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Dear Participants

It is my great pleasure and honor to welcome you to the 5th National Congress of Medicinal Plants (NCMP, 2016) on behalf of the National Network of Research and Technology in Medicinal Plants.

The meeting will provide the necessary platform on which researchers from all over Iran will meet in order to present the state of the art in the different fields of medicinal plants including pharmacy, medicine, agriculture and natural resources, biotechnology, basic sciences, business and industry. In this congress, more than 900 abstracts were received at the secretariat office, about 680 of which will be presented as posters and oral lectures.

The program will be complemented with a professional exhibition that will provide the participants an opportunity to exchange their experiences and negotiate with the producers and business sectors of medicinal plants and herbal medicines.

In addition to the appealing program of the conference, Isfahan, with its tourist attractions, the diversity and quality of its masterpieces, is an unforgettable place to visit.

In particular, I would like to thank the members of organizing committee for their invaluable efforts on setting up the program, our many colleagues of scientific committee for their thorough and timely reviewing of the papers, and our sponsors who have helped us keep down the costs.

Peyman Salehi

Congress Scientific Chair

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Oral Presentation

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MANAGEMENT OF *PHYTOPHTHORA* SPP. USING *THYMUS ERIOCALYX* ESSENTIAL OIL

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Phytophthora species are soilborne oomycete that can infect more than 45 species of crops plants and survives in the soils as Oospores for several years [1, 2]. This pathogen can cause fruit, crown, and root rot, and stem and leaf blight disease. It is one of the most devastating diseases affecting cucurbit and vegetables production in Iran [3]. In this study we survey the antifungal activity of *Thymus eriocalyx* essential oil and Metalaxyl fungicides against three species of *Phytophthora* including *P. capsici*, *P. drechsleri* and *P. melonis* causal agent damping-off in plants of Pepper, Cucumber and Melon *in vitro* respectively. Six different concentrations of essential oils and fungicide were used for assessment of their inhibitory activities against the pathogen through mycelial growth inhibition on Corn Meal Agar. Fungal radial growth was measured and a median effective concentration (EC_{50}) value (ppm) was calculated according to the linear relation between inhibitory probit and concentration logarithm. The chemical composition of the essential oils was determined by gas chromatography-mass spectrometry (GC-MS). Also, Data were analyzed using SPSS software. The results showed that *Thymus eriocalyx* essential oil were very effective on three species of *Phythophthora*. Maximum and minimum EC_{50} values of oil on species of Phythophthora were 41.060 and 28.494 for *P. capsici* and *P. melonis* respectively. The mean EC_{50} values for Metalaxyl on *P. capsici*, *P. drechsleri* and *P. melonis* were 20.869, 20.055 and 17.702, respectively. The profile of the oil components of *T. eriocalyx* showed that Thymol (35.86%), Eucalyptol (7.74%), Borenol (7.95%), γ-Terpinene (5.49%) were the main compounds. Nevertheless, the effectiveness of the essential oils was variable depending to concentration of plant essential oil and species of fungi. This results show that essential oil may be have potential to control of some *Phytophthora* species and could be considered for developing new fungicides.

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ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS IN HAMADAN W.IRAN

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For many years medicinal plants were the only available material for human. Human found their properties by test and mistake. Further scientific developments provide appropriate tools to have a better knowledge of these materials. Different side effects of chemical drugs shift scientist to reexamined natural materials to find substitutions [3]. Iran with a wide range of habitats and rich flora is a precise sample of natural medicinal substances. To improve non chemical pharmacy field studies should be done to encounter with traditional beliefs of local inhabitants. Medicinal plants have a main role in the food and daily life of people in Hamadan. Data gathering was based on interviews with old locals, visiting daily market at spring and summer and studying the literature [1, 2]. Samplings from different localities were done. In present study 33 species of medicinal plants were recognized in this region. Most abundant medicinal families are Asteraceae and Lamiaceae but totally there are 16 families with traditional use in studied region. *Capparis* and *Foeniculum* are medicinal plants which are used in daily cuisine. *Stachys lavandulifolia* is used temporarily as a beverage to heal stomach pains too. Turmeric, Cumin and Fenugreek are used as additives in local breads.

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COMPARATIVE STUDY OF CHEMICAL COMPOUNDS BETWEEN ORGANIC AND NON ORGANIC SAFFRON

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Saffron(Crocus sativus L.) as a main medicinal and industrial cash crop has more than 70,000 ha with annual production of 300 tons in Iran .This plant is one of the most valuable herbs that attracted the world's attention due to various medical properties. Agronomic and environmental factors effect on the quality and quantity of active constituents in saffron. Tested saffron was collected from saffron farm which the necessary and requirement of organic production was done in Qaen. In this study, we compared chemical compounds of organic (OS) and non-organic saffron (NOS)..In addition, was evaluated their total antioxidant, total phenolic contents, and radical-scavenging activity. Our result indicated that OS has more secondary metabolites than to NOS. The FRAP values of adequate concentrations of both organic OS and NOS extracts (2.5 g/l) indicated that the reducing power of the OS extract is significantly higher compared to NOS extract. The results of total phenolic values for both OS and NOS stigmas extracts indicated that the amounts of total phenolic content of equal concentration (2.5 g/l) of OS was dramaticly more than NOS one. Also cytotoxic and antioxidant properties of OS are higher compared to NOS, significantly.

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COMPARATIVE STUDY OF EFFECT TREATMENT OF *FICUS CARICA* LATEX CREAM VS. PODOPHYLLIN IN TREATMENT OF GENITAL WARTS

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Genital wards are the most common sexually transmitted disease (STD) throughout the world. This STD is caused by some types of human papillomavirus (HPV). Pathogenicity spectra of vaginal HPV infection is very different and includes warts and cancer. Treatments for genital warts such asimiquimod, podophyllin and cryotherapy. The recovery and recurrence rates and complications were different amongst these treatments. Regarding traditional medicine applied in countries such as Iran and India, a variety of traditional treatments are used for common warts including fig latex. This double blind clinical trial was carried out in Yazd province from October 2013 to June 2015. A total of 32 female patients with external genital warts who were randomly divided into two groups entered this study. Fig latex cream was topically administered two or three times a day and podophyllin cream was topically used once a week. Duration of the treatment was investigated and the recovery rate was evaluated based on the reduced number and size of warts, recurrence rate one month after termination of treatment, complications during the treatment procedure and satisfaction level of patients. The mean duration of the treatment was 7.8± 6.12 weeks and 10.9± 6.18 weeks in fig latex cream and podophyllin cream groups respectively. There were no significant differences between these two groups (p=0.19). The recovery rate was reported %46.6 and %69.2 in fig extracts therapy and treatment with podophyllin, respectively. The number and size of the warts in both groups was significantly reduced before and after the intervention. Furthermore, there were no significant differences in the number and size of the warts in two groups. The frequency of complications was significantly higher in patients treated with fig latex cream compared podophyllin cream group (p=0.008). The recurrence rate was reported zero in both groups and no significant difference was observed between recurrence rates in both groups. Also there were no significant difference between satisfaction level of the patients in both groups. The findings of the present study show the therapeutic effect of ficuslatex creams on treatment of genital warts. No significant recurrence was observed after termination of therapy and the satisfaction level of the patients was similar the patients treated by podophyllin.

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ASSESSING COMPARISON THE EFFECT OF COOLING GEL PADS AND TOPICAL OLIVE OIL ON THE INTENSITY OF EPISIOTOMY PAIN AND WOUND HEALING

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Episiotomy is one of the most common surgery intervention. The perineal pain resulting from episiotomy is a stressful factor in primiparous women which interferes with their ability of nursing and doing their duties as a mother. Cold therapy is a topical treatment which is effective in relieving inflammation and wound healing. Olive oil also increase the rate of wound healing. The present study has been conducted to evaluate and compare the effect cooling gel pads and topical olive oil on the intensity of episiotomy pain and wound healing in primiparous women referring to hospitals affiliated with the Gilan University of Medical Sciences in 2014. This randomized clinical trial was conducted on 90 primiparous women who referred to hospitals affiliated with the Gilan University of Medical Sciences. The participants were randomly allocated to two groups: those receiving cooling gel pads (for 20 minutes on demand, 12 hours after delivery and for 10 days) and the topical olive oil (2 times a day, 12 hours after delivery and for 10 days). The perineal pain intensity was evaluated using visual analogue scale (VAS) and the wound healing was evaluated by the REEDA scoring scale for 3 times: the 12 hours, 5th and 10th day after episiotomy. The two groups did not show any significant differences in demographic featuresand other intervening variables. There was a statistically significant difference in the intensity of perineal pain in two groups at 12 hours (p= 0.04) and on the day 5 after episiotomy (p= 0.03) and wound redness on the day 10 after episiotomy (p= 0.04). Using cooling gel pad and olive oil are effective in reducing the perineal pain intensity and episiotomy wound healing, as a safe, available and cost-effective method.

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TANACETUM PARTHENIUM LIPID TRANSFER PROTEINS ENHANCE APOPLASTIC ACCUMULATION OF COSTUNOLIDE AND PARTHENOLIDE

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Feverfew, *Tanacetum parthenium* L., has been used for centuries as fever reducing herb and even now it is still being used to treat migraines. The most active compounds in feverfew extracts are the sesquiterpene lactones (ST) which are known as anticancer compounds, of which 85% is parthenolide. Since these almost hydrophobic compounds are made in glandular trichomes and are supposed to be secreted to the space between trichomes and cuticle, a transport mechanism should be involved. Here we investigated whether lipid transfer proteins (LTPs), forming a hydrophobic cavity in their tertiary structure, may be involved in transport of such metabolites. LTPs are secreted to the apoplast, hence may facilitating the transport of partehnolide/costunolide to or in the apoplast. We identified eight feverfew LTPs from glandular trichome library which were showing similar expression pattern to parthenolide biosynthesis pathway genes. All candidate LTPs were amplified by RACE-PCR approach and their CDS were subsequently cloned into plant expression vector under the control of CaMV35S promoter. Individual LTPs were coexpressed with costunolide or parthenolide biosynthesis pathway in *Nicotiana benthamiana* and the total production of costunolide and its conjugates as well as their apoplasticratio was measured. We show for the first time that LTPs do indeed affect free products with LTP1 and 2 showing the most increase in costunolide and its conjugates. On the other hand, LTP3 was effectively increasing parthenolide content in the cells, where apoplastic content of this compound was 8 times higher than control plants. We also show that secretion of free costunolide to the apoplastis increased by 15.2% by LTP1+ LTP2. Characterisation on specificity and possible mechanism of actions LTPs is in progress.

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EFECT OF CHLOROCHOLINE CHLORIDE ON ACCUMUATION OF BETULIN AND BETULINIC ACID IN CELL SUSPENSION CULTURE OF *BETULA PENDULA*

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Silver birch (*Betula pendula* Roth) is a medicinally important woody plant. This plant produces a range of biologically active terpenoids such as betulin and betulinic acid. These triterpenes have been used for their medicinal properties. Recent clinical studies have shown that betulin was effective against a variety of tumors [1, 2]. The biotechnological techniques for the production of terpenoids using cell cultures, is a good strategy to enhance the yield of these natural compounds. The objective of the present study was to evaluate effect of different concentration of chlorocholine chloride and exposure time on the cell culture and growth index. In this research cell cultures of *B. pendula* was established on NT-based medium [3] with hormonal concentration of 2.5 mg L^{-1} 2,4-D and 0.5 mg L^{-1} BAP. Then the effect of chlorocholine chloride (with final concentration 0, 0.5, 1, 2 and 3 mg L^{-1}) on cell suspension cultures was investigated. chlorocholine chloride was added to the 8-day-old cell cultures and cell growth, betulin and betulinic acid content were monitored at 1, 2, 3, 5 and 7 days after feeding. The results showed that cell viability in the fed cells were decreased compared to controls. Also maximum increase in growth index was obtained on the 5 days after feeding with 0.5 mg L^{-1} chlorocholine chloride. The accumulation of betulinic acid in cells 3 days after feeding by 2 mg L^{-1} chlorocholine chloride was increased about 1.7-fold (3 mg g^{-1} DW) compared to controls. Moreover, betulin accumulation was enhanced 7 days after feeding by 2 mg L^{-1} chlorocholine chloride about 149.3-fold (19.4 mg g^{-1} DW). In conclude, although the low concentration of chlorocholine chloride (0.5 mg L^{-1}) was resulted the highest increased cell growth but interestingly, betulin production can be increased by high concentration of chlorocholine chloride (2 mg L^{-1}).

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EVALUATION OF PHENYLALANIN AMMONIA LYASE (*PAL2*) GENE INVOLVED IN ANTIOXIDANT SYNTHESIS PATHWAY IN SOME ENDEMIC MEDICINAL PLANTS

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Nowadays, the use of natural antioxidants instead of synthetic ones has been improved in food industries. Many of medicinal plants can be added in the foods as natural spices. Moreover, Herbs and spices are amongst the most important targets to search for natural antioxidants from a safety point of view . These properties are due to their many active phytochemicals such as phenolic compounds, flavanoids, terpenoids and carotenoids. phenylalanin ammonia lyase *(pal_2)* gene is a major compound of antioxidant synthesis pathway in some medicinal plants. The Sequencing of phenylalanin ammonia lyase was also reported by previous researchers to use in phylogeny of important genera belong to Anthemideae subfamily. The aim of the present study was to evaluate diversity among some endemic species of Apiaceae using detection of *pal2* involved in antioxidant synthesis pathway. Therefore, this study was designed to identify the gene amplification in some of the native species of the family Apiaceae. We used the Basic Local Alignment Search Tool (BLAST) to finds regions of local similarity between sequences. The program compares protein sequences to sequence databases and calculates the statistical significance of matches. Thus, in order to designed primers, we compared similarity between sequences for the first time with the Mulitalin software and finnaly primers were deisgned based on conserve sequences. Conserve primers were designed and applied in three species of Apiaceae family including Dorema aucherii, Ferula assa-foetida and Prangos ferulacea. The PCR products were amplified the amplicon about 700 base pairs and finally the PCR products were sequenced [1-3].

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OPTIMIZING THE PRODUCTION OF ARNEBIA EUCHROMA OIL, AN IRANIAN TRADITIONAL ANTI-INFLAMMATORY FORMULATION

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Havachoobeh (*Arnebia euchroma*) root is traditionally claimed as one of the most potent anti-inflammatory herbs. Recent investigations have confirmed its antibacterial, anti-oxidant, and anti-inflammatory activities [1]. It is full of deep red materials which the most part of them belong to hydroxynaphthoquinones (HNQ) especially shikonin derivatives [2]. These compounds are responsible for most of therapeutic actions of the herb [1]. As a consequence of considerable medicinal effects, libertine collection of the roots endangers the herb. Therefore, optimizing the method of preparation of pharmaceutical products of this herb can be helpful in preserving and protecting the herb from inexistence. In Iranian traditional medicine, the method of preparing Havachoobeh root oil is to boil 40 g of crushed roots in 200 g of sesame oil [3]. The residue of the roots is then discarded. In this study, we try to extract and determine the active compounds from the residue by sequential extraction. Regarding the scientific documents, we will finally highlight the probable therapeutic properties of the root extracts. Fourty grams of crushed roots were boiled in 200 g sesame oil for 30 min at 100°C. The oil was filtered and kept in a closed container (Oil 1). The residue of roots was boiled again in 200 g new sesame oil for four times (Oil 2-5). All these samples were extracted via ethanol 96 to separate HNQ. The total content of HNQ was the measured by spectrophotometry at 516 nm while using L-shikonin as standard. The results showed that HNQ contents of oil 1 to 5 are 0.4, 0.25, 0.09, 0.06, and 0.02% (w/w), respectively. Previous in vivo investigations suggested the oral anti-inflammatory dose of HNQ as 9-12.5 mg/kg (equivalent to 1-1.4 mg/kg in human) [4, 5]. Based on these studies, only the oil 1 contains enough content of HNQ and can be prescribed in human by the dose of 3 tablespoon daily. On the other hand, recent investigations have determined topical therapeutic doses of HNQ much less than oral ones [6]. Thus, oil 2 to 5 can be used for topical ailments such as skin burns, wounds, and ulcers.

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QUALITATIVE AND QUANTITATIVE ANALYSIS OF PLANT MATERIALS

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Plant materials are used throughout different countries as home remedies for the prevention and treatment of various diseases, over-the-counter drug products and raw materials for the pharmaceutical industry, and represent a considerable proportion of the global drug market. It is needed to ensure the quality of medicinal plant products by using modern control techniques and applying suitable standards. In the present study, we classified a series of tests for assessing the quality of medicinal plant materials. It constituted a collection of test procedures to support the development of national standards based on local market conditions, with due regard to existing national legislation and national and regional norms. Plant preparations have a very special characteristic that distinguish them from chemical medicines, because a single plant may contain a great number of bioactive compounds and a combination of plants even more. This complexity is one of the most important challenges to researchers attempting to identify a single bioactive compound or chemical group in the enormous universe that comprises a single crude extract. Several techniques similar to those used for the analysis of synthetic drugs are also frequently employed for analysis of medicinal plant materials (e.g. volumetric analysis, gravimetric determinations, gas chromatography, column chromatography, high performance liquid chromatography and spectro-photometric methods). Sample preparation is one of the critical steps in analysis of plants. Some modern sample-preparation techniques include solid- phase micro-extraction, supercritical-fluid extraction, pressurized- liquid extraction, microwave- assisted extraction, solid-phase extraction, and surfactant-mediated extraction. Subsequent evaluation revealed some products to be adulterated with other related plants from the same genus or family. Determination of adulteration in herbal products could be achieved by some accurate physical and chemical analysis [1-3].

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EFFECT OF THE LEMON INTAKE ON WEIGHT LOSS, METABOLIC PROFILES AND BIOMARKERS OF OXIDATIVE STRESS IN OVERWEIGHT SUBJECTS: A RANDOMIZED DOUBLE-BLIND PLACEBO-CONTROLLED CLINICAL TRIAL

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Overweight has been defined as accumulated body fat in the body [1]. Overweight is associated with increased risk of type 2 diabetes mellitus (T2DM), cardiovascular disease (CVD), and nonalcoholic fatty liver disease and decreased quality of life [2]. However, the use of various medications [3] and bariatric surgery has also been argued as an alternative strategy in some cases. Due to the several side effects of these strategies, there is an increasing demand for using herbal medications, including lemon in the management of excess weight. The current study for the first time was performed to determine the effects of lemon pearl intake on weight loss and metabolic profiles among overweight subjects. Methods: This randomized double-blind placebo-controlled clinical trial was conducted among 103 overweight subjects aged 15-65 years old. After 2 weeks Run-in period Participants were randomly assigned into three groups to receive: 1) lemon soft gel100 mg (n=35); 2) orlistat120 capsule (n=34) and 3) placebo (n=34) three times a day for 8 weeks. Anthropometric measures and metabolic profile, total antioxidant capacity and glutathione in fasting blood samples were taken at baseline and after 8 weeks of intervention. Results: Consumption of the lemon pearl, orlistat and placebo resulted change in weight (-0.56±1.05 ,-0.46±1.67 and. 0.29±1.36 kg, respectively) and BMI change (-0.21±0.41, -0.18±0.66 and 0.11±0.53 kg/m2, respectively) that changes in both of treatment group was significant and non significant in compared with control group. Blood indexes changes in 3 of the groups was not significant. Conclusion: Taking lemon pearl for eight weeks among overweight subjects had the significant reduction in weight and BMI compared with the placebo group.

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PREPARATION, ^{99M}TC LABELING AND EVALUATION OF HYDROALCHOLIC EXTRACT FROM *KELUSSIA ODORATISSIMA* MOZAFF FOR CYTOTOXIC EFFECTS ON CANCER CELLS AND TUMOR IMAGING

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Medicinal plants are rich resource of secondary metabolites which are important both in traditional and modern medicine. Due to spread of cancer, early diagnosis is very important in treatment process. Medicinal plants contain compounds with cytotoxic effects and further, cause growth inhibition of cancer cells. Among these compounds are phthalides. Phthalides prevention of cell cancer growth exerts their DNA methylation inhibitory by different mechanisms [1, 2, 3]. The study on *kelussia odoratissima* mozaff showed that phthalides are the main compound in essential oil of this plant. In this work, in order to design an anticancer drug and also a tumor imaging agent in this work lead extract of this plant was prepared and after labeling its effect for anticancer property is investigated. *Kelussia odoratissima* Mozaff was collected from Zard-Kooh Mountains, Charmahal-e Bakhtiari province and was extracted by maceration method, and then different fractions of crude extract were prepared. Cytotoxic effects of these fractions were evaluated in human colon carcinoma cell line HT-29 via MTT test. Radiocomplex was prepared with use of ^{99m}Tc in the presence of $SnCl_2 \cdot 2H_2O$ as a reducing agent. Labeling yield and in vitro stability of the complex was investigated by HPLC. Crude extract and its fractions especially chloroform fraction showed cytotoxic effect for human colon carcinoma HT-29 cells. Labeling yield of more than 80% was obtained corresponding to a high specific activity. Radiocomplex showed good stability in the presence of normal saline. Biodistribution studies in tumor bearing mice and structure evaluation of its anticancer materials are under way. The extract from this medicinal plant may be useful for tumor treatment and imaging and further investigation in this area is required.

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COLCHICINE FLUORESCENCE AMPLIFICATION WITH ENVIRONMENTAL PARAMETERS

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Colchicine is an alkaloid, which derived from a plant source known as *Colchicum* L., possesses anti-inflammatory and anti-mitotic properties.Colchicine and its analogues have been used clinically for the treatment of certain forms of leukemia and of solid tumors.It is clearly degraded under light exposure and the degradation products being pharmacologically inactive [1, 2]. Colchicine is degraded in acidic and alkaline pH [3]. It is demethylated to colchiceine with dilute acid, and further hydrolyzed with concentrated acid to trimethylcolchicinic acid.Colchicine exhibits a spontaneous fluorescence, but the intensity of the signal is much smaller compared to the UV absorbance. Fluorescence spectroscopy is an influential tool for determination of chemical and biological system's reactivity, whereas it provides non-intrusive measurements of substances in low concentration under physiological conditions. The present study demonstrated the effect of some parameters such as: pH, light and ionic concentration on fluorescence intensity of Colchicine. The stock solution of colchicine (3.0×10^{-4}Mol L^{-1}) in double distilled water was prepared for the fluorescence, light, pH, and ionic concentration studies. The solutions were stored at ambient temperature (25°C).The 10^{-3} mol L^{-1} of Colchicine has a pH of 5 and in the pH of 10 the intrinsic fluorescence of Colchicine shows the maximum enhancement.The results of light on Colchicine molecule was investigated by fluorescence method. The intrinsic fluorescence of 10^{-3}mol L^{-1} Colchicine solution which is treated in different time lightening from 6 to 66 hours was measured. Lightening more than 12 hours caused quenching of the intrinsic fluorescence of theColchicine. The effect of changing ionic concentration on the intrinsic fluorescence of Colchicine was also investigated with different concentrations of NaCl (5% to 25%). The maximum enhancement was observed in 20% solution of NaCl. All the results in line with Ertel and Wallace, 1970, and Bodoki *et al*., 2005.

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EFFECTS OF TROXERUTIN ON THE MYOCARDIAL ISCHEMIA/REPERFUSION INDUCED ARRHYTHMIAS IN DIABETIC RATS

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Troxerutin is a trihydroxyethylated derivative of the naturalbioflavonoid rutin. Sufficient evidence has shown that it has manybiologic effects, such as anti-oxidative, anti-inflammatory, antierythrocytic, anti-fibrinolytic, anti-thrombotic and anti-neoplastic effects. To date, effects of troxerutin on the myocardial ischemia/reperfusion (I/R) injuries in diabetic conditions remain unclear.The aim of this study was to investigate the effects of troxerutin on the cardiac arrhythmias induced by myocardial I/Rin diabetic rats. Male Wistar rats (230-300g) were randomly selected, and then diabetes with duration of 10 weeks was induced by single injection of streptozotocin (50mg/kg; ip). The animals were divided into four groups: control, control+ troxerutin, diabetic and diabetic+ troxerutin. Troxerutin (150mg/kg) was orally administered during a month after induction of diabetes in the mentioned groups. The heart of rats were removed and quickly mounted on a Langendorff apparatus, perfused at a constant perfusion pressure of 100 mmHg and at 37 °C by modified Krebs-Henseleit buffer medium gassed with 95% O_2- 5% CO_2 (pH=7.4). The hearts were subjected to 30 min regional ischemia followed by 60 min reperfusion. At the end of the experiment, cardiac arrhythmias were analyzed based on the Lambeth conventions to determine the number of premature ventricular contractions (PVC), ventricular tachycardia (VT), the incidence and duration of VT and ventricular fibrillation (VF) during ischemia and 20 min at the beginning of reperfusion. Troxerutin had considerable effects on the arrhythmias of ischemic phase as caused significant reduction on PVC ($P<0.01$),VT and VF arrhythmia in diabetic rats. In addition, troxerutin showed a significant reduction on the VF incidence during reperfusion phase in diabetic groups($P<0.01$). In conclusion, the present study indicated that troxerutin can decrease the arrhythmias induced by I/Rin diabetic rats. Maybe, this flavonoid can be used as a potential therapeutic agent against cardiovascular diseasessuch as arrhythmiasin diabetic conditions.

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ISOLATION AND IDENTIFICATION OF THREE PHENOLIC COMPOUNDS FROM *ALLIUM FISTULOSUM*

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Allium fistulosum (Welsh onion) is a perennial herb that is widely cultivated throughout the world, specially is a very famous vegetable in Asian countries, both the white sheaths and green leaves are eatable [1, 2]. This plant is also a very known vegetable in Iran and beside the food and medicinal uses, it is used routinely as a raw vegetable with the main meals [3]. Phytochemical investigation of *A. fistulosum* leaded to the isolation of three main phenolic compounds including two cinnamic acid derivatives and a flavonol glycoside. The chemical structure of the compounds have been elucidated unambiguously by spectroscopic methods, including 1D and 2D NMR and MS. Finally the isolated compounds identified as N-p-coumaroyltyramine (1), (10)-methoxy-N-p-coumaroyl tyramine (2) and isorhamnetin-3-O-galactoside (3), respectively. While the coumpound (1) has previously been reported from *A. fistulosum*, the compounds (2) and (3) described from this plant for the first time.

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PREVENTIVE AND RELIEVING EFFECTS OF *NIGELLA SATIVA* ON OBSTRUCTIVE RESPIRATORY DISEASES, BASIC AND CLINICAL EVIDENCES

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Nigella sativa (*N. sativa*) is one of the most widely used medicinal plants. It has been used as food additive, preservative and herbal remedies for different diseases from ancient time. In traditional medicine (Ayurveda, Unani and Tibb) many astonishing effects like treatment and prevention of many diseases related to the respiratory, gastrointestinal, immune and nervous system had been mentioned for *N. sativa* [1]. Online literature searches were done using different search engine such as Medline, Pubmed, Iran medex, Scopus, and Google Scholar backed to 1960 to identify articles, editorials, and reviews about preventive and relieving effects of *N. sativa* on obstructive respiratory disorders. In recent three decades, numerous researches have been done to approve those folk properties, identifying plant-derived natural substances and understanding their mechanisms of action in the body. Different extracts, fractions and constituents of *N. sativa* showed anti-inflammatory, immunomodulatory and antioxidant effect in animal models of obstructive respiratory disorders associated with lung inflammation, oxidative stress and imbalance of immune system. Clinical studies also indicated preventive effect as well as relieving effect of the plant and its constituents on various obstructive respiratory diseases. There are many basic and clinical evidences of *N. sativa* and its constituents on preventive (anti-inflammatory, antioxidant and immunomodulatory) and relieving (bronchodilatory) effects on obstructive respiratory diseases. Therefore *N. sativa* could be of therapeutic values as both preventive and relieving therapy in obstructive respiratory diseases [2].

