULGARE* MILL.)

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Fennel (*Foeniculum vulgare* Miller.) which belongs to Apiaceae family is one of the most important medicinal and aromatic plants due to its estrogenic activities and uses as a carminative, diuretic, anti-inflammatory and antimicrobial [1]. In order to study the effect of bio-fertilizers and chemical fertilizers on yield and yield components of fennel (*Foeniculum vulgare* Mill.), an experiment was conducted in a randomized complete block design with eight treatments and three replications at research farm of NourAbad in Lorestan, Iran, during 2013. Treatments included: control (N1), nitroxin (free-living nitrogen fixing bacteria) (N2), phosphate solubilizing bacteria (N3), nitroxin + phosphate solubilizing bacteria (N4), chemical fertilizer (urea 100 kg ha^{-1} + mono super phosphate 120 kg ha^{-1}) (N5), 50% chemical fertilizer + nitroxin (N6), 50% chemical fertilizer + phosphate solubilizing bacteria (N7), 50% chemical fertilizer + nitroxin + phosphate solubilizing bacteria (N8). Results indicated that the fertilizer treatments had significant effects on plant height, seed yield, biological yield and harvest index of fennel. Maximum seed yield (1017 kg/ha) was obtained from (N8) treatment and the highest plant height (107 cm), biological yield (3875 kg/ha) and harvest index (26%) were obtained from (N8) and (N6) treatments respectively. The fertilizer treatments had no significant effects on the 1000 seed weight. According to the results, it is concluded that application of biofertilizers with 50% chemical fertilizer could reduce the need for chemical fertilizers and the highest seed and fruit yield would be obtained.

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IN VITRO EVALUATION OF *CUCUMIS SATIVUS, PUNICA GRANATUM* AS A CONTRAST FOR CT-SCAN

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CT, or computed tomography, is one of the most advanced methods of medical imaging. After plain radiography, CT scans help the most lesions in the motor system of the human body, especially the bones. The use of CT integral component in the diagnosis and treatment of many diseases is even. In most cases, CT with contrast material injected into the diagnostic value occurs. The digestive system of oral contrast is used to show the path that led to the inner lumen of the gastrointestinal tract and lesions can be differentiated from the lumen. Contrast material used in CT scan, barium sulfate, which is a lot of side effects, including constipation, bowel obstruction, appendicitis, etc. Gives. The purpose of this study was to investigate the potential for using *Cucumis sativus* and *Punica granatum* syrup as a natural contrast agent is replaced by CT scan. This study is an experimental study. According to previous studies in which plants of three elements magnesium, iron and copper have a higher frequency of a contrast agent in CT closer to the ideal Accordingly, this study evaluated the *Cucumis sativus* and *Punica granatum* syrup. *Cucumis sativus* and *Punica granatum* syrup after preparing it in a plastic container and then put the walls of the transparent imaging by CT scan was performed. Distilled water as a negative control and a undiluted contrast agent as positive control *Cucumis sativus* and *Punica granatum* syrup in plastic containers that are transparent walls were inserted. After image acquisition for any of the following results were obtained: *Cucumis sativus* syrup (12 Hounsfield), *Punica granatum* syrup (53 Hounsfield), distilled water (0 Hounsfield) and undiluted contrast agent (Hounsfield 4000). Based on the results obtained in this experiment were determined that the *Punica granatum* syrup than *Cucumis sativus* syrup required to show a contrast, such as iron, copper and magnesium has, Therefore it is recommended to evaluate more precisely, the plant should be complementary studied.

OPTIMIZATION OF CALLUS INDUCTION IN *MENTHA PULEGIUM*

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Medicinal plants have been identified and used throughout human history. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorous mammals [1]. *Mentha pulegium* is a species of flowering plant in the family Lamiaceae. Crushed pennyroyal leaves exhibit a very strong fragrance similar to spearmint. Pennyroyal is a traditional culinary herb, folk remedy, and abortifacient. The essential oil of pennyroyal is used in aromatherapy, and is also high in pulegone, a highly toxic volatile organic compound affecting liver and uterine function [2]. In current research callus induction in *M. pulegium* was optimized. For this purpose, two explants (leaf and stem) of *M. pulegium* was cultured on MS medium that was supplemented with BAP (0.5 and 1.0 mg/l) and 2,4-D (1.0 and 2.0 mg/l) in a factorial experiment. Statistical analysis showed that the leaf explant showed the highest callus induction in *M. pulegium*.

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IN VITRO EVALUATION OF *CITRUL LUSLANATUS, PRUNUS PERSICA* AS A CONTRAST FOR CT-SCAN

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CT, or computed tomography, is one of the most advanced methods of medical imaging. After plain radiography, CT scans help the most lesions in the motor system of the human body, especially the bones. The use of CT integral component in the diagnosis and treatment of many diseases is even. In most cases, CT with contrast material injected into the diagnostic value occurs. The digestive system of oral contrast is used to show the path that led to the inner lumen of the gastrointestinal tract and lesions can be differentiated from the lumen. Contrast material used in CT scan, barium sulfate, which is a lot of side effects, including constipation, bowel obstruction, appendicitis, etc. Gives. The purpose of this study was to investigate the potential for using *Citrullus lanatus* and *Prunus persica* syrup as a natural contrast agent is replaced by CT scan. This study is an experimental study. According to previous studies in which plants of three elements magnesium, iron and copper have a higher frequency of a contrast agent in CT closer to the ideal Accordingly, this study evaluated the *Citrullus lanatus* and *Prunus persica* syrup. *Citrullus lanatus* and *Prunus persica* syrup after preparing it in a plastic container and then put the walls of the transparent imaging by CT scan was performed. Distilled water as a negative control and a undiluted contrast agent as positive control *Citrullus lanatus* and *Prunus persica* syrup in plastic containers that are transparent walls were inserted. After image acquisition for any of the following results were obtained *Citrullus lanatus* syrup (28 Hounsfield), *Prunus persica* syrup (39 Hounsfield), distilled water (0 Hounsfield) and undiluted contrast agent (Hounsfield 4000). Based on the results obtained in this experiment were determined that the *Prunus persica* syrup than *Citrullus lanatus* syrup required to show a contrast, such as iron, copper and magnesium has, Therefore it is recommended to evaluate more precisely, the plant should be complementary studied.

LABORATORY EVALUATION (IN VITRO) ORAL CONTRAST MATERIAL FOR CT SCAN GASTROINTESTINAL TRACT USING *MALUS DOMESTICA* SYRUP, *SOLANUM LYCOPERSICUM* SYRUP IN VITRO EVALUATION OF *MALUS DOMESTICA*, *SOLANUM LYCOPERSICUM* AS A CONTRAST FOR CT-SCAN

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CT, or computed tomography, is one of the most advanced methods of medical imaging. After plain radiography, CT scans help the most lesions in the motor system of the human body, especially the bones. The use of CT integral component in the diagnosis and treatment of many diseases is even. In most cases, CT with contrast material injected into the diagnostic value occurs. The digestive system of oral contrast is used to show the path that led to the inner lumen of the gastrointestinal tract and lesions can be differentiated from the lumen. Contrast material used in CT scan, barium sulfate, which is a lot of side effects, including constipation, bowel obstruction, appendicitis, etc. Gives. The purpose of this study was to investigate the potential for *using Malus domestica* and *Solanum lycopersicum* syrup as a natural contrast agent is replaced by CT scan. This study is an experimental study. According to previous studies in which plants of three elements magnesium, iron and copper have a higher frequency of a contrast agent in CT closer to the ideal Accordingly, this study evaluated the *Malus domestica* and *Solanum lycopersicum* syrup. *Malus domestica* and *Solanum lycopersicum* syrup after preparing it in a plastic container and then put the walls of the transparent imaging by CT scan was performed. Distilled water as a negative control and a undiluted contrast agent as positive control *Malus domestica* and *Solanum lycopersicum* syrup in plastic containers that are transparent walls were inserted. After image acquisition for any of the following results were obtained: *Malus domestica* syrup (45 Hounsfield), *Solanum lycopersicum* syrup (-39 Hounsfield), distilled water (0 Hounsfield) and undiluted contrast agent (Hounsfield 4000). Based on the results obtained in this experiment were determined that the *Malus domestica* syrup than *Solanum lycopersicum* syrup required to show a contrast, such as iron, copper and magnesium has, Therefore it is recommended to evaluate more precisely, the plant should be complementary studied.

INVESTIGATION SAIKOSAPONIN (IN AERIAL PARTS) AND SAIKOGENIN (IN ROOT) OF *BUPLEURUM LANCIFOLIUM* (HORNEM)

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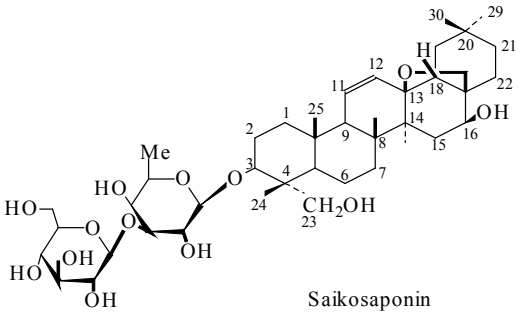
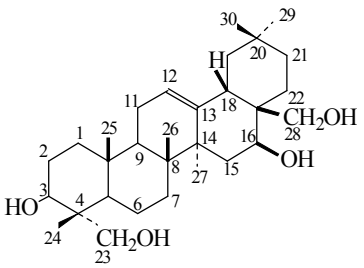
'Si Ho' is one of the Chinese crude drugs used mainly to cure inflammation, fever, cough, hepatitis, jaundice. Although the botanical origin of the crude drug has been considered to be *Bupleurum*, there has been no pharmacognostical study. To clarify the botanical origin of 'Si Ho', the morphological and anatomical characteristics of roots of Bupleurum species growing in Korea Republic, such as *B. euphorbioides*, *B. falcatum*, *B. leveillei*, *B. longiradiatum* and *B. scorzoneraefolium* [*B. scorzonerifolium*], were studied. As a result, it was determined that 'Si Ho' is made from roots of *B. falcatum* and *B. scorzoneraefolium*, and that 'Jug Si Ho' comprises roots of *B. longiradiatum.* The methanolic extract from flowering, aerial parts and root of *Bupleurum lancifolium*.(Hornem) (found in Tehran, Iran), was studied by ^{1}H-NMR and ^{13}C-NMR**,** Saikosaponin (in aerial parts) and Saikogenin (in root) was established.



Saikosaponin



Saikogenin

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A STUDY OF LARVICIDE EFFECTS OF *EUCALYPTUS CAMALDULENSIS* DEHNH (MYRTACEAE) AND *ARTEMISIA AUCHERI* BOISS (ASTERACEAE)ESSENTIAL OIL ON *ECTOMYELOIS CERATONIAE* ZELLER (LEP: PYRALIDAE)

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Pomegranate Fruit Moth (PFM) (*E. ceratoniae*) is the most important pest in pomegranate producing countries. In this study, the fumigant toxicity effect of *E. camaldulensis* and *A. aucheri* essential oils were tested on adult instar *E. ceratoniaelarvae*. Fumigant toxicity was carried out at 27 ±2 C° and 60 ± 5% R. H., under 16:8C condition with a completely randomized design. For each essential oil, 5 doses (control, 17.4, 34.8, 69. 6, 104.3 (µl/cm3) were tested in 4 replications. Results showed that an increase in essential oil dose increased the toxic effects on larvae in both plants. In Eucalyptus essential oil, there was a significant difference among all doses in %5 level. In *A. aucheri* there was no significant difference between (69. 6, 34.8, 17.4 µl/cm^3) doses. In comparison to a similar dose of Artemisia essential oil with 3.75 averages, a 104.3 (µl/cm^3) dose of eucalyptus essential oil with 9.25 averages was more effective on 21days larvae. It was found that *E. camaldulensis* essential oil can be used as either a safe pesticide or a model for controlling this pest [1, 2].

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LARVICIDE EFFECTS OF *ZATARIA MULTIFLORA* BOISS AND *ROSMARINUS OFFICINALIS* ESSENCIAL OILS ON *ECTOMYELOIS CERATONIA* ZELLER (LEP: PYRALIDAE)

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Applications of essential oil as a safe and effective means for pest control have attracted a lot of attention. In this research the larvicide effects of *Z. multiflora* and *R. officinalis* were tested in the form of a completely randomized design with five treatments (Control, 17.4, 34.8, 69.6, 104.3µl/cm³) and four replications on 21 days *E. ceratoniae* larvae under 27±2 Cº, 60±5 R. H. and 16:8 C condition. For fumigant effects, 115 ml cylindrical utensils were used. Results showed that for both essentials oils, the 104.3 (µl/cm³) doses had the highest mortality. In *R. officinalis* plant there were no significant difference between doses (17.4, 34.8and 69.6µl/cm³) in the %5 level, but the 104.3 dose had a significant difference in comparison to the other doses. In *Z. multiflorae* there were no significant difference in %5 level between doses (17.4, 34.8, and 69.6µl/cm³), but there is a significant difference between these doses and the control treatment. With average 3.5 in comparison to1.5 for *R. officinalis, Z. multiflorae* plant has a higher larvicide effect.

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PEPPERMINT (*MENTHA PIPERITA* L.) ESSENTIAL OIL AND WATER EXTRACT AS A NATURAL HERBICIDE

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Recently weed scientists are more interested in weed management by application of allelopathy [1], which could lead to the discovery of natural herbicides that act directly on the weeds and do not cause environmental damage [2]. In the present study, different concentrations (300, 600, 900, 1200, 1500 and 1800 μlL^{-1}) of essential oil of aerial parts and (2, 4, 6, 8 and 10%) of water extract of (*Mentha piperita*) were investigated on seed germination and seedling growth of *Echinochloa colonum* and *Raphanus sativus* L. *in vitro*. For this purpose, a experiment based on a completely randomized design (CRD) with three replications was arranged. The essential oil was extracted by hydrodistillation and its components were determined by using GC and GC-MS. The main oil components were menthol (35%), mentone (17.48%), menthofuran (11.66%) and methyl-acetate (3.8%). Results showed that different concentrations of essential oil and water extract had a significant effect *($P \leq 0.05$)* on seed germination, stem and root length as well as, fresh and dry weight of both weeds. By increasing the concentration of the essential oil and water extract, all studied traits of the weeds were decreased when compared with the control. In conclusion, the present components in essential oil and water extract of peppermint had remarkable inhibitory effects on the studied plants and could be considered as a natural herbicide for future weed control programs. However, further studies are still required to investigate the application of those natural substances for weed management in sustainable agriculture [1].

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DETERMINATION OF THE SECONDARY METABOLITES OF SOME *ECHIUM* L. SPECIES

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Intense light and low temperature conditions are favorable for the production of Anthocyanins as is (Beckwith et al., 2004). Anthocyanins wide range of biological activities such as free radicals (Tsuda et al., 1994). Tannins have different properties, such as albumin and producing precipitation protective layer is to prevent infection. Tannins general secondary products survivor metabolic cycle plants have anti- bacterial and are considered to be (Amydbygy, 1386). Tannins in many plant species are abundant found. Tannins be they are leaves, bark and fruits are plants which protects them against plant pathogens and contempt come (Vermerris, 2006). Materials and Methods: The extractable phenolic compounds (TEPH) 1/0 ml of sample extract in a test tube Estonia (3 times) was poured , and a 9 / 0 ml distilled water , 5 / 0 Shykaltv ml of Folin reagent (Folin Ciocalteu) 1M (one molar) and 5/2 ml was added 20% sodium Lytrkrbnat . The solution is shaken and the temperature is maintained for 35 minutes to. Extraction of tannins (TET) 2 ml of sample extract to a test tube containing 100 mg Estonia polyvinyl Pyrvlydvn poly (PVP) was added to the above mixture was centrifuged at 3000 rpm for 5 min. With this method, the total phenolic compounds were determined no tannin size. Results and Discussion: The highest total phenol content of E. amoenum mg/g38 value and the lowest total phenol species, E. russicum value mg / g 26, respectively. Most of the species *Borago officinalis* tannins total value mg / g 1/8 and the lowest total tannin content in the species *E. italicum* value mg/g 9/3, respectively. The highest amount of anthocyanins in the anthocyanin species *E. russicum* value mg / g 65 and the least amount of anthocyanin was mg/g41 amount of *Borago officinalis*.

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EVALUATION OF RELATIONS GENUS *ECHIUM* L. BASED ON PHYSIOLOGICAL CHARACTERISTICS

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Boraginaceae is a large Family is of true dicotyledonous plants. It has 100 genera and 1600 species in the world with Eurasian origin distribution. The purpose of this study is the assessing of four related species in the genus *Echium* L. Based on physiological characteristics and fatty acids in the seeds of this plant. For this purpose, three species *Echium russicum*, *E. italicum*, *E. amoenum* to be arguably within the species *Borago officinalis* selected. Seed collected from different locations , all within a developed area with similar ecological conditions and physiological parameters such as the amount of tannins, polyphenols, anthocyanins, total protein, seed fatty acids and activities of antioxidant enzymes catalase and superoxide dismutase were measured. Results of fatty acids analyzed by NTSYS software and the relationship between species was determined based on the characteristics. The results of the cluster analysis showed that the species *E. italicum* is most similar to the species *E. russicum* as a group of species and *E. amoenum* in a separate group of *Borago officinalis* least familiar with the characteristics of a distinct group. These data with the results of the morphological data *Borago officinali* species in a single genus of four species of the genus *Echium* L. Puts correspond.

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THE ESSENTIAL OIL OF *SALVIA MULTICAULIS* VAHL. GROWING WILD IN PAVEH DISTRICT (IRAN)

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The genus Salvia, belong to the Lamiaceae family, consist of about 700 to 900 species throughout the world. In Iran, about 58 species are present, of which some are endemic. Plants belonging to this genus are pharmacologically active and have been used in folk medicine all around the world. The aim of the present study was to detect the essential oils composition of *Salvia multicaulis* Vahl. collected from Paveh, Kermanshah province. Plant samples were dried in shade condition and the essential oil of the plant obtained by hydrodistillation by Clevenger type apparatus was analyzed by GC/MS. Yield of essential oil was (1.5 % v/w). The results of essential oil analysis showed that among all determined compounds: bornyl acetate (19.46%), borneol (18.53%), camphor (15.21%), β-caryophyllene (5.89%), camphene (5.52%), α-pinene (5.29%), 1,8 Cineol (2.44%) were the main compounds with the greatest content.

THE EFFECT OF DIFFERENT ECOTYPES AND CULTIVATION METHODS AND CORM SIZES TO SAFFRON YIELD IN TABRIZ

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Saffron is a perennial crop well adapted to arid and semi-arid lands which produce stigmas annually. It is also adaptable to temperate and sub-tropical climates, and can be grown on soils varying from sandy to well-drained clay loams. It blooms in autumn and spends a long period of dormancy (aestivation) in the summer. It is said to be native to the Mediterranean environment that is characterized by cool to cold winters, with autumn–winter– spring rainfall, and warm dry summers with very little rainfall. In order to correlate corm size and different ecotypes of corms to gain the best choice for Tabriz climate, this experiment was conducted in "Khalatpooshan", Research Station of Agricultural Faculty of University of Tabriz. We used two ecoptypes: Kashamr and Marand, and different sizes: 4, 5, 6, 7 gram corms. In addition, we compared two type of saffron cultivation: Linear and clumped. Our results showed that we had the best flowering in 6-7 gr corms. Linear method of cultivation is better than clumped method. It can be because of soil texture (sandy loam).