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THE EVALUATION OF SOIL FERTILITY SYSTEMS ON SAGE (*SALVIA OFFICINALIS* L.) UNDER DIFFERENT MOISTURE CONDITIONS

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Sage is a popular medicinal plant which is widely used in cosmetics and pharmaceutical industries. A two years study was conducted to study the effects of different fertility systems on growth and essential oil production of sage under water deficiency. For this purpose, we used a randomized complete block design arranged in split plots with three replications. Treatments included three irrigation levels (irrigation after depletion of 40% available water, irrigation after depletion of 60% available water, irrigation after depletion of 80% available water) and five different soil fertility systems (control (no fertilizer) (F0), chemical fertilizer (urea) (Ur), nitrogen fixing bacteria (NFB), vermicompost (V) vermicompost + nitrogen fixing bacteria (V+NFB)) will be allocated to main plots and sub plots respectively. Results showed that the highest plant height, canopy diameter, leaf area index, and dry matter yield were obtained at no stress and V+NFB at all three harvest. Also, the maximum essential oil content, essential oil yield and essential oil compounds were obtained at moderate stress and V+NFB at all three harvest. The maximum essential oil content was obtained at second harvest time and the highest essential oil yield, α-thujone, 1, 8- cineol and camphor were obtained at third harvest time. Also, the results showed that the highest content of photosynthetic pigments were observed in treatment of vermicompost + bacteria and in no stress conditions. The maximum of Rosmarinic acid and caffeic contents were obtained in moderate stress. The results showed that the highest sugar and proline contents were observed in vermicompost + bacteria treatment and severe stress. Overall, organic fertilizers could partially improve the harmful effects of water deficit stress on sage plant. Overall, application of vermicompost and inoculating the plant with PGPR resulted in the highest qualitative and quantitative yields of sage as these treatments favored different soil characteristics and help in establishing a sustainable agricultural system.

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USE OF NEW DRUG DELIVERY SYSTEMS FOR INCREASING THE BIOAVAILABILITY OF HERBAL ACTIVE INGREDIENTS WITH EMPHASIS ON THE FORMULATION OF CURCUMIN NANOPARTICLE

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Recently, there is an increase use of herbal medicines because of more healing and less adverse effects compared with conventional medicines. However, many herbal preparations and extracts while exhibit impressive effects in in-vitro conditions, they present less or minimal effects in in-vivo practices. This is as a result of low fat solubility, improper molecular size, weak absorption and ultimately low bioavailability. By recent advances in the technologies of drug delivery systems, new prospects have been built toward increasing the bioavailability of herbal active ingredients. These technologies include: Liposomes, microspheres, nanoparticles, autosomes, etc. These technologies can be implemented and evaluated on some herbal active ingredients, such as: sinomenine, naringin, genistein, quercetin, glycyrrhizin, piperine and Curcumin. Curcumin is a photochromic pigment which is extracted from the rhizomes of perennial Turmeric plant (Curcuma longa), and has numerous pharmacologic activities. As an antioxidant, it inhibits oxidative processes. In addition, it exhibits anti-inflammatory, anti-cancer, anti-viral and anti-bacterial activities. Its several pharmacologic activities bring it into the center of attentions in research programs [1, 2].

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FOR A NEW STRATEGY OF MEDICINAL PLANTS PRODUCTION IN ACCORDANCE WITH AGROECOLOGICAL PRINCIPLES

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In the past decades, farming based on profit rules has destabilized the sustainable systems of the planet with an industrial productivism ideology, ignoring its ecosystem and its environmental resources capacities. Consequently soil is polluted, the erosion accented, biodiversity affected and the more important: the menace of water scarcity increased. Agroecology as a suitable agriculture, compatible with ecological principles is one of the options which can reduce the devastating effects of this situation. Concerning ecological crisis, particularly water crisis in our country, there is now an urgent need to define new strategies for developmental programs of medicinal plants, in accordance with the basic principles of agroecology. Zardband Pharmaceuticals Company, as a pioneer in this matter, try to produce medicinal plants in respect of these principles. Its practical field experience could be used to improve this new strategy.

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SCIENTIFIC BASES OF MODERN HERBAL MEDICINE MANUFACTURING

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Herbal medicine is applicable in two field of traditional and modern herbal medicine.What are addressed in this article and lecture is scientific bases of modern herbal medicine manufacturing; in which the basic principles of making medicines from raw materials, extracted from the herbal medicine and controlling methods discussed.
As well as to its compatibility with international standards and comparing it with synthetic medicines will be discussed. Therefore at the end of the discussion for the audience a realistic view is reached from modern herbal medicine [1- 3].

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INTRODUCTION AND CLASSIFICATION OF SUPER FOODS: EMPHASIZING ON CHLORELLA AS A POTENTIAL SOURCE OF FOOD AND ENERGY

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In view of introducing some of super foods: oral medications for the future of humanity: three groups of food that is divided by research centers of Europe, America and Japan are as follows:
1. Live foods and eating raw food (vegetarian).
2. Super foods each one alone has at least more or less ten common nutritional and medicinal properties such as complete protein, Polysaccharide, cleaners and liver poisoned more than 20 nutrients.
3. The group of foods is quite distinctive and healing such as fungus, Algae and Microscopic Algae are Phytoplankton's. Research has proven that Hall super foods simultaneously are food and medicine, which are opponents for the toughest conditions. The features of super food are taste, stability of satiety for a long time and effective absorption material till 90% of the food whenever the person is aging or ill. A very little amount of food eaten is excreted because the high percentage of it is involved in cell metabolism so they are cells and organs active and enjoyable food. 1000 types of vitamins, mineral, amino acid, sugars short chain of polysaccharide, fat, enzyme, coenzyme, antioxidants has identified. The super foods are included nutrient density lacking hormones, harmful chemicals, toxic metals such as Mercury, Lead, Cadmium, uranium, etc. Super food due to eating live are not cooked like other common foods because the perfect nutritional and pharmaceutical value is in eating raw food. Super foods are cultivating easier. By eating them the key of psychological emotions and stresses will decreased within two or three weeks. Most of the time don't replace free radicals in cell metabolism. Super foods are not stuffed so they are not fattening. Japan research center told Japanese who were suffered from atomic radiation sickness: by eating 8 grams of this plant each day can toxin what is in the urine or stool. Chlorella as one the potential source of food and energy or as a super foods will be presented here.

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EVIDENCE BASED HERBAL DRUG EFFECTS ON PSYCHONEURO DISORDERS AND ERECTILE DYSFUNCTIONS

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In the evaluation of the evidence based effects of herbal drugs on the psychoneuro disorders, sleeplessness, insomnia, anxiety, Alzheimer, multiple sclerosis and erectile dysfunction will be discussed. It has been proved that chamomile, and Melissa officinalis are helpful for insomnia, passiflora incarnatus and lavender has a similar effect. Studies suggest that valerian is by far the best natural solution for insomnia for most people. No one knows what causes Alzheimer's disease however, turmeric and its constituent's curcumin in the prevention and treatment of Alzheimer is effective. It has antioxidant, anti-inflammatory effect and thus improves brain functions in the patient. It also prevents the formation and precipitation of beta amyloid a harmful protein in the brain which is a cause for Alzheimer disease. Extracts of Boswellia serrata has been clinically studied for multiple sclerosis. It may the help slow the progression of this disease. Ginkgo biloba extract also is useful in the age associated memory impairment, dementia and Alzheimer. Panax ginseng counteracts physical and mental fatigue. Hypericum is comparable to tricyclic antidepressants and fluoxetine in mild to moderate depression. Herbal products contain the extract of tribulus terrestris is effective in the treatment of impotence and sexual desire disorder.

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DOMESTICATION OF NATIVE AND ENDEMIC ELITE MEDICINAL PLANTS, AN INEVITABLE NECESSITY

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There are 8000 plant species in Iran, about 2300 of them have medicinal, aromatic, flavoring or hygienic-cosmetic properties. 1728 of Iranian plant species are endemic, means there are growing in Iran, exclusively and there are supposed as an exclusive capacity in the country. Nowaday, the most important medicinal plants that are cultivated in Iran are saffron, cumin, Rose, Henna, Coriander, indigo and borage. Other cultivated medicinal plants have less than 1000 hectares surface. Iran's share of the world market of medicinal plants (including saffron) up to 400 million dollars in 2014. While, the volume of world trade in medicinal plants increased from $ 60 billion in 1996 to $ 100 billion in 2010 and according to the forecast of the World Bank and World Trade turnover in 2050 based on medicinal plants and herbal medicines to some 5,000 billion dollars. On the other hand, some of native and endemic medicinal plants of Iran with more amount and quality of active ingredient, have ability to compete with similar products in the world. For example in Iran, Satureja genus consists of 16 species, 11 ot them are endemic. Pimpinella genus have 20 specis, 6 of them are endemic, Nepeta genus consists of 67 species, most ot them are endemic, Anthemis genus have 39 specis, 15 of them are endemic. Some of these endemic species in all mentioned genus contains more percentage and quality of essential oil rather than commercial species of that cultivated in many countries. While none of these endemic species, are not widely cultivated in the country now. Reseacrch for the domestication of these elite species is one of the priorities of Iran's. In this lecture, Comparative advantages of some endemic species of Thymus and Satureja with Thymus vulgaris and Satureja hortensis as well as Research findings for domestication of them and introduction of proper species or populations for each ecological regions of Iran will be presented.

NEW MEDICINAL PLANTS

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Two definitions can be produced for new plants. The first, the plant that crosses historical filter. In the other hand, the plant that can be seen in one area/zone/country for the first time. The second, introducing new proper utilization for one old plant. We have numerous new plants in our country, according to both definitions. Momordica carantia, Guizotia abbysinca are new medicinal plants for our flora, Thymus daenensis, Satureja Khozestanica(wild plants) have been produced for fields of central region of Iran. Rilsan is new valuable compounds that are made from castor oil. All of the mentioned plants(karela, Niger seed, castor, savory, thyme) are examples of new plants. In this manuscript, according to our research results, we describe some medicinal, morphological and agronomical traits of certain new medicinal plants.

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IRAN HEALTH SYSTEM REFORM AND HERBAL MEDICINE

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Nowadays Iran health system experiences huge reforms. Health is in transition due to changes in the pattern and burden of diseases. In order to achieve the goals of health system reform, an effective health agenda must ensure that Iranian health system is complemented with herbal medicine. Iran government is committed to ensuring the integration of traditional medicine into health care systems. One of the well establish of traditional medicine is herbal medicine. It has been reported that sufferers of many diseases are turning to herbal remedies especially for non-communicable diseases treatment. Herbal remedies are readily available and accessible for many patients in rural and urban area. Herbal medicines are as old as Iranian history and it can play a significant role in health system reform. The Ministry of Health and Medical Education of Iran policy should is considered herbal medicine capacity for improvement of health in health transformation plan.

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NEW BIOACTIVE SCAFFOLDS FROM IRANIAN ENDEMIC SPECIES

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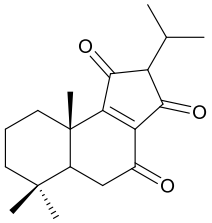
Natural products research continues to explore a variety of lead structures, which may be used as templates for the development of new drugs by the pharmaceutical industry [1]. These substances, representative of very wide chemical diversity, continue to demonstrate the importance of compounds from natural sources in modern drug discovery efforts [2]. Nowadays, one of the strategies for drug discovery is extraction and identification of chemical constituents of the plants and assessment of their bioactivities through cellular or animal studies. Our recent studies, aimed at identifying structurally interesting and bioactive metabolites from the Iranian endemic 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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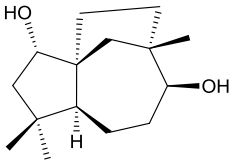

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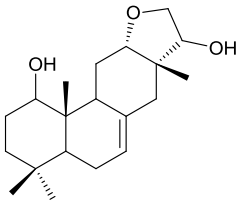

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ENDEMIC MEDICINAL PLANTS IN IRAN

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During a careful research on the complete list of Iranian medicinal plant species which are listed by Mozaffarian (2013) includes spontaneous and exotic plants have taken from Flora Iranica (Rechinger K.H. 1968-2015) and others Floras and books, that contains Iranian medicinal plants names. Out of an estimated 8000 higher plants including Ca. 2000 endemic plant species comprising medicinal and aromatic species of spontaneous and exotic plants containing medicinal trees and shrubs, annual and perennial herbs and some introduced medicinal and nutrition plants as food, spices and flavoring. About 850 well know medicinal plants in Iran adopted from well known references. Out of them 400-450 species are common medicinal plants, which are used in traditional herbal medicine non of them or very rarely are endemic, because from very early time most common and accessible plants are used by herbal medicine practitioner for being much more easier and acceptable for user. Therefore between common medicinal plant very rarely we can find endemic plants. Though with a sightseeing to totally checklist of medicinal and aromatic plants in Iran we can find many species which are endemic, but rarely used as medicinal plants. Most endemic aromatic plants are belong to large botanical families like Compositae, Labiatae and Umbelliferae and are included in the below genera [1, 2].

Achillea 7 species
Anthemis 13 species
Tanacetum 12 species
Cyclotrichium 3 species
Dracocephalum 3 species
Eremostachys 5 species
Hymenocrater 4 species
Lagochillus 4 species
Marrubium 1 species
Mentha 1 species
Micromeria 1 species
Nepeta 33 species
Salvia 13 species
Satureja 6 species
Scutellaria 7 species
Stachys 11 species
Teucrium 2 species
Thymus 2 species
Zhumeria 1 species
Haplophyllum 13 species
Ferula 15 species
Pimpinella 7 species
Azilia I species
Ducrosia 1 species
Echinophora 1 species
Johrenia 1 species
Johreniopsis 3 species
Malabaila 3 species
Pycnocycla 4 species

Based on Geobotanical researches most of Iran belongs to the Holarctic kingdom ad coastal areas of the Pesian Gulf and Oman Sea belong to Paleotropic kingdom and this two kingdom comprises Euro – Siberian, Irano – Turanian and Saharo – Sindian or Nobo-Sindian regions and comprises 5 provinces and 8 subprvinces. Which about 160 wild and cultivable medicinal plants grow in Hyrcania province, 170 species in Azarbaiejanian subprovince, 208 in Alborzian and 144 in North khorasanian subprovince, 155 species in Kurdo-Zagrosian, 120 species in Central –Iraniam an d 115 in South Iranian provinces. Which non of them are Endemic medicinal plants.

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ABSTRACTS OF POSTERS

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CHEMICAL COMPOSITIONS OF THE ESSENTIAL OIL OF (*GUNDELIA TOURNEFORTII* L.) ASTERACEAE FROM CENTRAL ZAGROS, IRAN

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Gundelia tournefortii L. (Tumbleweed) has been identified as one of the well-known and widely distributed plants with various applications in some of Asian and North African countries [1]. It belongs to the (Asteraceae) family and grows in the Middle East, particularly in the temperate, mountainous and semi desert areas of countries such as Iran, Iraq, Turkey, Jordan, Syria, Egypt, Turkmenistan and some regions of Azerbayjan and Armenia [2]. The Central Zagros area in Iran is known as one of the richest areas in terms of medicinal plants of biodiversity. In this regard, *Gundelia tournefortii* L. was collected from one of its natural habitats in the mentioned area and air dried. The essential oil of the plant was isolated by hydro-distillation method with a yield of 0.8% (v/w). The chemical composition of volatile oil was studied using GC-MS. The results indicated that major components were palmitic acid (12.48%), lauric acid (10.59%), alpha ionene (6.68%), myristic acid (4.45%), 1-hexadecanol, 2-methyl (3.61%), phytol (3.6%), and beta Turmerone (3.4%). Meanwhile, *Gundelia tournefortii* L. as one of the plants having many therapeutic properties especially in traditional and contemporary medecine is known in the world, was found to have nutritious value due to its special usage in making local dishes in some mentioned countries [3, 4].

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ACETYLCHOLINESTERASE INHIBITORY (AChEI) ACTIVITY OF *MATRICARIA CHAMOMILLA* L. EXTRACTS

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Alzheimer's disease (AD) is the origin of dementia and common neurodegenerative syndrome among older people. The pathogenic background of AD is not comprehensively identified, but it seems that cholinergic system disturbance is involved in it. Recently, medicinal plants have attracted a great deal of attention as potential sources of natural drugs. *Matricaria chamomilla* L. (Asteraceae) is a famous medicinal plant with a wide range of biological activities. In this study, we evaluated the AChEI activity of *M. chamomilla* [1]. *M. chamomilla* aerial parts were collected from Fars province. Total methanolic extract and different fractions (hexane, methanol and residual) were prepared. AChE inhibitory activity of the extracts was evaluated using the Ellman method with some modifications. Total methanolic extract and methanol fraction inhibited the activity of acetylcholinesterase enzyme with IC_{50} values of 750±1.2 and 475±4.6 µg/ml respectively (in comparison to donepezil as positive control). In this study, total methanolic extract and methanol fraction of *M. chamomilla* aerial parts showed promising inhibitory activity on acetylcholiesterase enzyme. However, further investigation is needed for isolation and structure elucidation of effective phytochemicals.

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CYTOTOXIC ACTIVITY OF *MATRICARIA CHAMOMILLA* L. EXTRACTS

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Cancer is a non-communicable disease that causes more than half of deaths around the world. It is defined by progressive and uncontrolled proliferation of abnormal cells in an organ because of some changes in controlling points of cell growth cycle, which can harm other parts of the body by metastasis. Recently, medicinal plants have attracted a great deal of attention as potential sources of natural drugs. *Matricaria chamomilla* L. (Asteraceae) is a famous medicinal plant with a wide range of biological activities. In this study, we evaluated the cytotoxic activity of *M. chamomilla* [1]. *M. chamomilla* aerial parts were collected from Fars province. Total methanolic extract and different fractions (hexane, methanol and residual) were prepared. Cytotoxic activity of the extracts on different breast cancer cell lines (T4-7D, MCF-7 and MDA-MD-231) was evaluated using the MTT method. Total methanolic extract and hexane fraction showed potent cytotoxic activity against all three cell lines with IC_{50} values of 180-200 and 76-127 µg/ml respectively (in comparison to etoposide as positive control). In this study, total methanolic extract and hexane fraction of *M. chamomilla* aerial parts showed promising cytotoxic activity on different breast cancer cell line. However, further investigation is needed for isolation and structure elucidation of effective phytochemicals.

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9
ANTINOCICEPTIVE EFFECT OF *MARRUBIUM ASTRACANICUM* JACQ

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The genus *Marrubium* is used for treatment of joint pain and gout in Persian Traditional Medicine. *Marrubium astracanicum* Jacq. is a native species in the flora of Iran. The aim of this study was to investigate the antinociceptive properties of various extracts from aerial parts of this species [1]. Antinociceptive activities of hydroalcoholic extract (HE) and its n-hexane (non-polar) and residual (polar) partition fractions were analyzed using formalin test in mouse. Morphine (5 mg/kg) and normal saline were used as positive and negative controls respectively. Intraperitoneal administration of HE (50, 100 and 200 mg/kg), non-polar fraction (200 mg/kg) and polar fraction (100 and 200 mg/kg) 30 min before formalin injection, caused significant analgesic activity in acute phase (0-5 min after formalin injection) of formalin test ($p<0.05$ in comparison to control and $p>0.05$ in comparison to morphine). In chronic phase (15–60 min after formalin injection), non-polar and polar fractions (50, 100 and 200 mg/kg) showed significant analgesic activity ($p<0.001$ in comparison to control and $p>0.05$ in comparison to morphine). Different extracts of *M. astracanicum* showed antinociceptive activity that support the traditional and folkloric usage of *Marrubium* genus in joint pain, gout and other inflammatory diseases.

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12
THE COMPARISON AND STUDY OF OIL CHARACTERISTICS AND FATTY ACIDS LEVEL IN CULTIVAR2 OF PHOENIX DACTYLIFERA IN BUSHER PROVINCE

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Date is one of important agricultural products in Iran. And annually is produced great amount of date,s kernel production work rooms as wastage. Oil can be prepared from these kernels. In this survey, Charactristics of oil and two variety fatty acids of dates in Bushehr and some chrrractristics of soil like chemical features, tissue, elements quality on this 2variety is considered. In this study Kabkab, and Shekar, two kinds of current date in Bushehr is studied. The measure of oil was determind by sokcelwa machine, Acetone and N- Hexan. And measure of fatty acids was studied by Gas choromatography machine. The measure of oil in kernel was % 8-5 (according to dry weight). Other charactristics of oil such as Peroxcidnumber, Acid number and light failure factot were obtained as following measures: (1.04-1.06), (1/33-1/79) and (1/461-1/462). Profile of produced fatty acids was studied by gas choromatography machine and was oleicacids by measure of (31/79-37/91), saturated fatty acids and luric by measures of (25/57-30/85) was found as dominant saturated fatty acids in kernel's oil. Fatty acids such as miristic (13/49-16/93), Palmetic (11/30-13/10), Estearic (1/87-2/94) and Linoleic (4/46-6/96) in all 2- variety was found in all twovarietes. Fatty acid C11 was looked on in Shekarvarietie. Average measure of Nitrogen in soil for varieties Kabkab, Shekar was respectivly: (0/1, 0/04) and also Average measure of Phosphorus for two varieties was respectively (4/4, 4/26 Potassium also was respectively (78/33, 180) in two varities. Measure of organic carbon was (/17, /39) for Kabkab variety, kind of soil was predominantly lomy sandy, for Shekar variety was mostly silt lomy. Date palm grow in the sandy, sandy loamy, clay and other heavy soils and need to and appropriate ventilation. Moderate amount of salt is not harmful to plants, but more measures reduced growth and fruit quality. There are unsaturated fatty acids in kernel's oil like Linoleic which is one of essential fatty acids for body ststem and It can be considered as source of feed oil The kernel's oil is useable for producing toilety, medicine and feed productions.

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14
STUDY ON CULTURE OF FIVE MEDICINAL PLANTS TO INCREASE PARASITISM RATE OF *ECTOMYELOIS CERATONIAE* EGGS BY *TRICHOGRAMMA* WASPS IN POMEGRANATE ORCHARDS

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Medicinal plants flowers can attract and retain natural enemies and increase their longevity and fecundity by providing nectar. In this study effect of culture of medicinal plants including: *Achillea millefolium, Thymus daenensis, Mentha pulegium, Matricaria chamomilla, Foeniculum vulgare* were investigated on parasitism rate of *Ectomyelois ceratoniae* eggs by *Trichogramma* wasps in pomegranate orchards. Relative attractiveness of medicinal plants to *Trichogramma* wasps was assessed by using *Sitotroga cerealella* (Oliv.) egg cards. The experiment was conducted in a randomized complete block design with 8 treatments and 4 replications. Data were analyzed using ANOVA and mean comparison were performed using Duncan's multiple range test. The results indicated that Fennel treatment had the highest level of parasitism (6.72%) of the pest eggs and the lowest damage of fruites (24.92%). Fennel was the most preferred flower to attract the *Trichogramma* wasps (11.19%) compared to other medicinal plants.

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QUANTITATIVE STRUCTURE-ACTIVITY RELATIONSHIP (QSAR) STUDY ON ANTI-HEPATITIS B ACTIVITY OF NOVEL P-HYDROXYACETOPHENONE DERIVATIVES FROM ARTEMISIA CAPILLARIS

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Hepatitis B virus (HBV) infection, causing a series of acute and chronic liver diseases like hepatitis, liver cirrhosis and hepatocellular carcinoma (HCC), has a worldwide distribution [1].P Hydroxyacetophenone (p-HAP) is a main hepatoprotective and choleretic constituent of Artemisia capillaris which is well-known as 'Yin Chen' and widely used for the treatment of icterohepatitis in traditional Chinese medicine (TCM) [2]. Currently, p-HAP isolated from Artemisia morrisonensis was also revealed with inhibitory activity on HBV, the mechanism of which might involve the regulation of viral surface gene expression and block virion secretion by interference with the endoplasmic reticulum (ER) stress signaling pathway. In this research, to understand the pharmacophore properties of p-hydroxyacetophenone derivatives from Artemisia capillaris and to design inhibitors hepatitis B, quantitative structure–activity relationships (QSAR) were developed. The biological activity of p-hydroxy- acetophenone derivatives was efficiently estimated and predicted with the QSAR model. The 2D structures of the p-hydroxyacetophenone molecules were drawn using the Hyperchem 8 software. The optimization was conducted using the semi-empirical method PM3. Molecules descriptors were calculated by Dragon software. Subjective selection was performed on descriptors and then the data set was divided to two groups of training set and test set randomly. Step-wise method was used to select descriptors. After that a QSAR model was used to construct a model to predict activity of molecules. In the present study, multiple linear regression as a simple and very fast method was used to construct a quantitative relation between the structural physic-chemical properties and biological activity of p-hydroxyacetophenone derivatives from Artemisia capillaris. Step-wise has been used as a powerful method for selecting the best descriptors. Based on the obtained results, it seems that QSAR could be quite useful for predicting the activity of mentioned class molecules and it helps us in drug design.

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ISOLATION AND IDENTIFICATION OF BIOLOGICALLY ACTIVE COMPOUNDS FROM *SALVIA SYRIACA*

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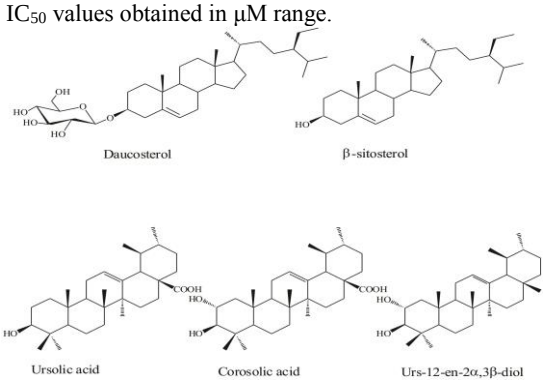
The genus *Salvia* is the largest member of the Lamiaceae family and comprises over 1000 species [1]. *Salvia* species are traditionally used for medicinal purposes world wide. Various biological activities such as antimicrobial, cytotoxicity, anti-protozoal, anti-HIV, antioxidant and anti-inflammatory activities have been reported for the genus [2]. In addition, *Salvia* species are used for central nervous system disorders. In the present study, bioactive constituents were isolated from the acetone extract of the roots of *S. syriaca*. The acetylcholinesterase inhibitory activity of the acetone extract and the isolated compounds (ursolic acid, corosolic acid, β-sitosterol, daucosterol and urs-12-en-2α, 3β-diol) was investigated for the first time and the IC_{50} values obtained in μM range.



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ISOLATION AND STRUCTURAL ELUCIDATION OF TRITERPENOID FROM HEXANE EXTRACT OF *SALVIA LERIIFOLiIA*

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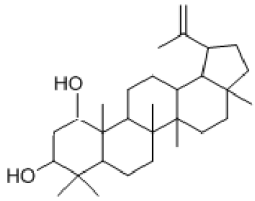
The genus Salvia belongs to the Lamiaceae family and comprises numerous species that have been used since ancient times for the treatment of several disorders [1]. Diterpenoids, triterpenoids and polyphenols are very common in plants of this genus. Most Salvia species have been extensively investigated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



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SURVEY OF PHYTOCHEMISTRY OF *MARRUBIUM ASTRACANICUM* IN FARS PROVINCE

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Marrubium astracanicum is a kind of plant belonging to Lamiaceae, kind: Marrubium and species: *astracanicum*. It is a perennial plant and looks grayish green. Some parts of this plant which are used for making essence are its leaves and flowers, and its harvest time is in May (late Ordibehesht). In this study, 5 populations of *Marrubium astracanicum* species were first detected in 5 regions of Fars province and some plant samples of each species were collected. After drying the plant samples, some essence was extracted from their aerial parts by using the Clevenger Apparatus, and their major chemical compounds were determined by GC Mass Spectroscopy (GC/MS). 52, 37, 40, 43 and 54 compounds were detected in Sadra, Arjan Lake, Bavanat, Dasht Arjan and Pasargad areas, respectively. The research findings indicated that the major compounds in these 5 areas were as follows: n-Decane, n-Dodecane, Germacrene D, n-Hexadecanoicacid, E-caryophyllene Bicyclogermacrene, Phytol, n-tricosane, n-pentacosane, caryophyllene oxide, n-heneicosane، 6, 10, 14-termethyl-2-pentadecanone. The 12 above mentioned major compounds were analyzed by Minitab V.14 software. The findings showed that although having different height and climate, Sadra region was more similar to Arjan Lake and Lakposhti Bavanat, regarding chemical compounds. Findings also revealed that genetics is the most effective factor in variation of the essential oil compositions. In the present study the polyphenolic compounds were also taken from the samples. The extract was analyzed by HPLC.The Gallic acid, quercetin, Catechin, caffeic acid in wavelength of 280 nanometers and chlorogenic acid in wavelength of 320 nanometers were reported. The amount of these polyphenols varies in different areas and the amount of each polyphenol in an area is also different, and this shows the effect of the height and climate in each area which causes the variation of the polyphenolic compounds.

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IDENTIFICATION AND COMPARISON OF PHYTOCHEMICAL OF *TEUCRIUM POLIUM* IN FARS PROVINCE

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Teucrium is a genus of perennial plants which belongs to the family Lamiaceae (Labiatae) is represented by more than 340 species widespread all around the word and comprises about 12 species in Iran. This genus is one of the richest sources of diterpenes, with a neoclerodane skeleton: more than 220 diterpenes have been described up to now, and many of these are particularly interesting because of their ecological role as antifeedants against different species of insects and for their role in the medicinal properties of the plants. In this investigation essential oils of *T. polium* were analyzed in seven areas of fars such as Ghalat Sarvestan with 1692 meter height, Derak 2500 meter, Ab Mourdi 1832 meter, Cheshmeh Anjir 2125 meter ,bavanat 1750 meter, mian jangal fasa 1750 meter, farashband 800 meter. The EOs of air-dried samples were obtained by hydro distillation and analysed by gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS). In total, 50 constituents were identified and quantified in Derak, 55 compounds in Ab Murdi, 68 compounds in Cheshmeh Anjir, 58 compounds in Ghalat sarvestan, 59 compound in bavanat, 63 compound in Mian Jangal fasa, 59 compound in Farashband. The main comounds in these seven areas were: α-pinene, β-Pinene, Myrcene, Limonene, (E)-Caryophylle, Germacrene D, Bicyclogermacrene, Spatulenol, Cariophyllene oxide, Valerianol, 7-epi-α–eudesmol and 7-epi-α-silene. The results of analyzing of photochemical dataes with mini tab soft ware lead to recognizing 3 distinct groups that shows internal variety in these herbs.

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SURVEY OF PHYTOCHEMISTRY OF *STACHYS INFLATA* IN FARS PROVINC

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Stachys is one of the largest genera in the flowering plant family Lamiaceae. Estimates of the number of species in the genus vary from about 300, to about 450 and comprises about 34 species in Iran. This genus is one of the richest sources of diterpenes, and many of these are particularly interesting because of their ecological role as antifeedants against different species of insects and for their role in the medicinal properties of the plants. In this investigation essential oils of *Stachys inflata* were analyzed in 4 areas of Fars such as Ghalat Sarvestan with 1692 meter height, Derak 2500 meter, Ab Mourdi 1832 meter, Cheshmeh Anjir 2125 meter. The EOs of air-dried samples were obtained by hydrodistillation and analysed by gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS). In total, 25 constituents were identified and quantified in Derak, 30 compounds in Ab Murdi, 45 compounds in Cheshmeh Anjir, 50 compounds in Ghalat sarvestan. The main comounds in these seven areas were: Germacrene D, Bicyclogermacrene, Spathulenol, δ-Cadinene. The results of analyzing of photochemical dataes with mini tab soft ware lead to recognizing 3 distinct groups that shows internal variety in these herbs.

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A SURVEY ON PLANTING AND DOMESTICATION OF SEVERAL IMPORTANT MEDICINAL SPECIES OF FARS PROVINCE WITH COMPARISON OF THE ESSENTIAL SUBSTANCES IN WILD AND FIELD

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Aerial parts of some wild medicinal plant were collected in full flowering stage from natural sites in June 2012. Also, the seeds of this plant cultivated in research farm in November and Feb 2012. Aerial parts of cultivated plants harvested at full flowering stage. The essential oils (Eos) obtained by hydro-distillation of dried aerial parts and analyzed by GC and GC/MS. In *Salvia sclarea*, 50 components were characterized for cultivated plants with linalyl acetate (35.9%), germacrene D (13.3%), linalool (12.8%) and sclareol (9.27%) as majour constituents, 45 constituents were identified for wild plants with linalyl acetate (34.0%), linalool (18.5%), germacrene D (10.0%) and sclareol (8.7%) as the major constituent. In *S. virgata* (cultivated plants) 46 constituents, representing 100% of the oils, respectively, were identified. (E)-Caryophyllene (37.0), Caryophyllene oxide (15.2), Phytol (6.1), Spathulenol (5.0), Germacrene D (4.0), Sabinene (3.9) were found to be the major constituents. In wild plants 45 constituents, representing 98.9 of the oils, respectively, were identified (E) -Caryophyllene (38.1), Caryophyllene oxide (18.6), Bicyclogermacrene (9.0), Spathulenol (7.4), Phytol (4.0), Germacrene D (3.3) were found to be the major constituents. In the *Salvia lachnocalyx* 31 components were characterized for cultivated plants with bicyclogermacrene (40.7%), (E)-caryophyllene (11.1%) and spathulenol (9.3%) dominating constituents, 36 constituents were identified for wild plants with. bicyclogermacrene (18.1%), α-pinene (15.3%), β-pinene (13.5%) and sabinene (12.9%) as the major constituents. In the Eso of *Nepeta glomerulosa* in wild and natural condition were identified 52 component which Geranyl acetate (18.2%, 24.2%), Geranyol (11.4%, 12.4%) and caryophyllene oxide (11.5, 7.7) were the majour components respectively. In the essential oils of *Marrubium astracanicum*, n-Decane, n- Dodecane were the maind composion at wild and natural condition And in the essential oils of *Stachys inflata*, Germacrene D, Bicyclogermacrene and Spathulenol were the maincomposion at wild and natural condition .In *Teucrium polium*, 52 components were characterized for cultivated plants with Valerianol E)-Caryophyllene ,Germacrene D, (7-epi-α-Eudesmol dominating constituents, 57 constituents were identified for wild plants with β-Pinene, (E)-Caryophyllene, Germacrene D, α-Pinene as the major constituent.

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IMPROVING SEEDLING GROWTH OF PEPPER GRASS (*LEPIDIUMSATIVUM* L.) BY SALICYLIC ACID PRIMING UNDER SALINE CONDITIONS

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Salt stress in one of the most abiotic stresses that limit plant establishment of medicinal plants such as pepper grass (*Lepidiumsativum* L.).Laboratory experiment was conducted to improve the seedling growth of pepper grass by salicylic acid priming (SA) (0, 50, 100, 150, and 200mg/L), under five levels of salinity (0, 50, 100, 150, and 200 mMNacl). Also, by regression analyses the best concentration of SA was determined. Interestingly, results showed thatseeds primed with different levels of SA were not affectedseed germination and rate, root and shoot length and dry weight of pepper grass under 0 mMNaCl. In contrast, application of 100 and 150 mg/L SA, not only improved germinationpercent but also reduced germination time under 150 and 200mM NaCl. Seedling growthfrom primed seeds with 150 mg/LSA hadsignificantly higher in root and shoot length than the other primed or non-primed seedsunder saline conditions. On the other hand, seed priming with 200mg/L SA had negative effects on germination characteristics of pepper seed, so reduced 26 to 53% germination rate under saline condition. Based on the result of regression analysis, it can be concluded that SA at 150mg/L could be considered as the best concentrations for improving seedling growth under saline conditions and SA at 200mg/L had negative effects on seedling properties.

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SEEDLING RESPIRATION OF GOAT PEA (*SECURIGERASECURIDACA*) AND FENUGREEK (*TRIGONELLA FOENUM-GRAECUM* L.) UNDER SALINITY

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Goat pea (*Securigerasecuridaca*) and fenugreek (*Trigonellafoenum-graecum* L.) are the useful medicinal plants that adapted to the most area of Iran. Seed germination of these medicinal plant sisa critical stage in plant establishment especially under salt stress. Laboratory experiment was conducted to investigate the effect of sodium chloride on respiration of goat pea and fenugreekin 2014. Experimental design was completely randomized design with four replications. Seeds were germinated and grown in black covers using distilled water as control andsalt stress was applied at concentrations of 2, 4, and 6dS/m NaCl. Seedling respiration was expressed as the difference between initial seed weight and seedling dry weight after 48 hours. Under salt stress, significant differences were found in bothgoat pea and fenugreek in terms of plumule and radicle length. Also, in poth plant salt stress in habited plumule growth and length more than radicle length. The lowest reduction in root length was observed ingoat pea at6dS/m NaCl. On the other hand, under salinity, the mean respiration rate in goat pea and fenugreek was 0.23and 0.38 mg/day, respectively.Also, in goat pea and fenugreek, seedling respiration decreased54%to 28%as salinity level increased, respectively and goat pea with higher respiration rate had accelerated seedling growth.Overall, determination of seedling respiration rate might be used as a useful criterion in selection of suitable medicinal plants such as goat pea under saline area.

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CHEMODIVERSITY OF VOLATILE COMPOUNDS IN NINE FERULA (APIACEAE) SPECIES FROM IRAN

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The genus Ferula L. belonging to the Apioideae subfamily of Apiaceae consists of c. 177 species which are mostly distributed throughout the central Asia, of which 32 taxa containing 16 endemic species are growing in Iran[1][2][3]. A chemodiversity of essential oil components in nine Ferula species (F. hirtella, F. badghysii, F. diversivittata, F. foetida, F. tabasensis, F. orientalis, F. galbaniflua, F. gummosa and F. persica) were studied. The oils were obtained by hydrodistillation from aerial flowering parts of samples and analyzed by GC-MS. The identified constituents revealed significant qualitative and quantitative differences among species studied. For the evaluation of chemotaxonomic significance of the essential oil components, each specific and or common identified compound was used as marker. α-Pinene was the common component almost in all analyzed oils except for the first three species. Germacrene B and germacrene D were the major compounds of F. hirtella, while verbenone isomers were the principal ones for F. diversivittata. The major constituents in other species studied were myrcene, thiophene derivatives, sabinene, nonane and octane, β-pinene, carotol and sabinene, respectively. Finally, a detailed discussion on chemodiversity and chemotaxonomic relationship among species investigated are presented.

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EFFECTS OF DIFFERENT METHODS OF DRYING ON ANTIOXIDANT CAPACITY IN MEDICAL MUSHROOM OF AGARICUS BLAZEI

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Button mushroom of blazei with the scientific name of Agaricus blazei, belonging to Agaricaceae family, is one of the most important edible-medical mushrooms (1, 2). One of the most important preservation methods of agricultural products is drying which prevents microbiological and chemical spoilage, reduction of food mass, and significant save in transportation and preservation costs. In the present research impacts of two casing soils of compost and vermi-compost in conjunction to drying methods of oven, microwave and freeze-drying on antioxidant capacity of the mushroom are verified. Measurement of antioxidant capacity of extracts was carried out according to Liu et al. With a few changes. For better assessment of antioxidant activity, IC50 factor was used which indicates the concentration of extract that is able to reduce initial DPPH free radical concentration to 5 percent of the initial amount. Results showed that the most antioxidant capacity of mushroom samples is related to microwave method in both culture soils, treatment of freeze dry in casing soil + vermi-compost. Whereas the least antioxidant capacity was related to the oven method in casing soil+return compost of mushroom. Reduction of antioxidant capacity of products by some heat treatments is due to decomposition of natural antioxidants during the drying process. Whereas increasing anti-oxidant capacity during drying process is due to Maillard reaction and reduction in time of decomposition of polysaccharides.

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ETHNOBOTANICAL INVESTIGATION OF MEDICINAL PLANTS FROM ABADEH (NORTH OF FARS PROVINCE)

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Although the science of synthesis of the chemical drugs (Pharmacology) is widely progressed, this mater never decreases the value of the medicinal plants so that the recent century was called "Return to Nature". Iran by having famous scientists like Ebn-e-Sina, Abooreyhan Birooni, Zakaria Razi and also rich diversity of the medicinal and endemic plants has been able to keep the ethnobotany and conveying it to others and today using of medicinal plants has a high value in all areas of Iran [1, 2, 3]. In this study for description of the role of the ethnobotany and mixing it with scientific researches, the Abadeh plants were investigated. The data obtained by the interview method with the local experience people. Seventy species belong to 20 families totally determined. For each plant, the scientific and local name, parts used and approaches and the local use, were provided.

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PHENETICAL STUDY OF IRANIAN FERULA BASED ON MORPHOLOGICAL DATA

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The genus Ferula L. belongs to Apiaceae family and tribe Scandiceae with persian name Koma, Barijeh and Anghouzeh consisting of about 170-187 species worldwide and 32 species (16 endemics) in Iran [1, 2]. This genus is the largest member of Apiaceae in Asia and ranks third place in the world. Most of the investigated species were collected and determined from wild habitats. In this study, for the first time, Phenetical situation of the genus of Iranian Ferula were investigated through PCA and CA analyses of 31 morphological data. Total species classified in two main groups and four subgroups. In addition, these groups compared with traditional classification of Drude [3]. Somewhat, our results were different with common classification in Flora Iranica [4]. Presence of pilus on sheath surface, number of dorsal vitta of mericarps, width of leaf segments, pilus of leaves underside, shape of leaf segments, pobesences of mericarp and ovary and breadth of mericarp wings were important the first main factor and length and width of sheats, length of leaf segments and stem base diameter were second main factor in our groups based morphological data, respectively.

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STUDY OF VASCULAR PLANTS OF BAMU NATIONAL PARK (FARS PROVINCE)

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In this research, vascular plants of Bamu National Park (48000 ha.) situated in Fars province were studied [1]. Analyses of all collected plants (450 species) showed that because of climatic conditions, 94% of them were flowering in spring; also, hemicryptophytes and therophytes possess abundant growth form with 39.6% and 23.5%, respectively [2,3]. Phytogeographically, Irano-Turanian elements comprise 69% of species. Eighty-eight species of the park are endemic in Iran. Finally, analyses of formations showed that cushion forms are abundant.

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THE EFFECT OF THE CHEMICAL COMPOSITION OF NIGELLA, OLIVES AND ROSEMARY ESSENTIAL OILS ON THREE IMPORTANT MICROORGANISMS IN THE SINUSITIS FOR TREATMENT OF SINUSITIS AND BRONCHITIS

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The treatment of plants and plant sources like Nigella, olives and rosemary as antibacterial agents is mentioned. Sinusitis and bronchitis among outpatient referrals to doctors who need to prescribe an antibiotic. Sinusitis and bronchitis to help treat the disease natural antibiotics and secondary metabolites of medicinal plants, could be an important objective of the research. The study is in vitro, the essential oils extracted by steam distillation of essential oils obtained by gas chromatography mass analysis and its components were identified. The antibacterial properties of the disk diffusion method, the minimum inhibitory concentration and minimum bactericidal concentration was used. Minimum Inhibitory Concentration (MIC) results from essences evaluated on Streptococcus pnemoniae with Nigella oil, (159.87 µg/ml), Haemophilus influenza in Rosemary, (153.31 µg/ml) and in Moraxella catarrhalis with Nigella oil, (77.93 µg/ml). In the disk diffusion test turned out, the greatest diameter of Streptococcus pnemoniae of Nigella sativa (48 mm), about Moraxella catarrhalis this situation (51 mm) and the Haemophilus influenza (36 mm) respectively. The results showed good effects of black seed oils, olives and rosemary on 3 Microorganisms sinusitis and bronchitis, and have succeeded in making the suitable medicine derived from whole plant to destroy the microorganisms and we pharmaceutical much less complications.

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GERMINATION IMPROVEMENT OF MADDER (*RUBIATINCTORUM*) UNDER DIFFERENT DORMANCY BREAKING TREATMENTS

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Madder (*Rubiatinctorum*) is a suitable and useful medicinal plant where distributed in Iran. Seed of madder was collected from Agriculture Research Station of Darab and subjected to different dormancy breaking treatments including stratification (1, 2, and 3 weeks), potassium nitrate solution 0.2 M (24h), soaking in tap water (24, 48 and 72 h), soaking in sulfuric acid 50% (5, 10 and 15 min), scarification by gravel sand, and control. The experiment was conducted as completely randomized design with 4 replicates in Shiraz University, during 2014. Results showed the highest germination percentage was obtained in 3 weeks stratification treatment (91.6%). Maximum germination rate (3 mm/day) was observed in stratification for 3 weeks, whereas the lowest germination rate was gained in potassium nitrate solution 0.2 M for 24h. Scarification by gravel or sulfuric acid caused a significant decrease in germination percentage (22 to 48%) and germination rate (33 to 66%). It appeared that madder had more physiological dormancy than physical dormancy and the best way for dormancy breaking of madder was stratification for 3 weeks.

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COMPARISON ON QUALITY AND QUANTITIES OF ESSENTIAL OILS OF 6 CULTIVATED SPECIES *OF SATUREJA* AT BEFORE FLOWERING, 50% FLOWERING AND FULL FLOWERING STAGES IN YAZD

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The genus *satureja* belongs to the family of lamiaceae and consists of over 235 different species throughout the world. Fourteen species grow naturally in IRAN of which nine species are endemic. Different species *of satureja* are used in food , Healthy, cosmetic and medical industries. This research has been carried in medicinal plants research station inYazd province with the coordinates of longitude and latitude 55 31 49 north, 27 15 54 east to a height of 1209 meters above Sea level in the region Gerdefaramarz city of Yazd shahedial. Then cultivate of 6 species (10 accessions) of *Satureja including: Saturejamutica, S.rechingeri, S.bachtiarica, S.macrantha, S.spicgera, S.khuzistanica*. Aerial parts of plants were collected at before flowering50% flowering and full flowering stages. Then were dried in shadow and hydro-distillated for obtaining their essential oil. That determined the best time to harvest with regard to percentage of essential oil and essential oil yield per hectare is 50% flowering.The highest amount percentage of essential oil (5.46%) was related to accession BR (*S.rechingeri*) with originIllam province before flowering stage. The highest amount essential oil yield (84/7Kg/ha)was related to accession 15(*S. rechingeri*) with origin Ilam province at before flowering stage.The highest amount percentage of essential oil (7.48%)was related to accession HKP(*S.khuzistanica*) with origin Lorestan province at 50% flowering stage. The highest amount essential oil yield (124.7Kg/ha)was related to accession 15 (*S.rechingeri*) at 50% flowering stage.The highest amount percentage of essential oil (4.85%)was related to accession BR and the highest amount essential oil yield (42Kg/ha)was related to accession 15,at full flowering stage. mean percentage of essential oil was .87%more than at50% flowering to full flowering and so means essential oil yield 25/5Kg/ha more than at 50% flowering to full flowering stage . Regarding mean of high essential oil yield at 50% flowering to before and full flowering, the best time harvest for different species is 50% flowering.

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INVESTIGATION OF VARIATION IN YIELD AND YIELD COMPONENTS AND ADAPTABILITY IN CULTIVATED ACCESSIONS OF *SATUREJA SAHENDICA* IN YAZD

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Different species of *Satureja* are used in food, Healthy, cosmetic and medical industry. This reseach has been carried due to selection and introduction of suitable germplasm in *saturejasahandica* accessions in medicinal plants research station inYazd province with the coordinates of longitude and latitude 55 31 49 northly, 27 15 54 east to a heigh of 1209 meters above Sea level in the region Gerdefaramarz city of Yazd shahedial.In order to in the first year (2009) seeds8 accession of *saturejasahandica* obtained from the research institute of forsts and Rangelands, were planted in jifypot and in the green house. Then seedling in case of randomized complete block with three replication were planted on the main floor. Rate of plant establishment, canopy diameter, plant height,yield, essential oil yield per hectare, percentage of essential oil , were meseared and recorded. The results showed, analysis of varianceplantheigh, rate of plant establishment,dry weight of shoot, at the level of one percent and canopy diameter, yield, essential oil yield per hectare were significant at level of five percent and percentage of essential oil was not significant. Regarding to yield, percentage of essential oil, essential oil yield per hectare and amount plant stablishment accessions SS1 with mean of yield (1747 kg/ha), percentage of essential oil (1.43%),oil yield (9.5kg/ha) and amount plant stablishment(38%) and SS3 with mean of yield(668kg/ha), percentage of essential oil (1.76%),oil yield (6.42kg/ha) and amount plant stablishment (85.3%), with origin East Azarbayejan province were selected superior accessions.

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EFFECTS OF *ALOE VERA* EXTRACT ON CARCASS COMPOSITION AND BACTERIAL FLORA OF INTESTINE IN SIBERIAN STURGEON (*ACIPENSER BAERII*)

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Regarding the beneficial effects and benefits of the herb *Aloe vera* and its applicationin various industries such as pharmaceuticals and food industries, this study investigated the effects of *Aloe vera* extracton growth parameters and bacterial flora of the Siberian sturgeon (*Acipenser baerii*). In this study, a total of 360 numbers of Siberian sturgeon weighted average 10.95 ± 0.04 (g) randomly distributed in four treatments including a control group and three experimental groups (each with three replications) were used. So, *Aloe Vera* extract powder ratio of 0.5%, 1% and 1.5% were added to the food. After eight weeks of feeding in the fiberglass vans and physicochemical parameters of water daily registration, biometry carried out and necessary samples collected. In this study, The body composition can be affected by a combination of diet and daily feeding amount placed percent [1,2]. The results of this study showed that the amount of protein, lipid, carbohydrate, ash and moisture of Siberian sturgeon farmed in different treatments compared to the control group is no statistically significant difference ($p > 0.05$). In this study, the increased use of *Aloe vera* in the diet, the amount of protein and lipid decreased. So that the maximum amount of protein and lipid, respectively, in treatment 1.5% and 0.5% and least amount of protein and lipid the control group was observed. Amounts of carbohydrate, ash and moisture content compared to the control group were associated with a reduction. Meanwhile, total count of bacteria intestine in the treatment and control groups did not show significant differences ($p>0.05$), but significant increase in the count of anaerobic bacteria were observed compared to the control group ($p<0.05$). The result showed that *Aloe vera* extract can be effective in improving lactic acid bacteria of Siberian sturgeon.

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QUANTITATIVE DETERMINATION OF THE AROMA COMPOUNDS OF HEALTHY AND DISEASED PEPPERS (*CAPSICUM ANNUUM* L) BY COUPLED TO GAS CHROMATOGRAPHY/MASS SPECTROMETRY

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The fruits of the genus *Capsicum* are consumed as vegetable foods, spices, external medicines, etc. Because of their considerable commercial importance, the composition of volatile compounds in it is also of importance. In this reaserch, solid phase microextraction was employed to extract the aroma compounds from both fresh, healthy and diseased peppers and then, the constituents were identified and quantified by gas chromatography/mass spectrometry. The effect of various parameters on the efficacy of microextraction was investigated in detail and the procedure was optimised accordingly. The data indicated that main constituents of the volatile fractions both in fresh and old peppers were 2-hexenal, hexyl 3-methylbutanoate, 3-hexenyl-3-ethylbutanoate, hexyl pentanoate, 3, 3-dimethylcyclohexanol, and hexadecanoic acid. It was further established that the amount of volatile compounds decreases during age progress.

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RAPID DETERMINATION OF AROMATIC COMPONENTS OF VOLATILE CONSTITUENTS OF THE YOUNG GREEN WHEAT LEAVES BY GAS CHROMATOGRAPHY–MASS SPECTROMETRY WITH SOLID-PHASE MICROEXTRACTION

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Solid phase microextraction (SPME) was used to extract volatile compounds of young green leaves of wheat (*Triticum aestivum* L.) from their headspace and then were analyzed and identified by gas chromatgraphy with mass detection. A 100 µm polydimethyl siloxane fibre was employed for this extraction. 14 aromatic compounds were identified, including pyrezine, 2-acetyl-6-methyl pyrazine, pyridine, phenyl acetonitrile, styrene, thiazole, ethyl pyrazine, dimethyl pyrazine, 2, 5-dimethyl-benzaldehyde and derivitives of acetophenone. In addition, 5-hexenenitrile found to be the major componentof the essence (~ 6 ppm).

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EFFECTS OF ORGANIC MANURE AND NITROGEN FERTILIZER ON SOME GROWTH TRAITS OF BALANGU SHIRAZI *(LLALEMANTIA ROYLEANA)*

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Due to lack of efficient use of medicinal plants cultivation and medical care in recent years has provided an opportunity to use valuable medicinal plant as Balangu .However, chemical fertilizers and manure by increasing the nitrogen content increases the chlorophyll has been followed by greenness, ability to absorb sunlight, photosynthesis and the production of plant growth and yield will increase The trial was an opportunity to evaluate the effects of different rates of manure and chemical fertilizers on some growth traits of medicinal plants Balangu Shirazi trial randomized complete block design with three replications in research farm control of both fertilizer livestock at four levels (0, 10, 20 and 30 tons per hectare) and nitrogen fertilizer (0, 60, 120 and 180 kg per hectare) to be implemented in the spring of 1391. The results of data analysis showed that the organic fertilizers for fresh weight and dry root weight to 5% for other traits was a significant percentage.The effect of nitrogen fertilizer for all traits was a significant at 1% percentage.Most of the fresh weight of root, root, leaf dry weight, respectively, with an average of 0/25, 0/27, 0/7, 0/13, 22/5,22/5,21/8, 3/6 and 3/9 gram of 180 and 120 kg per hectare to 30 tonnes per hectare of fertilizer and manure, and in order to the highest number of branches, number of flowers per branch and the number of flowers per plant with an average of 7/58, 8/63, 9/386, 406/461, 96/06 and 102/86 belongs to organic fertilizers 30 tons per hectare and 180 kg of fertilizer per hectare and the lowest values in all traits was given control [1].