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INHIBITORY EFFECT OF ESHANOLIC EXTRACT OF CYPERUS ON ACETYLCHOLINEESTERASE ENZYME

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Dementia is a progressive reduction in perceptional abilities which some mental disease or damages cause it. There are various types of dementia but Alzheimer's disease is the most prevalent Dementia disorders. Reduction in memory, unusual behavior, expotion decrease and change in character have been seen in this disease. There are not any definite methods to treatment this disease but there are some ways to decrease the sings and control of disorders. In this way antioxidant agents, acetylcholinestrase inhibitors and nonsteroidal untiboil drugs such as physostigmin could be used. The most important effect of Alzhimer disease is reduction in memory. In traditional medicine of Iran *cyperus rotundus* extract is used to improve Alzheimer disease and in this research comparison between inhibitory effects of this extract and physostigmin in to acetylcholineeterase was investigated. We realized that *cyperus rotundus* extract could improve Alzhimer disease signs and this positive effect is achieved via uncompetitive inhibition but physostigmin inhibits acetylcholineesterase via uncompetitive inhibition. *Cyperus rotundus* extract in the best condition has been showed 85.2% inhibition and it is very high present of inhibition and is nearly equal with the highest level inhibition of physostigmin. But in this way the concentration of used *cyperus rotundns* is different from physostigmin and it is 40 fold more than physostigmin. This inhibitory effect of physostigmin is 40 fold more than *cyperus rotundus*. However, *cyperus rotundus* has not bad effect of chemical drugs.

CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF *AJANIA SEMNANENSIS* ESSENTIAL OIL IN TWO GROWING STAGES

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The essential oils from aerial parts of *Ajania semnanensis* in two growing stages were isolated and examined for their potential antimicrobial activity for the first time. The oils were obtained by hydrodistillation and analyzed by GC-FID and GC-MS. A total of 23 and 16 compounds comprising 96.5 % and 92.0 % of the essential oil were identified in the vegetative and flowering stages, respectively. The essential oils with the major compounds of 1,8-cineole (32.5 %, 27.4 %), bornyl acetate (19.1 %, 15.0 %), camphor (18.9 %, 12.2 %), lavandulyl acetate (7.4 %, 10.0 %) and terpinen-4-ol (5.4 %, 10.8%) were qualitatively similar. According to the analyses, the predominant of the oils in two stages was oxygenated monoterpenes. The oils with the minimum inhibition concentration (MIC) of 1-2 mg/mL showed a better activity against fungus rather than the assessed bacteria [1].

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CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *TEUCRIUM OLIVERIANUM* (LAMIACEAE) FROM IRAN

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The genus *Teucrium* L. belongs to the mint family (Lamiaceae) and is represented in Iran by 12 species. In traditional medicine various species of the genus *Teucrium* are used as anti-jaundice, anti-liver disorders, anti-flatulence, anti-dyspepsia, antipyretic, antinociceptive, anti-rheumatic, hypoglycemic and tonic. *Teucrium oliverianum* is one of the endemic species which grows in southwestern of Iran in Khuzistan and Bousher provinces. Arial flowering parts of plant were collected from Ab-Pakhsh (Borazjan, Bousher Province) on April 2013. The essential oil were isolated by hydrodistillation and analyzed by GC and GC-MS. The essential oil content was 0.25% (w/w) based on the dry weight of plant. In total, 32 compounds accounting for 91.2 % of total oil were identified and quantified. α-Cubebene (29.3%), (*E*)-Phytol acetate (16.5%) and β-cubebene (15.5%) were found to be the major compounds in the essential oil.

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PHYTOCHEMICAL ANALYSIS OF *SALVIA MULTICAULIS*

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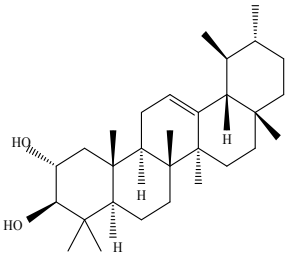
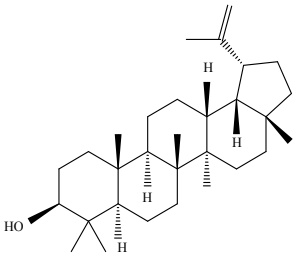
Salvia multicaulis is a native species which grows in the regions of northwestern, west and center of Iran. In order to study the potential bioactive secondary metabolites of *S. multicaulis*, the acetone extract of its aerial parts was investigated. The extract was subjected to purification by different chromatographic methods. Finally, one abietane diterpenoid (salviol) and five triterpenoids including an ursane-type triterpenoid (ursolic acid), a lupane-type triterpenoid (lupeol), two steroidal compounds i.e. *β*-sitosterol and daucosterol and one amyrin-type triterpenoid (2-α-hydroxy amyrin) were identified. Their structural elucidation was accomplished by extensive spectroscopic methods including 1D (^{1}H, ^{13}C APT) and 2D NMR experiments (COSY, HSQC, HMBC, NOESY).



2-α-Hydroxy amyrin



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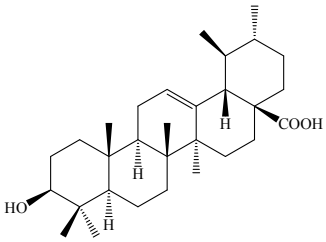

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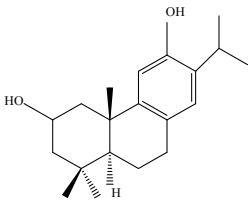
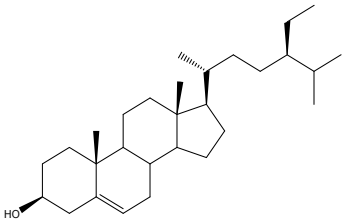
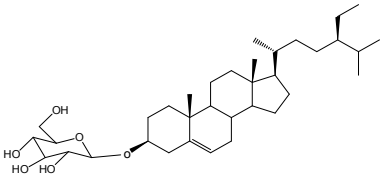


Salviol



***β*-Sitosterol**



Daucosterol

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MICROPOROPAGATION OF *CATHARANTHUS ROSEUS* OF – AN IMPORTANT MEDICINAL PLANT

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Micropropagation has the potential to provide very high multiplication rates of selected tree genotypes, with resulting short-term silvicultural gains. Aseptic cultures have been established from seeds, seedlings, shoots, flowers and lignotubers. Experiments were carried out aiming to develop techniques for in vitro propagation of *Catharanthus roseus* medicinal plants. Multiplication was done from shoots witch were placed in MS (MURASHIGE & SKOOG, 1962) medium, supplemented with various auxins and cytokinins individually and in various combinations. MS medium fortified with 1.0 mg/l BAP was found to be effective individually. The medium with 3.0 mg/l BAP + 1.0 mg/l IAA responded better as compared to other combinations. The *in vitro* raised shoots were excised and implanted on MS half strength medium fortified with NAA and IBA (0.5-3.0 mg/l) in an attempt to produce roots. The half strength medium supplemented with IBA (0.5-3.0 mg/l) developed roots after 15 days of implantation. The maximum frequency of roots obtained on 1.0 mg/l of IBA fortified medium. Most of the roots were long and healthy. The regenerated plantlets were successfully transferred to pots containing sterilized soil and sand mixture (3:1) and acclimatized with 70% survival rate in the field conditions.

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ENCAPSULATED SOMATIC EMBRYOS FOR OBTAINING ARTIFICIAL SEEDS OF ORNAMENTAL PLANTS

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The technology provides methods for preparation of seed analogues called synthetic seeds or artificial seeds from the micropropagules like somatic embryos. The rapid improvement in somatic embryogenesis methods allow the use of somatic embryos in plant micropropagation as synthetic seeds. Synthetic seed technology is today an important tool, available to breeders and scientists, for the *in vitro* propagation and conservation of ornamental plants. Encapsulated in different artificial endosperms in order to generate a cover that fulfills the function of nourishment and protection of the embryos, facilitating their later germination. The content of sodium alginate varied by 4%, 3%, and 2%, as did the immersion time in calcium chloride (CaCl2), which acts as complexing agent. The artificial endosperm components of the Murashige and Skoog medium (MS) were added, supplemented with 0.5 mg L^{-1} indolacetic acid (IAA), 0.5 mg L^{-1} naphthaleneacetic acid (NAA), 2 mg L^{-1} 6-benzylaminopurine (BAP) and 30 g L^{-1} sucrose. The germinative behaviors of encapsulated somatic and zygotic embryos were evaluated after 4 week. Comparing the percentages of germination reached by encapsulated somatic and zygotic embryos it was observed that they had similar germinative behavior according to the type of encapsulation applied. However, zygotic embryos substantially exceeded the germination levels reached by somatic embryos, 100% vs. 45% respectively.

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INVESTIGATING THE COMPOUNDS OF *TRIBULUS TERRESTRIS* AND *TANACETUM PARTHENIUM* ESSENTIAL OIL EXTRACTED WITH SESAME OIL

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Use of medicinal plants and natural products as medicine in pharmaceutical sciences is increasing every day. This is mostly because of the people's interest in natural and organic products, particularly in medicine. In Iranian traditional medicine, extracting the ingredients from plants by using sesame oil was widely used. In this study, the oily extraction of *Tribulus terrestris* and *Tanacetum parthenium* which was mentioned in ancient texts was investigated. Enfleurage was used to identify the exact extraction components. More specifically, plants used in this study were initially prepared and their components were extracted by using enfleurage method with sesame oil (the traditional method). The second stage of extraction was performed by using absolute alcohol at low temperatures. The final extract was then purified in several stages and eventually injected into the GC/MS. Finally, the extraction components were identified from detailed interpretation of mass spectra and were matched with MASS Device Library. It was found that the major ingredients that have been detected in this oily extractions of *Tanacetum parthenium* were: Vaccenic acid, α-pinene, α-bisabolol oxide, α-Farnesene, Stigmastan-3,5-diene, β-Sitosrerol, γ-Tocopherol, Stigmasta-5, 22-dien-3-ol, and Ergost-5-en-3-ol. In the case of *Tribulus terrestris*, the major identified ingredients were: Eucalyptol, 2,3-Methylenedioxyphenol, Vaccenic acid, γ-Tocopherol, β-Sitosrerol, sesamin, campesterol, stigmasterol. In both aforementioned plants there were lots of fatty acids and their esters and sterol materials. Compounds with pharmacological effects were detected in oily extractions (enfleurage method). However, the number of extracted components identified in this study was lower than expected and this indicates that the active components of the plant cannot be effectively detected by using Enfleurage method with sesame oil. In addition, final extract was containing some of the component of the extractor oil. More accurate separation methods can extract more active components from the plants.

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ANGELICIN, HERATOMIN AND 6-ISOPENTENYLOXYISOBERGAPTEN FROM HEXANE EXTRACT OF *HERACLEUM PERSICUM*

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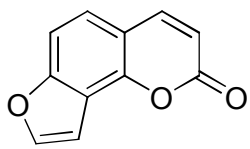
Heracleum persicum L. is one of the most important species from *Heracleum* genus belonging to the family of Umbelliferae [1]. This aromatic plant used as a flavoring ingredient in many Iranian food products. It is proposed to reduce swelling, aid digestion and is used as tonic and aphrodisiac [2]. In this study we investigated chemical composition of *n*-Hexane extract of *H. persicum*. The extract was fractionated by silica gel column chromatography (*n*-hexane/ethyl acetate). As a result, three phytochemicals have been isolated and purified. Three furanocoumarins i.e. angelicin **(1)**, heratomin **(2)** and 6-isopentenyloxyisobergapten **(3)** have been identified by using NMR spectroscopy.



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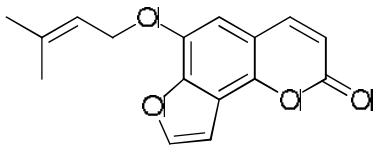

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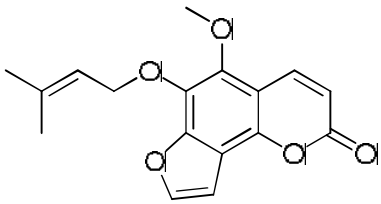

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THE EFFECT OF NATURAL COMPOUNDS (CHALCONE AND THYMOL) ON LIVER ENZYMES IN OBESE MICE

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Change of diet and limited physical activity, the prevalence of obesity is considered a serious threat to human health [1]. Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) are enzymes found mainly in the liver [2]. These enzymes are normally contained within liver cells with damaged liver cells, enzymes are released into the bloodstream. Elevated aminotransferase levels are commonly associated with compromised hepatic integrity from various insults [4]. Chalcones belong to the flavonoid family, which possess a number of interesting biological properties such as antioxidant, cytotoxic, anticancer, antimicrobial, antiulcer, antihistaminic and anti-inflammatory activities [3]. Thymol from thyme extract and has a phenolic structure. That has potent antioxidant properties [5]. The purpose of this study was to determine the effect of natural compounds such as thymol and Chalcone on serum ALT and AST levels in obese mice. This study was performed in NMRI male mice. Animals were randomly divided into two groups: a control group (receiving standard rodent diet) and experimental group for 8 weeks (receiving high-calorie diet group).The obese animals into three groups: sham, obese and experimental groups. In the experimental group of mice with compounds thymol and Chalcone (12mg/kg/day) were gavage for 8 weeks. The end of treatment, blood samples, to investigate serum levels of ALT and AST are performed. AST levels in group thymol, compared with the obese group showed a significant decrease ($p < 0.01$) in chalcone group ,AST levels decreased, but not significantly. In all treatment groups ,ALT levels decreased ($P < 0.05$). According to the results of this study , natural compounds such as thymol and chalcone can be used in the preparation of anti- obesity drugs.

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ANTIOXIDANT PROPERTIES AND REDUCING POWER OF*GLEDITSCHIA CASPICA* POD & FRUIT AND *CONVOLVULUS PERSICUS* ROOT & STEM

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Antioxidants are vital substances which possess the ability to protect the body from damage caused by free radical induced oxidative stress. There is an increasing interest in natural antioxidants, e.g. polyphenols, present in medicinal and dietary plants, which might help prevent oxidative damage [1, 2]. Genus Gleditschia comprises 14 species of deciduous trees. *Gleditschia caspica* Desf. (Caspian locust), a tree that grows up to12 m, is native to northern Iran (Mazandaran). Gleditschia species have been widely used in folk medicine, the mature pods and anomalous fruits are mainly used for treating apoplexy, headache, productive cough and asthma [3]. Convolvulus is a genus of about 200 to 250 species of flowering plants in the Convolvulaceae family, widely distributed in the Middle East. Convolvulus has purgative activity, also used in asthma, jaundice and as antihemorrhagic. *Convolvulus persicus* L. is one of the species of this genus that distributed in the Southern coasts of Caspian Sea [4]. The present study was conducted to analysis on antioxidant activity of methanolic extract of *G. caspica* fruits and pods & *C. persicus* roots and stems. Antioxidative activities measured by using 2,2 -diphenyl-1-picrylhydrazyl radical (DPPH), total antioxidant activity and reducing power assays [5]. The extracts exhibited total phenolic contents: 4.44± 0.03 mg GAE/g dried fruits and 6.48 ± 0.01mg GAE/g dried pods for *G. caspica* and 3.83 ± 0.01 mg GAE/g dry matter for root, 4.79 ± 0.004 mg GAE/g dried stem for *C. persicus*. The ability of the extracts in scavenging of DPPH radical (IC_{50}) were found for *G. caspica* pod and fruit extract respectively, 39.99 ± 0.001 µg/ml & 49.41± 0.04µg/ml and for *C. persicus* is 73 µg/ml for root and 24.09µg/ml for stem. In conclusion, the results obtained in the present study indicate that the *G.c* & *C.p* might be a potential source of natural antioxidants.

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PHYTOCHEMICAL SCREENING OF *CONVOLVULUS PERSICUS* LEAF AND *GLEDITSCHIA CASPICA* POD, LEAF & FRUIT

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Antioxidants such as phenols, flavonoids and natural tannins are increasingly attracting because they are natural disease preventing, health promoting and anti-ageing substances. Antioxidants may serve the task of reducing oxidative damage in humans induced by free radicals and reactive oxygen species under oxidative stress conditions. These conditions can cause DNA and protein damage, lipid peroxidation, cancer, ageing and inflammatory activity [1]. Convolvulus is a genus of about 250 species of flowering plants in the bindweed family Convolvulaceae, with a cosmopolitan distribution. This species occurs in many temperate and subtropical regions. Many Convolvulus species are known for their medicinal utilization and exhibit interesting biological properties such as purgative, CNS and antidepressant, antioxidant, hypoglycemic antinociceptive, anticancer, antiulcerogenic and antidiarrhoeal activities [2]. *Gleditschia caspica* is an endemic tree species found in the endangered lowland Hyrcanian forests near the Caspian Sea in southeastern Azerbaijan and northwestern Iran. The thorns of *Gleditsia sinensis* Lam. are used in China for treatment of carbuncle, scabies and skin disease. Dried fruits have long been known in oriental medicine as a diuretic and expectorant [3]. Phenols, flavonoids, tannin and terpenoids in leaf of *C. persicus* and pod, fruits methanolic extract of *G. caspica* were detected qualitatively and quantitatively by common methods [4]. The extracts exhibited different amount of secondary metabolites. The results obtained in the present study indicate that the *C.p.* and *G.c.* might be potential sources of natural antioxidants.

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ANGELICIN, HERATOMIN AND 6-ISOPENTENYLOXYISOBERGAPTEN FROM HEXANE EXTRACT OF *HERACLEUM PERSICUM*

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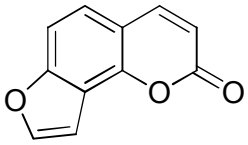
Heracleum persicum L. is one of the most important species from *Heracleum* genus belonging to the family of Umbelliferae [1]. This aromatic plant used as a flavoring ingredient in many Iranian food products. It is proposed to reduce swelling, aid digestion and is used as tonic and aphrodisiac [2]. In this study we investigated chemical composition of *n*-Hexane extract of *H. persicum*. The extract was fractionated by silica gel column chromatography (*n*-hexane/ethyl acetate). As a result, three phytochemicals have been isolated and purified. Three furanocoumarins i.e. angelicin **(1)**, heratomin **(2)** and 6-isopentenyloxyisobergapten (**3)** have been identified by using NMR spectroscopy.