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STUDY ON THE ANTI-PARASITIC EFFICACY OF *NIGELLA SATIVA*, *ALLIUM SATIVUM*, *SYZYGIUM AROMATICUM* AND *CUCURBITA MAXIMA* ON *TOXOCARA CATI* FECAL EGG COUNT AND WORM FECUNDITY IN STRAY CATS IN STRAY CATS

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Toxocara cati is an ascarid nematode (in the order Ascaridida, superfamily Ascaridoidea, family Toxocaridae) of cats (felidae), in which they live as adults within the lumen of the small intestine. Infection of animals can occur by the host ingesting viable, embryonated eggs from contaminated sources (e.g., soil and earthworms, etc.), or they can acquire the infection in utero (i.e., transplacentally) from the infected mother when she ingests more infective eggs [1]. This study was carried out to determine the anti-helminthic impact of four natural medicinal plants in naturally infected DSH cats (*Felis Catus*) with *Toxocara cati*. Twenty five infected stray cats were captured from different areas of Tehran, Iran. The cats were adapted for 3 days to the environment and transferred to separate cages to prevent cross infection/treatments. Groups of 5 stray cats each infested with *T cati* were supplemented garlic *(Nigella sativa)*, black seed *(Allium sativum)*, clove *(Syzygium aromaticum)* or pumpkin seed *(Cucurbita maxima)* in daily rations for 7 consecutive days. Controls (5 cats) were fed rations without supplement. At day 0 and seven days after treatment, fecal samples were collected and the numbers of parasite eggs per gram (EPG) of feces were counted and compared with each other to see the effect of herbs on fecundity of parasites in cats. 10% formalin buffer was added to prevent decay of eggs from ammonia. In addition, the gastrointestinal tracts of cats were pathologically observed to see the safety of herbs on alimentary tract. Compared with controls, there were statistical reductions ($P< 0.0001$) in *T cati* eggs and fecundity of adult female parasites in cats given supplements, also strongest effect of anti-helminthic was belonging to the garlic group ($P< 0.01$). There were no macro-microscopical signs of intestinal pathology and indicated that herbs had no side effects. According to this results, above mentioned herbs may be alternative choices for the treatment of parasitic diseases in future and can also be considered as harmless and affordable additives in animal food diets.

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TOXICITYACTIVITY OFSOME MEDICINAL PLANTSON *ARTEMIASALINA*

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The brine shrimp *Artemia* (Crustacea, Anostraca) is themain zooplanktonic organism that inhabitshypersalineenvironments all over the world. This branchiopod has acquired extremely capableadaptive mechanisms to survive and evolve in habitatswith extensive and often abrupt fluctuations in salinity, UV irradiation, temperature, and oxygen concentration*Artemia*cystsfor use as larval food for culturedspecies, and the benefits of*Artemia*as a food source[1].Essential oil is a concentrated hydrophobic liquid containing volatile aroma compounds from plants Essential oils are generally extracted by distillation, often by using steam. Other processes include expression or solvent extraction [2]. The toxicity activity of the two plant essential oils were tested at 6 concentrations (1.5, 3.12, 6.25, 12.5, 25 and 50µg/ml) against *Artemiasalina*. The essential oils were dissolved in DMSO (Dimethyl sulfoxide) and added to the microplates (24 wells).containing 1 ml of sea waterand Determinethe concentration ofessential oils. The assays were carried out as described for *Artemia*except that five nauplii were added per well and mortality was enumerated after 24 h and then larvaldeath observed under loop. Larvae were determined to be dead if they lay on the bottom for 15 s, without swimming in the water. Toxicity results are presented as 24 h LC50 with 95%confidence intervals. Result showed that at 24h LC_{50} for three types of essential oils such as *Zataria multiflora*, *SaturejaKhuzistanica*was102.17, 64.53 µg/ml, respectively and essential oils from two plant in high concentration have the toxicity effect on larvae of *Artemiasalina* that the essential oil of *S.khuzistanica* was stronger.

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PHENOLIC CONTENT OF GREAT MULLEIN FLOWERS AND CORNELIAN CHERRY FRUITS EXTRACTS

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Great mullein **(***Verbascum Thapsus)* and cornelian cherry *(Cornus Mas L.)* are a naturally growing species in *Arasbaran* mountainous area. Great mullein grows in a wide variety of habitats and is a hairy plant with small yellow flowers on a tall stem. Cornelian cherry is a medium to large deciduous shrub or small tree with red fruit containing a single seed. In present study antioxidant properties of cornelian cherry fruits and Great mullein flowers were studied. Extracts from Great mullein flowers were prepared in methanol and ethanol 70% (w/w) by employing 2 different methods of extraction: soxhlet method for 3h and extraction by continuous shaking at room temperature for 3h. Extraction of cornelian cherry prepared with Soxhlet method and methanol as solvent and Fresh cornelian cherry with 25% dry mater used for extraction. Total phenolic content of the extracts obtained from solvents was measured at 765 nm using Folin-Ciocalteau spectrophotometric method. Total phenolic content of Great mullein flowers was 29.07±0.65 and 24.61±0.35 $^{mg}/_{100g\ of\ DM}$ for methanol extract with Soxhlet method and continuous shaking method in compare to 32.05±0.19 $^{mg}/_{100g\ of\ DM}$ for 70%ethanol with continuous shaking method. Lower concentration of Total phenolic content observed in methanol extract of cornelian cherry with Soxhlet method in compare to Great mullein (24.53±1.06 vs. 29.07±0.65 $^{mg}/_{100g\ of\ DM}$ respectively). Results suggest that these plants can be used as antioxidant in foods as food additives to avoid oxidation because of their high phenolic contents.

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MUCILAGE ASSESSMENT IN DIFFERENT EXPLANTS OF *PLANTAGO OVATA* FORSK VIA CALLUS CULTURE

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The seed husk of *Plantago ovata* Forsk, is an effective laxative. Seeds of *P. ovata* release, mucilage in water which is used to treat diverticulitis, constipation, high blood pressure and high cholesterol. This study was conducted to assessment the mucilage of different explants (seed, hypocotil, cotyledon) of *Plantago ovata* via callus culture. This experiment was conducted as split plot design with five replications. The explants were culture on MS medium supplemented by 2,4D (0.5) mgL^{-1} and Kin (1) mgL^{-1}. Different traits including mucilage, callus growth rate (CGR) (mm/day) and callus initiation (%) were recorded. Analysis of variance showed that highest value for mucilage (10 g/g dry weight %), callus growth rate (0.33 mm/day) and callus initiation (70 %) was denoted to hypocotyls explants. Obtained results revealed that hypocotyls explants were suitable to use for mucilage production by in vitro callus culture. The mucilage production by callus was more than mucilage of seed. Therefore, this secondary metabolite, with medicinal properties could be commercially produced by callus culture of hypocotyls explants.

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LINSEED OIL ENHANCED ANTINOCICEPTIVE POTENCY OF GABAPENTIN IN MICE MODELS OF INFLAMMATORY PAIN AND PACLITAXEL INDUCED NEUROPATHIC PAIN

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Linseed oil, a fixed oil separated from Flaxseed (*Linum usitatissimum* L), was evaluated for its potentiating effects on gabapentin induced analgesia in mouse models of inflammatory and neuropathic pain. It was shown that intraperitoneal administration of linseed oil alone or together with gabapentin could significantly inhibit acetic acid-induced writing response in mice. The writhing inhibition of gabapentin (30 mg/kg, i.p.), linseed oil (0.1 ml/kg, i.p.) alone or co-administrated with each other was 48%, 40% and 75 %, respectively, which in the linseed oil-gabapentin co-treated group was significantly higher than that the positive control group that treated with morphine (0.5 mg/kg, i.p.). In the rat model of paclitaxel induced neuropathic pain a relatively constant analgesic effect of linseed alone or its combination with gabapentin was observed. These investigations suggested that linseed oil could exert a good antinociceptive effect on inflammatory pain and cancer-related neuropathic pain. In confirmation of previous findings, linseed oil probably act through potentiating of GABA mediated mechanisms, but further studies are still needed to elucidate the precise mechanisms and activities of it.

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IDENTIFICATION CHEMICAL COMPOSITION OF TWO ECOTYPES OF (*THYMUS DAENENSIS*CELAK) FROM IRAN

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Thymus (thyme) is one of the most important genera with regard to the number of species within the family Lamiaceae. *Thymus daenensis*Celak is an endemic species to Iran. Thymus, with the common Persian name of "Avishan or Azorbe," consists of 14 species which are found wild in many regions of Iran, some of which are endemic; *T. carmanicus*Jalas, *Thymus daenensis*Celak subsp. daenensisCelak, *T. daenensis*Celak subsp. *lancifolius* (Celak.) Jalas, *Thymus persicus* and *Thymus trautvetteri*Klokov and Desj-Shost [1]. Infusion and decoction of aerial parts of Thymus species are used to produce tonic, carminative, digestive, antispasmodic, anti-inflammatory, rheumatism, skin disorders, expectorant and for the treatment of colds in Iranian traditional medicine [2,3]. The aim of this study was to identify of the chemical components of two ecotypes of **(***Thymus daenensis*Celak**)** collected from Iran**.** The aerial parts of *T. daenensis*were collected from two provinces of Estahban (Fars province) in South Iran and (Kamu Mountain) Isfahan provincein Iran, during 2014. The essential oil was extracted by a Clevenger approach and analyzed using GC/MS. In total, 26, 34compounds were identified of*T. Daenensis* oil in Estahban and Isfahan province, respectively. The major constituents of the oil Estahban were; thymol (71.2%), γ-terpinene (8.81%), *p*-cymene (3.8%), and carvacrol (2.4%). The major constituents of the oil Isfahan were; thymol (80.24%),γ-terpinene (3.51%), *p*-cymene (2.15%), and carvacrol (1.72%). In conclusion, ecotypes collected from Isfahan province showed higher amounts of thymol than Estahbanprovince.The variability of thymol and carvacrolcontentsin the essential oils that obtained from *T. daenensis* wild growing can be attributed mainly to environmental conditions.

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EVALUATION SEED YIELD AND OIL QUALITY 10 ECOTYPES OF BLACK SEED (*NIGELLA SATIVA* L.) CULTIVATED IN ISFAHAN PROVINCE

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Black seed (*Nigella sativa* L.) is an annual plant belongs the family Ranunculaceae, it grows to 20–30 cm tall and about eight species in Iran, also known as the black cumin seeds or small fennel have tremendous potential for cultivation and is native in Europe, Middle East and Western Asia [1]. It also grows in most parts of Iran such as Arak, Kermanshah, Isfahan and other parts of the country. Black cumin originally grown in arid and semi-arid regions [2]. This experiment has been conducted in research field of Islamic Azad University Isfahan (Khorasgan) branch, in center Iran, during spring2013, experiment based on a randomized complete block design with three replications. Seed 10 ecotypes (Semirom, Zawareh, Golpayegan, Fereydan, Meymeh, Kashan, Khansar, Daran, Ardestan and Isfahan) cultivated in research field of Islamic Azad University Isfahan (Khorasgan).The essential oil was extracted by a Clevenger approach. The results of analysis of variance indicated that the significant effect of different black cumin ecotypes on seed yield and essential oil percentage.The results obtained in our study showed that the highest of highest seed yield (276 g/m^2) was obtained in Fereydan ecotype while the lowest (245.6 g/m^2) in Ardestan ecotype.The highest of highest essential oil content (1.7%) was extracted in Fereydan, Kashan and Daran province ecotypes and the lowest essential oil content (1.22%) was extraxted in Semirom ecotype.According to the results of the present study, Fereydan and Daran ecotypes produced the highest amount of seed yield and the best quality of essential oil of black cumin (*Nigella sativa* L.) cultivated in Isfahan climatic conditions.

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AN INVESTIGATION OF ENZYME INHIBITORY ACTIVITY OF LAMIACEAE PLANTS LINKED TO TYPE 2 DIABETES

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Medicinal plants are used traditionally as food, spices and medicine all around the world. Todays, medicinal plants are widely involved in human health [1]. They are increasingly utilized in food, perfume, cosmetic and pharmaceutical industries. Also, plant based natural products are a main source of drug discovery [2]. Flora of Iran comprises 46 genera and 410 species from Lamiaceae family [3]. In this work, α-amylase and α-glucosidase inhibitory and cytotoxicity effects of methanol extracts from selected Lamiaceae species (*Salvia syriaca* L., *Teucrium polium* L., *Phlomis olivieri* Benth., *Nepeta ispahanica* Boiss., *Scutellaria tomentosa* Benth., *Salvia limbata* C.A. Mey., *Teucrium orientale* L., *Salvia atropatana* Bunge., *Salvia nemorosa*, *Salvia multicaulis* Vahl., *Ajuga chamaecistus* Ging. ex Benth., *Mentha longifolia* L. and *Satureja khuzestanica* Jamzad) were evaluated. These activities were ranged from 0.135 to 0.291 mmol in α-amylase assay and 1.256 to 6.640 mmol ACAEs/g extract in α-glucosidase assay. The highest cytotoxic effect was observed in the root extract of *S. syriaca* (LC_{50} = 12.3 µg/mL). The tested Lamiaceae species could be useful as new sources of natural products for pharmaceutical, food and medical applications.

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IDENTIFICATION OF ESSENTIAL OIL COMPONENTS OF (*MENTHA LONGIFOLIA* L.) FROM FIVE DIFFERENT LOCALITIES IN IRAN

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Lamiaceae is subdivided in to two major groupings; the Lamioideae and Nepetoideae. The genus Mentha, which belongs to the Lamiaceae family, subfamily Nepetoideae. Lamiaceae is one of the large plant families used as a frame work to evaluate the occurrence of some typical secondary metabolites [1]. The typical secondary metabolism of Lamiaceae includes various terpenoids and phenolic compounds [2]. (*Menthalongifolia* L.) has the widest natural geographic distribution of any mentha species, from western Europa to central Asia and in soutern Africa [3]. The aim of this study was identification chemical composition from five ecotypes of (*Mentha Longifolia* L.) wild grown of (Ardestan and Baghe-Bahadoran) Isfahan province and (Chelgard, Saman and Sureshjan) Chaharmahal and Bakhtiari provincein Iran, during 2014 were investigated.The essential oil was extracted by a Clevenger approach and analyzed using GC/MS.The 31, 21, 27, 29 and 23compounds were identified in Ardestan, Chelgard, Baghe-Bahadoran, Saman and Sureshjan province, respectively. The major constituents of the essential oil of (*M. Longifolia*) in Ardestan province were; 1,8-cineole (31.21%), pulegone (23.01%), sabinene(6.77%), γ-terpinene(5.43%), trans-pinocarveol(4.37%) and menthone(3.89%). The major components in Chelgard province were; 1,8-cineole (37.16%), piperitenone oxide (18.97%), sabinene (13.93%), α-pinene (8.92%) and pulegone (6.14%). The major components in Baghe-Bahadoran province were; 1,8-cineole (34.26%), pulegone (27.97%), sabinene (7.88%), α-pinene (4.64%), mnthofuran (4.52%) and α-terpineol (4.36%). The major components in Saman province were; 1,8-cineole (31.06%), pulegone (24.33%), sabinene (7.44%) and piperitenone oxide (5.39%). The major components in Sureshjan province were; 1,8-Cineole (41.5%), pulegone(25.95%),α-pinene (11.92%) andmenthone (3.71%).Different in the volatile composition 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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ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED FOR HYPERTENSION AMONG THE INHABITANTS OF JAHROM OF FARS PROVINCE, IRAN

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Hypertension (HTN or HT) is a common condition in the world that many people suffer of it. High blood pressure cause serious health problems including cardiovascular disease. From ancient time traditional medicine using plants have been very important in Iran. Nowadays phytotherapy is including the most popular remedies for various kinds of illnesses. This study has identified medicinal plants used for hypertension among the local inhabitants of Jahrom in 2015. Jahrom is located in the southern half of the Fars province (28°30′00″N 53°33′38″E). Ethnopharmacological data was collected using open discussion and face to face interviews during April to July 2015. Plant samples were collected and identified by using the identification keys. Finally, information on 16 plant species belonging to 11 families was gathered. The most common family is Lamiaceae (4 plant species). Frequently reproductive parts of the plants are used by the local people.The study is the first ethnobotanical survey of hypertension in Iran. We have obtained some considerable knowledge about folk herbal medicine for treating high blood pressure in the study area that indicate the Jahrom people possess rich ethnopharmacological knowledge in the treatment of this disease.

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ETHNOPHARMACOLOGICAL APPLICATION OF MEDICINAL PLANTS TO TREATMENT OF RESPIRATORY DISORDERS BY FOLK COMMUNITIES OF FIRUZABAD REGION OF FARS PROVINCE, IRAN

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The respiratory system is an important biological tract in human body. The main function of respiratory system is exchange the respiratory gases between body and the environment. Respiratory diseases such as colds are common diseases in the world. Indigenous people of every area are used medicinal plants for traditional remedies of a variety of diseases. Investigations on folk knowledge and traditional therapeutic applications of plants are placed in the field of science of Ethnobotany. The traditional therapy of respiratory diseases using medicinal plants by ethnic communities of Firuzabad was studied in 2015. Firuzabad is located in southern of Fars province (28°50′38″N 52°34′15″E). Fieldwork was carried out from July to October 2015. A total of 20 local people (9 man and 11 woman) were interviewed using by structured questionnaire. In this study 16 medicinal plants belonging to 14 families and 15 genera used for treating respiratory diseases were documented. Among families Asteraceae and Malvaceae dominate over other families by two species. These plants are often used to treat sinusitis, asthma, colds, cough, throat infections and chest pain. Leaves are the most important part of medicinal herbs. Medicinal plants are often prepared as decoction. Many of the plants obtained in this survey are used in different parts of the world for the treatment of respiratory diseases that this issue can be good evidence for their healing power.

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ETHNOPHARMACOLOGICAL STUDY OF HAIR CARE HERBS AMONG THE HERBAL SHOPS OF JAHROM IN FARS PROVINCE, IRAN

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Healthy and beautiful hair is causing boost up the confidence in each individual. Traditional natural cosmetics have long been spread widely among people of different regions. Plants are a vital source for a variety of cosmetics such as hair color shampoo, herbal soap and hair care products. Ethnopharmacology is a branch of ethnobotany which deals with the study of ethnic groups and their use as a traditional drugs. In this study traditional herbal knowledge of hair care in herbal shops of Jahrom were investigated. The study area is located in Fars province (28°30′00″N 53°33′38″E). Field study has been carried out over the course of five months (from April to July 2015). Ethnobotanical information was obtained from semi-structured interviews and open discussion with herbalists or Attaran (in Persian). As a result, 25 plant samples belonging to 21 families and 25 genera were found to be used as a hair care and natural cosmetics in Jahrom district. Most of the parts used of plants were fruits. The majority of plants were used to dye and strengthen hair as well as improving hair loss. Furthermore, the herbalists of Jahrom own a relatively good knowledge in the hairs care and plenty of these plants have a phytochemical impact on hair.

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EFFICACY OF ESSENTIAL OILS OF *CINNAMOMUM ZEYLANICUM* AGAINST FUSARIUM WILT OF TOMATO

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Fusarium wilt caused by *Fusarium oxysporum f. sp. lycopersici* (Sacc.) W.C. Synder and H.N. Hans is the major limiting factor in the production of tomato [1]. The pathogen occurs throughout most tomato-growing worldwide causing a vascular wilt that can severely affect the crop [2]. It is considered as one of the main soil-borne systemic diseases [3]. In this study, antifungal activity of essential oils of Cinnamon (*Cinnamomum zeylanicum*) and two fungicides Benomyl and Roval T-S in five different concentrations were investigated against Fusarium wilt disease of tomato *in vitro* and greenhouse conditions. *In vitro*, fungal radial growth for each concentration of essential oils and fungicides on pathogen was measured. In greenhouse, soil infested with *F. O. f. sp. lycopersici* was treated by adding 50 ml of different concentration of essential oils and fungicides. Disease severity was measured after four weeks. The chemical composition of the essential oils was determined by gas chromatography-mass spectrometry (GC-MS). Results of *in vitro* showed that plant essential oils of Cinnamon caused a significant decrease in the mycelial growth of *F. O. f. sp. lycopersici*. The mean EC_{50} value for plant essential oils on pathogen was 50.23 ppm. The profile of the plant essential oils of Cinnamon showed that Cinnamaldehyd (77.51%), ß-linalool (11.13%) and para methoxy cinnamic aldehyde (3.7%) were the main compounds. Microscopic observation shown morphological changes in hyphal cell of *F. O. f. sp. lycopersici* as discoloration and lyses of hyphe. In addition, the results of greenhouse indicated that plant essential oils significantly decreased disease severity and increased growth factors in tomato plants compared to control. Our results conclude that application of the plant essential oils of Cinnamon inhibited the growth of *F. O. f. sp. lycopersici in vitro*, and succeeded to control Fusarium wilt of tomato under greenhouse conditions. This finding suggests that the application of this essential oils as biological alternative in controlling the Fusarium wilt of tomato instead of fungicides to conserve the environment from chemical pollution.

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PROTECTIVE EFFECTS OF VITAMIN E ON SPERM MOTILITY AND QUALITY OF SPERMATOGENESIS IN RATS EXPOSED TO LEAD

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Vitamins are Rich sources of antioxidant substances with high potential in neutralizing the harmful effects of lead on sperm parameters. The purpose of present study was to determine the protective effects of vitamin E on sperm motility and quality of spermatogenesis in rats exposed to lead. In this experimental study, 36 male Wistar rats weighing 180 ± 20 were randomly allocated into 4 groups (n= 9): gavage with distilled water (control), vitamin E, Lead acetate (Pb), and Pb with vitamin E. After 30 days exposed to lead. Rats were killed, and sperm count, motility and morphology sperm, chromatin assay, weighting of epididymis and testis were done. Data were analyzed using statistical methods such as Kruskal- Wallis, Wilcoxon, U Mann- Whitny and chi-square by SPSS 21 software, p value less than 0.05 was considered statistically significant.The results of study showed that weight gain of rats, epididymis weight, percent of Non-life sperm and greater than 50% sperm motility, had significant difference in the study groups ($P < 0.05$), and vitamin E and control (gavage) groups had the most weight gain and lead group had the least weight gain. Highest Sperm motility was in the control group that significant difference with all groups. Minimum mobility less than 50% in Pb group was highest than other groups (05/0 <p). Most sperm dead was found in the lead group that with the control group and the group receiving vitamin E had no significant difference. Also the group lead with vitamin E were statistically significant with vitamin E and control groups. There were no statistically significant differences between the study groups in testicular weight, percentage of normal morphology and normal DNA (P> 0/05).The results of study indicate that significant effects of vitamin E on rat's weight gain, epididymal sperm titers and dramatically reduce the toxic effects of lead on sperm death.

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A COMPARISON OF ULTRASONIC ASSIST WITH HEADSPACE SOLID-PHASE MICROEXTRACTION AND CLASSIC HYDRODISTILLATION METHODS FOR THE IDENTIFICATION OF ESSENTIAL OIL OF THE FRUITS AND THE LEAVES OF *PISTACIA ATLANTICA*

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Pistacia atlantica is one of the three species *Pistacia* growing in Iran. The essential oil compounds from the areal parts (fruits and leaves) of *Pistacia atlantica* were obtained by hydrodistillation (HD) and ultrasonic assist with headspace solid-phase microextraction techniques (UA-HS-SPME) and analyzed using GC-MS. Analysis identified 40 and 36 components of essential oils of the fruits and the leaves extracted using HD respectively. The oil was rich in monoterpenes, and the main constituents were Germacrene D (9.29%), Myrcene (9.3%), Terpinen-4-ol (7.63%) , p-Cymene (5.98%), (E)-Caryophyllene (4.86%) and Camphene (4.28%) of the fruits and Myrcene (8.91%), Germacrene D (7.89%), Terpinen-4-ol (5.92%), p-Cymene (5.59%) in the leaves. A total of 43 components were identified by UA-HS-SPME technique in both of the fruits and the leaves which the major constituents of the fruits: Germacrene D (12.06%), Myrcene (12.01%), Terpinen-4-ol (9.03%), p-Cymene (7.01%), Camphene (6.03) and (E)-Caryophyllene (5.21%). The volatile components, such as Germacrene D (10.53%), Myrcene (10.18%), Terpinen-4-ol (7.78%), p-Cymene (5.87%), and Camphene (5.21%) were found to be major volatile constituents of the leaves. UA-HS-SPME analysis showed a more precise distribution of compounds in the studied plant: Germacrene D, Myrcene, Terpinen-4-ol compounds were well represented in the aerial part (fruits and leaves). Moreover, HS-SPME allowed the occurrence of α-Cubebene, α-Ylangene and α-Farnesene as main component in *Pistacia atlantica* fruits and the leaves, but it was not detected in the HD method. Compared to conventional technique, HD the advantages of the UA-HS-SPME method are: short extraction time and high extraction efficiency. All experimental results show that the proposed method is an alternative tool for fast analysis of essential oils in dry aerial parts of *Pistacia atlantica* for the first time.

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STANDARD, CHARACTERISTIC AND DETERMINATION OF CONTAMINATION IN CUMIN

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Cumin is dried seed of the herb *Cuminum Cyminum* L. and a member of *Umbellifera* family. The seed is 3-6 and the diameter of central section is 1-2 mm long, respectively. The color of mericarp changes gray to light brown. Cumin is thought to be suitable for constipating, anti convulsion and the removal of stomach gas. Cumin must contain specific aroma and flavor and lack smell rancid. Classifying, packaging, labeling, sampling and testing methods of cumin are important. External materials such as mineral and organic materials especially animal waste, sand and soil, plant organic material like stem and leaves may contain cumin if packaging is not in accordance to the standard methods. Humidity may turn cumin into black and reduce quality; therefore the amount of humidity is very important in dried seed. In order to determine the amount of contamination a study was carried out based on primary extraction with petroleum ether, washing with carbon tetrachloride to test heavy contamination in sand and soil. And light contamination within some parts of insect body and rodent's hair.