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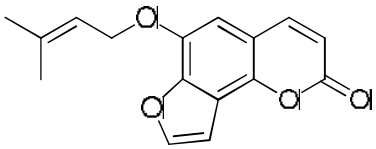

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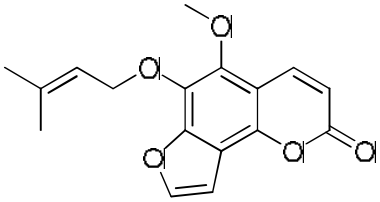

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BIOASSAY-GUIDED-FRACTIONATION OF *PIMPINELLA AFFINIS* ON THE BASES OF ANTIBACTERIAL ACTIVITY

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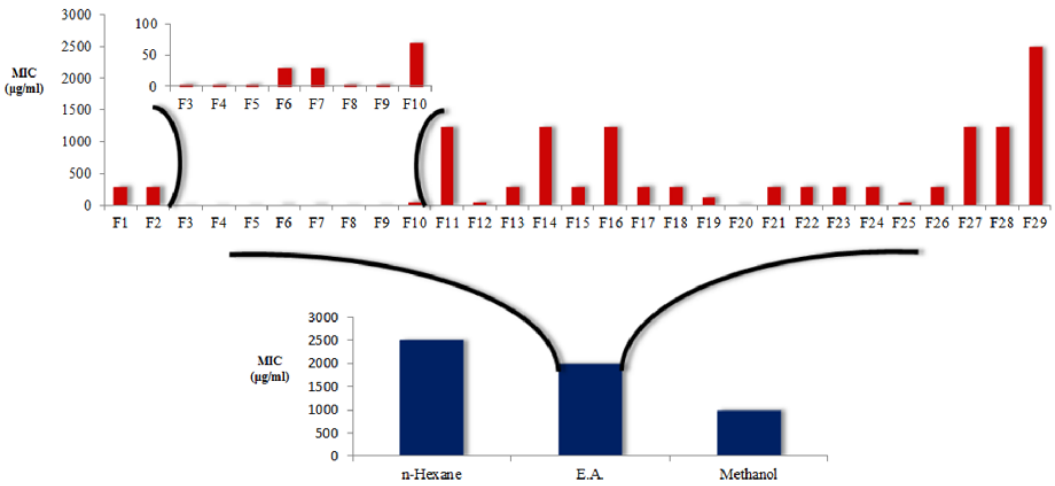
Pimpinella affinis is one of the species of *Pimpinella* genus belonging to the family of Apiaceae. This aromatic plant used as food flavoring in Northern regions in Iran [1]. In this work, antibacterial activities of *n*-hexane, ethyl acetate and methanolic extracts of aerial parts of *Pimpinella affinis* (against *Staphylococcus aureus* and *Escherichia coli*) have been investigated. At the second stage the ethyl acetate extract fractionated by silica gel column chromatography. Twenty nine fractions obtained and antibacterial activities of them were measured. Accordingly, fractions 3, 4, 5, 8, and 9 have best antibacterial activities (MIC against *S. aureus*: 5 µg/ml) when the MIC of control positive (chloramphenicol) was 1 µg/ml.



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TREATMENT OF BURN WOUNDS WITH TRAGACANTH HYDROCOLLOID DRESSING

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Burns are one of the most common and devastating forms of trauma. Animals with serious thermal injury require immediate specialized care in order to minimize morbidity and mortality. An intact animal skin surface is vital to the preservation of body fluid homeostasis, thermoregulation, and the host's protection against infection. Thermal injury creates a breach in the surface of the skin. Direct contact with flame or a source of heat conduction, convection, or radiation causes a degree of cellular damage to the skin that varies with the temperature and duration of exposure. As the temperature rises, increasing molecular collisions occur, resulting in altered molecular conformation and the disruption of intermolecular bonds. This process leads to cell membrane dysfunction as ion channels are disrupted, resulting in sodium and water intake. As the temperature rises further, protein denaturation occurs, oxygen radicals are liberated, and eventually cells die with the formation of the burn eschar. Astragalus is a large genus of about 3,000 species of herbs and small shrubs, belonging to the legume family Fabaceae and the subfamily Faboideae. Iran is the original source and one of the important places for diversity of Astragalus species. Alborz and Zagros heights are the most important places where the tragacantha grows in Iran. Tragacanth has been used as a demulcent in cough and cold preparations and to manage diarrhea. It also has been shown to moderate the blood sugar level, but this has not been demonstrated consistently. However, limited information is available. The aim of this work was to investigate the effects of Iranian tragacanth (*Astragalus gummifer*) hydrocolloid dressing at the treatment of burn wounds in the 4 calves compared with silver sulfadiazine 1% ointments. Four calves with burn wounds in the skin were examined in this study. Each calf received tragacanth (*Astragalus gummifer*) hydrocolloid dressing gel (THD) and silver sulfadiazine 1% ointment (SS) for treatment. The results indicate that wounds treatment with THD spends shorter periods of time (8.25 days) than SS (15 days). Contraction of wounds with THD is better than SS.

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ANTIFUNGAL ACTIVITY OF SAATAR IN CATTLE

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Skin fungal infections are common causes of skin infections and health problems in dairy herds. The use of medicinal plants as antifungal agents has a long history. Limitation in treatment of fungal disease include a few available anti-fungal drugs, side effects , drug resistance and decreased susceptibility to anti-fungal drugs , leads to search for anti-fungal agents as herbal veterinary medicines. *Zataria multiflora* Boiss with the Persian name of Avishan Shira is an aromatic tree that grows wild in southern and west regions of Iran. It is used in lung disorders and bronchodilator too. The aim of this study is to determine the effectiveness of Saatar *(Zataria multiflora*) distillate extracts in treating skin fungal infections and comparing it's effects with Mycoderm lotion. 20 cattle with confirmed of clinical sings of dermal fungal infections, were enrolled to the study. These cattle randomly divided in two groups which in one group treatment were started with Mycoderm lotion (M) and in the other with *Zataria multiflora* distillate extract (Z). Treatment continued for three weeks and then after follow up for 3 weeks the data was collected and the results were analysed through statistical software SPSS, version 11. The results of this study showed 60.4% improvement in M group and 56% in Z group respectively. Although statistical difference between two groups isn't meaningful; Saatar distillate extract was suggested for treatment of skin fungal disease in cattle because of it's suitable performance.

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TREATMENT OF WART BY FIG EXTRACT IN CATTLE

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Wart is a benign lesion which is caused by pappiloma virus in cutaneuos. The virus infects the top layer of skin, usually entering the body in an area of broken skin. The virus causes the top layer of skin to grow rapidly, forming a wart. Warts can grow anywhere on the body and cause of hemorrhage sometimes. Some warts cause of dangerous in vital organs such as neck and jugular grooves. Skin warts are common in dairy herds. Today, a lotion contained from salicylic acid, lactic acid and clodin is used as conventional treatment in humans which shows improve only in 67% of patients . Limitation in treatment of warts in animals include a few available drugs, side effects, prolonged time of treatment, ineffective drugs and decreased susceptibility of warts to drugs , leads to search for other agents as herbal veterinary medicines. The fig (*Ficus carica*) is a species of flowering plant in the genus *Ficus*, from the family Moraceae, known as the common fig . Native to the Middle East and western Asia, it has been sought out and cultivated by man since ancient times, and is now widely grown throughout the temperate world, both for its fruit and as an ornamental plant. The aim of this study is to determine the effectiveness of *Ficus carica* leaves extract in treating skin warts and comparing it's effects with traditional treatment. 7 cattle with clinical sings of warts in different points of body were enrolled to the study. Each cattle received *Ficus carica* (FC) extract and salicylic acid lotion (SA) for treatment. Treatment continued for 15 days and then after follow up for 15 days the data was collected and the results were analyzed through statistical software SPSS, version 11. The results of this study showed 53.2% improvement in treatment by FC and 37.3% in SA respectively. According to the results of this study, Fig leaves extract was suggested for treatment of skin warts in cattle because of it's suitable performance.

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SURVEY OF RESPIRATORY EFFECTS OF DAMASK ROSE IN LAMBS

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Damask rose (Rosa damascene) is one of the most important species of Rosaceae family. Rosaceae are well- known ornamental plants and have been referred to as the king of flowers The *R. damascena* has been used for medicinal purposes. The most therapeutic effects of *R. damascena* in ancient medicine are including treatment of abdominal and chest pain, strengthening the heart, treatment of menstrual bleeding and digestive problems. Other pharmacological properties of *R. damascene* are including: hypnotic, analgesic, anticonvulsant, antibacterial, and antioxidant activities. In the outset of study, the fresh petals of R. damascene were washed, chopped into tiny fragments and sun dried. The dried petals were ground into powder with pestle and mortar. The aim of this study is to determine the effectiveness of R. damascene distillate extracts in treating respiratory disorders. 12 lambs with confirmed of clinical sings of respiratory problems, were enrolled to the study. These lambs randomly divided in two groups which in one group treatment were started with intramuscularly Oxytetracycline 5% (Oxy) and in the other group with R. damascene distillate extract orally and Oxytetracycline 5% intramuscularly (R). Treatment continued for 5 days and then after follow up for 5 days the data was collected and the results were analyzed through statistical software SPSS, version 11. The results of this study showed better recovery for R group. Although statistical differences between two groups isn't meaningful; because of it's suitable performance, R. damascene distillate extract was suggested for treatment of respiratory disease in sheep with other common treatments.

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PHYTOCHEMICAL STUDY OF THE HEXANE EXTRACT OF *GRAMMOSCIADIUM PLATYCARPUM* FROM IRAN

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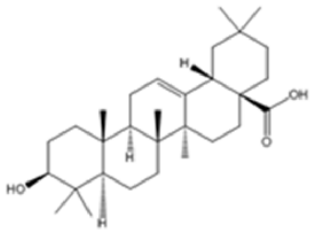
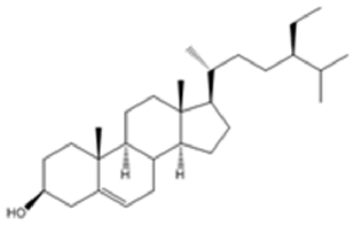
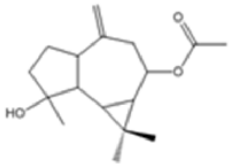
Grammosciadium platycarpum is one of the three endemic species of *Grammosciadium* genus (Apiaceae) in Iran, that grows in the western areas of Iran. This genus is represented in the Iranian flora by 8 species [1]. *G. platycarpum*used in Iranian folk medicine as anti-vitiligo and other skin disease. In this paper, the phytochemical analysis of *n*-hexane extract of *G. platycarpum* is reported. Thus 2 kg of the dried aerial parts of the plant was grind and subjected to extraction by *n*- hexane. 104 gr crude extract was obtained and the constituents were isolated and purified by different chromatographic methods. Our studies led to the isolation of a new sesquiterpene (I), β-sitostrol, oleanolic acid and 1-heneicosyl formate, which their structures were elucidated by means of 1D&2D NMR spectroscopic methods.



Oleanolic acid



β-Sitostrol



(I)

$CH_3(CH_2)_nCH_2OCHO$
n=19

1-Heneicosyl formate

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ISOLATION OF A NEW NOR-DITERPENE FROM *SALVIA SAHENDICA* AND DETERMINATION OF ITS ABSOLUTE CONFIGURATION

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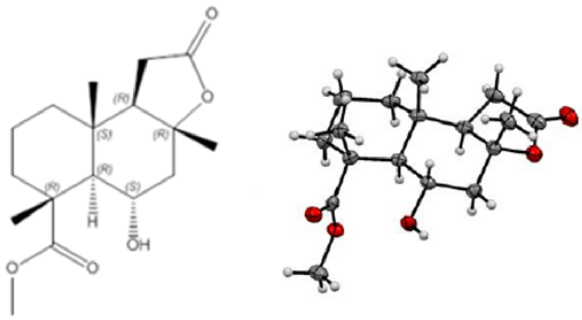
Salvia sahendica is one of the 17 Iranian endemic *salvia* species that grows in northern hilly areas of Azerbaijan province. *Salvia sahendica* has been used in Iranian folk medicine as an antibacterial, antifungal and anti-dyspepsia plant [1, 2]. In this investigation, a new nor-diterpene (**I**) was isolated from *n*-hexane extract of aerial parts of *Salvia sahendica* by using different chromatographic methods. Structure elucidation was carried out by analysis of spectroscopic data including 1D and 2D NMR. The absolute configuration was determined by using single crystal X-ray diffraction and also by comparison of experimental VCD with calculated VCD data, using density functional theory (DFT) calculations [3].



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TREATMENT OF BONE INFECTION IN WILD BIRDS BY *ZATARIA MULTIFLORA* HERBA

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Osteomyelitis is inflammation of the bone caused by infection with bacterial or fungal organisms. Bone infections are a significant cause of morbidity in injured wild birds. Saatar (*Zataria multiflora*) is from lamiaceae family. In Iran, *Zataria multiflora* is used in traditional for carminative property. In this study, we investigated of saatar for bone infection treatment of wild birds compared to tetracycline ointment. Nine wild birds including 5 eagles *(Aquila chrysaetos*), 3 falcons (*Falco pelegrinoides*) and 1 long legged buzzard (*Bueto rufinus*) were examined in this study in three groups of treatment. In group 1 the injured area were irrigated by surgical povidone iodine solution and normal saline daily for one week. In group two, irrigation was done and saatar extracts used in infected wounds daily for one week. In group 3 only tetracycline ointment was used on the wouds for one week. Statistical analysis was performed using one-way analysis of variance (ANOVA). Statistical analyses were performed using SPSS Version 11.5 for Windows (Micro Master Inc., Richboro, PA, USA). The results of this study showed that group 2 was treated better than two other groups significantly in limited time. After one week, purulent discharge was dissolved and no odor was smelled in traumatized area in group 2. In group 3, one bird died from infection spread in the wound. Another bird was wormed in the wound site. In group 1, all birds were not treated in one week period. The results of this study, appears that Zataria *multiflora* has to antiseptic effect, and it is a good candidate for osteomyelitis treatment in birds.

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EVALUATION OF ANTIOXIDANT AND CYTOTOXIC ACTIVITIES OF THE BROWN SEAWEED *PADINAAUSTRALIS*

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Antioxidant and cytotoxic activity of brown algae [1-3], due to active ingredients such ascarotenoids (fucoxanthin) [4], polysaccharides (Fucoidan, Fucans, Laminarin) [5, 6] and has been proven. Therefore, in this study, antioxidant and cytotoxic effects of brown algae *Padina australis* was evaluated. In this study *P. australis* was collected from oman sea in 1388, and were identified in Traditional Medicine and Materia Medica Research Center of Shahid Beheshti University of Medical Sciences .The total extract of algae was prepared with maceration method using methanol 80%.(7,8).The extract was evaluated for antioxidant activity through DPPH and determined by IC50 value.(9) Cytotoxic properties were evaluated by use of MTT assay on four cancer cell lines for example HT-29, MCF-7, A-549, HepG-2 and normal cell line(MDBK).The cells were grown in 96-well plates and after 24 hour incubation were affected by Extract (with a maximum concentration in 100µg/ml) .The survival rate of cells after 48 hour of incubation by reduction of MTT to formazan was measured. And absorbance at 570 nm wavelength was measured by ELISA reader (10). The results revealed that *Padinaaustralis* with the IC50 value of 163.9 µg/mL was capable of scavenging DPPH free radicals. Evaluation of cytotoxic effects of extract on the cell lines studied, Neither of the total extract showed cytotoxic activity to the maximum amount examined (100 µg/mL). Due to the absence of cytotoxic effects of algae *P. australis*, especially on normal cell line MDBK the algae as a potential source of antioxidants can be used without any toxic effects on normal cells.(11)

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INTRODUCTION OF MEDICINAL PLANTS OF BESHARAT AREA LOCATED IN NORTH OF ZANGELANLO WATERSHED (RAZAVI KHORASAN PROVINCE)

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Besharat area with 2000 hectars is located 21 Km South east of Daregaz city in Razavi Khorassan Province and in north of Zangelanlo watershed. Based on Amberge method, climatologically, the area belong to a cold and dry zone with an average of annual precipitation of 272 mm rainfall. This investigation was done for collection and plants identify and determination of medicinal plants of Besharat area. Based on the taxonomic studies performed in the area a total of 283 species (from which two were gymnosperms and the rest angiosperms) belonging to 201 genera and 44 families were identified. By regard to source, aware and informed persons medicinal plants of Besharat area were identified. that the most medicinal species were in Compositae and Labiatae families. The life forms of the declared medicinal plants were determined based on the Raunkiaer method. The flora of area belonged to Irano – Turanian region [1-4].

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COMPARATIVE STUDY ON SIX PERSIAN WALNUT (*JUGLANS REGIA* L.) GENOTYPES AND EASTERN BLACK WALNUT (*JUGLANS NIGRA* L.) WITH RESPECT TO PHENOLIC COMPOUNDS AND ANTIOXIDANT CAPACITY OF LEAF AND FRUIT

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Walnuts have important amounts of phenolic compounds in leaves and different parts of fruits and this makes them as one of the most useful nuts and pharmaceutical plants. The objective of this work was to analyze phenolic compounds and antiradical capacity of leaves and fruits among six genotypes of Persian walnut (*Juglans regia* L.) (H1/1, H1/7, H2/1, H2/12, T15, KD2) and Eastern black walnut (*Juglans nigra* L.) after harvesting time. Therefore, total phenol, flavonoid and tannin contents were determined spectrophotometric. Methanolic extracts antioxidant activity were evaluated using the reducing power assay and by the ability of the extracts to scavenge the DPPH (2, 2-diphenyl-1-picrylhydrazyl) radical. Significant differences were found between different genotypes in phenolic content and radical scavenging capacity of leaves and fruits. Among the six genotypes of Persian walnut, H1/1 showed the highest level of total phenol, total flavonoid and total tannin in both leaves and fruits. Comparison between them and black walnut revealed that in spite of the relative similarity between them in total tannin and flavonoid of fruits, total phenol and antioxidant activity in black walnut fruits were significantly lower. IC50 of leaves in black walnuts had the lowest level and it means that their leaves had significantly higher antioxidant activity than six Persian walnut genotypes. These results confirmed that walnut genotypes have different phenolic compounds and phenolic compounds have different radical scavenging power [1]. However, numerous studies have been focused on the obtaining of antioxidants from natural sources. Researches have been promoted by the need to find natural substitutes for the synthetic antioxidants, suspected to be potentially toxic [2]. Present research showed that in spite of low antioxidant capacity of fruits or whole kernels of black walnuts, their leaves had higher antioxidant activity than Persian walnut genotypes. On the other hand, although fruits of *J. nigra* L. are edible but fruits of Persian walnut are more popular and the results showed they had more antioxidant capacity. Because of higher antioxidant capacity in leaves of *J. nigra* L. than *J. regia* L., cultivation of this species in different parts of Iran, is recommended.

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INVESTIGATION OF POLYPHENOLS IN ROOTS OF *POLYGONUM AFGHANICUM* PLANT

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The genus *polygonum* is well known for producing a large number of biologically important secondary metabolits such as coumarins, flavonoids, anthraquinones, sesquiterpenoids, stilbenoids [1]. The dried roots of this plant were traditionally used for treatment of atherosclerosis, cough, hypertension, cancer, skin burn, gallstone, hepatitis in East Asian countries [2, 3]. In this study, chloroform extracts of the roots of *Polygonum afghanicum*, which is an Iranian species and is found in northeastern and southeastern of Iran, was phytochemically examined. Therefore, the dried and finely ground roots were initially extracted by methanol in a soxhlet apparatus. Then, concentrated in vacuo, and successively extracted by n-Hexane, chloroform and ethyl acetate. Accordingly, the chloroform extract was investigated. Chromatographic analyses was performed by thin layer chromatography using chloroform: methanol in different polarity as the mobile phase. The resulting TLC spots were observed under $UV_{365\ nm}$ before and after spraying TLC reagents such as 5% $AlCl_3$ and 10% H_2SO_4. Tyupical compounds were flavonoids that showed yellow spots under UV_{365nm} without reagent, with AlCl3 reagent showed dark yellow and with H_2SO_4 and then heating showed yellow to brown.

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DEVELOPMENTAL CHANGES OF TOTAL PHENOL, FLAVONOID AND PHENOLIC ACIDS IN LEAF AND GREEN HUSK OF PERSIAN WALNUT (*JUGLANS REGIA* L.) AND EASTERN BLACK WALNUT (*JUGLANS NIGRA* L.)