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CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF THE ESSENTIAL OIL AND METHANOLIC EXTRACT OF *FERULAGO ANGULATA*

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Ferulago angulata is a permanent herb belongs to the Apiaceae family which consist of 35 species throughout the world. In Iran, about 7 species are present, of which some are endemic. Traditionally this plant are used as the flavouring agents and for their sedative, tonic, digestive and anti-parasitic properties. This study is designed to examine the chemical composition and antioxidant activity of the essential oil and methanolic extract of *Ferulago angulata*. The aerial parts of the plant were collected from Oramanat region in Kermanshah province. The air-dried samples were subjected to hydrodistillation using by Cleavenger apparatus. The essential oil was analyzed by GC and GC/MS. The samples were subjected to screening for their possible antioxidant activity by using DPPH assay. Yield of essential oil was (2.7 % v/w). 31 constituents were identified, accounting for 98.44% of total oil. The main components of this oil were cis-ocimene (27.2%), α-pinene (24. 6%), germacrene-D (20.3%), bornyl acetate (4.5%), p-cimene (4/01%) and sabinene (2/3%). The samples were subjected to a screening for their possible antioxidant activities by using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) assays. The result show that the methanolic extract exhibited greater antioxidant activities than essential oil. The present results demonstrate that the essential oil and methanolic extract of *F. angulata* exhibits antioxidant activity and may serve as potential source of natural antioxidants for treatment of some diseases. Further investigations are necessary for chemical characterization of the active compounds and more comprehensive biological assays.

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THE STUDY OF ANTI-INFLAMMATORY EFFECTS OF LAVENDER, EUCALYPTUS AND WALNUT OIL EXTRACT COMPOUNDS

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During the recent decades, many countries have increased the use of alternative therapies, especially herbal therapy and dietary supplements for treatment of various diseases [1]. Efforts are continued to obtain plant products and their compounds that have beneficial effects without causing side effects [2]. In this research the effects of compounds extracted from three herbs on patients who have had bone pain was evaluated. In this study, oil products prepared from three medicine plants: lavender (*Lavandula angostifolia*), eucalyptus (*Eucalyptus globulus*) and walnut (*Juglans regia L.*), were mixed with a specific ratio and used. The herbal compound was prescribed on 20 patients with joint pain and inflammation and pain in the neck spine and the sacral spine. The duration was 15 days and studied with a specific dose of the drug. Type text or a website address or translate a document. At the end of the specified period, the number of 17 patients was healed because of the effects of the herbal drug were perfectly satisfied and symptoms of pain and inflammation were gone. In 3 patients who had the disease for many years, the healing effect was temporary and their disease relapsed after discontinuation of the drug. The effect of the herbal composition on patients was satisfactory and without side effect. So such medicine plants compounds can be used as an adjunct in the treatment of inflammatory disease of the joints.

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THE EFFECT OF NITROGEN FERTILIZER AND HUMIC ACID ON YIELD AND ESSENTIAL OIL PERCENT IN MIXED CULTIVATION OF HYSSOP AND CASTOR MEDICINAL PLANTS IN ARAK WEATHER CONDITIONS

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This research was conducted in order to evaluation of bio-fertilizer Nitroxin, Super-nitro plus, Bio-sulfur and urea fertilizer (NH22CO) in randomized completely block design (RCBD). This trial included of 9 treatments and 3 replications. Data of this experiment analyzed using SPSS software and means comparison studied according to Duncan test. Bio-fertilizers including bio-fertilizer Nitroxin, Super-nitro plus and Bio-sulfur each one in 4 and 8 kg/ha, urea fertilizer in 75 and 100 kg/ha and control treatment (without using urea fertilizer and bio-fertilizer). The results showed that according to results obtained from variance analysis in Lemon balm medicinal plant found that effect of soil fertilizers including bio-fertilizers (Nitroxin, Super-nitro plus, Bio-sulfur) and urea fertilizer on traits such as plant height, number of stems per plant, fresh weight of stem in plant, dry weight of stem in plant, fresh weight of root in plant, dry weight of root in plant, leaves number per plant, fresh weight of leaves per plant, dry weight of leaves in plant, fresh weight of shoot in plant, essential oil percent, essential oil yield and dry biological yield in 1% level of probability was significant. This trial showed that bio-fertilizers (Nitroxin, Super-nitro plus and Bio-sulfur) could partly compensate the decline in biological yield and essential oil yield resulted from nutrients deficiency caused by not using of fertilizers thus application of these bio-fertilizers (Nitroxin, Super-nitro plus and Bio-sulfur) alone or with less amounts of chemical fertilizer is recommended.

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ANTICONVULSANT EFFECT OF HYDRO-ALCOHOLIC EXTRACT OF NIGELLA SATIVA ON SEIZURES IN PENTYLENETETRAZOL-INDUCED KINDLING MODEL IN MALE MICE

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With respect to epilepsy prevalence and the fact that some of the patients remain refractory to available antiepileptic drugs, design of suitable drugs, without unwanted side effects is necessary [1]. The use of plant extracts to treat diseases is proposed as a therapeutic modality. Nigella sativa (NS) has been used for a long time in traditional medicine for some of nervous disorders like epilepsy. The aim of this investigation was to provide a scientific basis for traditional use of NS in epilepsy [2]. A total of 60 male NMRI mice weighing 25-30 g were randomly divided into six groups including: 1. PTZ, 2. positive control (PTZ and valproate 150mg/kg, as an anticonvulsant drug), 3 to 5. Mice received NS extract at three doses of 200, 400 and 800mg/kg, and 6. Mixed group which received NS (200mg/kg) and valproate (100mg/kg) i.p. All groups were kindled by 11 injections of PTZ (35mg/kg) with an interval of 48 h. In the 12th injection, all groups were tested for PTZ challenge dose (75mg/kg). The phases of seizure (0-6), threshold and duration of second and fifth phases were observed for 30 min after PTZ injection [3]. Data analysis showed that NS could reduce intensity and duration of seizures. In addition, there was no phase 5 following NS treatment. Anti-epileptic effect in mix group was not more than the NS group. Antiepileptic effect of chronic administration of NS was established and it was more effective at a dose of 200 mg/kg than doses of 400 and 800mg/kg. Meanwhile, NS could reduce seizure phases better than valproic acid.

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EVALUATE THE EFFECTS OF CURCUMIN ON DIFFERENTIATION OF ADIPOSE-DERIVED MESENCHYMAL STEM CELLS INTO CARTILAGE LINEAGE

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Guided differentiation of stem cells toward the cartilage lineage is a successful and effective strategy in cartilage regenerative medicine. Today, the adipose-derived mesenchymal stem cell (AD-MSC) is one of the most important applicable of stem cells in regenerative medicine which is considered to be an appropriate capability in the field of chondrogenic differentiation. Curcumin is one of the turmeric plant, Curcuma longa L. (Zingiberaceae family), products which is being used in many applications of tissue engineering and regenerative medicine. The aim of this study was to evaluate the potential of curcumin in induction of adipose-derived mesenchymal stem cells (AD-MSCs) differentiation into chondrocyte. In this study, the adipose tissue was sampled from patients undergoing nephrectomy with their consent. Mesenchymal stem cells were isolated from fat tissue samples by standard culture conditions in the laboratory. Then, the adipose-derived mesenchymal stem cells were proliferated in cell culture and reached the third passage. Following, cells were transferred to the chondrogenic differentiation environment which was contained curcumin and were differentiated into cartilage within fourteen days at 37° C and 95% humidity in the incubator. Assessment of cartilage-specific gene expression was performed in differentiated cells by real-time PCR. In this study, AD-MSCs was successfully isolated from adipose tissue. Real-time PCR analysis showed that AD-MSCs can differentiate into the cartilage lineage after these cells exposures in a chondrogenic differentiation environment with the presence of curcumin during fourteen days at passage 3. The results of this study suggested that curcumin induces chondrogenic differentiation of AD-MSCs.

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COMPARATIVE EVALUATION OF ANTIMICROBIAL EFFICACY OF *PISTACIA ATLANTICA* MOTHWASH WITH CHLORHEXIDINE AND PERSICA AGAINST COMMON ORAL PATHOGENS; AN IN VITRO STUDY.

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Nowadays, the use of medicinal plants has been become one of the most common approaches to treatment of diseases because of their benefits. Since the leaves of *Pistacia atlantica* contain high flavonoids and other phenolic components content, it was hypothesized that their treatment might modulate the antimicrobial functions. The objective of this research is to formulate the non-toxic mouthwash solution from the extract of *Pistacia atlantica* leaves and to compare the antibacterial effect of formulated mouthwash with those of chlorhexidine, Persica and negative control mouthwashes against salivary *Streptococcus mutans*, *Candida albicans* and *Actinomyces.*The present study was carried out in2 phases; In Phase1, after drying the leaves, hydro-alcoholic extract was collected. The zone of inhibition of various concentrations of herbal extract against *S. mutans*, *C. albicans* and *A. myces* was determined using the well-plate method. Minimum inhibitory concentration (MIC) for preparing a mouthwash in Phase2 was carried out by microdilution in a concentration range from0.8to200µg/ml. Second phase was mouthwash formulation as a new development to the uses of *Pistacia atlantica.* In this process, hydro-alcoholic extract act as the active ingredient, mixing with all the chemicals needed for mouthwash formulation. As for the method of analysis, in-vitro method used in order to test and observe the antimicrobial activities. Meanwhile to check the physicochemical properties of formulation the tests were done. To formulate the mouthwash, various weight of *Pistacia* extract was added in the formulation. The various weight added give different result for the antimicrobial test that analyze via the well-plate method. The optimum value for the weight was determined by the greatest zone of inhibition in comparison with chlorhexidine and Persica. The results showed that between antimicrobial activities had a significant effect. The inhibition zone of *A.myces*, *S. mutans* and *C.albicans* from highest to lowest, respectively, was related to the prepared mouthwash (57,51 and 45 mm) Persica and Chlorhexidine mouthwash ($P<0.05$). MIC of formulated mouthwash against *C.albicans*, *S.mutans* and *A.myces* respectively, were 12.5, 20 and 25 (µg/ml) which were significantly different with Chlorhexidine and Persica mouthwashes ($P <0.01$). Formulation containing 3% *Pistacia* extract was chosen with the best anti-microbial efficacy and stability in room temperature. The results suggest that the hydro-alcoholic leaves extract of *Pistacia atlantica* has significant inhibitory effect on *S. mutans*, *A.myces* and *C.albicans*. Formulated mouthwash was also expected to work for the antimicrobial action.

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EFFECT OF CORM WEIGHT AND PLANTING DENSITY ON SAFFRON (*CROCUS SATIVUS* L.) YIELD BETWEEN APPLE TREES IN FIROUZ ABAD OF YASOUJ

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There is also a long tradition of saffron use in the traditional medicine of many cultures. More recently, there has been increasing interest in the biological effects of the components of saffron and their potential medical applications, particularly those based on their cytotoxic, anticarcinogenic and antitumor properties [1].Saffron is a cold tolerant plant, but temperate climate is better for its growth [2]. This plant is mainly produced in Iran [3].Since apple trees have no economical yield during the first 10 years, saffron is a suitable plant for growing between them. The growth period of saffron is in the time that apple tree is dormant, so there is not any interference between saffron and farming operation of apple trees [4]. The planting of saffron at higher densities led to increase in the yield during first three years of planting. Omidbaigi et al. reported the maximum number of flowers and daughter corms, obtained from corms with 11 gram weights. So in order to study the effects of sowing density and corm weight on saffron yield between the apple trees, an experiment carried out in an apple garden inFirouzabad of Yasouj in 2015. This experiment was a factorial based on a randomized complete block design with three replications.The first factor included of three sowing density (30.8, 40 and 57.1 corm m^{-2}) and second factor included of four corm weight (<6, 6.1-8, 8.1-10 and >10gr).The results of the first harvest showed that saffron yield were significantly affectedby sowing density and corm weight.So that the highest number of flowers and wet and dry weight of stigma obtained from the treatment of 57.1 corm m^{-2} and corm weight higher than 10.1gr.Furtheremorethe highest length of stigma and emergence percentage observed fromcorm weight higher than 10.1 gr. Also sowing density with 57.1 corm m^{-2} showed the maximum percentage of emergence.

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APPLICATION THE USE OF HERBAL PLANTS IN THE PATIENTS CANDIDATE FOR HEART SURGERY

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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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OLIVE PROPERTIES IN ANCIENT MEDICINE AND ISLAMIC TRADITION AND COMPARE IT TO MODERN MEDICINE

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Olives, shrub height is approximately 3 meters with multiple uses.Olive mentioned in the Quran 7 times, as well as in many hadiths order to use it, and this reflects the importance of this plant and its beneficial properties. This descriptive study using three sources Nabi medicine, medicine al-Sadiq, alreza medicine, articles and reports have been published. Olive oil chemical composition oleic acid,linoleic acid,palmitic acid,compounds and oxidative polyphenols and of sodium,potassium,iron and vitamins A and E for the treatment of many disorders and diseases, including hypertension, complications of kidney stones gallstones, diabetes,joint pain, etc., used. Olive has several medicinal properties including softening effect, passage of gallstones, treatment of chronic constipation,treating Kulyks caused by kidney inflammation, relieve pain and irritation, burns, sunstroke and frostbite treatment, reducing the risk of breast cancer,especially cancers of the gastrointestinal tract and,prevention of cardiovascular disease, ulcers and gastritis protect,maintain health and beauty of skin and hair, reducing the risk of stroke and other properties that are mentioned in this study. The olive,Quran fruit,according to multiple reports indicating the importance of different pharmacological effects in the treatment of diseases.Many of the properties of the olive, which had been mentioned in Islamic traditions in modern medicine have been proven. Nevertheless further research to investigate the therapeutic effects and side effects is required.

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EFFECT OF PLANT GROWTH REGULATORS ON DIRECT SHOOT REGENERATION FROM SHOOT TIPEXPLANTSOF (*HYOSCYAMUSRETICULATUS* L.)

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Hyoscyamus reticulatus L. is an herbaceous, biennial, belonging to Solanaceae family [1]. The effects of various concentrations of plant growth regulatorsKin and TDZ (0, 1, 3, and 5 mgl^{-1}) and IAA in (0, 0.5 and 1 mg l^{-1}) on shoot regeneration from shoot tip explants of *H reticulatus* L were investigated. Data were collected after 3 subcultures (9 weeks). Statistical analysis revealed that,the maximum average bud induction (41.063 buds per explant) were in combination of 5 $mg.l^{-1}$ Kin and 0.5 $mg.l^{-1}$ IAA and combination of 5 $mg.l^{-1}$TDZ and 0.1 $mg.l^{-1}$ IAA. The lowest average bud induction (2buds per explant) was observedin control.Also the high shoot regeneration (164.25 shoots per treatment and 162.25 shoots per treatment) recorded on MS medium [2] fortified with 5 $mg.l^{-1}$ Kin and0.5 $mg.l^{-1}$ IAA and 5 $mg.l^{-1}$TDZ in combination with 1.0 $mg.l^{-1}$ IAA respectively.The lowest shoot regeneration (9 shoots per treatment) was obtained in control (MS hormone free media). The regenerated shoots were rooted in MS and ½ MS media whit different concentration of IAA and IBA (0, 1.1, 2.2 µM) during four weeks. The maximum average root induction (87.50 roots) were observed inMS mediumfortified with 1.1, and 2.2 µM IBA. The rooted plantlets were acclimatized successfully in the green house condition with 90% of survival rate.

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CHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITIES OF *DRACOCEPHALUM KOTSCHYI* BOISS. AGAINST SOME STRAINS OF THE ENTEROBACTERIACEAE FAMILY

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In the present study, essential oil of *Dracocephalum kotschyi* Boiss was analysed and its chemical composition was identified by gas chromatography coupled to mass spectrometry (GC-MS). Forty-three components were identified in the essential oil and the main components of the oil were Geranial (12.1%), α-Pinene (10.34%), Geraniol acetate (10.27%), Geraniol (9.55%), Neral (8.9%) and Limonene (6.95%). Antioxidant combination effect was assessed by DPPH free radical scavenging method. I C_{50} values of *D. kotschyi* essential oil was 49.2 µg ml^{-1}. Using micro broth dilution and disc diffusion methods for in vitro antibacterial activity of *D. kotschyi* essential oil in comparison with vancomycin, and gentamicin antibiotics against on some human standard strains of the Enterobacteriaceae family including *Escherichia coli* (ATCC 11775), *Salmonella typhi* (PTCC 1609), *Salmonella paratyphi A* (PTCC 1230), *Salmonella enterica* (PTCC 1709) and *Klebsiella pneumoniae* (ATCC 700603) which were obtained from Persian Type Culture Collection (PTCC) and America Type Culture Collection (ATCC). Moreover, Minimum inhibition concentration (MIC) and minimal bactericidal concentration (MBC) of its essential oils were also evaluated. The essential oil of *D. kotschyi* showed the highest antimicrobial activity against the three strains of *Salmonella*. The minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) for essential oil ranged between 80 to 1280 µg ml^{-1}, respectively.The results of this work confirm the antimicrobial activity of Native *D. kotschyi* as well as its potential application in the treatment and prevention of some strains of the Enterobacteriaceae family.

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ANTIBACTERIAL AND ANTIOXIDANT ACTIVITIES OF *NEPETA CATARIA* L. ESSENTIAL OIL

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Side effects of chemical preservatives necessitate research on the use of natural oils to prevent the growth of bacteria. The aim of this study was elucidating the antioxidant and antibacterial effect of the essential oil of *Nepeta cataria* (*N. cataria*) on human pathogenic bacteria in the Lorestan province. The volatile oil from the leaves of *N. cataria* has been obtained by hydrodistillation and analyzed by GC-MS.The activity of essential oil was evaluated against four bacterial pathogens including *Pseudomonas aeruginosa* (ATCC 27853), *Klebsiella pneumoniae* (ATCC 700603), *Listeria monocytogenes* (ATCC 13932), and *Streptococcus mutans* (PTCC 1683) using disc diffusion and broth micro dilution methods. Antioxidant combination effect was assessed by DPPH free radical scavenging method. Major compounds detected in the oil were β-Nepetalactone (53.83%), α-Nepetalactone (8.74%), Crypton (4.28%), α-Pinene (3.32%), and Caryophyllene oxide (2.58%). In all the systems, essential oil showed a strongest activity profile within the concentration range. IC_{50} values of *N. cataria* essential oil was 80.62 µg ml^{-1}.The minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) for essential oil ranged between 160 to 1280 µg ml^{-1}, respectively. The encouraging results indicate the essential oil of *N. cataria* leaves might be exploited as natural antibiotic for the treatment of several infectious diseases caused by these germs.

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ARBUSCULAR MYCORRHIZAL SYMBIOSIS OF *THYMUS KOTSCHYANUS* BOISS & HOHEN. IN RELATION WITH SOIL ELEMENTS IN NOUJIAN WATERSHED (LORESTAN PROVINCE)

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Arbuscular mycorrhizal fungi (AMF) are the most important microorganisms of soil having an important role in soil fertility. In this research, the correlation between soil nutrient elements and Arbuscular mycorrhizal fungi colonization and spore numbers in the rhizosphere of *Thymus kotschyanus* Boiss. & Hohen. growing in the three regions (Taf, Vark and Kohkala) of Noujian watershed were studied during spring and autumn. Influence of arbuscular mycorrhizal symbiosis were also determined on vegetative characteristics and essential oil yield of *T. kotschyanus*.The results indicated that magnesium significant positive correlation with arbuscular mycorrhiza fungi spore density (+ 0.84) and percentage colonization (+ 0.92). Soil organic matter no significant linear correlation with arbuscular mycorrhiza fungi spore density and percentage colonization. Potassium negatively correlated with spore density and percentage colonization respectively; -0.85 and -0.90. Arbuscular mycorrhizal fungi colonization significant linear correlation with dry weight (+ 0.79). Essential oil yield of *T. kotschyanus* positively correlated with that of spore density and percentage colonization respectively; + 0.93 and + 0.91. Given the importance of mycorrhizal symbiosis and compilation this with soil elements, this information can be useful for development of medicinal plants in agricultural ecosystems.

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ANTIBACTERIAL EFFECT OF SOME EXTRACTS AND QUANTIFICATION OF 20-HYDROXYECDYSONE, A MAJOR PHYTOECDYSTEROID, OF *AJUGA CHAMAECISTUS* SSP. *TOMENTELLA*

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Ajuga chamaecistus ssp. *tomentella* is an endemic subspecies of *Ajuga chamaecistus* in Iran. The genus *Ajuga* has been used for the treatment of joint pain, gout, jaundice, and as wound healing in traditional Iranian medicine. [1,2] This study was aimed to evaluate anti-bacterial effects of some extracts as well as developing an HPLC method for determination and quantification of 20-hydroxyecdysone (20-E), a major phytoecdysteroid in methanol extract of aerial parts of *Ajuga chamaecistus* ssp. *tomentella.* The methanol 80% and water extract and partition fractions of n-hexane, diethyl ether, and n-butanol fractions of the methanol extract of *A. chamaecistus* ssp. *tomentella* were tested against *Staphylococcus aureus*, *Basilus sabtilus*, *Escherichia coli* and *Pseudomonas aeruginosa* using the cup plate method. Antibacterial activity was determined by measurement of zone of inhibition around each well in plate. HPLC analysis was carried out on an ODSA (C18) column with isocratic elution using water –acetonitrile (75:25). The mean of inhibition zone of diethyl ether fraction against *S. aureus* and *B. subtilis* were 18 and 16.5 mm, respectively. N- butanolic fraction was active against *E. coli* by 16 mm inhibition zone. The methanolic extract inhibited *P. aeruginosa* (15mm/ inhibition zone). The lowest MIC was 333 µg/ml for methanolic extract and n-butanol, diethylether and hexane fractions on *S. aureus.* According to the results, antibacterial properties of *A. chamaecistus* ssp. *tomentella* extracts and fractions against *S. aureus*, *B. subtilis*, *E. coli* and *P.aeruginosa* have been confirmed. The content of 20-E in methanolic extract of this plant was determined to be 2.58% (w/w) (0.46% in dry plant). The above results showed that this plant extracts with antibacterial effect against *S. aureus* can be used for treatment of various skin infections.

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USABILITY ASSESSMENT OF ESSENTIAL OIL OF IRANIAN ANISE (*PIMPINELLA ANISUM* L.) POPULATIONS FOR PHARMACEUTICAL INDUSTRIES

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Today, chemical medicines, because of their harmful and irreversible effects on people, are slowly being replaced by medicines extracted from plants. Therefore medicinal plants are so important that pharmaceutical experts search among plants to find medicines of the 21st century and these experts believe that plants are the solution to medical problems of the future. Anise (*Pimpinella anisum* L.), belonging to the Apiaceae family, is an annual and herbaceous plant originating from the Mediterranean region. Around 1.5 to 6.0% essential oil that the main components of it is *trans*-anethole ($C_{10}H_{12}O$) will be obtained from the plant seeds. It is also reported other components in anise essential oil such as estragole (harmful to health), γ-himachalene, *p*-anisaldehyde, α-himachalene, β-bisabolene, *cis*-anethole, β-caryophyllene and zingiberene. Essential oil of anise has antimicrobial, antifungal, antivirus, anti-parasite, anti-pain and seizures, antispasmodic, antiepileptic properties, along with strong antioxidant effects and it is effective in healing of gastric ulcers. According to European Pharmacopoeia, anise seeds as a drug must be have essential oil content higher than 2 percent, 84-93 percent *trans*-anethole and 0.5-6.0 percent estragol. Therefore, to study value of Iranian anise essential oil for medicinal purposes, an experiment conducted with 12 Iranian anise populations in randomized complete block design with three replications at the research farm of agricultural faculty, university of Zanjan (36°41' N longitude, 48°27' E latitude, and 1620 m in elevation) in 2014 and 2015. After harvest, the essential oil of seeds extracted by Clevenger and the quantity and quality of essential oil analyzed by gas chromatography (GC) and mass spectrometry (MS). Results showed that the essential oil content is more than 2 percent in all studied populations. The percentage of trans-anethole was also higher than 84 percent (84.82-92.13 percent) and estragole content was low (less than 3.22 percent) in essential oil of the studied populations. So, the quantity and quality of essential oils in the studied anise populations are suitable for the pharmaceutical industry.

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EFFECT OF SALINITY BY TAKING POTASSIUM REGULATORS ON MORPHO-PHYSIOLOGICAL TRAITS OF HOLY BASIL

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To evaluate the effect of salinity irrigation water by taking potassium regulators on morpho-physiological traits of holy basil (Ocimum sanctum), using a factorial experiment in a completely randomized design with 15 treatments and 3 replications was conducted in 45 experimental plots .The first factor is the salinity at five levels: 1(control-drinking water) and 3, 5, 7 and 9dS/m with a combination of sodium chloride and calcium chloride were applied 1to 2 the second factor of K at three levels of 0, 200, 400mg potassium nitrate was used.Results showed basil holy salinity of 3dS/m well tolerated, and the salinity of 3dS/m onwards, although a decrease in markers of growth relative humidity, altitude, and rate of shoot fresh weight and fresh weight dried roots and increased electrolyte leakage was further But the plant was not a total loss. Using potassium nitrate negative effects of salinity on some attributes include relative humidity, altitude, root and shoot fresh weight, dry weight of shoots and roots partially However, the efficacy was evaluated.

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MORPHOLOGICAL STUDY OF *PASPALUM* (POACEAE) MEDICINAL PLANTS IN IRAN

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Paspalum L. is one of the large genera of the grass family with more than 330 species in the world. *Paspalum* comprises three species in Iran, as: *Paspalum dilatatum, P. urvillei* and *P. distichum.*Most species are distributed in tropical and subtropical regions of the world [1]. Seeds, rhizomes and shoots are of medicinal importance [2, 3]. Main medicinal effects of these plants are anti-diabetic, laxative and anti-fungi [3]. Main aim of present study is to evaluate the morphological variation of these medicinal taxa in Iran. For this purpose 13 populations of different localities were evaluated by use of 26 quantitative and qualitative features of vegetative and reproductive parts. Multivariate statistical analyses were done in form of cluster and factor analysis and also ordination methods. Species relationships are discussed.

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POLLEN MORPHOLOGY OF MEDICINAL *FALLOPIA* (POLYGONACEAE) SPECIES IN IRAN

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Fallopia Adans. (polygonaceae) is a genus with 16 species in the world. In Iran there is only 3 species of this genus: *Fallopia convolvulus, F. dumetorum* and *F. baldshuanica* [1]. *F. convolvulus* (Black bind weed) is a toxic, due to the presence of oxalic acid and also medicinal plant with purgative, anti diabethic and antibacterial effects [2]. *F. convolvulus* and *F. dumetorum* are edible plants [3]. In this study, the variation in the pollen grains of these species are considered by use of Light and scanning electron microscopy. All studied taxa showed spheroidal, tricolporate and isopolar pollens. Scaning electron micrographs showed microechinate ornamentations. In *F. convolvulus* and *F. dumetorum* microechinate sculpture exist around colporus but in *F. baldshuanica* it is find in all parts of pollen grains.The length of colpi in *F.baldshuanica* is 22.07µm, in *F. convolvulus* is 16.52 µm and in *F. dumetorum* is 12.79µm. The most important achivment of this study is the differences of *F. baldshuanica* the other two species. *F. baldshuanica* has bigger Pollen, perhaps due to the difference in its ploidy level. The major difference was observed in exin ornamentation between *F.bald shuanica* with two other species. Species realtionships are discussed.

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INTRODUCTION AND IDENTIFICATION OF MEDICINAL PLANTS OF SOUTH OF SEPIDAN REGION IN FARS PROVINCE

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Historically, plants have a great importance in the development of human societies. Due to the role of medicinal plants in providing hygiene and human health it has been under the attention of human being. Because of side effects of chemical drugs and negative effects of chemical environmental pollutions on human health nowadays, the use of medicinal plants and natural products in general have a special place in drug industries and modern medicine. Sepidan region has rich vegetation because of its 1200mm precipitation per year. Studies were carried out to collect and identify medicinal plants of Sepidan of Fars province. Plants were studied by a surveying method. After collecting, the plants were transferred to the laboratory and identification was done by library and herbaria studies. [1-3]. Totally 67 species of medicinal plants were identified which classified in 28 families. The most prevalent species were belong to Asteraceae, Fabaceae, Lamiaceae and Brassicaceae families. Some species such as *Lepidium* sp., *Plantago* sp. and *Ranunculus* sp. were the most frequent medicinal plants in the region. Dicotyledonous plants were the dominant species. However, native people prefer using medicinal species such as *Glycyrrhiza glabra, Descurainia Sophia, Cichorium intybus, Fumaria officinalis, Achillea milifolium, Plantago lanceolata* and *Plantago major* more than other medicinal plant species.

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INVESTIGATION OF METHYL JASMONATE AND SALICYLIC ACID EFFECT ON SECONDARY METABOLITES PRODUCTION IN *MENTHA PIPERITA* (FILED CONDITION)

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Mentha piperita is widely used in food, cosmetics and medicines. It has been proven helpful in symptomatic relief of the common cold. It may also decrease symptoms of irritable bowel syndrdome and decrease digestive symptoms such as dyspepsia and nausea. It is used topically as an analgesic and to treat headaches. The main aim of this study was to evaluate the effect of salicylic acid and methyl jasmonate on production of various secondary metabolites, especially menthol in field condition. The effects of 4 levels of 0, 2, 4, 6 mM salicylic acid and methyl jasmonate were tested in the field based on a randomized complete block design with three replications. The results indicated the difference in concentration and kind of secondary metabolites. The salicylic acid effect the production of secondary metabolites significantly especially menthol more than methyl jasmonate. The highest (%39.9) and lowest (%36.4) menthol content was obtained in 6 mM salicylic acid and control respectively. In other cases (Menthone, α-pinene, β-pinene, Menthyl acetate) the effect of methyl jasmonate was greater than salicylic acid. Also significant correlation was observed between mentol and other secondary metabolites including 3-octanol (-0.99), limonene (-0.99), neo-menthol (-0.99), myrcene (-0.99), menthon (-0.95). cineol (0.99), menthofuran (0.99), β-pinene (0.86), linalool (0.25), γ-terpinen (0.25). The results showed that the applications of salicylic acid and methyl jasmonate has additive and ablative significant effects on secondary metabolites production and it can be applicable in the field to increasing the important secondary metabolites yield [1,2].

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MORPHOLOGICAL STUDY OF MEDICINAL *ARISTOLOCHIA* SPECIES OF IRAN

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Aristolochia is a medicinal genus with more than 400 species in tropical and temperate regions of the world [1]. *Aristolochia* species are famous medicinal plants in traditional medicine [2]. This genus comprises 3 species in Iran with two endemic species. These are distributed in montan regions and fields. These are of diuretic, anti worm, scorpion bites treatment importance. Recently nephritis and urinary cancer are found due to the Aristolochic acid of these species [3]. The aim of present study is to evaluate the morphological variation of these species. 35 populations of three species are considered by use of 63 qualitative and quantitative features. Multivariate statistical analyses were done by use of cluster analysis, factor analysis and ordination methods to demonstrate the species relationships. Result of present study revealed that most diagnostic features are seed colour, seed shape, leaf blade indumentums, limb colour and leaf apex shape. Species relationships are discussed.

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STUDY THE EFFECTS OF DIFFERENT PLANTING BEDS AND PLANT GROWTH REGULATORS ON ROOTING OF YOUNG NON APICAL SHOOT STEVIA (*STEVIA REBAUDIANA* BERTONI) CUTTINGS

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Stevia rebaudiana Bertoni is a natural sweetener plant. The leaves of stevia are the source of glycosides. Stevia can be propagated by seed, tissue culture and stem cuttings. Seed germination is very poor in stevia due to infertile seed, small size seed and their self-incompatibility. For tissue culture propagation, high infrastructure and technological knowledge is needed [1]. So we research on *in vivo* vegetative propagation. By attention to the importance of planting bed and plant growth regulators on root induction of cuttings, this study was conducted as a factorial experiment based on completely randomized design for seven planting bed (soil + perlite + sand, soil + cocopeat + sand, soil + sawdust + sand, soil + cocopeat + perlite, soil + perlite + sawdust, soil + cocopeat + sawdust with portion 1: 2: 2 and soil + sand + cocopeat + perlite + sawdust with portion 1: 2: 2: 2: 2) and seven dose of plant growth regulators (control (solvent + distilled water), 250 ppm IBA, 500 ppm IBA, 250 ppm NAA, 500 ppm NAA, 250 ppm IBA + 250 ppm NAA and commercial rooting powder contains 0.2 % IBA). Cuttings made at 26 July 2015 and treated and remained at germinator. After 4 weeks cuttings, some characteristics were recorded. Results showed that planting bed and plant growth regulators significantly affected on number of root for cutting, rooting percentage, root fresh weight, root dry weight and length of the highest root. Result showed that maximum number of root for cutting (27.61) and rooting percentage (100) occurred at planting bed (soil + cocopeat + sand), maximum fresh weight root (110 mg/plant) occurred at (soil + cocopeat + sawdust) and dry weight root (13 mg/plant) were obtained at planting bed (soil + cocopeat + perlite) and maximum length of the highest root (5.82 cm) got at planting bed (soil + sand + cocopeat + perlite + sawdust). Result showed that maximum number of root for cutting (19.95), dry weight root (13 mg/plant) and Rooting percentage (90.64) occurred by applying plant growth regulator (500 ppm IBA). fresh weight root (91.57 mg/plant) and maximum length of the highest root (4.91 cm) obtained at applying 500 ppm NAA. In conclusion the best treatment was planting beds that were lighted and applying plant growth regulator (500 ppm NAA and 500 ppm IBA).

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IDENTIFICATION AND EXAMINING MEDICINAL PLANTS IN HEJAL MOUNTAINS (KOHGILOUYE AND BOYER AHMAD PROVINCE)

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Investigation of plant diversity of country as an essential bed to studies of ecosystem, plant gen bank, agriculture and medicine is of much considerable important. In this research the flora of Hejal Mountain in Kohgiloyeh and boyerahmad province has been investigated. The mention region of floristic that has gone investigated is located in the 42 kilometers away in the northwestern of yasuj and 5 kilometers away in east of Sisakht. The research by collecting the essential information in order to floristic study started. The plants of region has collected and pressed, then we provide a samples of herbarium and in centeral herbarium of Yasuj University with use of existing flora resources have been identified. This investigation showed that in the Hejal mountain, there are 44 families, 134 and two genous, 184 species than include 4.34% of Phanerophytes, 61% Hemicryptophytes, 9.87% geophytes, 13.04% Therophytes. Also in this research, the growth region of existing species in this region has been determined. Analyses shows that most of species of region belongs to the growth area of Iran-o-Turanian Region with having 90% of region flora.Medicinal plants including 18 families, 29 genus, 31 species that the most species is related to Lamiaceae (8 species, 25/8% species).

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FOLK HERBAL MEDICINES USED IN PSYCHOGENIC PAIN RELIEF BY LOCAL PEOPLE OF LARESTAN DISTRICT, IRAN

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Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage that may be intense or mild [1]. Psychogenic pains are the most common types of pain that many people in the world suffer from them. Psychogenic pains such as headache, back pain, and stomach pain are physical pains that are caused by mental factors [1]. In the past, patients used traditional herbal therapies to relieve their pain. Nowadays use of herbal remedies for treatment of psychogenic pain is still developing rapidly. The present investigation is an attempt to find out folk medicinal herbs used as psychogenic pain relief by native people of Larestan. The study area is located in southern of Fars province (27° 41′ 0″ N, 54° 20′ 0″ E). The survey was conducted from November to July 2015. Information was obtained through interviews with local informants using open-ended and face to face conversations. Medicinal plants were collected in flowering and fruiting growth stage. Voucher specimens were deposited at Jahrom University herbarium and identified using Flora of Iran and Flora Iranica. A total of, 14 medicinal plant species belonging to 12 plant families were documented from this area for psychogenic pain relief. Asteraceae and Boraginaceae were the largest medicinal plants families. The most used part of plants was fruits. Also, decoction (36%) was the most common mode of herbal drug preparation. Majority of these plants were used in the treatment of stomach ache (28%) followed by muscle aches, back pain and leg pain (each with 16%), rheumatism etc. In conclusion, the traditional use of plants for pain relief is widely widespread among the local inhabitants of Larestan.

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MEDICINAL VALUE OF COMMON WEED *CAPPARIS SPINOSA* L. IN FOLK MEDICINE OF LARESTAN IN FARS PROVINCE, IRAN

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The wild medicinal plants have a fundamental role in folk medicine of each country. These plants are used as traditional therapies by ethnic people due to their healing properties. *Capparis spinosa* L. is a common perennial flowering weed of the family *Capparidaceae*, found in many parts of the world. This plant has diverse economic and medicinal value in folk medicine of different regions such as in Iranian, Unani, Chinese ect [1, 2]. This study aimed to identify medicinal value of *Capparis spinosa* in folk medicine of Larestan, an old city located in southern of Fars province (27° 41′ 0″ N, 54° 20′ 0″ E). Fieldwork was carried out from November to July 2015. Ethnobotanical information was gathered through open ended and free listing interviews with 20 local informants. The results of this study showed that the leaves and fruits of *Capparis spinosa* are used by the indigenous people to treat various health problems such as gastrointestinal diseases, skin diseases, high blood fats, the circulatory system disorders, and to strengthen eyesight. The results of present research were in line with some previous experimental studies confirming healing power of Caper [1, 3]. Therefore, the present ethnopharmaceutical data can provide a clue for the researchers to identify plant metabolite associated with curing abobe mentioned health problems.

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ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS USED BY ETHNIC PEOPLE OF LARESTAN (IN FARS PROVINCE) TO TREAT GYNECOLOGICAL DISEASES

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Gynecological diseases are referred to disorders that affect the female reproductive organs. Gynecological diseases include cervical cancer, infections of the reproductive tract, dysmenorrhea, premenstrual syndrome, complications after childbirth etc. Female reproductive disorders are among the most severe health issues around the world. Herbal remedies is one of therapeutic approaches for treatment of gynecological diseases. The present study investigated the role of medicinal plants in traditional women's healthcare of Larestan, an old city located in southern of Fars province (27° 41′ 0″ N, 54° 20′ 0″ E) with an area of 6000 km^2. This study was conducted during November to July 2015 from local communities of the area using freelisting interviews. Voucher specimens of medicinal plants were collected and kept at the herbarium of Jahrom University. A total of 15 plant species (such as, *Achillea wilhelmsii* C. Koch, *Anchusa strigosa* Lab., *Peganum harmala* L., *Pistacia atlantica* Desf., *Plantago coronopus* L., *Salvia mirzayanii* Rech. & Esphand and *Teucrium polium* L., ect.) which belongs to 10 plant families were reported to be effective for treatment of gynecological disease. The most prevalent used plant parts were leaves. The herbal medicines were prepared mainly via decoction. Most of local herbal medicines were used to treat vaginitis, improve premenstrual syndrome and dysmenorrhea and to lessen complications after childbirth. The effectiveness of some of the plants mentioned in the present research on curing disorders of the female reproductive system has also been proven by experimental methods [1, 2, 3]. It can be concluded that above mentioned plant species are reasonable candidates yet to be more investigated for alleviating gynecological diseases.

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ETHNOPHARMACEUTICAL STUDY ON WEED PLANTS BELONGING TO PLANTAGINACEAE IN LARESTAN FLORA (FARS PROVINCE)

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From the perspective of agricultural science, weeds are any unwanted plants which grow in farmlands. They compete with the main crop and cause to reduce its quality and quantity. However, weeds were used to treat diseases by rural and nomadic people in the past and some of them are still used today. Many medicinal and healing effects of weeds have been proven nowadays. *Plantaginaceae* is a family of dicotyledonous flowering plants that many of its members have medicinal value [1, 2]. Considering the importance of traditional medicinal uses of the plants, we studied the use of weeds belonging to *Plantaginaceae* family for treatment of diseases by native people of Larestan city. Larestan (27° 41′ 0″ N, 54° 20′ 0″ E) is located in southern of Fars province. Ethnobotanical survey was conducted in 2015. There were extensive palm gardens and wheat fields in the region which provided suitable habitats for the weed growth. Weeds have been collected and were identified by identification keys. Then ethnobotanical data were gathered through semi-structured interviews with 15 informants. Based on the gathered data, four medicinal species of weeds belonging to *Plantaginaceae* were recognized. *Plantago* L. with four species was the largest genus. The collected weeds are often widely used for improving and treatment of respiratory diseases, psychogenic pain, skin diseases, reproductive system disorders etc. Remedies were mostly prepared by the people as decoction. Today, many species of the genus *Plantago* are used as herbal medicines [2, 3]. It seems that the indigenous people of Larestan have found how to use the herbs belonging to *Plantaginaceae* for treatment of different diseases from ancient time.

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INHIBITORY EFFECT OF HYDROALCOHOLIC EXTRACT OF GREEN TEA ON COGNITIVE IMPAIRMENT AND OXIDATIVE STRESS INDUCED BY STREPTOZOCIN IN RATS

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Alzheimer's disease (AD) is the most common kind of progressive neurodegenerative dementia of the aged brain, characterized by disturbance of cognitive functions. It affects many people especially in elderly ages and has known as a major medical problem for developing countries. Therapeutic approaches for AD are limited. Many promising chemicals have failed because of therapeutic limitations i.e. only making symptomatic relief..The antioxidant system, is known to contribute to the etiology of some conditions affecting neurodegenerative disorders, notably AD .This imbalance may originate from an overproduction of free radicals or from a reduction in antioxidant defenses. Streptozotocin (STZ), is administered in lateral ventricles, that is characterized by long-term and progressive deficits in learning, memory, and cognitive behavior .Green tea has been proven as anti-oxidative herbal agent which its' use in prevention of some neurodegenerative disease as parkinson ,Alzheimer and depression ,Antioxidative properties of green tea belong to polyphenol compounds as cathechin and epi gallo- cathechin , according to these background we planned to study preventive role of green tea extract on streptozocin related brain -oxidative stress and cognitive impairment. For experimental model of Alzheimer, we administered 3mg/kg i.c.v twice in 48 hr interval between each injection to wistar male rats, green tea hydro alcoholic extract administered for 3 weeks by gavage (100 mg/kg/1ml), after than animals have gone for behavioral cognitive studies through passive avoidance test by shutle box and after killing their brain tissue have been assayed for oxidative stress. Cognitive impairment observed in animals which received streptozocin as increased their latency time and green tea could have decreased their latency time and green tea can prevent this impairment. Also green tea extract could ameliorate oxidative stress parameter as MDA, Glutation, Catalase and SOD significantly. According to results of this experiment we can suggest green tea extract for old people who are at risk of Alzheimer and also may involve diabetes.

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AN ETHNOBOTANICAL SURVEY OF *MYRTUS COMMUNIS* L. IN FIROZABAD, FARS PROVINCE

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Ethnobotany is a branch of botanical science that study the useful use of plant species by local people of a nation or region. Nowadays, hidden and non-documentary information about traditional uses of medicinal plant plays an important role in development of pharmaceutical science and can be as a basis for the production of new drugs. Therefore conducting ethnobotanical studies in any area is very essential. Myrtaceae is a family of flowering plant belonging to Myrtales that many of species such as *Myrtus communis* L. have medicinal and economic value. *Myrtus communis* or myrtle grows in different parts of Iran, including Firozabad in Fars province. Thus, according to the medicinal value of this plant an ethnobotanical study was conducted in Firozabad district in 2015. Firozabad is located in the South West of Fars Province (latitude 11 ° 29 'and longitude 42 ° 52'). Data collecting was done using structural questionnaire and 20 local informants were interviewed. This plant was collected from the study area. The results of this study showed that the local people of Firozabad used this plant for the treatment of gastrointestinal and skin diseases, vaginitis, the prevention of hair loss and strengthening the hair, etc. Leaves and fruits of *Myrtus* are the most common used plant parts by native people of the region. The results obtained from the present study showed that the people of Firozabad have a good traditional medicinal knowledge regarding Myrtle. Some healing effects of *Myrtus* such as treatment of pests and its antiseptic properties have been proven by experimental researches in recent years [1,2].

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AN ETHNOBOTANICAL STUDY OF ANTI-DIABETIC MEDICINAL PLANTS IN KHUZESTAN PROVINCE, THE SOUTHWEST OF IRAN

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Diabetes mellitus (DM), often referred to a group of chronic metabolic diseases in which the person has high blood sugar levels. The disease is a common and serious metabolic disorder throughout the world that in the long term can be cause serious complications such as stroke, cardiovascular disease, chronic kidney failure ect. Nowadays, traditional herbal therapies are prevalent treatment methods for diabetes worldwide [1]. Hence, an ethnobotanical survey with the aim of documenting traditional medicinal practices for remedy of diabetes was carried out in Khuzestan Province in 2015. Khuzestan Province is in the southwest of Iran, bordering Iraq and the Persian Gulf. It is located at the 48° 41′ 38.4 latitude and 31° 19′ 38.28″longitude with an area of 23664 km^2. The study was conducted through oral interviews with local people and ethnobotanical information were collected according to the conventional methods used in ethnobotanical studies. A total of 15 local people of study area (4 man and 11 women) were interviewed. All medicinal plant samples were identified using flora of Iran. Totally 13 angiosperm species belonging to 13 genera and 9 plant families were identified to anti-diabetic from the area. Decoction, infusion and powder were including methods of drug preparation. The survey shows that Asteraceae, Cucurbitaceae and Lamiaceae are most common used families by native people of Khuzestan Province for the treatment of diabetes mellitus. Anti-diabetic effects of some of these plants (such as *Cucurbita pepo* L., *Citrullus colocynthis* (L.) Schrad., *Trigonella foenum-graecum* L., ect) have been proven using experimental methods[2,3].

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EFFECT OF DIFFERENT AMOUNTS OF NITROGEN AND IRRIGATION WATER ON BLACK CUMIN (*BUNIUM PERSICUM* L.)

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

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INVESTIGATION THE POSSIBLE ANTAGONISTIC EFFECT OF PROSOPIS FARCTA AGAINST THE VENOM OF IRANIAN SNAKE NAJA NAJA OXIANA IN MICE

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Snakebite is an important medical emergency. Iranian snake *Naja naja oxiana* with a potent neurotoxin is responsible for many snakebite incidences in Iran and some neighboring countries. The common treatment is current antivenoms which are insufficient, expensive and cause severe allergic reactions. This study has been conducted to find an alternative antivenom by testing the effect of hydro alcoholic extract of *Prosopis farcta*on this venom. In some pilot studies the lethal dose of venom has been determined in mice. The route of administration in this study was Intraperitoneal (IP) injection. Sixty four albino mice weighting 28±5g were divided into eight groups (A, B, C, D, E, F, G, H) of eight mice. Groups A and B, as controls received the venom at 2 mg/kg and seed extract of *Prosopis farcta* at 80 mg/kg respectively. Group C was treated with injection ofextract and venom simultaneously, group D was treated with same dose of plant, 15 min after injection of venom, group E was treated with the combination of venom and seed extract 30 min after incubation in room temperature, Groups F and G were treated like group E but with different doses of seed extract at 20 and 40 mg/kg. Group H was treated with 80 mg/kg combination of venom and seedpod 30 min after incubation in room temperature. The results showed that all mice in group Asuccumbed after 34±3 min and all mice in group B survived. Seven mice in group C succumbed after 59 min while one mouse survived. All mice of group D succumbed after 30 min and all mice in the group E survived. In group F, all mice survived but in group G seven mice succumbed and one mouse survived. Finally in group H seven mice succumbed after 48 min and one of them survived. In conclusion, the seed extract of *prosopis farcta* is unable to prevent *Naja naja oxiana* venom effect in vivo. This maybe because the venom bind to its acceptors soon after absorption. In contrast, the seed extract canpointedly neutral the venom in test tube in dose-depended manner. The research continue with oral doses of plant extract [1].

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THE INHIBITORY EFFECTS OF *CHENOPODIUM ALBUM* ON BREAST CANCER

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chenopodium album has considerable anti-cancer effects. The main aim of this study was to investigate the effects of chenopodium album on breast cancer cells in cell culture. In this laboratory-experimental study, breast cancer cells were randomly divided into control group and groups exposed to 10µg/ml, 100µg/ml and 1mg/ml of hydroalcoholic chenopodium album extract. The toxic effectsof extract was measured using MTT assay method. The data were statistically analyzed between groups using ANOVA. Proliferation of of breast cancer cells exposed to 10µg/ml and 100µg/ml of chenopodium albumextract significantly decreased compared to control group ($p<0.001$). chenopodium albumcan decrease proliferation of breast cancer cells; according to which, it is suggested to use this plant extract for breast cancer treatment.

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EVALUATION OF TOTAL POLYPHENOL CONTENT OF ITRIFLE SAGHIR BY FOLIN-CIOCALTEU METHODS DURING FORTY DAYS (IDRAK TIME)

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Itrifal or Triphala is a polyherbal preparation that has been used as one of a traditional products for several years. It composed of the three medicinal fruits Terminalia chebula Retz, Terminalia belerica Retz. and Phyllanthus emblica L.. It is also claimed that Itrifal Saghir produces beneficial effects on heath and helps the digestive tract, brain and nervous system to work at optimal level. The benefits of this drug *in vivo* and *in vitro* include: antioxidant, anti-hypercholesterolemic, anti-diabetic, anti-obesity, chemo-preventive potential and anti-mutagenic activity, anti-inflammatory, antimicrobial, radioprotective effect, immune-modulatory, improving wound healing, enteroprotective efficacies, anti gastric ulcers and nitric oxide scavenging activity. It may be potent therapeutic agents for scavenging of NO and thereby help to explain, rejuvenating, adaptogenic, cardioprotective and neuroprotective activities of these traditional product, and clinically used as a non toxic drug. In traditional medicine we need to have long term Incubation after making medicine that must pass before the drug is usable. This time was named idrâk time. This phase takes for 40 days for Itrifal in the oven [1, 2]. In this research the Itrifal was made and divided in to two parts. One of them was placed in Laboratory temperature and another was in the oven at a temperature of 40° C. The changes of polyphenol during idrâk time were measured with Folin-ciocalteu method for both of parts. The results showed that the pattern of change of polyphenol was different in the two parts. It seems that we can be taken positive steps to improve drug formulation by studying the changes. In addition to find out the main cause of these changes gives very useful information about the nature of a new active ingredient that may be put at our disposal.

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ASSESSMENT OF CYTOTOXICITY OF (*ASTRODAUCUS ORIENTALIS* L.) DRUDE DIFFERENT PARTS USING BRINE SHRIMP (*ARTEMIA SALINA*) LETHALITY ASSAY

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Medicinal plantsconstitutea significant part of the flora and are extensively distributed in Iran.Therefore, identifying and expansion of information toward biological activity of these plants which can be appropriate foundation for the development of pharmaceuticals substances, is indispensable. In this direction, *Astrodaucus orientalis* (L.) Drude (Apiaceae Family) were selected and collected. *A. orientalis* (L.) Drude is regarded as a pleasant carrot-parsley flavor and so are used as a food additive or a salad vegetable in some parts of Iran and turkey. In the present work, methanol extract of whole of plant extracted by soxhlet apparatus were screened for its cytotoxicity using brine shrimp lethality test. The brine shrimp lethality assay is considered a useful tool for preliminary assessment of cytotoxicity. It has also been suggested for screening pharmacological activities in plant extracts. Total extract of leave and root-stem of *A. orientalis* (L.) Drude exhibited lethality percent 26% and 44.7% in 1000 $\mu g/ml$ of concentration, respectively. Thecurrent study with the support by brine shrimp bioassay showed theroot-stem methanolic extract of *A. orientalis* (L.) Drude have more anti canceral effects than own leaves [1].

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PHYSIOLOGICAL RESPONSE OF HENNA (*LAWSONIA INERMISE* L.) TO SALICYLIC ACID AND SALINITY

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Herbal medicines are in great demand in the developed as well as developing countries for primary health care because of their wide biological and medicinal effectiveness, higher safety margins and lesser costs [1]. Henna (*Lawsonia inermis* L.) is naturally cultivated from north-east Africa to India as a medicinal-industrial plant. In the present study effect of exogenous application of salicylic acid was evaluated to determine the most effective concentration of this compound which can alleviate the salinity stress effects in henna seedlings. For this purpose, we evaluated the effects of three concentrations of SA (0, 40 and 80µM) and salinity (0, -3 and -6 bar) on photosynthetic pigments, protein content, catalase (CAT, EC 1.11.1.6) activity, electrolyte leakage, leaf relative water content and dry matter. The experiment was carried out with a factorial arrangement based on complete randomized design in triplicates at University of Kerman, Iran. The results revealed that salinity caused a significant decrease in photosynthetic pigments, protein content, relative water content and quantum yield of henna. By increase in salinity levels from 0 to -6 bar, the mean values of mentioned traits were reduced. CAT activity, electrolyte leakage, F_0 and F_m were elevated significantly with increasing the salinity concentration. Application of SA under salinity stress increased the photosynthetic pigments, protein content, CAT activity, leaf relative water contents and quantum yield, while it decreased electrolyte leakage, F_0 and F_m. Dry matter as an important index of plant growth or biomass yield, was significantly affected by the interactions of salinity and salicylic acid. Reduced dry matter caused by salinity was improved by applying salicylic acid treatments. Increases in dry matter of salt stressed plants in response to SA may be related to the induction of protective role of membranes that increase the tolerance of plant to damage. It is reported that SA treated maize plants showed higher dry mass as compared to those of untreated seedlings grown under salt stress [2]. It is conclusive that SA induced salinity tolerance in henna seedlings. The role of SA in henna under salt stress might be through regulation of oxidative stress and managing the antioxidants status.