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The genus *Juglans* which belongs to the family Juglandaceae, contains 20 species, all producing edible nuts. The fruit and timber of Persian walnut (*Juglans regia* L.) has been put to maximum use in dietary and industrial applications. *Juglans nigra* L. or black walnut is another important species of this genus that is valuable for its wood [1]. The health benefits of walnuts are usually attributed to their chemical composition including phenolic compounds. Walnut's green husk is a by-product of the walnut production, having scarce use. Thus, using husk as a source of phytochemicals will increase the value of the walnut production [2]. The objective of this work was to analyze the changes of total phenols, flavonoids and phenolic acids in leaves and green husks during period of growth with monthly intervals among two cultivars (Z63 and Chandler) of Persian walnut (*J. regia* L.) and one genotype of black walnut (*J. nigra* L.). Total phenol, flavonoid and phenolic acids were determined spectrophotometric. Effect of genotype and harvesting time as main effects and interactive effect on total phenol, total flavonoid and phenolic acids content at level of 1% were significant. The highest level of total phenol of leaves was obtained in cv. Z63 in May, in cv. Chandler in July and in *J. nigra* L. in both May and July. cv. Z63 and *J. nigra* L. had the highest content of total flavonoids of leaves in September but in cv. Chandler it was obtained in May. In all of the samples, phenolic acids of leaves had the highest level in September. In some other cultivars of *J. regia* L., May or July was introduced for collecting the leaves with respect to higher level of flavonoid and phenolic acids [3]. The results were obtained from green husk phenolic compounds showed some differences between cultivars. Only in cv. Chandler total phenol content of green husks reached to the highest level in October, just when the fruits were mature. *J. nigra* L. and cv. Chandler showed a reduction in total flavonoid of husks during fruit maturation. Phenolic acids of husks in *J. nigra* L. just like total phenol had the highest level in August. The total phenol content in walnut green husks aqueous extracts was different according to the variety [2].

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ANTIFUNGAL POTENCY OF NANOEMULSION OF SOME MEDICINAL PLANTS ESSENTIAL OILS IN CONTROL OF RHIZOPUS FRUIT ROT OF STRAWBERRY

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The nanoemulsion of three essential oils; *Mentha piperita*, *Thymus daenensis* and *Satureja khuzistanica*; were prepared and then characterized. Three essential oils and their nanoemulsions as well as fungicide 'tiabendazole' were studied at various concentrations (1, 2 and 4:1000) to control of Rhizopus fruit rot of strawberry. All essential oils and their nanoemulsions exhibited noticeable antifungal activity against *Rhizopus Stolonifer*. Generally, nanoemulsion of essential oil showed more antifungal activity than essential oil. The nanaoemulsion oil of *S. khuzistanica* could completely suppress the rot disease of fruits at the concentration of 4:1000 and showed stronger antifungal activity than tiabendazole. In addition, there was no significant difference of fruit rot control between both *M. piperita* and *T. daenensis* oils and tiabendazole. The present study suggests that nanaoemulsions of essential oils especially oil of *S. khuzistanica* can use as an alternative for synthetic fungicides. So, application of nanaoemulsion of essential oils will develop safe and environmentally friendly management of postharvest diseases control of crops [1, 2].

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EFFECT OF DIFFERENT LEVEL OF HUMIC-ACID AND VERMICOMPOST TEA ON PRODUCTION, BIOLOGICAL TRAITS AND OIL CONTENT OF *SATUREJA KHUZESTANICA*

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Agroecology emphasizes the use of organic materials. The organic acids are important sources of organic materials [1]. In order to study the effect of different levels of humic acid and vermicompost tea (vermicompost extracts) on production, biological traits and essential oil percentage of *Satureja khuzistanican,* an experiment was conducted as factorial base on a randomized complete block design with three replications in 2013. Factors included of three levels of humic acid (1.5, 2.5 and 3.5 liter per ha.) and vermincompost tea in concentrations of 5% (1:5, water: vermicompost), 10% and 20%), which were sprayed on aerial parts of the plants. Treatments of 2.5 L/ha humic acid and 20% of Vermicompost Tea showed the highest plant height and treatments of 3.5 L/ha humic acid and 20 % of Vermicompost Tea sowed the highest crown width with 52.36 cm and 59.88 cm, respectively. Maximum of dry weight yield was 426.66 g/m^2 when the plants treated with 2.5 L/ha humic acid and 20% vermicompost tea. Essential oil percentage was evaluated in the flowering stage. Maximum oil content (3.44% w/w) was obtained when plants treated with 1.5 L/ha humic acid and 20% vermin-compost tea.

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PHYTOCHEMICAL ANALYSIS AND PURIFICATION OF CHIEF COMPONENTS OF *ONONIS SPINOSA*

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Ononis plant is a category of Fabaceae family. This category includes 75 different species which are seen as weeds growing on plains and high lands. Regarding strong antibacterial features in the species like *O. fruticosa*, *O. spinosa, O. natrix، O. ramosissima, O. tridentate,* In this research we investigated and focused on the isolation and identification of the main flavonoid from the aerial parts of *Ononis spinosa.* There are several reports finally leading to applying ethanol extract of *O. spinosa* species in some of medicinal and hygienic products manufactured by European and American companies since the year 2010. The tests required to separate active and effective compounds of *O. spinosa* were developed and accomplished based on two different methods. TLC test for the fractionates resulted from chromatography of the extracts used in the 1st and the 2nd methods was performed to compare the methods and it indicated that the 2nd method was better because of less compounds existing in TLC and therefore better separation of compounds. TLC test for semi-polarized to polarized compounds of the fractions resulted from the chromatography accomplished on the 2nd method chosen extract contains most spots in yellowish green at the wavelength 366 nm. In many papers, this color is attributed to Flavonol compounds. Amon the compounds separated from this plant, one may mention needle crystals purified by recrystallization in which the final purity has been proved by TLC test. Ethyl acetate and Ethanol extracts of *O. spinosa* contain various flavonoids as the main components. Chlorogenic acid is identified in this investigation.

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TWO NEW POLYHYDROXYLATED TRITERPENOIDS FROM THE AERIAL PARTS OF *SALVIA URMIENSIS* BUNGE

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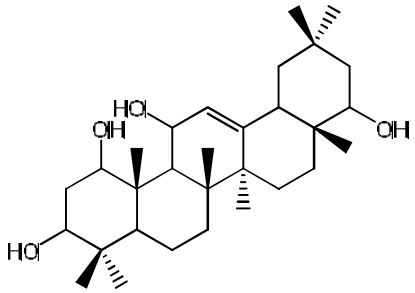
The genus *salvia* has a long history of medicinal and culinary uses. Several species of *Salvia* are known to possess antimicrobial, antioxidant, and anticancer properties that have made *Salvia* a popular genus in medicine since ancient time [1]. There are over 900 different species of *salvia* all around the world [2]. In Iran there is a high diversity of *salvia* species and accessions which includes 61 species that 17 of them are endemic [3]. *S. urmiensis* Bunge is an aromatic perennial woody sub-shrub that grows in the West Azerbaijan province of northwestern Iran. In our efforts to discover new and potentially bioactive secondary metabolites from Iranian *Salvia* species, we investigated the acetone extract of the aerial parts of *S. urmiensis.* This attempt led to the isolation of two new poly-hydroxylated triterpenoids with oleane **(1)** and ursane (**2**) skeletons. Structural elucidation of purified compounds was carried out based on spectral data including 1D and 2D NMR (^{1}HNMR, ^{13}CNMR, COSY, HMQC, HMBC) as well as HR-ESI-MS.



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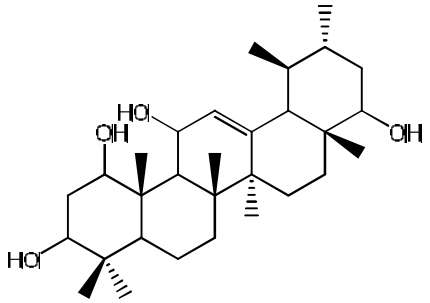

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EFFECT OF CARBON NANOTUBE AND SALINITY STRESS ON MORPHOLOGICAL CHARACTERIZATION OF *SATUREJA RECHINGERI* JAMZAD

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Amongst all Nano-materials, carbon-based materials (especially carbon nanotubes (CNTs) have attracted much interest since their discovery due to their unique mechanical, electrical, thermal and chemical properties. Furthermore, their potential use in hydrogen storage, drug delivery, and tumor imaging are some important fields of interest being vigorously pursued [1]. Plants as important ecological receptors have not received enough attention with regard to the use of carbon-based Nano-materials. In other hand salinity is one of the major abiotic stresses affecting germination, crop growth and productivity. In this study we evaluation effect of carbon nanotube (in three concentrations: 50, 100 and 200 µg/ml) and salinity stress (in three concentrations: 50, 100, 200 mM) on morphological characterization of *Satureja rechingeri* plants in in vitro culture. Maximum of root length and average shoot length in concentration of 50 µg/ml and maximum average number of branches in concentration of 100 µg/ml was observed. In concentration of 200mM NaCl most studied traits including aerial part fresh weight, root length, average shoot length and average number of branches had lower values compared to other concentrations.

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INDUCTION AND IDENTIFICATION OF POLYPLOIDY IN *THYMUS PERSICUS* - A NATURAL SOURCE OF ANTITUMOR TRITERPENOIDS BY COLCHICINE TREATMENTS

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Thymus persicus (Ronniger ex Rech. f.) Jalas (Lamiaceae), as a rich source of the three pentacyclic teriterpenoids *i.e.* betulinic acid (BA), oleanolic acid (OA) and ursolic acid (UA), is an endemic species which is growing in Zanjan and West Azerbaijan provinces of Iran [1]. The anti-cancer, anti-inflammatory and hepatoprotective activity of BA, OA and UA has previously been reported [2]. In order to produce an autopolyploid population of *T. persicus*, different concentrations of colchicine (0.0, 0.05, 0.1, 0.3 and 0.5%) and two treatment methods (seed and shoot tip treatment) were examined. Our results revealed that polyploid plants were produced only by treatment of shoot tip, and treatment with 0.3 and 0.5% proved to be the most effective in producing autopolyploids. The induced polyploids in *T. persicus* was accompanied by larger stomata, increase in chloroplast number in guard cells and decrease in stomata density, compared to diploid control plants. In order to distinguish the induced colchicine polyploid plants from the diploids, morphological changes and techniques as stomata size, number of chloroplasts per guard cell and flow cytometry were considered and proved that these methods are suitable, quick and easy methods for identification the ploidy level of in *T. persicus*. Among studied methods, flow cytometry was found as the most efficient method for detecting induced changes in ploidy level.

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ARABIDOPSIS THALIANA SQUALENE SYNTHASE GENE TRANSFORMATION IN HAIRY ROOT CULTURES OF *WITHANIA SOMNIFERA* (L.) DUNAL

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Withania somnifera (L.) Dunal (Solanaceae), an important medicinal plant, is distributed in the drier parts of tropical zones, ranging from the Eastern of Mediterranean region to the Southwest of Asia. The plant is enriched in a group of valuable compounds as steroidal lactones called withanolides. Recently, pharmacological properties of withanolides including the antitumor activity and the neuropharmacological properties to prevent Alzheimer and Parkinson disease have been reported [1]. The natural populations of the plant are distributed throughout the drier parts of subtropical areas, ranging from the Southeast to the Southwest of Iran [2, 3]. In the present study, induction of hairy root system in *W. somnifera* by *Agrobacterium tumefaciens* strain C58C1 (pRiA4) to produce the most important bioactive withanolides, withaferin A was conducted. Squalene synthase gene (*SQS*) encoding squalene synthase from *Arabidopsis thaliana* was also introduced in the plant under the control of the CaMV35S promoter together with the T-DNA of *A. rhizogenes* A4. Our results revealed that hairy root induction was significantly affected by the strain of *Agrobacterium*. Root lines induced in more than 76.6% of leaf explants inoculated with *Agrobacterium* strain carrying *SQS* gene after 15 days. 3.3 and 7.8 roots were observed on the leaf explants infected by *SQS* containing strain and wild type, respectively. The hairy roots obtained (100%) showed typical hairy roots (HR) morphology. The *rolC* gene of pRiA4 was detected by PCR analyses in all obtained hairy roots. 67.66 and 86.42 percent of transformed roots infected with wild type and strain containing *SQS* gene contained agropine gene (*AGS*), respectively. *SQS* gene was detected in 87.88 % of induced hairy root lines. For typical transformed hairy roots with *SQS* gene there is no morphological difference in comparison with wild strain. The growth pattern for typical transformed hairy roots after several subculture was steadily remained. Transformed hairy root lines with SQS gene can be considered for the production of withanolides as important medicinal compounds.

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NEW SESTERTERPENOIDS FROM *SALVIA LACHNOCALYX*

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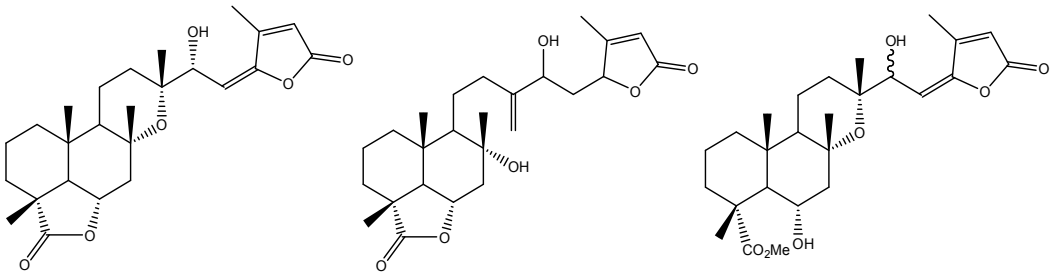
The genus *Salvia* with approximately 1000 species, is the largest genus of the family Lamiaceae. This genus is represented in Iran by 61 species, of which 17 are endemic. *Salvia lachnocalyx* Hedge is an endemic and range restricted species which grows in the Fars province of Iran. From a phytochemical point of view, the main constituents in the aerial parts of *Salvia* species are terpenoids and flavonoids. Sesterterpenoids are a small branch of terpenoids which exhibit diverse biological properties, such as anti-inflammatory, cytotoxic, antimicrobial, and anticancer activities [1]. As a part of an ongoing research program aimed at the isolation, structural characterization, and pharmacological evaluation of bioactive secondary metabolites from the genus *Salvia* [2], we started the phytochemical analysis of the acetone extract of *Salvia lachnocalyx*. Our studies led to the isolation of four new sesterterpenoids (**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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OPTIMIZATION OF CYCLOSPORIN A EXTRACTION FROM *TOLYPOCLADIUM INFLATUM* BY ULTRASONIC METHOD

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Cyclosporin A is a cyclic peptide with 11 amino acids produced as secondary metabolites mainly by fungi *Tolypocladium inflatum* PTCC. In the current era cyclosporine A could be considerate as the most important immunosuppressive drugs [1]. It seems that finding ways to enhance production and purification of this compound is of utmost importance. This study is focused on the extraction of cyclosporin A from *Tolypocladium inflatum* biomass by Ultrasonic method that produced with a 2L airlift bioreactor. As this compound is thermally stable, based on their cyclic peptide form, Ultrasonic was introduced as a potent extraction method. In this work, the procedure was performed under the different conditions using ultrasonic. The influential parameters including time, temperature and amplitude, which are affecting the ultrasonic potency, were optimized by Design Expert 7. Optimum conditions were obtained at 15 minutes of extraction time, medium amplitude of system in 40 °C. In order to investigate the effect of Ultrasonic on the amount of extraction of cyclosporine A, HPLC was utilized. Comparing the chromatograms of cyclosporine A extracted using Ultrasonic with those of maceration method showed that, the cyclosporine A was extracted about two times more than maceration method.

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ANOTHER NEW ISOPRENOID WITH RARE CARBON SKELETON FROM *SALVIA HYDRANGEA*

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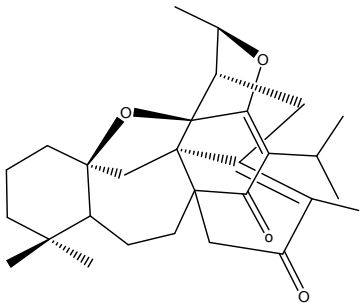
The genus *Salvia* is a rich source of terpenoides with structural diversity. Apart from sesterterpenoids as unusual constituents of *Salvia* species [1], It is a source of di-and triterpenoids with unprecedented carbon skeletons. Aiming at identifying structurally interesting and bioactive metabolites from the *Salvia* species, we examined the extract of *Salvia hydrangea* DC. ex Benth. This species is popularly known in Persian as "Gol-e Arooneh". It grows widely in Iran, Anatolia and Transcaucasia, and the aerial parts of the plants have been used in Iranian folk medicine as anti-inflammatory, antispasmodic, carminative, and sedative compounds. Infusions prepared from flowers serve as an anthelmintic and antileishmanial, especially in the Pars province of Iran. We recently identified Hydrangenone, pervoskone B and salvadione C, three new antiplasmodial triterpenoids from this plant [2, 3]. In the present work, we have undertaken a further phytochemical investigation on the aerial parts of *S. hydrangea.* Fractionation of the n-hexane extract of the plant led to the isolation of another new isoprenoid which is characterized as a conjugated monoterpene-diterpene. Its structure were established by high-field NMR techniques (^{1}H-NMR, ^{13}C-NMR, ^{1}H-^{1}H COSY, HMQC-DEPT, HMBC, APT), HRMS and by comparison of its NMR data with those of the related compounds.



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REARRANGED ABIETANE DITERPENOIDS FROM THE ROOT OF *SALVIA LERIIFOLIA*

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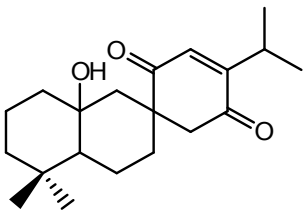
The genus *Salvia* (sage) belongs to the Lamiaceae and encompasses 900 species. *Salvia* is the largest genus in this family and constitutes almost one quarter of the Lamiaceae. The genus *Salvia* is generally known for its multiple pharmacological effects including anti-inflammatory, antipyretic, antioxidant, hepatoprotective and hypoglycaemic activities. Fifty-eight species of the genus *Salvia* are found in Iran, of which 17 are endemic. *Salvia leriifolia* Benth. is a perennial herbaceous plant that grows exclusively in south and tropical regions of Khorasan and Semnan provinces, Iran. This plant was introduced in Florica Iranica in 1982 and has different vernacular names such as Nuruozak and Jobleh. 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 [1]. In the present work, we have undertaken a phytochemical investigation on hexane extract of the root of *S. leriifolia* and reported the isolation and identification of three rearranged abietane diterpenoids (**1-3**) together with several other compounds. Structural elucidation of these compounds was accomplished by extensive spectroscopic methods including 1D and 2D NMR experiments (HSQC, HMBC, COSY). Abietane diterpenoids are a large group of secondary metabolites isolated from many plants. These compounds have attracted interest on account of their biological properties such tumour inhibitory, antiplatelet aggregation, antituberculostatic and antiviral activities [1].



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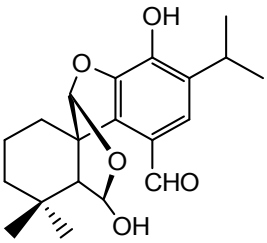

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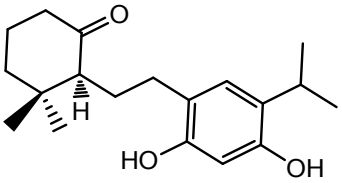

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NEW ENT-PIMARANE DITERPENOIDS FROM *HYMENOCRATER ELEGANS*

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Lamiaceae family is well represented in Iran by 46 genera and 410 species and subspecies. Many members of this family have important roles as sources of medicinal and aromatic plants of commercial importance. 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. For example, *hymenocrater* has 9 species in Iran, with a wide range of distribution and usages in traditional and folk medicine such as anti-inflammatory, antispasm, sedative and anti-emphysema [1], 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 [2]. 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 till now (**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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CHEMICAL COMPOSITION OF THE ESSENTIAL OIL FROM *HERACLEUM RAWIANIUM*

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Heracleum rawianium is a perennial herb which belongs to the Apiaceae family. This Plant distributed in Iran, Turkey and Iraq. The Plant fruits used as a food spice in Iran and Turkey [1]. A literature survey showed that there has been no data concerning the essential oil composition of *Heracleum rawianium*. In this study, the flat-oval shaped fruit of *H. rawianium* was hydrodistilled and chemical composition of the essential oil was analyzed by GC and GC-MS. The essential oil yield based on dried plant material was 1.82% and fourty-six compounds were identified. The main components were: butanoic acid hexyl ester (54.28%), acetic acid octyl ester (17.73%), 3-octenyl acetate (5.12%), hexyl 2-methylbutyrate (3.67%), hexanoic acid hexyl ester (3.34%), propanoic acid 2-methyl hexyl ester (2.37%), hexyl isovalerate (1.32%), butanoic acid 2-methyloctyl ester (0.82%) and hexyl propanoate (0.74%).

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INVESTIGATION OF ANTI-OXIDANT ENZYMES ACTIVITY AND ANTHOCYANIN CONTENT IN TREATED *LEMON BALM* SEEDLING WITH CU IONS

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Lemon balm (*Melissa Officinalis*) is a perennial herb from the Lamiaceae family [1]. This plant have many beneficial effects such as anti-bacterial, sedative, spasmolytic, mnemonic improvement, and could reduce excitability, anxiety, stress, gastrointestinal disorders and sleep disturbance[2]. In this research, we assayed the effects of various Cu concentrations (0, 5, 10, 20 and 30 µM) on anti-oxidant enzymes activity and anthocyanin content at different times (8 and 16 hours) in *M. offisinalis* 45-day seedling. The results showed that the activities of peroxidase (POD) and superoxide dismutase (SOD) were higher than control but in the case of catalase (CAT) activity, all investigated treatments exhibited lower activity as control sample. Also treatment of *M. officinalis* 45-day plantlets with Cu ions causes a significant loss in anthocyanin content in comparison with control treatments, whether for 8 or 16 hours, while for 8-hour treatment, the loss is more considerable than 16-hour treatment

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ANTISPASMODIC EFFECT OF EPHEDRA MAJOR ON ADRENERGIC RECEPTOR ON THE RAT JEJUNUM

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Tendency to utilize Ephedra contain product are increasing due to its favorable properties such as energytic, fat burning, decongestant etc [1, 2]. Present of gastero-intestinal system agonism α and β adrenergic compound and lack of systematic research on this issue, we conduct this study to determine the *Ephedra Major* Host (*E. Major*). Hydroethanolic extract effect on the gastero-intestinal system and reveal the underlying mechanism for this constriction effect. Isolated jejunum from 24 male Wistar rat (Body weight 220±30) were tested in organ bath. Rats were anesthetized and jejunum placed in crebs solution with bubbled 95% O_2 and 5% CO_2 Carbogene then cut into segment 2-3cm in width wich then mounted in 25ml chamber of organ bath and constructive response recorded in 4 groups[3]. Statistical compression made by student T-test and ANOVA (SPSSVer.19). $P \leq 0.05$ considered as statistically significant. Half Maximal Effective concentration calculated by Lab ChartVer.7 software. The result was shown *E. Major* extract has a relaxant effect on rat jejunum. The cumulative concentration of *E. Major*(0.00625, 0.0125, 0.025, 0.05, 0.1, 0.2, 0.4, 0.8, 1.5 and 3mg/ml) relaxed the KCl 80mM induced contraction dose-dependently(n=6, $P \leq 0.05$). The inhibitory effect of extract was unaffected by phenoxybenzamine as a α antagonistic receptor blocker but the propranolol as a β antagonistic receptor blocker, inhibited the relaxant effect of extract on jejunum. This result showed the part of relaxant inhibitory effect of *E. Major* extract involve adrenergic receptors. The results support the usage of this plant in traditional medicine.

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DETERMINATION OF CHICORIC ACID AND METALS CONCENTRATIONS IN *ECHINACEA PURPUREA* ROOT AND EXTRACT

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Echinacea purpurea is well established tradition of medicinal use in North America, Europe and Australia. In modern cultures, *E. purpurea* is used for medicinal purposes, in treating acute upper respiratory infections, urinary tract infections, burns and disorders such as viral infections, cutaneous affections and chronic disease due to a deficiency of immunological responses [1]. Chemical compounds such as carbohydrates, fatty acids, derivatives of caffeic and tartaric acids, flavonoids, isobutylamides, polysaccharides, poliacetylenes and essential oils were detected in fresh raw materials. Chicoric and caftaric acids are the main phenolic compound (marker) in *Echinacea purpurea* [2]. Effectiveness of Echinacea extract is highly dependent on the species of Echinacea, part of the plant used (root, stem or leaves), the age of the plant, its location and the method of extraction [3]. In this work, the concentration of chicoric acid from *E. purpurea* root has been investigated by ultrasonic extraction method and the results were compared with maceration method. The effects of experimental parameters on extraction of chicoric acid were studied. The concentrations of chicoric acid as marker component in extracts were determined by High Performance liquid Chromatography (HPLC). The experimental parameters were; solvent types, extraction temperature, solid to solvent ratio and extraction time. The optimum conditions were 50:50 aqueous- ethanol solution as solvent, 30 min sonication time, 10:1 solvent to solute ratio and the temperature of 60˚C. The contents of cichoric acid in roots were analyzed and their concentrations were 8.7 mg/g. The extracts and root samples were analyzed by ICP-AES for metals contents. Root sample treated with 4 acid digestion include HNO_3, H_2SO_4, HF and HCl solution with composition of 5:4:2:5 respectively but extracts analyzed directly without digestion. The results showed the concentration of some elements in root and extract was significant (Al, Ca, Cu, Fe, K, Mg, Mn, Na, P, Zn) and other elements quantities were less than LOD.

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ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL OF *TANACETUM HOLOLEUCUM* FROM IRAN

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The antibacterial activity of the hydro-distilled essential oil of the aerial flowering parts of *Tanacetum hololeucum* was studied. Identification of the oil constituents was conducted by GC-MS. The major compounds were found to be artemisia alcohol (22.8%), yomogi alcohol (19.4%), artemisyl acetate (12.9%), γ-eudesmol (12.1%) and camphor (10.5%). The antibacterial activity of the essential oil was tested against two Gram-positive bacteria (*Staphylococcus aureus* and *Bacillus cereus*) as well two Gram-negative strains (*Klebsiella pneumonia* and *Escherichia coli*) by disk diffusion, MIC and MBC methods. The results showed that Gram-positive bacteria were highly inhibited by the essential oil with MIC values of 2 mg/mL. The most resistant strain was *Klebsiella pneumonia* with the lowest MIC and MBC values of 16 and >32 mg/mL, respectively. Considering sensitivity screening it is notable that the antibacterial property of the oil from *T. hololeucum* could be attributed mainly to the synergistic property of main compounds.

COMPOSITION AND ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL OF *TANACETUM KOTSCHYI* FROM IRAN

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Tanacetum L. belongs to the family Asteraceae and tribe Anthemideae. This genus in flora of Iran is represented by 35 species. In this research, composition and antibacterial activity of the hydro-distilled essential oil of *Tanacetum kostchyi* collected from East Azerbaijan province, Marand (Mishodagh) was studied. The oil was analyzed by GC and GC-MS and essential oil property was tested against two bacteria. A total of 40 compounds accounting for 99.8% of the total oil, were identified. The main constituents of the essential oil were camphor (20.6%), 1,8-cineole (9.0%), α-Bisabolol (8.6%), E-Nerolidol (7.2%), δ-Cadinene (5.4%), cis-Chrysanthenyl acetate (4.9%) and α-pinene (4.3%). The essential oil exhibited moderate antibacterial activity against the studied strains *Escherichia coli* and *Staphylococcus aureus* with MIC value of 16 mg/mL.

COMPOSITION AND ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL OF *NEPETA HORMOZGANICA* FROM IRAN

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The composition and antibacterial activity of the essential oil of the aerial flowering parts of *N. hormozganica* Jamzad have been studied. Analysis of the oil was conducted by GC and GC-MS. Thirty-two components were characterized accounting for 99.4% of the total oil. Oxygenated monoterpenes (87.5%) were found to be the predominant group of compounds, of which 1, 8-cineole (65.0%) and 4aα-7α-7aβ-nepetalactone (13.0%), were the main constituents. The antibacterial activity of the essential oil and its main constituents showed that all of the tested microorganisms were highly inhibited by the essential oil with inhibition zones ranged from 12 – 24 mm. The most sensitive bacteria were *S. aureus* and *S. epidermidis* with the lowest MIC values of 0.3 and 0.6 mg/ml, respectively. Considering sensitivity screening it is conceivable that the activity of the oil from *N. hormozganica* could be attributed mainly to the synergistic property of 1, 8-cineole and nepetalactone.

GENETIC DIVERSITY STUDY OF SAFFRON ECOTYPES *(CROCUS SATIVUS)* USING ISTR MARKERS AND SOME MORPHOLOGICAL TRAITS

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Saffron (*Crocus sativus*) is a aromatic, triploid, unilabiate and perennial plant. This plant is asexual and replicates via follicle. The most important problem in saffron survival and maintainance is genetic erosion and distributing herbal substances having high quality is one of the best ways to prevent this problem for the purpose of investigating genetic variation, 22 safrron ecotypes from different parts of iran in a plan of perfectly random blocks within three repetitions were evaluated from the viewpoint of morphology characteristics in 2010. In addition to this ecotyps, eight other ecotypes (a total of 30 ecotypes) were investigated via 12 initiation compounds. The result of variance analysis for morphological characteristics indicated that the whole characteristic among the ecotypes had a meaningful difference. heritability among the whole characteristics, except the wet weight of one flower which had a mean rate, was very high. Nishabur- gheibod and khoaf ecotypes had the highest rate and those of nishabur-khujan and natanz had the mean rate among most morphologic characteristic. Nishabur, hamedan and mianjolgeh had the least rate among the wet weight characteristics and the dry weight and the number of spurs and the wet weight of a flower. The mean for the dry weight of the crest had a high and very meaningful correlation with the whole characteristic except the plant height, the number of spurs in the bush. The wet weight of the flower per day, the wet weight of the crest. The highest correlation existed between this character and the characteristic of the flower number per day, the wet weight of the crest per day, the sum for the wet weight of the flower per each period, the total number of flower per period and the sum for the dry weight of the crest. The sum for the weight of flower per each period, the total number of flowers per each period. Out of the whole 12 ISTR marker compositions which showed a suitable quality and replication among the ecotypes were chosen and employed in the next steps. The result obtained from experimentally with these initiating compositions on a sample of 90, showed a figure indicative of non-existence of genetic variation among and inside the30 saffron ecotypes. This possible that the whole populations have had an equal origin and the considerable variation related to they physiological and morphological characteristics have resulted from their distribution among some patts. With different environmental difference and being adaptable with these condition.

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LIMONENE AND LINALOOL AS TWO PLANT CONSTITUENT COMPOUNDS AGAINST THE PULSE BEETLE, *CALLOSOBRUCHUS CHINENSIS* (L.)

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The pulse beetle, *Callosobruchus chinensis* (L.), (Coleoptera: Bruchidae) is the most widespread and destructive major insect pest of stored legumes. Current practices for managing stored product pests using chemical fumigants provide only marginal control and cause environmental problems. The present study reports the use of two plant constituent compounds, limonene and linalool, as alternatives for managing this pest. The toxicity of these compounds in two doses was evaluated by fumigant toxicity bioassay on the adults of *C. chinensis* inside Plexiglas cylinders under the temperature of 25±1°C, relative humidity of 60±5%, photo period of 16:8 (light: dark). After 24 hours, pure limonene resulted 8.66±1.91% and 21.33±1.91% at 10 and 20 $\mu l.L^{-1}$air concentrations, while untreated control treatment showed nil mortality. In the bioassay, linalool at both 10 and 20 $\mu l.L^{-1}$ concentrations were found to be the most effective compound with 100% mortality. This study demonstrated that linalool has great fumigant toxicity at this low dose against this stored product pest and thus has the potential as an alternative for the common synthetic fumigants.

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INVESTIGATING OF INCREASE POSSIBILITY OF BLACK CUMIN (*BUNIUM PERSICUM*) IN *IN VITRO* CULTURE.

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For investigating of increase possibility of black cumin in In vitro condition by using seed , an experiment was done during 1391- 1392 in the In vitro culture laboratory of Islamic Azad university of Jiroft. In this experiment three features including establishment, Infection and Necrosis of different masses of seed with two treatments. including dry seed with safe, broken and scratched seeds as subgroups and wet treatments with safe seed and seed embryo as subgroups were investigated and the following results were observed: In generally investigating the percentage of establishment،Infection and Necrosis in dry an wet treatments without considering the culture state and seed mass got a result that establishment percentage in wet treatment with significant difference was more than dry treatment and the Infection percentage of dry treatment was more than wet treatment and Necrosis percentage did not show any significant different between two treatment. Also, between wet and dry different seed masses, was not significant difference regarding establishment percentage and the same result was about Infection percentage. Necrosis in Jupar, Dehbakri and Esfandaghe seeds was more than Orzooieh and Khabr ones. Regarding establishment percentage of different seed masses of wet treatment the maximum establishment percentage was seen in Orzooieh and the minimum was in Khabr and in dry treatment the minimum of establishment was for Dehbakri seed. Considering Infection of treatments, this feature did not show any significant difference in wet treatment but in dry ones the maximum of it was seen in Orzooieh and the minimum in Jupar and Esfandaghe masses. Necrosis among wet and dry treatments was maximum in Jupar mass in wet treatment and minimum in Orzooieh mass in dry treatment.

INVESTIGATING OF INCREASE POSSIBILITY OF BLACK CUMIN (*BUNIUM PERSICUM*) IN *IN VITRO* CULTURE BY USING SHOOT ORGANS AND RHIZOME

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For investigating of increase possibility of Black cumin *invitro* culture by using shoot explant and Rhizome and also evaluating of problems that exist during doing this project ,after carrying out the studying phase on the developed plants of Black cumin in the mountainous areas of Kerman province ,a research was done from Autumn of 2013 until summer of 2014 in the Islamic Azad university of Jiroft. In this research ,sampling was done in tow times: in the middle of march and in the early of May and three item including: establishment ,Infection and Necrosis of cultivated shoot organs and Rhizome. comparison between the means showed that in both of these time periodes , maximum of establishment was seen in the Rhizome and maximum of Infection was seen in the shoot organs and Necrosis percentage had not any significant difference. Also ,in this research the problems of carrying out the process of Black cumin in vitro culture was investigated analytically.

THE DETERMINATION OF RANGE TYPE OF HESARBON REGION IN THE CITY OF FIROUZKOUH

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The conditions of a range reveal the history of living and non-living factors existing in the vegetative cover and range soil in the past or present. Therefore, the determination of the conditions of a range can discover the potential reactions of the range to the measures and management plans can be useful. For this purpose, this research aims to study the range type of the rural area of Hesarbon in the central district of Firouzkouh, 60 kilometers far from the southwest of the city. A random systematic sampling method was applied in the transect of 50 meters in the representative regions and 4 m2 plots were used. The field studies show that the range type of the studied area is Arspp-Ep in. The dominant species of this range type are Artemisia sieberi, Artemisia aucheri, Ephedraintermedia locally called katureh. The range type is 1,949 hectares in area and it covers 80.4 percent of the total area. According to the 28 points obtained by this range type in the 4-factor Parker method, the condition of this range is evaluated as weak. Certainly, this condition that is close to a middle condition can be improved by correct management.

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EFFECT OF PLANTING DATE AND DENSITY ON YIELD AND YIELD COMPONENTS OF *PLANTAGO OVATA*

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To study the effect of planting date and plant density on yield and component yield of *Plantago ovata*, factorial experiment was conducted in a randomized complete block design with three planting dates(15 February, 15 March, 15 April) and three planting density(10cm, 15cm, 20cm) in three replication. The results showed that stem of the flower spikes, spike length, number of grains per spike, biological yield and grain yield, influenced by planting date and planting density and interaction between the two was significant. Characteristics of leaf water potential and relative water content were not affected by any of the experiment treatments. Stems spike number, number of grains per spike, harvest index, biological yield and grain yield plant on March 15 reached its maximum value. Spike tiller number, spike length and number of seeds planted at 15cm and biological yield and grain yield reached its maximum value at spacing of 10 cm.

SEED GERMINATION AND SEEDLING VIGOR INDEX VARIATIONS OF *SINAPIS ALBA* L. UNDER DIFFERENT CONCENTRATIONS OF NANO DIOXIDE TITANIUM (ANATASE)

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White mustard (*Sinapis alba* L.), an annual medicinal or spice herb, belonging to family Brassicaceae, which is its seeds used as spices or flavoring agent in food industry. Nowadays, titanium dioxide nanoparticles (<100 nm in diameter) have been frequently used in numerous productions in our daily life, such as cosmetics, sunscreen, toothpaste, and also as additives in pharmaceuticals and food colorants [1]. The development of nanotechnology on physiology and biochemistry has expanded the application area of nanomaterials in different fields due to their unique characteristics (e.g., large surface area to volume ratio, ability to engineer electron exchange and highly surface reactive capabilities) [2]. This research was performed to determine the influence of different concentrations (0, 20, 40, 60 and 80 $mg.L^{-1}$) of titanium dioxide (anatase) in nano size (30 nm in diameter) and bulk (10 $mg.L^{-1}$) on *S. alba* L. seed germination features including germination percentage (GP), mean time germination (MTG), germination rate (GR), germination index (GI) and seedling vigor index (VI) in a randomized completely design (RCD). The seeds were surface sterilized by soaking in 1% sodium hypochlorite (NaOCl) for 10 min and subsequently rinsed three times with sterilized water. All germination experiments were conducted using three replications of 20 seeds per each treatment. Seeds were placed on one layered Wathman No.1 filter paper moistened with 7 ml of employed solution and distilled water for control in sterilized Petri dishes. After each treatment, seeds were transferred to germinators with 16/8 h photoperiod, temperature of 22 ºC and relative humidity between 70% and 75%. Germinated seeds were counted daily for 14 days. The germination characteristics were calculated based on their formula. Results showed that the maximum GR (0.14) with the lowest MTG (6.86 day) were obtained in 60 $mg.L^{-1}$ of concentration. However, the highest (102) and the lowest (25) VI were observed in the highest anatase treatment and control, respectively. Moreover, variations of GP and GI were not significantly ($P<0.05$) affected under all employed treatments. In our current study, nano-sized titanium oxide treatment especially in medium concentrations markedly improved the *S. alba* seed germination parameters and seedling vigor index (GP× seedling length).