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ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY OF HENNA (*LAWSONIA INERMIS* L.) LEAF EXTRACT

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Lawsonia inermis L. is an important medicinal plant that popularly known as henna. It grows in warm and arid regions.The principle coloring matter that is derived from green leaves of *L. inermis* is lawsone, 2-hydroxy-1, 4-naphthoqunone [1]. The purpose of this study was to evaluate the antibacterial and antioxidant effect of aqueous extract of *L. inermis* in the case of some important bacteria regarding skin hygiene. Bacterial pathogens used in the study were reference strains of both Gram positive (*Staphylococcus aureus, Streptococcus agalactiae, Bacillus cereus and Corynebacterium pseudotuberculosis*) and Gram negative bacteria (*Klebsiella pneumonia, Escherichia coli and Salmonella enteric* serovar *typhi*). Two concentrations (1.25 and 2.5%) of three *L. inermis* ecotypes (Shahdad, Roodbar and Bam) were investigated to determine the sensitivity or resistance of these pathogenic bacteria. The total antioxidant capacity was determined by phosphomolybdate method using ascorbic acid as a standard. The antioxidant capacity of various extracts of *L. inermis* was found to decrease in this order: Shahdad 2.5%> Shahdad 1.25%> Roodbar 2.5%> Bam 2.5%> Roodbar 1.25%> Bam 1.25%. The highest antioxidant activity of all extracts was belonged to Shahdad 2.5%, but statistically was not similar to ascorbic acid. This amount of antioxidant activity indicates the presence of antioxidants compounds in extract. The results showed that the aqueous extract of *L. inermis* had relatively antibacterial activity on all the species. This antibacterial activity of *L. inermis* extract in the case of *K. pneumonia* and *B. cereus* species was lower than other species. Among three *L. inermis* tested ecotypes, Shahdad ecotype had higher antibacterial activity in compared to the other ecotypes. The line Slope of the plotted equations showed that the Effect of higher concentration of *L. inermis* (2.5%) on preventing the growth of bacteria was more effective than lower concentration (1.25%). The results of present study recommend that *L. inermis* should be explored for their potential use in treatments of bacterial infectious diseases. The antioxidant activity might be attributed to the presence of several natural antioxidants. Finally, the results obtained in the present study demonstrated that *L. inermis* possesses good antioxidant and antimicrobial activity, suggesting that it could be useful in the treatment of free radicals and associated diseases in the form of antimicrobial agent.

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AMELIORATIVE EFFECTS OF EXOGENOUS NITRIC OXIDE ON PHYSIOLOGICAL PROPERTIES OF BASIL UNDER SALINITY STRESS

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Nitric oxide (NO) is known as an important messenger in plant defence signaling and it is shown that it has a crucial role in plant physiological processes regulation, including germination, flowering, fruit ripening and organ senescence stomatal closure, growth and development [1, 2]. Basil (*Ocimum basilicum* L.) is an important medicinal plant belongs to Lamiaceae family, which is a widely grown aromatic crop cultivated either for the production of essential oil, dry leaves for the market, or as an ornamental [3]. In this study a factorial experiment based on completely randomized design was carried out to investigate the effects of three concentrations of NO (0, 0.1 and 0.2 mM) on growth, photosynthetic pigments, lipid peroxidation and antioxidant activity of basil (*Ocimum basilicum* L.) under different salinity concentrations (0, 100 and 200 mM). Results revealed that salinity caused a significant decrease in growth of basil. Increasing salinity concentration led to a significant increase in the activity of SOD, CAT, APX, proline content, MDA and electrolyte leakage while content of photosynthetic pigments and relative water content were reduced. Application of NO under salinity stress increased dry weight, chlorophyll content, antioxidant activity and proline content, while MDA content and electrolyte leakage were decreased. These results demonstrated that exogenous NO treatment reduced the oxidative stress damage in basil imposed by salt stress. It is due to the fact that the activities of CAT, SOD and APX in the presence of NO under salt stress were higher than those under salt stress alone. Exogenous application of NO especially in low concentrations has been reported to improve the plants performance under a wide range of environmental stress [4]. It is also believed that a large group of plants are able to produce substantial amounts of NO in their natural environments [5]. In general, it can be concluded that exogenous application of NO is an effective approach to alleviate hazardous effects of salinity on basil plants and it is mainly through the change in physiological properties and antioxidative system.

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SYNTHESIS OF SILVER NANOPARTICLES USING *RHEUM KHORASANICUM* EXTRACT AND EFFECT ON SEED GERMINATION OF WHEAT

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The biological approaches for synthesis of nanoparticles using plants and their extract are better than chemical and physical procedures because of low energy and time expenditure. Green synthesis of nanoparticles is an eco-friendly method and uses natural solvent. Silver nanoparticles (SNPs) are promising agents in bionanotechnology, because of their unique activities against unfavorable process in biosciences like antioxidant affects and etc. In this research, extracellular biosynthesis of the SNPs was carried out by using extract of *Rheum ribes* that treated with aqueous silver nitrate solution extracts. Synthesized SNPs were characterized by UV-visible Spectro-photometer, Transmission Electron Microscopy (TEM), X-ray diffraction (XRD) and Fourier transform infrared Spectroscopy (FTIR).The formation of silver nanoparticles was confirmed by an absorption peak at 450 nm. TEM and XRD analysis showed the average particle size of 30 nm as well as revealed their cubic structure. FTIR results showed the role of compounds phenols, carbohydrates and proteins in synthesis of silver nanoparticles. The effect of concentrations of silver nanoparticles synthesized (0, 20 , 40, 80, 120, 200 µg /ml) on the parameters of wheat germination in a completely randomized design with three replications in controlled conditions (temperature 25±2, relative humidity 30,without light) within a period of one week was evaluated. The results showed that all levels of silver nanoparticles synthesized on percentage and rate of germination, root dry weight and shoot dry weight additive effect, then decreased. In all invoices largest increase in treatment 80 µg/ml and the highest concentration was 200µg/ml. The results of this study indicate the impact caused by the toxicity of nanoparticles in high concentrations (120, 200 µg/ml) inhibits the growth of wheat germination and.

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PHYTOTOXIC ACTIVITY OF MEDICINAL PLANT (*ROSMARINUS OFFICINALIS L.*)

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Allelopathy is an important mechanism of plant competition by producing phytotoxins to the plant environment to decline other plant growth and development. Concentration of plant residue could influence the toxicity intensity of released allelochemicals in the environment.When susceptible plants are exposed to allelochemicals, germination, growth and development may be affected.The most frequent reported gross morphological effects on plants are inhibited or retarded seed germination and effects on coleoptile elongation and shoot and root development. In order to study the allelopathic effects of aerial parts Rosemary of fruit ripeningstage on seed germination, seed vigor index, fresh and dry weightofAmaranth (*Amaranthus retroflexus*) and Radish (*Rhaphanus sativus*), an experiment in a completely randomized design with three replications and seven treatments (EOs of 300, 600, 900, 1200, 1500, 1800 μlL^{-1} and distilled water as a control) was performed. Amaranth is one of the parasitic weeds that cause yield losses of many crops and orchards. The results showed that the Seed germination and plant growth were significantly reduced by all essential oil concentrations in both species (at 0.05 level). So thatmost effective were 1800 μlL^{-1}concentration compared with the control of radish and 900 μlL^{-1} concentration in Amaranth.As a result the allelopathic properties of Rosemary essential oil can inhibitory effects on weed species. Degree of this effect responds considerably to essential oil concentrations.

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EVALUATING THE POTENTIAL OF ALLELOPATHIC ROSEMARY WATER EXTRACT

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Allelopathy has been defined as the inhibitory or stimulatory effects of a plant or microorganism on other plants through the release of chemical compounds into the environment. Most allelochemicals are classified as secondary metabolites of the plant.Allelopathy is a novel approach for environment safety and development of sustainable agriculture.In this study, the allelopathic effect of aqueous extract of aerial parts Rosemary of fruit ripening stage on seed germination and seedling growth of *Lipidiumsativum*and *Amaranthus retroflexus*were studied.This research was performed in form of completely randomized design with five treatment (0, 2.5, 5, 7.5 and 10%),three replication. The comparisons of mean were done by LSD test at level five.Aqueousextract effect caused pronounced inhibitory effect on seed germination and reducedseed vigor, fresh and dry weightof receptor plants.In the Amaranthseed germination was reduced to zero.The results of this experiment also showed that the inhibitory effects of aqueous extracts were higheron Amaranth than Cress.Hence, it could be concluded that the Rosemary aqueous extracts contain water-soluble allelochemicals.

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THE EFFECT OF WORMICOMPOST ON THE FORMING INGREREDIENTS OF *CALENDULA OFFICINALIS* L HERBS ESSENCE

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One experiment was carried out for different levels of wormicompost on the forming ingredients of calendula officinalis L herb´s essence in form of totally random design with 4 treats (2%, 4%, and 6%) with 3 replication at research farm at Shahrekord University in 1392. The comparisons of mean were done by LSD test at level five. The photochemical properties measured by GC/MS. The forming composition includes Menthon, Gamatrepn, Alphamololen, caryophyllene´s essence have been obtained. The results showed that, the different levels of wormy compost on the essence ´s forming ingredients. Except Caryophyllene increased in 1% levels significantly. The increases in different levels of wormicompost increased essence contain throughout providing additional nutrients that are present in forming ingredients of calendula officinalis L´s essence. While consumption reduction of chemical inputs in herbal produce and their production is basic condition of its normal healthy, therefore, calendula´s positive response to biological organic fertilizer is promising to sustainable production possibility of this medicinal plant.

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THE EFFECT OF HEADING BACK AND IRRIGATION METHODS ON EVENING PRIMROSE (*OENOTHERA BIENNIS*) SEED YIELD

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Evening Primrose (*Oenothera biennis*), is herbaceous and biennial fuchsia belongs to the family Onagraceae and has yellow flowers. The seeds contain oil and its medicinal properties have been reported. Therefore, the present study examined the effects of toping and irrigation on seed yield. This research was performed as Factorial experiment in a complete randomized block design in 2012, in the farm of Sadiq Abad in Saman city. Treatments contain height of toping (0, 20, 30, 50 cm) and two irrigation type (flood and drip). Results showed that treatments have a significant effectivness on yield of plant. It was observed that drip irrigation and height of 30 cm of toping made the most of number of capsule per plant, shoot fresh/dry matter and 1000 seed weight.

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ASSESSMENT OF DIVERSITY OF ANTIOXIDANT PHYTOCHEMICAL PROPERTIES AND ESSENCE FUNCTION BETWEEN DIFFERENT MINT POPULATIONS

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Mentha longifolia (L.), a member of the Lamiaceae family, is a herbaceous perennial plant with cylindrical stem that its height is about 40 to 60 cm. Ment 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. It has important properties such as anti-bacterial and anti-oxidant properties so that further research in this field were required. This study identified mint essence compositions and then assayed variety of anti-bacterial and antioxidant compounds of mint essence populations. Flowering samples were collected from provinces of Isfahan, Chahar Mahal and Bakhtiari, Lorestan in Iran. The aerial sections and flower were separately used for extraction of essence by hydro-distillation using a Clevenger- type apparatus and, was analyzed by GC and GC/MS. Chemical compounds were identify and antioxidant properties were assayed by NPPH method. Result of this study determined that there are meaningful differences in antioxidant properties, essence compositions and functions between different mint populations.

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IN VITRO LARVICIDAL ACTIVITY OF *CHRYSANTHEMUM INDICUM* METHANOL AND WATER EXTRACT AGAINST ANOPHELES STEPHENSI

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Malaria is a mosquito-borne infectious disease of humans and other animals caused by protozoan parasite belonging to the genus Plasmodium. The disease is transmitted most commonly by infected female Anophel mosquitoes. The increasing resistance to insecticides is an important threat to the impressive gains in control of vector-borne diseases. Plant products with a different mode of action should be valuable agents to control of mosquitoes. The present study assessed the role of larvicidal activities of Chrysanthemum indicum extract on Anopheles stephensi. The larval mortality was observed after 24 h of exposure. A highly larvicidal effect was obtained with C. indicum against larvae of A. stephensi in various instars. The highest larval mortality was found in methanol extract (89% mortality, LC50 213.66 mg/lit). The aqueous extract at 5% (LC50 308.23 mg/lit) was the most effective against various instars of larvae. Our results suggest that C. indicum could be a candidate for consideration as a new insecticide agent.

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CHEMICAL COMPOSITION OF LEAF ESSECTIAL OIL OF *CALOTROPIS PROCERA* AIT R.BR (ASCLEPIADACEAE)

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Calotropis a genus belongs to family of Asclepiadaceae which has great medicinal importance, various parts of this plant is reported to have multiple therapeutic activity [1, 2]. Essentail oil from *Calotropis procera* Ait, leaf collected from Chah dadkhoda (Kerman) habitat was analyzed for its constituents using gas chromatography coupled with mass spectrometry. Eighteen compounds were identified in leaf essential oil which were responsible for 66.27% leaf oils. Most abundant compounds in oil were Decane (25.04%), Caryophyllene oxide (7.16%), Dodecane, and 2-Pentadecanone (6.16%), 6, 10, 14-trimethyl (4.66%). Several groups of chemical compounds including alkanes, alkenes, Ketone, esters were observed in the essential oil. Our results showed the existence of terpenoids such as geranyl acetate, and (iso) caryophyllene, a in leaf essential oil of the plant.

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ANTIOXIDANT ENZYMES ACTIVITY OF *HIBISCUS SABDARIFA* L. CALICES

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Kenaf (*Hibiscus cannabinus* L.) is an annual herbaceous plant that has great potential as a source of herbal medicine. It has been cultivated as a commodity plant in many countries [1, 2]. Studies on the antioxidant enzymes activity of kenaf calices extracts are very limited at present. Catalase, Peroxidase activity and total protein and anthocyanin content of Roselle calices were investigated in this project. Our results indicated a high activity of peroxidase with 18 U mg^{-1} protein. The activity of cat was estimated as 3.6 U mg^{-1} protein. The content of total protein and anthocyanin was 204.3 and 3.6 mg g^{-1} FW on *Hibiscus sabdarifa* L. Based on the results, hibiscus calices can be used as a rich source of antioxidant compounds and protein compounds in herbal medicine.

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INTERACTION OF SALICYLIC ACID AND SALINITY ON PHYSIOLOGICAL AND PHYTOCHEMICAL CHARACTERISTICS OF MEDICINAL PLANT LAVENDER (*LAVANDULAANGUSTIFOLIA*)

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The aim of this study was investigated the interaction of different treatments of salicylic acidand salinity on physiological characteristics and phytochemicals of lavender. In this study, three levels of salinity (50, 100, and 150 mM) was used. Also Salicylic acid (SA) treatments were used as foliar sprayed at three levels (200, 400 and 600 mg/L). The results show that the lowest concentration of chlorophyll a and b occurred in the interaction of 200 (mg/L) salicylic acid and salinity on 150(mM). The results showed that the salinity of 150 (mM) and salicylic acid 200 (mg/L) carried an increase in the uptake of Na while K and Ca concentrations in the highest salt concentration were decreased .In this study, Cheloregenicacid, Qercetin, Narengenin and Caffeic acid was measured. Cheloregenic acid was highest at 400 (mg/L) of treated salicylic acid while at the salinity of 150 (mM) and 600(mg/L) SA it showed the lowest value. The Qercetin in all treatments except 200(mg/L) SA and control samples that were treated with 150(mM) of salt and 600 (mg/L) SA showed the highest value.According the surveying the results, the features of lavender plants, salinity tolerance level was 150 (mM). Interaction between Salt and 600 (mg/L) salicylic acid treatments were the more effective concentration.

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COMPARISON OF *FRORIEPIA SUBPINNATA (*LEDEB.*)* BAILL. ESSENTIAL OIL COMPONENTS IN WILD AND FIELD POPULATION

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Froriepia subpinnata (Ledeb.) Baill. (Umbelliferae) has been found in natively in the eastern parts of the south Caspian Sea coasts [1]. Young leaves of the plant are used as a cooked vegetable and for flavouring in the preparation of several local foods and only one species of the genus *Froriepia* has been found in Iran [2]. In this investigation the essential oils of the wild and cultivated of *Froriepia subpinnata* (Ledeb.) Baill. were isolated and compared. Aerial parts of *F. subpinnata* (Ledeb.) Baill. were collected in full flowering stage from natural sites on May 2015. Also, the seeds of this plant cultivated in farm on April 2015. Aerial parts of the cultivated plants harvested at full flowering stage. The essential oils of the wild and cultivated plants were isolated by hydrodistillation in yields of 1.2% and 1.5% respectively. The chemical composition of the essential oils was examined by GC and GC–MS. 42 components were characterized for cultivated plants with myrcenone (27.39%), limonene (18.59%), Terpinolene (14.67%) and Totarolone (7.35%) dominating constituents, 55 constituents were identified for wild plants with myrcenone (36.95%), limonene (13.62%), Terpinolene (11.04%) and β-Pinene (7.69%) as the major constituents.

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INVESTIGATION ON HEAVY METAL *ACHILLEA MILLEFOLIUM* BIOACCUMULATION POTENTIAL

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Metal contamination of soil is an important issue as these toxic elements could be transported in terrestrial ecosystem posing potential risk on food quality, soil health and the environment [1]. In this study factors influencing heavy metal uptake by *Achillea millefolium* and the bioaccumulation potential of different parts of it for lead and cadmium were studied. *A. millefolium* has been traditionally used as a ready for external wounds of skin such as burn, swollen and irritated of skin conditions. Different parts of Plant samples (shoots, roots and leaves) were separated and washed and digested by wet method according the standard protocol for measuring cadmium and Lead[2]. 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 showed significant differences in lead and cadmium up taking by different parts of plant. The rate of lead uptake by this plant is significantly affected by pH ($p<0.02$) and Growth period ($p<0.01$). The best results for uptake of cadmium was in the soil with pH=5.8 among different samples after 20 days while for lead up taking was in pH=6.0 after 40 days. Besides helping farmers who grow crops on acid soils, phytoremediation research findings can be used by other organization in government and academia and by environmental consultants, and industry groups complying with cleanup of contaminated sites. Other fast growing plants with high biomass and good metal uptake ability are needed in Iran in order to clean contaminated soils especially near the mines.

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ANALYSIS OF THE CHEMCIAL COMPOSATION OF THE ESSENTIAL OIL OF *DOREMA AUCHERI* BOISS IN DAMCHENAR IN BOYER AHMAD USING GAS CHROMATOGRAPHY

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Different species of *Dorema D.Don* gens were used, well gens pharmaceutical more cost. 16 gens of this species in the world[1], and 6 gens in Iran report became [2]. That gens *Dorema aucher*i *Boiss*, is plant that is endemic to Iran[3]. In this experimental study, *D. aucheri* plant in late spring was collected from Damchenar region in 2014 and dried in qualification laboratory and by method Simultaneous distillation extraction (SDE) essential oil. The compounds of the essentail oil were analysis by GC/MS. Twintey-one composition were identified in part stem of the essential oil of *D. aucheri*. The major compounds of the essential oil was isologifolene (1.629), cycloundecane 1-methyl(1.125), trans-2-tridecenal(0.614), α-curcumene and β-vinyl guaiacol(0.689).

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MICROPROPAGATION OF *BETULA PENDULA* ROTH WITH THE AIM OF TRITERPENOID PRODUCTION

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Betula pendula Roth is an important forest tree with medicinal, industrial and ornamental uses which is used for reforestation in high altitudes of mountainous areas [1]. This is endangered at northern forests of Iran. Betulin and betulinic acid are pentacyclic triterpenes present in the bark of the birch tree and other vegetal sources [2]. These compounds exhibit a broad range of biological and medicinal properties [3]. In this study, micropropagation of *B. pendula* Roth was carried out in order to improve regeneration and production of triterpenoids. The seeds of *B. pendula* were cultured in Nagata-Takebe (NT) medium. Then, after two months for investigation of shoot regeneration, the explants were transferred to the NT and WPM media [4]. Rhizogenesis of aerial parts was studied in the media with different concentration of growth regulators. Betulin and betulinic acid content in the aerial parts and roots were quantified using a HPLC. The result showed that the best medium for shoot regeneration was NT medium. Moreover, the highest rhizogenesis was observed in the NT-based medium containing 0.2 mg L^{-1} IAA (87%). There was a significant difference for betulin and betulinic acid content in different parts of plantlets at different media. The maximum yield of betulin was achieved from shoots in WPM medium about 0.73 mg g^{-1} DW. Althuogh, there wasn't observed betulinic acid accumulation in the arial parts of all plantlets but the highest concentration of this compound was obtained from roots in NT medium containing IAA (0.2 mg L^{-1}) about 0.3 mg g^{-1} DW. In conclusion, NT-medium had a clear influence on the rhizogenesis and micropropagation. Also this medium can be used for explants micropropagation in large systems to save *B. pendula* from overthrow.

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THE CYTOTOXIC EFFECTS OF *ZIZPHUS SPINA* CHIRSTI LEAF EXTRACT ON NORMAL KIDNEY CELL LINE IN CELL CULTURE

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It is claimed that Ziziphus spina Christi has cytotoxic effects of on cancerous cells. The main aim of this study was to determine whether Ziziphus spina Christi leaf extract has cytotoxic effects on normal kidney cell line in cell culture. In this laboratory experimental study, normal kidney cells were exposed to 10, 100, 1000, 10000 microgram/ml of hydroalcoholic extract of Ziziphusspina Christi in cell culture. After 48 hours, the viability of kidney cells was examined using MTT assay. The data were analyzed using ANOVA. Our findings show that viability of kidney cells decreased significantly when exposed to 10000 microrgram/ml of Ziziphus spina Christi extract ($P<0.001$). Other doses of plant extract had no significant effect on proliferation of kidney cells. Our findings show that despite low and moderate doses, high dose of Ziziphusspina Christi extract has cytotoxic effects on normal kidney cell [1, 2].

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ETHNOBOTANY STUDY OF EFFECTIVE MEDICINAL PLANTS ON GASTRIC PROBLEMS IN DARAB, FARS PROVINCE

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Throughout human history, people used various materials from nature to cure their illnesses and improved their health [1]. Ethnobotany is the study of how people of aparticular culture and region use indigenous plants for particular purposes such as treating diseases in the past.Darabcounty has a total area of 11000 km2, cultivable land which is located in the south east of Fars central part[2].This county is geographically situated between longitude 54' 55° N 53' 55° E and latitude 28' 20° to 29' 10° N[3].Taken together, people in this county apply their herbal medicaments for gastrointestinal complication.Digestive disorders are included high proportion and prevalent of human diseases.Perpose of this study was to identify medicinal plants in this area which have been used to treat stomachache, gastritis and peptic ulcers. This work is based on observations, interviews, and guided trips during their flowering seasonin order to collect.A folk botanical survey was carried out in the period 2011 to 2012.Plant samples were collected during the study after drying by botanist were identified. The voucher samples were maintained at the Herbarium of Shiraz University. the information including the scientific name, family, local name,part kind of use, ways of their application, and traditional uses of them has been documented. A total number of 25 medicinal plant species belonging to 13 families are used for treatment of digestive disorders by local people.Lamiaceae family has the greatest therapeutic effect on gastritis and peptic ulcers.The most common method of preparation were decoction and powder. Also, the leaves of these plants are used most often. The results of this study can be used as a basis for selecting herbs for further pharmacological, phytochemical, and pharmacognostical studies and even lead to the discovery of new medicines to treat gastric disorders.

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EVALUATION OF GROWTH INDICES AND SEED GERMINATION OF CUMIN LOCAL VARIETIES UNDER DROUGHT STRESS

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Drought stress reducing plant growth and production is very important. In this research the evaluation of the effect of drought stress on seed germination of local varieties of cumin this research based on factorial complete randomized design with three replications carried out. Treatments consisted of six genotypes of cumin and different levels of polyethylene glycol (zero, -2, -4, -6 and -8), respectively. The results showed that drought stress has significant effects on seed germination percentage, germination rate, shoot and root length. With increased drought, seed germination percentage, germination rate, shoot and root length was significantly decreased. The highest level of germination (53.46%) was obtained in Azarshahr landrace, but Nishapur local variety was superior in radicle length. In terms of all parameters that examined in this study Azarsahr landrace had the relative superiority.

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DETERMINATION OF ANTIOXIDANT ACTIVITY OF METHANOLIC EXTRACT OF *SALVIA LERIIFOLIA* BENTH.

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Antioxidant compounds like phenolic acids, polyphenols and flavonoids scavenge free radicals such as peroxide and hydro peroxideto inhibit the oxidative mechanisms that lead to degenerative diseases [1]. Due to the toxicity and carcinogenic ability of the synthetic compounds such as butylated hydroxyl toluene (BHT), in the recent years most efforts has been focused on the utilization of effective and inexpensive antioxidants from the plants as natural source [2]. The genus *Salvia* belongs to the family of Labiatae. *Salvia* species some pharmacological properties, such as antioxidant, antimicrobial, anti-inflammatory, analgesic, antipyretic, hemostatic, hypoglycemic, and antitumor [3]. In this study theantioxidant activity of the Methanolic extract from the aerial parts including leaf and flower of *Salvia Leriifolia* Benth were evaluated bythree complementary test systems, namely total flavonoid content (TFC), total phenolic content (TPC), and DPPH free radical scavenging activity (RSA). For this propose, the parts of *Salvia Leriifolia* were collected from Sabzevar (May 2014). The samples were dried, grounded and macerated in methanol. The Methanolic extract of the leaf exhibited the highest TFC (109.38 ± 2.88 $mgRUg^{-1}$) followed by flower extract (20.47 ± 2.19$mgRUg^{-1}$)**.**The flower ones showed the highest RSA(IC_{50}= 39.98 ± 0.21 µg/ml) and TPC (36.37 ± 1.46mgGEA g^{-1}) that haveany significant difference with leaves result (IC_{50}= 48.19 ± 0.07µg/ml, 31.38 ± 1.78mgGEA g^{-1}).This results for RSA, are interestingly higher than other species like *S. miltiorrhiza* with 104.93 ± 0.03 *mgGEA* g^{-1} in ethanolic extract.

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PHYTOCHEMICAL TESTS TO SCREEN OF PHENOLIC, ANTHRAQUINONE, ALKALOIDS, STEROIDS, TERPENOIDSAND FLAVONOID COMPOUNDS OF AERIAL PART OF *SALVIA REUTERANA*

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Salvia reuterana Boiss is a species of *Salvia* genus that growing in the warm zones of the world [1].Previous studies reported antimicrobial, Antioxidant properties, and pharmacological effects of the essential oils from aerial parts of the plant [1-2]. Since there is no report on phytochemical properties of the plant extracts in literature we carried out some test to screen the presence of some secondary metabolite in the leaves and flower of *S.reuterana*. The collected plant parts were dried and extracted using methanol for 72 h at room temperature, then the extracts were fractionated by three solvents which were different in their polarity including n-hexane, ethyl acetate, and water. Finally, phytochemical tests have been used todetermine of different groups compounds on the TLC profiles or solutions of the fractions. The tests were: 1) aqueous$FeCl_3$ 1% for phenolic compounds (change to blue or green color); 2) ethanolic $AlCl_3$ 1%for flavonoid compounds (change to yellow color); 3)ethanolic KOH 5% for anthraquinone compounds (change to orange or red color); 4) Reagents Wagner was used for determination of alkaloids compounds(formed brown precipitate); 5) Salkowski test was used for the presence of steroidsand terpenoids compounds by adding of chloroform and concerted sulfuric acid to form two phases (the upper phase was in dark red color) the results are shown in the table 1.Since the phenolic and flavonoids compound possess a variety of biological activities such as antioxidant, antiplatelet, antitumor, and antiviral activities. It seems *S. reuterana* could be nominated as a suitable plant to evaluate of its biological properties such as antioxidant, antimicrobial, anticancer activity and also to isolate of secondary metabolite from the plant.