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CHEMICAL COMPOSITIONS AND ANTIBACTERIAL ACTIVITY OF *MENTHA SPICATA*. L ESSENTIAL OIL SEPARATELY AND IN COMBINATION WITH SODIUM CHLORIDE, LACTIC ACID, NISIN AND SODIUM CITRATE: AN IN VITRO STUDY

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Essential oils of some plants due to its antimicrobial, antioxidant and flavoring properties are used widely in the food industry. In the recent years, increasing the antimicrobial effects of essential oils in combination with other natural antimicrobial agents has been studied by researchers. In the present research, chemical constituents of spearmint (*Mentha spicata* L.) essential oil and its antibacterial effect separately and in combination with nisin and sodium citrate on *E. coli* O157 and *Staphylococcus aureus* ATCC 29213 were studied. Chemical composition of spearmint essential oil was analyzed by GC/MS method [1], and antimicrobial susceptibility testing was performed by disk diffusion and broth micro dilution MIC (Minimal Inhibitory Concentration) testing methods [2]. Analysis of GC/MS showed that the major constituents of spearmint essential oil are Carvone (60.16%) and Limonene (29.52%). The antimicrobial susceptibility testing results showed that studied agents separately have antibacterial activity on tested bacteria, and its antibacterial activity on *Staphylococcus aureus* was higher than *E. coli* O157. The Result showed that antibacterial activity of spearmint essential oil on *E. coli* O157 in combination with nisin synergistically increases. The antibacterial effect of spearmint oil on *E. coli* O157 in combination with sodium citrate additively increases. The antibacterial activity of spearmint essential oil in the presence of 1% ≤ NaCl significantly increased ($p<0.01$). Also, the antibacterial effect of spearmint essential oil in the presence of 0.5% ≤ lactic acid significantly increased ($p<0.01$). Therefore, to enhance the antimicrobial effect of spearmint oil on *E. coli* O157 in food systems, its combination with NaCl, lactic acid, nisin and sodium citrate is recommended.

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CHEMICAL COMPOSITIONS AND ANTIBACTERIAL ACTIVITY OF *MENTHA PULEGIUM*. L ESSENTIAL OIL SEPARATELY AND IN COMBINATION WITH SODIUM CHLORIDE, LACTIC ACID, NISIN AND SODIUM CITRATE: AN IN VITRO STUDY

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Essential oils of some plants due to its antimicrobial, antioxidant and flavoring properties are used widely in the food industry. In the recent years, increasing the antimicrobial effects of essential oils in combination with other natural antimicrobial agents has been studied by researchers. In the present research, chemical constituents of pennyroyal (*Mentha pulegium*. L) essential oil and its antibacterial effect separately and in combination with nisin and sodium citrate on *E. coli* O157 and *Staphylococcus aureus* ATCC 29213 were studied. Chemical composition of pennyroyal essential oil was analyzed by GC/MS method [1], and antimicrobial susceptibility testing was performed by disk diffusion and broth micro dilution MIC (Minimal Inhibitory Concentration) testing methods [2]. Analysis of GC/MS showed that the major constituents of pennyroyal essential oil are Pulegone (54.86%) and Eucalyptol (24.14%). The antimicrobial susceptibility testing results showed that studied agents separately have antibacterial activity on tested bacteria, and its antibacterial activity on *Staphylococcus aureus* was higher than *E. coli* O157. The Result showed that antibacterial activity of pennyroyal essential oil on *E. coli* O157 in combination with nisin synergistically increases. The antibacterial effect of pennyroyal oil on *E. coli* O157 in combination with sodium citrate additively increases. The antibacterial activity of pennyroyal essential oil in the presence of 1% ≤ NaCl significantly increased ($p<0.01$). Also, the antibacterial effect of pennyroyal essential oil in the presence of 0.5% ≤ lactic acid significantly increased ($p<0.01$). Therefore, to enhance the antimicrobial effect of pennyroyal oil on *E. coli* O157 in food systems, its combination with NaCl, lactic acid, nisin and sodium citrate is recommended.

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CHEMICAL COMPOSITIONS AND ANTIBACTERIAL ACTIVITY OF *CUMINUM CYMINUM*. L ESSENTIAL OIL SEPARATELY AND IN COMBINATION WITH SODIUM CHLORIDE, LACTIC ACID, NISIN AND SODIUM CITRATE: AN IN VITRO STUDY

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Essential oils of some plants due to its antimicrobial, antioxidant and flavoring properties are used widely in the food industry. In the recent years, increasing the antimicrobial effects of essential oils in combination with other natural antimicrobial agents has been studied by researchers. In the present research, chemical constituents of cumin (*Cuminum cyaminum* L.) essential oil and its antibacterial effect separately and in combination with nisin and sodium citrate on *E. coli* O157 and *Staphylococcus aureus* ATCC 29213 were studied. Chemical composition of cumin essential oil was analyzed by GC/MS method [1], and antimicrobial susceptibility testing was performed by disk diffusion and broth micro dilution MIC (Minimal Inhibitory Concentration) testing methods [2]. Analysis of GC/MS showed that the major constituents of cumin essential oil are p-Mentha-1, 3, 8-triene (26.61%), γ-Terpinene (26.28%), Cuminaldehyde (24.54%) and 2-Caren-10-al (17.98%). The antimicrobial susceptibility testing results showed that studied agents separately have antibacterial activity on tested bacteria, and its antibacterial activity on *Staphylococcus aureus* was higher than *E. coli* O157. The Result showed that antibacterial activity of cumin essential oil on *E. coli* O157 in combination with nisin synergistically increases. The antibacterial effect of cumin oil on *E. coli* O157 in combination with sodium citrate additively increases. The antibacterial activity of cumin essential oil in the presence of 1% ≤ NaCl significantly increased ($p<0.01$). Also, the antibacterial effect of cumin essential oil in the presence of 0.5% ≤ lactic acid significantly increased ($p<0.01$). Therefore, to enhance the antimicrobial effect of cumin oil on *E. coli* O157 in food systems, its combination with NaCl, lactic acid, nisin and sodium citrate is recommended.

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THE EFFECTS OF VERMICOMPOST AND CHEMICAL FERTILIZERS ON GROWTH CHARACTERISTICS, OIL AND MUCILAGE YIELDS OF MARSHMALLOW (*ALTHEA OFFICINALIS* L.)

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Organic fertilizers application can enhance the plant growth without polluting the environment [1]. In order to investigate the effects of vermicompost and chemical fertilizers on growth characteristics, yield and yield components of marshmallow (*Altheae officinalis* L.), a field experiment was conducted by using a completely randomized block design with three replications at Faculty of Agriculture, Ferdowsi University of Mashhad, Iran, in 2012. Experimental treatments were designed based on 3 levels of vermicompost (0, 5 and 10 ton ha^{-1}) and 5 levels of nitrogen fertilizer (0, 25, 50, 75 and 100% of 200 kg N ha^{-1}). Results indicated that vermicompost applying had significant effects on increasing leaf area, flower weight per plant, oil and mucilage Yields of marshmallow. Flower weights per plant, mucilage and oil yields of marshmallow were increased by 2 to 3 times by applying vermicompost at 10 ton ha^{-1}, as compared to control treatment. In addition, nitrogen fertilizer had a significant effect on increasing flower weight per plant and grain yield of marshmallow.

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ANTIBACTERIAL AND ANTIOXIDANT ACTIVITIES AND TOTAL PHENOLIC OF GUM TRAGACANTH HARVESTED FROM POPULATIONS OF *ASTRAGALUS PARROWIANUS* AND *ASTRAGALUS GOSSYPINUS*

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Gum tragacanth is an important source in food, pharmaceutical, and chemical industries [1]. Gum tragacanth harvested from the stems of some *Astragalus* species. In addition, it has been reported inhibited the growth of cancer cells and it could regulate blood sugar in diabetic patients [2]. Identification of phytochemical diversity in different ecotypes and the effect of environmental factors on quality and quantity of gum is important [3]. This study, in order to evaluate variation in total phenol content, antibacterial and antioxidant activities of gum tragacanth harvested from different populations of *Astragalus gossypinus* and *Astaragalus parrowianus* from province Isfahan (Khansar), Markazi (Khomein) and Chahrmahal-va-Bakhtiari (Shahrekord) was done. The total amount of phenolic compounds in each extract was determined using the Folin–Ciocalteu method. The antioxidant activity was determined by DPPH assay. Results of this study revealed that there is a significant difference in amount of total phenol content, antibacterial and antioxidant activities.Results of mean comparison indicated that the highest amount of total phenol content of gum tragacanth was obtained the Shahrekord and the Khomain populations for *A. parrowianus.* The highest antioxidant activity of gum tragacanth was obtained the Shahrekord population for both species and the Khomain population for *A. gossypinus*. Gum tragacanth is a dried exudation obtained from the stems and branches of Asiatic species of *Astragalus*. It has been used as a stabilizer, emulsifier and thickener in food, pharmaceutical, cosmetic industries. Iran is the original source and one of the important places for diversity of Astragalus species. Phenolic compounds are believed to account for a major portion of the antioxidant capacity in many plants. The total phenolic compound contents in the gum tragacanth of *A. gossypinus* and *A. parrowianus* were determined by a colorimetric assay, using the Folin–Ciocalteu reagent. The results showed that there were significant differences between the gum tragacanth of *A. gossypinus* and *A. parrowianus* for total phenolic compound. The results also indicated that the two species of gum tragacanth being studied in this paper exhibited significantly different physicochemical properties.

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INVESTIGATION OF AFFECTING FACTORS ON GERMINATION AND EMERGENCE OF *THYMUS DAENENSIS* AND *T. VULGARIS*.

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Biology of germination of medical plants management strategies to develop long-term, be beneficial. Overall germination events are set by several environmental factors such as temperature, light, salinity, PH and moisture and it is key to the success of in agroecosystems. In planting the Seeds of medical plants, Due to the high sensitivity of these seeds needed to complete information on how to grow and make seed bed germination which experts in the field have little information. *Thymus daenensis* is endemic to Iran. Mentioned in the all of the pharmacopoeia of drugs known as thyme and its benefits on health have been emphasized. Thyme morphological diversity can affect ecological factors of plant competition, herbivores, time of germination, flowering time and genetic effects. Thus, to understand the ecological characteristics of *Thymus daenensis* and *T. vulgaris*, Germination experiments in a randomized complete block design with four replications in 2013 in Laboratory, Faculty of Agriculture, Islamic Azad University of Shahrekord was carried out. Effect of temperature on seed germination in germinator under fluctuating temperature 5/15, 10/20, 15/25, 15/30 and 20/35 ° C night / day, Effect of salinity by using solutions of 0, 10, 20, 40, 80, 160 and 320 mM NaCl and effect of pH using acid buffer solution was adjusted tuberosity were evaluated 5 to 9. To study the effect of seed planting depth on seedling emergence of seeds per plant at depths of 0, 1, 2, 3 and 4 cm were buried. Results showed that the effect of different temperatures on percentage, speed and time to reach 50% of maximum germination of *T. vulgaris* and *T. daenensis* was not significant, As the highest and lowest percentage *T. vulgaris* germination, respectively 15/25 (day/night) with a 96% and 20/35 (day/night) with 37% in day and Highest and lowest percentage of *T. daenensis* germination in temperature treatments respectively 20/35 (day / night) with a 93% germination in day, But at other temperatures this herb seed germination was relatively acceptable. Increasing salinity reduces germination of both species. General emergence decreased with increased planting depth. PH treatments had significant effect on germination. Minimum and maximum germination of T. vulgaris at pH 9 with respectively 20% and 93% at pH 7, and lowest germination of *T. daenensis* at pH 9 with a 19% and the maximum germination at pH 7 with 94 germination was observed. This is because the mentioned plant in the Zagros Mountain, able to adapt to different lightness and with germination in a relatively wide temperature range guarantee its survival. Effect of depth on seedling emergence of plants it is known that with increased depth reduced seedling emergence an exponential decrease in seedling emergence to be occur.

INVESTIGATION OF THE ESSENTIAL OIL COMPOSITION AND ANTIFUNGAL ACTIVITY OF: *ACHILLEA MILLEFOLIUM AND ACHILLEA WILLHELMSII*

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Achillea spp. is from sunflower family (Asteraceae) with more than 100 species. The plant as a weed in most parts of the world and widely used in the pharmaceutical and food industries. In this study to evaluate the antifungal properties and chemical composition of yarrow species, the essential oil obtained by distillation method. And techniques, GC, and GC / MS was used to analyze the essential oil composition. 78 compounds were identified in the the essential oil *Achillea millefolium* in total (92.33%), the essential oil composition formed. The major constituents of the oils are respectively Longiverbenone (17.10%), 1,5-Heptadien-4-one (15.74%), l-Limonene (6.28%), Camphor (6.14%), alpha.-Curcumene (4.22%), and 1-8, Cineole (3.84%). 62 compounds were identified in the essential oil *Achillea wilhelmsii* in total (97.35%) form the essential oil of the composition. The main constituent of the essential oil composition of *Achillea wilhelmsii* are respectively Camphor (29.46%), 1-8, Cineole (20.81%), endo-Borneol (5.01%), Adamantane (4.96%) and Alpha. Terpineol (3.94%). In this study the antifungal properties of the plant *Achillea* used the two methods were well established and disk diffusion. There are well established methods for correlation coefficients a higher seems more accurate than. The results indicate that the essential oil of *Achillea* against Fungi *Penicillium funiculosum* PTCC NO.5301 has significantly higher anti-fungal properties than Other Fungi were investigated..

EFFECT OF TWO PLUMBUM AND CADMIUM HEAVY METALS ON GROWTH AND GERMINATION OF *CANNABIS SATIVA* AND *TRIGONELLA FOENUM GRAECUM*

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Heavy metals are dangerous for human health because they tend to bioaccumulate. The toxicity of metals most commonly involves the brain and the kidney, and in most cases cause cancer [1]. One of the efficient ways of decreasing the concentration of heavy metals in soil and hence in drinking water is phytoremediation. The first important issue for successful phytoremediation is the heavy metal-tolerance of a plant that is used to adsorb metals from the soil. This study was aimed to study germination and seedling growth of fenugreek and Hemp –Gallow to plumbum and cadmium. Experiment was arranged in randomize complete block design in three replications and each plot consists of 25 seeds. Seeds were sterilized and treated by Cd concentrations including 0 (control), 5, 10, 15, and 20 mg lit^{-1}, and Pb concentrations including 0, 50, 100, 150, and 200 mg lit^{-1} in Petri dish within 7 days. Treatments were replicated three times and response of each plant was evaluated based on randomized block design. The results of analysis of variance indicated that effect of Cd was ($P<0.01$) significant on length of radicle and plumule, and seedling dry weight of Hemp – Gallow; the average decrease in these three attributes found to be 25.5, 36 and 47.5% for Cd concentrations of 10, 15 and 20 mg lit^{-1}, respectively. The effect of Cd was also considerable for fenugreek. With exception of germination for fenugreek, the effect of Pb tended to be statistically negligible for all attributes of both plants. Therefore both plants are tolerant to these metals, and could be used for Phytoremediation of Pb.

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NECESSITY, IMPORTANCE AND DIMENSIONS OF JOB STANDARDS AND ENTREPRENEURSHIP PACKAGES OF MEDICINAL PLANTS

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In a recent decade has grown the international attention to the production, processing and use of medicinal plants. Also in the industry gradually being returned to the rightful place earlier. But the planning and development of this industry in Iran is not enough clear. Research findings indicate that confounding factors "technical and administrative" have a huge impact on the development process industry plants. But so far are not in good condition considering their amount is very low. In general, factors such as: "Economic compatibilities of producers and exporters", "knowledge of using", "technical capacity of producers" and "knowledge of managers and extensional experts", has been known the most important technical and management factors involved in the development of medicinal plants. On the other hand, that such "education and extension of medicinal plants", "providing the standards of skills and information by radio and television", "vocational education" and "research development" are priority development strategies for developing of Medicinal Plants. Due to the lack of a proper definition of the job market for medicinal plants industry in various aspects of production, processing, trade and consumption are faced with obstacles the entering experts and investors interested. As a result, business investment in agriculture and this industry, is hardly done particularly in the production and processing of medicinal plants. Accordingly, it is important entrepreneurial Package. These packages help the businesses in this area. Entrepreneurship package has four main areas "job description", "marketing", "Financial Management" and "Human Resource Management". In each of the above sections detail the importance of the entrepreneur, how to identify the business are met. On the other hand entrepreneurs believe to Job success and have been information and knowledge about how well the marketing, advertising and customer and also how to estimate and provide for initial and operating costs, and how to plan for effective recruitment and optimizing their capabilities. Finally, it has been suggested to the agencies responsible entrepreneurship industry that developing the necessary investments on the constructing of medicinal plants packages. Also, the Agricultural Jihad organizations plan on the education and promotion of these packages in collaboration with organizations of Agriculture and Natural Resources Engineering and companies of Agricultural technical -Engineering Service. On the other hand, medicinal plants industry in Sustainable development of Iran is the most important at various dimensions. Production of pharmaceutical raw materials, employment, access to medicinal plants markets and generate foreign exchange, maintaining public health and environment aspects of the field of view of specialists in agriculture, medicine and health, economic and social - are attracted to this industry. Accordingly, have been increased the importance and status of medicinal plants in Iran and the world. However, advanced planning and efficient market development has taken place in the industry. Nevertheless, advanced and effectiveness planning have not been in this industry for market development. As a result, the

manpower does not have capability and competencies in this area in all areas of production, processing, packaging, marketing, marketing, import and export. Also, studies indicate that "technical capability of producers ", "Knowledge management and extension experts" and "use knowledge of consumers" in this industry is not desirable location. On the other hand, "education and extension of medicinal plants", "constructing the standards of skills", "vocational education" and "research development" are priority for developing of Medicinal Plants. On the other hand, job standards for workers in this sector to develop skills do not exist in the areas of production, processing industry, traditional medicine and commerce. Therefore, constructing the job standards for each of the products is necessary in order for authorities such as the Agricultural Jihad Organizations and vocational education organization should be. Thus, in this research, have been designed the framework for Job or professional standards and competencies standards of medicinal plants. Job standards and competencies characteristics capabilities are needed to operate effectively in the workplace. These standards have more parts such as the standard of education, job training, input characteristics, length of training, educational content portion of the theoretical, practical and project, the professional qualifications of teachers and standard definition and et al. In the end, is proposed that job standards should be developed for the country's most important medicinal plants. Also, how to modify existing job standards is presented according to existing technical and vocational education in the country.

EFFECTS OF DROUGHT STRESS ON PHENOLIC COMPOUNDS AND PAL ENZYME IN *HIBISCUS SABDARIFFA*

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Drought is a multidimensional stress affecting the plant at different organizational levels[1] Plants are exposed to enzymatic and non-enzymatic defensive stress systems[5] Hibiscus is known as a opulent source of vitamin C [4]. Antibacterial effect is due to the flavonoids [2].The lowering of blood pressure [3, 4] To evaluate the effect of drought stress on components Hibiscus sabdariffa firstly they was planted in greenhouse and was applied drought stress in four- five-leaf "s stages and treatments were contain 25%, 50%, 75% and 100% of field capacity. Then the Measurement of total phenol and enzyme phenylalanine amonyalas was done in three repeat that total phenol was maximum at the lowest level of stress in the control sample of the phenol sample decrease with increasing rate stress But the reduction of phenol "s sepals in 5% was not significance but the activity phenylalanine amonyalaz enzyme increas in the maximum stress and was highest level of the activity enzyme in the 25% Fc.

EFFECTS OF THREE SOIL MOISTURE PROVIDING SYSTEMS ON THE OPERATION OF DRY LEAVES AND ESSENTIAL OIL CONTENT OF LEMON VERBENA

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Lemon verbena (*Lippia citriodora*) is the most valuable medical plants with chemical components such as neral and geranial. This plant is widely used in industries like pharmacology, food, make up and ect. Providing a sufficient amount of soil moisture using modern irrigation patterns has a substantial influence on operational criteria and phytochemical indices of medical plants. This study was designed in a completely randomized blocks in 3 different treatments with 3 replications in order to investigating the effects of three irrigation of patterns (i.e. 3 soil moisture providing systems) on dry leaves operation and essential oil content of lemon verbena (*Lippia citriodora*). Three treatments were designed as the following: irrigation using clay capsoul of pores (T_1); drip irrigation (T_2) and furrow irrigation (T_3) all of which in 100% of plant water need determined at 1300 mm per year according to the previous literatures. This study was conducted in greenhouse collection belonging to Tarbiat Modares University of Iran. The results showed a significant difference between treatments for plant leaves dry weight operation (p=0.01). Accordingly, the plant leaves based on its dried weight operation reached 1234, 1114.3 and 965 (Kg/ha) for T1, T2 and T3respectively. Results obtained from the essential oil content determine showed a significant difference among the treatments. The highest essential oil content was achieved in the first treatment 16.99 and this amounts to T2 and T3 was of 12.00 and 8.70 respectively [1].

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EFFECTS OF THREE SOIL MOISTURE PROVIDING SYSTEMS ON DRY LEAVES OPERATION AND ZINC CONCENTRATIONS OF *LIPPIA CITRIODORA*

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Lemon verbena (*Lippia citriodora*) is the most valuable medical plants with chemical components such as neral and geranial. This plant is widely used in industries like pharmacology, food, make up and ect. Nowadays, medical plants have occupied a lot of place in worldwide because their prominent treating characteristics. Every method that would lead to the performance of plant leaves and its quality in terms of nutrition is worthwhile. This study was designed in a completely randomized blocks in 3 different treatments with 3 replications in order to investigating the effects of 3 irrigation patterns (i.e. 3 soil moisture providing systems) on dry leaves operation and Potassium concentration of lemon verbena (*Lippia citriodora*). Three treatments were designed as the following: irrigation using clay capsule of pores (T_1); drip irrigation (T_2) and furrow irrigation (T_3) all of which in 100% of plant water need determined at 1300 mm per year according to the previous literatures. This study was conducted in greenhouse collection belonging to Tarbiat Modares University of Iran. The results showed a significant difference between treatments for plant leaves dry weight operation (p=0.01). Accordingly, the plant leaves based on its dried weight operation reached 1234, 1114.3 and 965 (Kg/ha) for T_1, T_2 and T_3respectively. Nutrient values of lemon verbena leaves (i.e. Zinc concentrations) as the consuming organ of the plant by human beings were determined. According to the results obtained the maximum Zinc concentration was observed 34.1 for T1. These numbers were measured 22.5 and 15 for T_2 and T_3, respectively [1].

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ANTI-INFLAMMATORY ACTIVITY OF *EUCALYPTUS GLOBULUS* ESSENTIAL OIL AND ITS IMPACT ON NF-KB PATHWAY

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Inflammation is known as the body's first defensive reaction against the aggressive microorganisms and allergens. In Persian folk medicine, *Eucalyptus globulus* (Myrtaceae) is used in inhalation therapy of respiratory tract infections and inflammations. In this study, the anti-inflammatory activity of *Eucalyptus globulus* essential oil (EgEO) was evaluated *in vivo* and also on the NF-κB pathway *in vitro*. NF-κB pathway is considered as an essential component of the uncontrolled inflammatory responses involved in a number of important respiratory tract diseases, such as asthma and chronic obstructive pulmonary disease (COPD). A carrageenan-induced rat hind paw edema model was used for evaluation of anti-inflammatory activity of EgEo. EgEo was injected intraperitoneal at different doses of 0.5 to 3 mg/kg. An *in vitro* model based on the luciferase reporter gene construct (having repeats of a consensus NF-κB coding sequence) was used for investigation of the inhibitory activity of EgEO on the NF-κB pathway with the doses of 100 to 150 μg/mL EgEo. Results showed that EgEO could reduce edema significantly ($p < 0.05$) at the doses of 0.5 and 1.0 mg/kg at 1 to 3 h after carrageenan injection up to 58%. Also, EgEO could inhibit TNFα induced NF-κB activity significantly ($p < 0.01$) at the dose of 250 μg/mL. The present study supports the findings that the *Eucalyptus globulus* driven essential oil is a potent anti-inflammatory natural product, which may play an important role in the modulation of NF-κB pathway.

CHEMICAL COMPOSITIONS OF THE ESSENTIAL OIL OF *ARTEMISIA CHAMAEMELIFOLIA* VILL AT DIFFERENT PHENOLOGICAL STAGES

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The genus *Artemisia*, with the common Persian name of 'dermane', includes 34 species that are found wild all over Iran [1]. The Iranian species has been investigated chemically and presence of monoterpenes, sesquiterpenes, especially sesquiterpene lactones and essential oils reported [2]. In fact, the Iranian *Artemisia* spp. has yielded a considerable amount of new, interesting terpenoids. Results a previous study showed that the major constituents of the essential oil obtained from the dried flowering aerial parts of *Artemisia chamaemelifolia* Villwere vulgarone B (38.8%), santolinyl acetate (10.5%) and 14-hydroxy-9-epi-β-caryophyllene (8.4%) [3]. Hydro-distillated essential oil of *Artemisia chamaemelifolia* Vill aerial parts at two phonological stages including before and 50% flowering collected from Pelor region in Mazandaran province, North Iran, were analyzed by gas chromatography (GC) and gas chromatography–mass spectrometry (GC–MS). The major constituents of essential oil of *Artemisia chamaemelifolia* Vill aerial parts at before flowering were1,8-cineole (27.5%), borneol (7.7%), terpene-4-ol (4.9%) and camphor (4.1%). The main compositions of essential oil of *Artemisia chamaemelifolia Vill* aerial parts at 50% flowering were1,8-cineole(31.4%), camphor (7.6%), borneol (7.0%) and terpene-4-ol (4.1%).

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EFFECT OF ASCORBIC ACID AND SODIUM NITROPRUSSIDE FOLIAR SPRAYING ON QUALITATIVE AND QUANTITATIVE TRAITS OF SUMMER SQUASH UNDER DEFICIT IRRIGATION

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Nowadays, application of anti-oxidant and plant growth regulators has been proposed to reducing the negative impacts of drought stress [1]. Ascorbic acid (ASA) and sodium nitroprusside (SNP) is the substances that make plants resistant to biotic and abiotic stresses [2]. In this study, the effect of drought stress, ascorbic acid and sodium nitroprusside foliar sprays was examined on the qualitative traits in summer squash plants. The experimental design was a split plot factorial with two irrigation regimes; irrigation at 75% FC and irrigation at 25% FC, comprising the main treatments, and combination of sodium nitroprusside at three levels of 0, 50 and 100 μmol and ascorbic acid at three levels of 0, 10 and 20 mmol at flowering stage as subplot that were applied with three replications. The experiment was conducted in 2011 at the Zabol University research farm in Zabol, east Iran. Deficit irrigation reduced seed oil content, chlorophyll a, one-thousand seed weight and seed yield. Also delay irrigation decreased relative water content of leaves and fruit yield. Ascorbic acid spraying increased, chlorophyll a, chlorophyll b, total chlorophyll, protein, seed yield, fruit yield, number of fruits per plant and oil contents of leaves, but leaf relative water content decreased with the use of ascorbic acid. Treatments had non-significant effects on carotenoid and chlorophyll fluorescence. The concomitant use of 20 mmol of ascorbic acid and 100 μmol of sodium nitroprusside achieved the greatest protein, chlorophyll a, chlorophyll b, total chlorophyll, oil contents, one-thousand seed weight, seed yield and relative water content of leaves.

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EVALUATION OF SOME NUTRITIONAL AND CHEMICAL CHARACTERISTICS OF FRUIT AND OIL OF WALNUT (*JUGLANS REGIA* L.) IN HAMEDAN

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Walnuts (*Juglans regia* L.) are rich source of a number of functional compounds that have positive effects on the human health. In this study nuts of three different walnut cultivars (‘Damavand’, Z53, and ‘Z67’) were collected during the 2013 harvest season in Hamedan, west of Iran. The analysis of chemical composition revealed that protein and dietary fiber was highest in Z53,‘Damavand’ cultivar. The total oil content ranged from (55.2 to 71.7%) while crude energy ranged from 659 to 738.6 Cal. The moisture was found to renge from 1.7% to 2.6% and Variations in peroxide value and acid value were between (0.90 to 0.98 meq O_2/kg oil) and (0.06 to 0.08% oleic acid) respectively. The main fatty acids identified by gas chromatography were stearic (3.1-3.6%), palmtic (6.3-6.9%), oleic (23.8-29.9%), linoleic (51.7-53.1%) and linolenic (8.9-13.5%) acids. Also, the results demonstrated that mineral contents including K, Mg, Fe and Na had significantly varied between all cultivars. The work attempts to contribute to knowledge of the chemical and nutritional properties of walnut kernels. The fruits were found to be rich in protein and unsaturated fatty acids. These results may be useful not only for pharmaceutical and food industries, but also for nutrition counseling. In the evaluated specimens, the oil percentage varied from 54.44 to 72.11. The palmitic, stearic, oleic, linoleic, and linolenic fatty acids were major fatty acids of the tested walnut oils and their proportions were greatly variable among studied genotypes. Result indicated that palmitic acid was the main saturated fatty acid component (6.3-8.4%) followed by stearic acid (2.7-4.3%). The oleic acid was the only monounsaturated fatty acid component and was varied from 23.9 to 34.2 present. Linoleic acid ranged from 45.7 to 53.3 percent was the main fatty acid component in all varieties. Polyunsaturated fatty acid (PUFA) content, as a percentage of total fatty acids, ranged from 51.5to 66.6 percent. In conclusion, the kernel of the ‘Damavand’, ‘Jamal’, ‘Z30’and‘Vina’with higher PUFA percentage, have a higher functional compounds than‘K72’, ‘B21’, ‘RDM’, ‘Ser’, ‘Lara’and‘Pedro’.

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ESTIMATING BIOMASS AND ESSENTIAL OIL YIELD *SATUREJA HORTENSIS* PLANT USING EASILY ACCESSIBLE PARAMETERS WITH ARTIFICIAL NEURAL NETWORK

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Satureja hortensis is Herbaceous, annual, from Lamiaceae family, with square stems, straight and its heights is between 30-60 cm. one of the most important needs in planning application processing of medicinal plants to achieve high performance and quality, Initial assessment physical and chemical properties of region soil By avoiding the use of unnecessary Soil tests diverse, reduced production costs to a minimum. The aim of this study was to estimate the biomass and essential oil yield of summer savory using easily accessible soil parameters including soil texture, %OM, Ph, EC, P, K, N, %C, with using ANN. using sensivity parameters a rapid and low cost method was selected from a variety designed models. Results showed that most artificial neural network models than the estimate multivariate regression model to estimate the biomass and essential oil showed better performance. Also the best model in terms of accuracy and speed of estimating biomass yield, and soil organic carbon model parameters was compared with other models. Related to oil yield because of the high number of parameters needed, emphasis to continuing research and similar studies in this regard.

QUANTIFICATION OF GALANTHAMINE AS AN ANTI-ALZHEIMER'S DISEASE COMPOUND IN TWO MEMBERS OF AMARYLLIDACEAE GROWING WILD IN IRAN

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Galanthamine (GAL) is a morphine-like alkaloid that is a possible therapeutic agent in Alzheimer's disease because of its central cholinergic effects. For pharmaceutical use this natural product has been extracted from the plant sources or produced synthetically. Limited supply of the natural source and high cost of synthetic production has led to a search for alternative sources of galanthamine. In the present study, the bulbs of *Narcissus tazzeta* and *Galanthus nivalis* populations growing wild in Iran have been studied for their galanthamine content. Determination of galanthamine compound was performed by reverse-phase high-performance liquid chromatography (HPLC) on a C_{18} column with the gradient system and acetonitrile and amomium acetate buffer as mobile phase. With this route, an average yield of 243, 104 and 123 µg/g dry weight of galanthamine was obtained from the methanolic extract of *G. nivalis* bulb, *G. nivalis* shoot and *N. tazzeta* bulb, respectively. Our results provided a suitable material for further agronomical and biotechnological strategies for enhanced production of valuable galanthamine compound on a large scale.

A SURVEY ON ALLELOPATHIC EFFECTS OF SAFFLOWER ON SEED GERMINATION OF BARNYARD GRASS, MARY THORN AND OXALIS

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Today, due to implications of utilizing fertilizers and the gradual decline in the effects of chemical weed management, reasonable biological methods have been introduced for weed control. Allelopathy can offer a valuable potential for economic and biological control via releasing allelochemical substances. This research was conducted to examine the allelopathic effects of Safflower extract on germination and growth of Barnyard Grass, Mary Thorn and Oxalis. Treatments were safflower extract in 4 concentrations (25%, 50%, 75% and 100%) as well as distilled water (control). The obtained results indicated that, different concentrations of Safflower cause a significant reduction in germination percentage and primary root and shoot length. 25% of Safflower concentration, at laboratory, decreases the germination of Mary Thorn, Barnyard Grass and Oxalis in percentage of 50, 40, and 20, respectively, in comparison with the control. And 75% concentration of the extract ceases the germination of seeds of Barnyard Grass and Oxalis. The results also show that the extract of Safflower plant has an average allelopathetic effect and prevents the germination of seeds of weeds.

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ANTI-INFLAMMATORY EFFECT OF MARHAME-MAFASEL POMADE IN RATS

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Inflammation is a protective response of body against invading foreign agents and necrotic tissue and can lead to tissue damage. According to Iranian traditional medicine texts, Marhame-Mafasel Pomade which consists of *Arnebia euchroma* L. and *Matricaria chamomilla* L. as major compounds could be beneficial in joins inflammation treatment [1, 2]. In this study, 72 male rats were divided to 3 groups of control, inflammation without treatment (non-treatment) and inflammation with treatment. For inflammation induction, injection of formalin to rat paw, xylene (i.p.) and acetic acid to ear were administered. In treatment group Marhame-Mafasel Pomade, was used on rat paw topically, 30 min before inflammation. To assess the degree of inflammation, Evans blue dye is injected (30mg/kg) through the heart and its penetration into legs, ears and peritoneal fluid were measure. In addition to the mentioned method, assessment of inflammation in the foot was used via measuring the foot diameter. In present study, mean absorbance of Evans blue in treatment group (0.046±0.0048) significantly different compared to non-treatment group (0.084 ±0.0032) ($p<0.05$). Also mean foot diameter in treatment group (0.0771 ± 0.015) was shown significant difference compared to non-treatment group (0.1503 ± 0.017) ($p<0.05$). Also in Peritonitis, the mean absorbance of Evans blue in treatment group (0.186 ± 0.019) was significantly lower than non-treatment group (0.237 ± 0.029) ($p<0.05$). In ear inflammation, Marhame-Mafasel Pomade doesn't shown decrease in inflammation. As a result of this study, Marhame-Mafasel Pomade reduces inflammation in the rat foot. In addition, systemic absorption also reduces inflammation of the peritoneum.

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EFFECT OF *VESICULAR ARBUSCULAR MYCORRHYZA* (VAM) ON SOME PHYSIOLOGYCAL CHARACTERISTIC OF *SATUREJA HORTENSIS* UNDER SALINITY STRESS

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Salinity is one of the most widespread environmental stresses which have enormous effects on crop productivity. In order to study the effect of VAM species (*Glomus mosseae*) on the amount of soluble carbohydrates, photosynthesis pigments and stomatal conductance of savory under salinity stress a Factorial experiments base on completely randomized design was performed with two factors first is salinity with four levels(S_1 = 0 mM, S_2 = 30mM, S_3 =60 mM& S_4 = 90 mM) and second factor is VAM with two levels (M_1= 0 & M_2 = 50 gr Fungal inoculum) in the vases with 25cm diameter and 40cm height. in the Ferdowsi University of Mashhad located in east of Iran. Result show that greatest amount of soluble carbohydrate was related S_4 level of salinity without use of VAM (M_1 S_4) . Minimum amount of soluble carbohydrate was related to M_2 S_1. VAM significantly increased the amount of chlorophyll$_a$, but wasn't significant on the rate of decline in carotenoid and increasing in chlorophyll $_b$ .VAM treats caused none significant reduction on the amount of soluble carbohydrates in salinity levels and had no significant effect on the stomatal conductance too.

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EFFECT OF *VESICULAR ARBUSCULAR MYCORRHYZA* (VAM) FUNGI ON THE MORPHOLOGICAL CHARACTRISTIC OF SUMMER SAVOURY (*SATUREJA HORTENSIS*) UNDER SALINITY STRESS

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Mycorrhizal vesicular-arbuscular fungi are unique between microorganisms occupying rhizosphere [1]. They can increase the tolerance of plants due to environmental stress. In order to evaluate the effect of *Vesicular Arbuscular Mycorrhyza* (VAM) on morphological characteristics of summer savory under salinity stress an experiment was conducted as factoriel based on completely randomized design with three replications and two factors .first factor is salinity with 4 levels (S_1 = 0 mM, S_2 = 30 mM, S_3 =60 mM, S_4 = 90 mM) and second factor is *Vesicular Arbuscular Mycorrhyza* (VAM) species (*Glomus Mosseae*) with two levels (M_1= 0 & M_2 = 50 gr Fungal inoculums in per vase) in the vases with 25cm diameter and 40cm height. this experiment was performed at Ferdowsi University of Mashhad located in east of Iran. Result of this experiment showed that VAM caused significant increase in the number of leaves, fresh weight, dry weight and length of the root, It also decreased the ratio of shoot to root length and the ratio of height to leaf numbers significantly. VAM increased the leaf number in S_1 treatment significantly, but it wasn't significant in S_2, S_3 and S_4 treatments. VAM also increased fresh and dry weight of the root in all of the salt levels. It seems that VAM can decrease the effect of salt stress on growth parameters of summer savory plant.

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EFFECT OF *VESICULAR ARBUSCULAR MYCORRHYZA* (VAM) FUNGI ON SOME BIOCHEMICAL INDICES AND ABSORPTION OF SOME ELEMENTS IN THE SAVORY (*SATUREJA HORTENSIS*) UNDER SALINITY STRESS

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Salinization in soils or waters is one of the world's most serious environmental problems in agriculture [1]. In order to evaluate the effect of Vesicular Arbuscular Mycorrhyza (VAM) fungi species (*Glomus mosseae*) on the proline , relative water content (RWC), electrolyte leakage, sodium and potassium of summer savory (*Satureja hortensis*) under salinity stress, an experiment was conducted as factorial based on completely randomized design with two factors and three replications. First was salinity with four levels(S_1 = 0 mM, S_2 = 30mM, S_3 =60 mM& S_4 = 90 mM) and second factor is vermicompost with two levels (V_1= 0 & V_2 = 1kg in per vase) in vases with 25cm diameter and 40cm height. This experiment was performed in the research greenhouses of Ferdowsi University of Mashhad located in the east of Iran. Result showed that application of VAM Causes significant decrease on RWC in S4 treatment, but this reduction wasn't significant in S1, S2 and S3 treatments. VAM treatment also caused Slight decrease in the amount of proline content and increase in the amount of electrolyte leakage, but This effects was not significant. VAM treatment caused reduces on sodium absorption in all salinity treatments, but this decrease was not significant. Potassium was increased VAM treatments in all salinity levels but this diverse wasn't significant. VAM can increase some of the physiological factors and can use As a solution for dealing with limit salinity.

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CHEMICAL COMPOSITIONS OF METANOL EXTRACT OF FLOWER AND LEAVES OF *ARTEMISIA KOPETDAGHENSIS* FROM IRAN

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The genus *Artemisia (*Asteraceae*)* is the largest and most widely distributed one of the approximately 60 genera belonging to the tribe Anthemideae. This genus comprises a variable number of species, ranging from 200 to 800, which are predominantly distributed in the northern temperature region of the world in the 0-50 cm precipitation area [1]. Thirty four genera of them are reported in Iran of which two are endemic [2, 3]. *Artemisia kopetdaghensis* is a common perennial herb growing wild in Iran. In this study *Artemisia kopetdaghensis* were collected from Sabzevar area in Khorasan-e-Razavi province, Iran. Chemical constituents of essential oil of flower and leaves of *Artemisia kopetdaghensis* were determined. Dried flowers and leaves of plant were subjected to hydrodistillation in a Clevenger–type apparatus until there was no significant increase in the volume of the oil collected. The yield of the oil was 0.13% (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 [4]. Twenty-two compounds were identified constituting more than 99.9% of the oil. γ-Costol (8.5%), camphor (11.1%), borneol (5.5%) , camphor (8.7%), (Z)-citral (17.8%), geranyl acetate (15.3%), and E-citral (17.1%)were major components in essential oil of flower of *Artemisia kopetdaghensis*. Amongst them oxygenated monoterpenes and Oxygenated sesquiterpenes were predominant components.

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SALVIA OFFICINALIS LEAVES EXTRACT DECREASES IMPAIRMENT EFFECT OF IRON OXIDE NANOPARTICLE ON LONG-TERM MEMORY FORMATION IN ADULT MALE MICE

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Nowadays, the use of iron oxide nanoparticles in medicine and industry has grown; while the effects of these substances have been less studied. The studies have shown that leaves of *Salvia Officinalis* have a wide range of biological effects, including learning and memory (1). In present study we evaluated the effect of *Salvia Officinalis* leaves extract on the impairment effect of long- term memory. Adult male mice (25-30 gr) were used in this study. The memory trained and tested by using Step-down apparatus. This apparatus usually is used for measurement of passive avoidance memory in mice. The animals received foot-shock in the train session. The animal were received post-training intraperitoneal (ip) injections of drugs as 6 groups: saline(10ml/kg, ip) group, iron oxide nanoparticle(5mg/kg, ip)group, *Salvia Officinalis* (20, 40 mg/kg, ip)groups, *Salvia Officinalis* (20, 40 mg/kg, ip) plus iron oxide nanoparticle(5mg/kg, ip)groups. Long- term retention tests were performed one week after training day. Step-down latencies to down from platform were recorded. Results indicate that post-training administration of iron oxide nanoparticles (5 mg/kg) decreased step-down latencies that shown impairment of long-term memory formation. On the other hands, extraction of *Salvia officinalis* leaves (20, 40mg/kg, ip) was not effect on long-term memory formation, but decreased the effect of iron oxide nanoparticles (5 mg/kg)when it injected before iron oxide nanoparticles. On the basis of these experiments, it seems that iron oxide nanoparticles are impaired long-term memory. Extraction of the *Salvia officinalis* leaves decreases this effect of iron oxide nanoparticles on memory retrieval in the passive avoidance task.

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THE INFLUENCE OF NANO SIZED TITANIUM OXIDE ON SEED GERMINATION AND EARLY GROWTH CHARACTERISTICS OF *CARUM COPTICUM* L.

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Carum copticum L., an annual herb belonging to Apiaceace (Umbelliferae) is cultivated around the Mediterranean the essential oils of plants and its main component (thymol) used as medicine, particularly for cholera [1]. Application of nanotechnology is now widely distributed throughout the life, and especially in agricultural systems. Nano-particles, because of their physicochemical characteristics (large surface area to volume ratio, ability to engineer electron exchange and highly surface reactive capabilities), are among the potential candidates for modulating the redox status and changing the growth, performance, and quality of plants [2]. The ninth most abundant element and the second most abundant transition metal in the earth's crust is titanium element (about 6.320 $mg.L^{-1}$). This study was conducted to determine the effects of different concentrations (0 as control, 20, 40, 60 and 80 $mg.L^{-1}$) of nano-sized titanium dioxide (anatase, 30 nm in diameter) and titanium oxide bulk (10 $mg.L^{-1}$) on *Carum copticum* L. seed germination parameters such as germination percentage (GP), mean time germination (MTG), germination rate (GR), germination index (GI) and seedling vigor index (VI) in a randomized completely design with three replications. The seeds were surface sterilized by immersion in 1% sodium hypochlorite for 10 min and subsequently rinsed thoroughly with sterilized water. This experiment were conducted using 20 seeds per each treatment. Seeds were placed on one layered Wathman No.1 filter paper moistened with 7 ml of employed solution in sterilized Petri dishes. After each treatment, seeds were transferred to germinators with 16/8 h photoperiod, constant temperature of 22 ºC and relative humidity between 70% and 75%. Germinated seeds were counted daily for 14 days. The germination characteristics were calculated based on their formula. Results showed that the maximum GR (0.103) and the lowest MTG (9.84 day) were obtained in 60 $mg.L^{-1}$ concentration of employed treatment. However, the lowest VI (3.70) and GI (1.64) were observed in the control untreated seeds. Moreover, all of the measured characteristics were not significantly ($P<0.05$) affected by bulk than those of control. In our recent study, nano-sized titanium oxide treatment especially in low concentrations could markedly promote the *C. copticum* seed germination features and seedling vigor index.

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ISOLATION OF RHIZOBACTERIA STRAINS FROM *THYMUS DAENENSIS* RHIZOSPHERE, STUDY THEIR EFFECTS ON SEED GERMINATION AND SEEDLING VIGOR, AND CHARACTERIZATION OF PGPRS

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Since, cultivation of endemic species in agricultural systems could result in their protection and survival at their natural habitat and, also could provide economical benefits; therefore, the cultivation of *Thymus daenensis*, which distributed along the Zagrous Mountain of Iran, seems to be so important. One of the environmental factors that should be considered in the cultivation of endemic species is their root symbiotic microorganisms. A group of bacteria are now referred to "plant growth-promoting rhizobacteria" (PGPR) participate in many key ecosystem processes such as those involved in nutrient cycling and seedling establishment, and therefore deserve particular attention for agricultural or forestry purposes . Considering the importance of PGPRs as biofertilizer for cultivation and regeneration of medicinal plants, the objects of present experiment is first to isolating and identifying the rhizobacteria strains from rhizosphere of *Thymus daenensis* Sub spp. Daenensis; second, study their effects on seed germination parameters include: seed germination percentage, seed germination rate and vigor index, and third, characterizing PGPRs based on some physiological assays such as IAA (Auxin) production, phosphate solubilization, and Siderophore compounds production. To isolating the rhizobacteria, Soil samples were collected from the rhizosphere of *Thymus daenensis* Sub spp. Daenensis plants grown in "Buin va Miandasht" district of Esfahan province. IAA production and phosphate solubilization abilities of rhizobacteria isolates were measured according to Bric *et. al*. (1991) and Pikovaskya (1948) methods, respectively. Chrome azurol S test (CAS) was conducted to differentiate the isolates with respect to production of siderophores. To conduct the seed germination and seedling vigor tests, seeds were inoculated with each bacterium isolate suspension. 21 bacterial treatments and one control (no inoculation) were placed in 3 replications including agar (2%, w/v) plates with 20 seeds in each replication, arranged as a completely randomized block design. Seeds of each treatment were placed and incubated for 10 days with photoperiod of 16 h light and 8 h dark at 24°C and 80% relative humidity. The measurements were done according to International Rules for Seed Testing . Results of our study indicated that TDE3, TDE16 and TDE20 isolates have a good physiological attributes include phosphate solubilization and siderophores production abilities. Also, TDE4 isolate (*Achromobacter spiritinus*) could significantly improve both the SGR and VI of *Thymus daenensis* ($p<0.01$). It seems that these 4 isolate have the potential of PGPRs for applying as biofertilizer in regeneration and cultivation of *Thymus daenensis* Sub spp. Daenensis.

ETHNO-PHARMACOLOGY AND MORPHOLOGICAL INVESTIGATION OF *DITTRICHIA GRAVEOLENS (L.) GREUTER* IN TWO DIFFERENT HABITATS IN GOLESTAN (BANDAR GAZ AND GORGAN)

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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 traditional medicine as anti spasmodic, anti inflammatory, and analgesic. Golestan province with ecological variation has good potential for growth of many wild medicinal plants [1, 2]. In this research, an ethno-pharmacological survey, field observation, investigation and deep interviews with old rural healers were performed and The morphological characteristics of plants in natural habitats around Gorgan and Bandar Gaz in Golestan Province were studied. The survey was performed in early autumn 2013 in 15 repeat. Factors measured included plant height, length of roots, diameter, canopy, crown diameter and stem diameter. Ethno-pharmacological results showed that Aerial parts of D. graveolens has been used in traditional medicine of this region as antispasmpodic , antiseptic ,anti inflammatory. The inhaler of aerial parts is used with Eucalyptus as antibacterial and anti-infection. It`s poultice with *Perovskia abrotanoides* is used as joints analgesic, backache, lumbar disc, Anti muscle stiffness. The morphological investigation results showed that plant height Bandargaz sites with an average of 92.36±2.1 to 68.6±2.09 was higher than the average of Gorgan sites. And root length in Gorgan sites with an average of 7.6±3.3 with an average of 13.94±3.42 was lower than Bandargaz sites. And the other factors were not significant. Different climatic conditions and soil type and altitude above sea level and etc can cause morphological changes in plants.

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THE ROLE OF NANO ANATASE IN BREAKING SEED DORMANCY AND SEEDLING VIGOR ENHANCEMENT OF *NIGELLA SATIVA*

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Nigella sativa is an annual flowering medicinal plant, native to south and southwest Asia. The seeds of *Nigella sativa* Linn. (Ranunculaceae), commonly known as black seed or black cumin, are used in folk (herbal) medicine all over the world for the treatment and prevention of a number of diseases and conditions that include asthma, diarrhoea and dyslipidaemia. *Nigella sativa* oil contains an abundance of conjugated linoleic (18:2) acid, thymoquinone, nigellone (dithymoquinone), melanthin, nigilline, damascenine, and tannins [1]. To date, nanoanatase has been frequently used in numerous productions in our daily life, such as cosmetics, sunscreen, toothpaste, and also as additives in pharmaceuticals and food colorants [2]. The present study is aimed at investigating the effects of various concentrations (0, 20, 40 and 80 ppm) of anatase in nano size (30 nm) and bulk (10 ppm) on *N. sativa* seed braking dormancy and germination characteristics like germination percentage (GP), mean time germination (MTG), germination rate (GR), germination index (GI) and seedling vigor index (VI, GP× seedling length). After seed surface sterilization with sodium hypochlorite (1%, for 10 min) and rinse with sterilized water, they were placed on one layered Wathman No.1 filter paper moistened with 7 ml of employed solution in sterilized Petri dishes. This experiment was done using three replications of twenty seeds per each treatment in a randomized completely design (RCD). Afterthat, seeds were transferred to germinators with 16/8 h photoperiod, 20±2 ºC temperature and relative humidity of 75%. Germinated seeds were counted daily for 14 days. The germination characteristics were calculated based on their formula. Results indicated that among the *N. Sativa* germination indices and growth, only VI was affected by employed treatments. The lowest and the highest VI (2.37 vs. 3.45) were obtained in 80 ppm concentration of nanoanatase and control treatments, respectively. However, the maximum (84.62%) and the minimum GP (78%) were observed in 20 and in control treatments, respectively. Also, the lowest MTG (9.46 day) were obtained in 80 ppm of anatase concentration. Employing nanoanatase in appropriate concentration could promote the seed germination features and early growth of *N. sativa* in comparison to control and bulk.

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COMPOSITION AND ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL OF *NEPETA HORMOZGANICA* FROM IRAN

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The composition and antibacterial activity of the essential oil of the aerial flowering parts of *N. hormozganica* Jamzad have been studied. Analysis of the oil was conducted by GC and GC-MS. Thirty-two components were characterized accounting for 99.4% of the total oil. Oxygenated monoterpenes (87.5%) were found to be the predominant group of compounds, of which 1,8-cineole (65.0%) and 4aα-7α-7aβ-nepetalactone (13.0%), were the main constituents. The antibacterial activity of the essential oil and its main constituents showed that all of the tested microorganisms were highly inhibited by the essential oil with inhibition zones ranged from 12 – 24 mm. The most sensitive bacteria were *S. aureus* and *S. epidermidis* with the lowest MIC values of 0.3 and 0.6 mg/ml, respectively. Considering sensitivity screening it is conceivable that the activity of the oil from *N. hormozganica* could be attributed mainly to the synergistic property of 1,8-cineole and nepetalactone.

TWO NEW EUDESMANE SESQUITERPENES FROM *SALVIA MIRZAYANII.*

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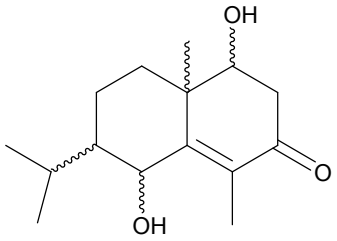
Salvia is the largest genus of Lamiaceae, with over 1000 species found throughout the world.[1] The genus is well known because of wide chemical diversity concerning volatile oils (mono and sesquietepenes) and non-volatiles including di-, sester- and triterpenes along with polyphenolic compounds. *Salvia mirzayanii* is one of the important species of *Hormozgan* province that is used for diarrhea, stomachache, headache, wound, sugar and high blood cholesterol from ancient time by native of Hormozgan [1, 2]. Fractionation of an acetone extract of the aerial parts of *Salvia mirzayanii* led to the isolation of two new eudesmane sesquiterpenes (1, 2) , together with several known compounds, whose structures were secured by 1D and 2D-NMR spectroscopic studies, in particular homo-COSY and hetero-(HMQC and HMBC). These two compounds (1, 2) have the same structure, the only difference is relative configuration of the stereostructures that should then be determined by NOESY.



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POLYPHENOLIC COMPOUND IN ROOTS OF *POLYGONUM AFGHANICUM* PLANT

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The genus *polygonum* is well known for producing a large number of biologically important secondary metabolits such as phenyl propanoids, acetophenones, chalcones, coumarins, flavonoids, lignans, naphtoquinones, anthraquinones, sesquiterpenoids, triterpenoids, stilbenoids and tannins [1]. The dried roots of this plant were traditionally used for treatment of atherosclerosis, cough, asthma, hypertension, cancer, skin burn, gallstone, hepatitis and osteomyelitis in East Asian countries [2, 3]. In this study, the methanolic and chloroform extracts of the roots of *Polygonum afghanicum*, which is an Iranian species and is found in northeastern (Khorasan province) and southeastern of Iran, was phytochemically examined by thin layer chromatography technique. Therefore, the dried and finely ground roots were initially extracted by methanol in a soxhlet apparatus. Then, the obtained methanolic extract was concentrated in vacuo, suspended in H_2O, and successively extracted by *n*-Hexane, chloroform and ethyl acetate. To detect the chemical classes of the main constituents in the extracts, the standard phytochemical reagents and TLC technique were employed. Accordingly, the chloroform extract purified by vacuum liquid chromatography (VLC), and column chromatography respectively. Finally, the structure of the isolated compound, 7-hydroxyflavane ,was elucidated by ^{1}H NMR, ^{13}C NMR and IR techniques.

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EFFECT OF FOLIAR APPLICATION OF DIFFERENT ZINC FORMS ON GROWTH, YIELD AND ESSENTIAL OIL CONTENT OF SUMMER SAVORY (*SATUREHA HORTENSIS*)

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Summer savory (*Satureja hortensis*) is a well-known medicinal plant species from the Lamiaceae family. Plant nutrition is one of the important factors that affect the quality and quantity of medicinal plants. Since the increase of nutrients in the soil and nutrient solution does not always lead to increased yield, so determine the proper amount of nutrients is essential for enhancing the quantitative and qualitative yield in plants. To study the foliar application effects of three zinc types (Zn nanoparticles, $ZnSO_4.7\ H_2O$ and Zn-EDTA) in four concentrations (0, 1, 2 and 3 g l^{-1}) on summer savory, a pot experiment was conducted as factorial based on completely randomized design with four replications. The results showed that foliar application of Zn has significant effects on growth parameters (plant height, stem diameter, number and area of leaves, number and length of axillary shoot, dry herb yield), essential oil content and yield. The highest and lowest amounts of growth parameters were observed in Zn nanoparticles and no Zn application treatments, respectively. Also, the highest (3.23%) and the lowest (2.57%) essential oil content were obtained in Zn nanoparticles and no Zn application treatments, respectively. Accordingly, the highest (1.25 ml/pot) and the lowest (0.62 ml/pot) essential oil yield were observed in Zn nanoparticles and no Zn application treatments, respectively. Overall, the findings of this study showed that foliar application of zinc can be used to increase the biomass and essential oil production in summer savory. In addition, the effect of $ZnSO_4.7\ H_2O$ was lower than Zn nanoparticles and Zn-EDTA.

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SALT TOLERANT EVALUATION OF FIVE *SATUREJA HORTENSIS* POPULATION (MORPHOLOGICAL TRAITS)

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Satureja hortensis L. (Lamiaceae) is an annual herb that is used in the traditional medicine of Iran for treating stomach and intestinal disorders. In this research, the experiment was conducted on factorial (include two factors) based on completely randomize design (CRD). The first factor was salinity stress (0, 25, 50 and 100 mM NaCl) and the second factor was savory population (Mashhad, Isfahan, Tabriz, Shiraz and Markazi). The important traits measured including: plant height, stem diameter, shoot number, leaves number, plant fresh weight, plant dry weight, root fresh weight and root dry weight. The results showed that there were significant differences between in various levels of salinity and population. Stem diameter decreased with increasing salinity in all population. The minimum stem diameter was observed on Mashhad population and the maximum content was related to Isfahan and Shiraz population. Salinity concentration reduced plant height and the highest and lowest plant height calculated in control (51.86 cm) and 100 mM NaCl (34.86cm) treatments, respectively. The most shoot number (15) was measured in Isfahans population and the lowest shoot number (6.33) belonging to Tabriz population. Salinity decreased leaf number at all level. Different NaCl treatments, significantly reduced plant fresh weight and dry weight. Salinity increasing caused a significant reduction in dry weight as maximum dry weight obtained in 0 Mm NaCl (5.18 g) in Shiraz population and the minimum content obtained in 100 mM NaCl (0.81 g) in Mashhad population. In addition, root fresh weight and root dry weight decreased with increasing salinity. Totally, the highest and lowest content of root fresh weight and root dry weight related to control treatment (0 mM NaCl) in Tabriz population and 100 mM NaCl treatment in Shiraz population. Our results indicated that with increasing salinity, Growth parameters were decreased.

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