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INVESTIGATION OF CYTOTOXIC ACTIVITY OF PRECIOUS MEDICINAL PLANT, *FRITILLARIA IMPERIALIS L.* AGAINST CANCER CELL LINES

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Fritillaria imperialis L. (Lilliaceae) is a bulbous plant which has been used traditionally for treatment of several diseases in some countries such as China and Turkey. In Iran, unfortunately, this plant is an endangered species because of indiscriminate harvesting of the plant, which has long been used in traditional and folk medicineof differentareas. Based on ethnobotanical surveysand Iranian traditional medicine books, this plant is used for a broad spectrum of diseasestomachache, diabetic and joint pains. Many of medicinal aspects of this precious species in folk and traditional medicine of Iranian people are not still studied and should be investigated pharmacologically and clinically. In this study, we have investigatedthe cytotoxic capacity of *Fritillaria imperialis* L. which has not been reported previously.Cytotoxic activity of crude extracts of *F. imperialis* bulb collected from KohgiluyehvaBoyer Ahmad province in southwest of Iran was examined against MCF-7, T47D and MDA- MB-231cell lines. MTT assay was used to evaluate their cytotoxic activities. Cytotoxic assay of thetotal extract of *F.imperialis*resulted inIC50 = 156.87, 260.09 and 333.68[$\mu g\ mL^{-1}$] for MCF-7, T47D and MDA- MB-231 cell lines respectively. In our approach and based on the achieved results, this herb could be considered as a moderate cytotoxic plant. More investigation should be conducted on the main compounds of this precious species, to find major efficient components to result in development of new natural products.

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COMPARATIVE STUDY ON THE CHEMICAL CONSTITUENTS OF ESSENTIAL OILS OF *FALCARIA VULGARIS* BERNH. (APIACEAE) FROM DIFFERENT REGIONS IN IRAN

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In this research , the genetic diversity of some falcaria (*Falcaria vulgaris*) populations was evaluated by phytochemical markers. Seventeen populations were collected from Kordestan, Tehran, Alborz and Gilan provinces for phytochemical analysis. In order to investigate the phytochemical diversity among the falcaria populations, plants from 8 populations were collected and dried in dark and shade places and distilled by Clevenger apparatus.The chemical constitutes of the essential oil were identified and measured by GC and GC-Mass. The most important compounds identified in each population are as follow: Bisabolole oxide (13.89%) and alloaromadendrone oxide (14.28%) in Vamkooh, alloaromadendrone oxide (14.26%) and spathulenol (8.31%) in Atashgah, naphtalenol (9.32%) and spathulenol (9.03%) and alpha-pinene (14.64%) and Beta-pinene (16-89%) in Deilaman and Babavali, Vinsar (40.8%), Alloaromadendrone oxide (9.89%), Neophetadyn (5.37%) and pentalen (9.48%) in Henzek, Galandook and Nazaninkala, respectively. Based on cluster analysis using all the identified compounds populations were classified in 5 groups. Vinsar is the best among the studied population since contained the highest amount of spathulenol.

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GENETIC VARIATION IN POPULATIONS OF *F. VULGARIS* (*FALCARIA VULGARIS* BERH.) NATIVE OF IRAN BY USING MORPHOLOGICAL CHARACTERS

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In this research the genetic diversity of some falcaria (*Falcaria vulgaris*) populations was evaluated by morphological markers. Seventeen populations were collected from Hamedan, Kordestan, Kermanshah, Tehran, Alborz and Gilan provinces for morphological analysis. Eleven morphological quantitative characters were evaluated. The results showed that all the studied characters have significant differences at 1% level. The most significant differences were observed in the lengths of leaves and main and secondary petioles. Populations were classified to three groups and six subgroups by cluster analysis using ward method. Vinsar & Deylaman had the longest, while Galanduak & Atashgah had the shortest Euclidian distances. Vamkooh and solan populations have the highest values for leaf length and number of leaves in plant, the two important productivity characters, so that they could be suitable candidate for breeding and cultivation programs.

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GENETIC DIVERSITY OF NAEIN-E HAVANDI (*ANDROGRAPHIS PANICULATA* L.) ACCESSIONS USING PROTEIN ANALYSIS

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Naein-e Havandi (*Andrographis paniculata*) is a medicinal herb in the family Acanthaceae. The leaves of the plant contain abundant diterpinoids of medicinal properties [1]. Knowledge of seed protein diversity improves the efficiency of germplasm conservation and development. The present study aimed to investigate the genetic diversity of 12 accessions of *A. paniculata* using seed protein analysis. There sults revealed the presence of 15 different types of proteins ranged from 13 to 105 kDa, yet, only two of them with low molecular weight were found polymorphic. The two polymorphic proteins were consisted of a 30 kDa protein, which was absent only in accession 11228, and a 20.5 kDa protein band,which was present in accessions 11228, 11266, 11306 and 11348. The results indicated that most of the bands were similar in all accessions. The Unweighted Pair Group Method with Arithmetic Average (UPGMA) cluster analysis of the accessions based on the protein profiles using the Ward method generated three clusters. The first cluster contained eight accessions, indicating the close similarity among most accessions, the second cluster contained only one accession and the third cluster comprised of three accessions. Accession 11228, which was lacking the 30 kDa proteinwas located separately in the second cluster. Although, the cluster analysis showed that the accessions possessing the 20.5 kDa proteinare much more related together than those accessions which were lacking this protein, and were located in the third cluster. Overall, the outcomes of the present study were indicated the presence of high genetic variability among the *A. paniculata* accessions. Our findings suggest that these protein bands can serve as useful markers to hybridization and breeding programs to generate useful recombinants in the segregating generations, the genetics and breeding programs for improvement of *A. paniculata*.

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A COMPUTER VISION SYSTEM AND COMPUTATIONAL INTELLIGENCE TECHNIQUES FOR COLOR-BASED SAFFRON QUALITY CHARACTERIZATION

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This study focused on development and evaluation of a Computer Vision System (CVS) for non-destructive characterization of saffron, stigma of *Crocus sativus L.*, based on coloring strength and its correlated chemical attribute namely Crocin's. Eleven sample of saffron from different geographical regions of Iran were prepared as experimental samples. Fourteen color features were extracted using image analysis and then fed to pattern recognition models. In this experiment, Principal Component Analysis (PCA) as unsupervised model was used for saffron sample clustering and also for color features selection. Artificial Neural Network (ANN) as supervised model was performed to saffron color characterization and Quality Grad (QG) prediction based on International Standardization Organization (ISO 3632). Experimental results showed that the optimal PCA was obtained under PCs = 2 with 91% total variance between the samples tested. The developed ANN models for saffron color characterization and QG prediction showed high performance, as the R^2_{cc}, R^2_{QG} and $RMSE_{cc}$, $RMSE_{QG}$ values were 99%, 99.2%, 7.121, and 0.0804 respectively. The overall results showed the effectiveness and feasibility of applying CVS-ANN for non-destructive and on-line saffron color characterization.

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THE EFFECT OF EXOGENOUS ASCORBIC ACID ON GENE EXPRESSION OF PHENYLALANINE AMMONIA LYASE AND ACCUMULATION OF PHENOLIC COMPOUNDS IN *SALVIA VIRGATA*

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Salvia spp. (Labiatae) are important sources of antioxidants that are used as preservatives in food industries, as well as pharmaceuticals for protecting the body against oxidative stress, free radical damages, angiogenesis, inflammation, bacterial and virus infections. In the present study, the effects of exogenous ascorbic acid (AsA) as an elicitor were investigated on *PAL* gene expression and production of three active phenolic compounds in the leaves of *Salvia virgata* Jacq. The mature seeds were collected from the wild plants and were sterilized and germinated in peat moss pots. Plantlets at six- leaf stage were treated with four concentrations (0, 50, 100 and 150µM) of aqueous solution of AsA. Leaf samples were harvested after 0, 12, 24 and 48 h treatment for RNA isolation. Total RNA was isolated from the leaf samples using BIOZOL reagent, cDNA was generated using the iScript cDNA synthesis kit (BIO-RAD) and Real Time PCR was used to investigate the expression profiling of *PAL* in the treated leaf tissues. A reliable and rapid HPLC method was used for simultaneously determination of rosmarinic acid (RA), salvianolic acid A (Sal A) and salvianolic acid B (Sal B) in the methanolic extracts using calibration equations. Real Time PCR analysis revealed that exogenous application of AsA led to up-regulation of *PAL* expression in the leaf samples, with the maximum value at 50µM concentration of AsA after 12 h of treatment. Further analysis showed that in *S. virgata*, the highest contents of Sal A (9.6 µg/g DW), S al B (355.3 µg/g DW) and RA (37.5 µg/g DW) were achieved at 50, 100 and 150 µM of AsA, respectively. Based on the obtained results, it could be concluded that there was no positive correlation between the intensity of *PAL* transcription and the phenolic compounds accumulation in the treated leaf samples with different concentrations of AsA. This is the first report on the effect of AsA as an elicitor on *PAL* enzyme in *S. virgata*. Consequently, the results approved that PAL is not the rate-determining step in phenolic compounds biosynthesis and probably some other key enzymes and factors involved in the synthesis of phenolics in *Salvia* species [1].

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THE EFFECT OF NITROGEN, POTASSIUM AND MICRONUTRIENTS ON YIELD AND ESSENTIAL OIL OF *SATUREJA HORTENSIS* L.

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This study was conducted to investigateton the effect of different amounts of nitrogen, phosphorus and micronutrient on yield and essential oil of *satureja hortensis* L. The experiment was conducted as a factorial experiment in randomized complete block design with three replications. This experiment included three levels of nitrogen from ammonium nitrate 0,150,300 kg/ha, two levels of phosphorus from triple supper phosphates 50,100 kg/ha and two levels of Fe, Zn and Mn from the iron sulfate, zinc sulfate and and manganese sulfate in 50 kg/ha. The analysis of variance results showed that it was significant effect nitrogen in: height, dry weight, number of derivative branches, length of inflorescence, essential oil, content of chlorophyll a in the level of 1% and the effect of phosphorous fertilizer on the length of florescent, essential oil, chlorophyll b in the level of 5% and in the dry weight and the total chlorophyll in the level of 1% .The interaction effect of nitrogen and phosphorous fertilizers were significant in dry weight, phosphorous amount, chlorophyll a and total chlorophyll in the level of 1% and chlorophyll b in the level of 5%. Comparison of mean results showed that the consumption of nitrogen source about 300 kg/ha and phosphorous with the amount of consumption 100 kg/ha have the most effect on the most studied traits, also micronutrients caused to increase the studied trais, however, this increase was not statistically significant. According to the resulte of these investigation can be concluded that sturejahortensis L. optimum yield with the ammonium nitrate fertilizer in 300 kg/ha and supper phosphate triple fertilizer 100 kg/ha obtaind.Since the highest nitrogen application in this experiment demonstrated a better plant function, further investigations using greater amounts of nitrogen is recommended.

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PHENYLALANINE AMMONIA LYASE GENE EXPRESSION AND ACCUMULATION OF PHENOLIC COMPOUNDS IN *SALVIA VIRGATA* UNDER ELICITATION OF EXOGENOUS GABA

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Pharmaceutical properties of *Salvia* plants (Labiatae) are mainly due to their secondary metabolites, especially phenolic compounds. For a long time, *Salvia* species have been used in traditional medicine and nowadays, these plants have attracted many attentions as novel natural treatments for the relief of many diseases such as depression, dementia, obesity, diabetes, heart disease, and cancers. The aim of this study was focused on the elicitation effects of γ-aminobutyric acid (GABA) on *PAL* gene expression and accumulation of three active phenolic compounds in the leaves of *Salvia virgata* Jacq. The mature seeds were sterilized and germinated in peat moss pots. Plantlets at six-leaf stage were treated with four concentrations (0, 0.01, 0.1 and 1µM) of aqueous solution of GABA. Leaf samples were harvested after 0, 12, 24 and 48 h treatment for RNA isolation. Total RNA was isolated from the leaf tissue samples using BIOZOL reagent, cDNA was generated using the iScript cDNA synthesis kit (BIO-RAD) and Real Time PCR was used to investigate the expression profiling of *PAL* in the samples. The methanolic extracts were analyzed by HPLC method and the concentration of rosmarinic acid (RA), salvianolic acid A (Sal A) and salvianolic acid B (Sal B) was measured in the samples using calibration equations. Real Time PCR analysis revealed that exogenous application of GABA led to up-regulation of *PAL* expression in the leaf samples, with the maximum value at 0.1µM concentration of GABA after 12 h of treatment. Data analysis also showed that in *S. virgata*, the greatest RA (106.3 µg/g DW) and Sal B (433.1 µg /g DW) accumulation was achieved at 0.01µM GABA, and the highest content of Sal A (8.2 µg/g DW) was reported at 1µM of GABA, while the maximum gene expression of this enzyme was obtained at 0.1µM GABA. It was concluded that there was no statistically significant correlation between increase in transcription of *PAL* gene and the phenolic compounds accumulation in the studied samples. This is the first report on the effect of GABA as an elicitor on *PAL* enzyme in *S. virgata.* In conclusion, our findings indicated that *PAL* is not the only rate-determining enzyme in the biosynthesis pathway of phenolic compounds in *Salvia* species, and accumulation of these compounds could also be affected by some other factors [1].

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THE EFFECT OF NANOPARTICLES OF TITANIUM DIOXIDE SPRAYED ON SOME PHENOLOGICAL CHARACTERISTICS OF DIFFERENT ECOTYPE CUMIN (*CUMINUM CYMINUM* L.) IN DROUGHT STRESS

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To evaluate the effect of foliar application of nanoparticles of titanium dioxide on phenological characteristics of cumin ecotypes under drought stress split-split plot design was carried out based on randomized complete block with three replications in research farm of College of Aburaihan, University of Tehran. Treatments of water stress at three levels (full irrigation throughout the growing season, low irrigation in vegetative and reproductive stages), nanoparticles of titanium dioxide in three levels (no spraying, spraying with a concentration of 15% and sprayed at a concentration of 30%) and nine cumin ecotypes. Phenological traits of days to emergence, emergence of leaves, emergence of branches, branching, flowering, pollination, seed formation and mature ripening were investigated. The results showed that spraying titanium dioxide nanoparticles have a significant effect on some of evaluated traits. Spraying particles have a significant effect on the characteristics of flowering, pollination, seed formation and ripening. Nano particles reduced the days interval between each of phonological stages. Interval days between the branching-flowering stages under normal conditions was 9.72 days, while it was reduced to 9.04 and 8.19 in spraying particles at a concentration of 15% and 30%, respectively. Flowering to pollination period was decreased under nanoparticle treatments rather normal irrigation condition. The longest period of growth (114 days) was identified in ecotype Jat-Golestan in normal irrigated condition without nano-particle treatment while the shortest period (86 days) was belonged to ecotypes Eivanakey-Semnan and Khansar-Isfahan under spraying 30% nano particles and water stress in reproductive stage. Based on the results, spraying particles at a concentration of 30% in terms of water stress on reproductive and vegetative stages of growth can shorten the period of plant maturation, decrease the drought threatening in final season.

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COMPARE EFFICACY OF VAGINAL WASHING WITH A SOLUTION OF IODINE ANDMATRICA® ON VAGINAL CANDIDIASIS AND BACTERIAL VAGINOSIS WITH COMPLETE TREATMENTS

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Extracts of some plants due to specific compounds are antifungal activities [1]. Chamomilla (*Matricaria chamomilla*) belongs to Asteraceae family and has antioxidant, anti-inflammatory and antimicrobial activity [2-3]. Matrica® is the alcohol solution (55% VOL. ethanol) of ChamomillaCapitules. Inthis study compared the efficacy of vaginal washing with of Matrica® and Iodine in patients with vaginal candidiasis and bacterial vaginosis with complete treatments was done. A total of 70 patients with a mean age of 28 years, with recurrent and severe vaginal candidiasis and bacterial vaginosis were divided into two groups of 35 patients.For the first group two weeks and each time, twice a week, vaginal was washed with Iodine solution andTreatment with clotrimazole vaginal cream was completed. The second group like the first treatment schedule, vaginal was washed with Matrica® and treatment was completed with the administration of vaginal cream Lecorex®. At the end of the second week follow-up examinations were performed. Comparison of the two groupsin terms of vaginal candidiasis, bacterial vaginosisand improving patient clinical symptoms, such as itching of the vulvovaginal candidiasis, showed the highest decrease by vaginal washing with a solution of Matrica® and complete treatment with Lecorex® vaginal cream.

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EFFECT OF SOWING DATE AND MATERNAL PLANT NUTRITION ON SEED GERMINATION CHARACTERISTICS OF BALANGU (*LALLEMANTIA ROYLEANA* BENTH.)

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In order to evaluate the effects of sowing date and amount of fertilizer on seed germination characteristics of medicinal plant seeds Balangu Shirazi (Lallemantia royleana Benth.), an experiment was conducted factorially as randomized complete block design (RCBD) with three replicates, during 2014-2015. The experimental factors were planting date in two levels (fall and spring) and amount of chemical fertilizer (nitrogen, phosphorus) at three levels including control (no fertilizer), 50% chemical fertilizer (NPK) (based on soil chemical analysis) and 100% chemical. Results of analysis of variance showed that the effect of planting date on germination percentage, mean germination time (MGT) and germination rate was significant, however the longitudinal vigor index did not affect. Also, the effect of fertilizer on all traits was significant at the 1% level, but the interaction effect of sowing date and fertilizer on all traits was notsignificant. According to results of means comparison the highest germination percentage (88.6) and longitudinal highest vigor index (LSVI) (427.17) obtained in 100% fertilizer amount treatment and the lowest germination percentage (51.11) and LSVI (86.14) in control (no fertilizer) treatment, respectively. Generally, applying chemical fertilizer in compared to sowing date was more important, applying full doze of fertilizer and fall sowing date is recommended for Balangu seed production.

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EFFECT OF *ECHINACEA PURPUREA* EXTRACT ON HEMATOLOGICAL PARAMETER OF *LIZA AURATUS*

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Use of immunostimulants in aquacultureindustry to increase non-specific defense mechanism and tolerance against disease has significantly increased in fin fishes. In present study 45 *Liza auratus*with an averageweight of50.35±0.02 g obtained from culturing and acclimatized for one week. Fish were injected IP with 400 mg/kg bw *Echinacea purpurea* extract. The experimental period was 22th. Blood was taken at 0, 5, 10 and 15days post injection and results were compared with untreated controls. There was significant increase in hematological parameter of serum in *Echinacea* group in comparison with control group ($P \leq 0.05$). The higher value of WBC (0.4±0.00), RBC (7.6±0.04), Hb (20.43±0.3), PCV (58.75±0.3), MCHC (4.2±0.1), MCV (19.8±0.02) and MCH (38.49±0.05) was observed on 5th. To conclude, it seems that Echinacea extract may affect some hematological parameters in *Liza auratus.*

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EFFECT OF SORBITOL AND 2.4-D ON MEDICINAL COMPOUNDS PRODUCTION IN (*SILYBUM MARIANUM L.)* GAERTN CALLUS

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Silybum marianum has been recognized as an antihepatotoxic plant. The active constituents of *S. marinum* include a group of flavonolignans known collectively as silymarin. Silymarin production by cultured cells of *S. marianum* has already been. Callus culture of *S. marianum* were established by transferring an explants from aerial part of plant on solidified MS medium supplemented with sorbitol, on solidified MS medium supplemented with 1 mg/l 2, 4, D and 0.2 mg/l kinetin. Optimal callus were subcultured to medium containing different concentration of sorbitol, PEG and control. Then cultures were harvested after 28 days, dried and extracted with methanol. Quantitative analyses of flavonolignans were carried out using GC-MS method. Higher levels of flavonolignans accumulation were observed in cultures containing 4% and 6% of sorbitol and l mg/l 2, 4, D also higher levels of cell growth were observed in 2% of sorbitol.

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PALINOLOGICAL STUDY OF MEDICINAL SPECIES OF *TAMARIX* L. IN SEMNEN PROVINCE

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Tamarix L. with almost 54 species is the largest genus of the Tamaricaceae. *Tamarix* s are shrubs, semi-shrubs and trees which grow as halophytic or xerophytic plants [1]. In Iran there are 25 species of Tamarix in different arid and semi-arid regions [2]. *Tamarix* species has medicinal importance in traditional medicine. The resin and many parts as flowers, leaves, and twigs can be used to treat fever, carbuncles and inflammation, dropsy, and jaundice [3]. The bark and gall can be used for diarrhea and ulcerating piles. In this study 5 medicinal species of 15 *Tamarix* populations, growing in Semnan province were considered. pollen grains were studied by light microscopy and scanning electron microscopy. Pollen grains were isopolar, tricolpate, prolate, sub-prolate or prolate – spheroidal. Exine sculpture was reticulate. Diagnsotic features in studied species were muri size, length of polar to equatorial axis, lumen diamter and shape of brochi. Palynological findings were efficient in species separation.

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PHYTOCHEMICAL INVESTIGATION, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF *PHYTOLACCA AMERICANA* L. FROM MAZANDARAN PROVINCE

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Phytolacca americana L. grows extensively in northwestern parts of Iran, mainly in the coastal areas and forest [1]. The aim of present study was evaluated the antioxidant activity of the ethanol and aqueous extracts of *p. americana* L. by two methods and estimated the total phenolic, flavonoids, anthocyanin, protein contents and investigated the antimicrobial activities of different concentration of ethanol and aqueous extracts, against pathogenic bacteria and fungi. Antioxidant activity was done by 2,2-diphenyl-1-picryl hydrazine (DPPH) method [2] and Ferric reducing antioxidant power (FRAP) assay [3]. As well as total phenolic content, total flavonoids, total protein and anthocyanin were done using Folin-ciocalteu, Woisky, Bradford and Wanger methodsrespectively. The antimicrobial property was done by Disc-diffusion assay. The results showed that the ethanol extract had more antioxidant activity compare with the aqueous extract in both methods (IC_{50}=65.36.43 µg/ml, 41.27 mMFe^{2+}/mg sample). The amountof total phenolic content, flavonoids, protein and anthocyanin was 110.62 mgGAE/gD.W, 32.48 mgQuer/g Extract, 85.35 mgAlbu/gD.w, and 210 µmol anthocyanin/ g.D.W respectively. Also the results of antimicrobialactivity showed that the ethanol extract had more activity compare with the aqueous extract. Therefore, due to the high amount of natural component, antioxidant and antimicrobial activities, *p. americana* L. can be used for treating diseases that werecaused by oxidative stresses and pathogenic bacteria and fungi.

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EVALUATING THE EFFECT OF SOY PRODUCT ON THE AMOUNT OF BDNF PROTEIN IN THE SPINAL CORD OF DIABETIC OVARIECTOMIZED RATS

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BDNF (Brain derived neurotrophic factor) is a secretion protein and a member of the neurotrophin family of growth factors. Studies have shown that in ovariectomized animals, the expression of BDNF decreased. However, recommending more estrogen increases its expression. Genistein is a phytoestrogen found in soy and soy products in large amount. The compound has attracted medical science researchers and public individuals, owing to the fact that it helps in the prevention and treatment of several diseases such as diabetes, menopause symbols, osteoporosis, heart and blood vessel diseases, renal disease, and different cancers. In this study, the effect of genistein was studied as an alternative to estrogen in the expression of BDNF in ovariectomized rats of type 2diabetes. Sixty (60) female rats were randomly divided into 4 groups. The SHAM group received laparotomy and drug solution (DMSO+PEG). In theovariectomy group (OVX), the ovary on both sides of the abdomen were removed. The diabetic ovariectomy group (OVX. DI) had type 2 diabetes after ovariectomy. In the diabetic ovariectomy group treated with genistein (OVX. DI. G), the rats received genistein 1 mg / kg / day after ovariectomy and induction of diabetes. Thereafter, samplingof spinal cord was carried out . The amount of BDNF was measured using RTPCR. The results showed that the injection of genistein significantly increased the amount of BDNF expression in the spinal cord when compared with the diabetic ovariectomy group (OVX.DI) and ovariectomy group (OVX) ($p<0/05$). Since BDNF is a member of the neurotrophic factor family, its expression is required for the regulation of growth, survival, and preservation of neurons and ovarian steroid . Therefore, genistein can be said to increase BDNF in the spinal cord.

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POLYPHENOLIC CONTENT, ESSENTIAL OIL ANALYSIS AND ANTIOXIDANT ACTIVITY OF *GONTCHARVIA POPOVII*

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The experiment was carried out using the shadow-dried aerial parts of *gontcharvia popovii* collected in Fars province in order to investigate the polyphenolic compositions, antioxidant activity and essential oil analysis. The result showed IC_{50} of 395.77 µg ml^{-1} in 517 nm which was a sign of strong antioxidant activity compared to some plants of different families and gallic acid as the standard. It also showed a wild range of polyphenols such as; Gallic acid, catechin, chloregenic acid, rutin, vanillin, trans-ferulic acid, sinapic acid, coumarin, hesperedin, quercetin, hesperetin, eugenol and also carvacrol as the main polyphenols detected which explains the high DPPH free radical scavenging in this plant. Some major compounds were also detected through essential oil analysis such as; 76.7% carvacrol, 4.25% γ-Terpinene, 3.8% p-Cymene and 2.4 (E)-Caryophyllene. According to the results *gontcharvia popovii* can be used in further studies for making herbal drugs of the new formula by separating the most effective compounds from the plant [1, 2].

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ESSENTIAL OIL ANALYSIS, POLYPHENOLIC COMPOUNDS, TOTAL PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY OF *PELTARIA ANGUSTIFOLIA*

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Peltaria angustifolia metahnolic extract and essential oil were obtained using maceration and hydrodistilation technique in order to investigate polyphenolic constituents, total phenol content (TPC), antioxidant activity and volatile oil analysis worked by HPLC-DAD in two different wavelengths of 280 and 320 nm, microplate reader and GC,GC/MS, respectively. It was found that the predominant phenolic constituents were trans-ferulic acid (6.29 mg g^{-1}), catechin (5.59 mg g^{-1}), rutin (5.16 mg g^{-1}) and hesperitin (4.93 mg g^{-1}). The plant also showed IC_{50} about 5068 µg ml^{-1} in 517 nm. The amount of total phenol measured by Folin-ciocalteu method in 765 nm was about 11.8 mg eq gallic acid/g. Major compounds in essential oil of the plant were 31.1% 5-neo-Cedranol, 13.3% α-Cadinol, 9.2% δ-Cadinene, 6.6% epi-α-cadinol and 6.5% Ledol. As the results showed there is no significant relationship between the polyphenolic content and antioxidant activity of the extract, however a significant relationship can be seen between polyphenols and TPC [1, 2].

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FATTY ACID PROFILES OF TWO ENDEMIC WILD ALMOND KERNEL OILS FROM IRAN:*AMYGDALUS WENDELBOI* FREITAG. AND *AMYGDALUS LYCIOIDES* FREITAG.

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Amygdalus lycioides and *A. wendelboi* are Iranian endemic almond species found in some parts of Iran especially in south regions. The fruits are locally called Badamak and Archen respectively. The kernels of *A. lycioides* are traditionally used as antidiabet, antiinflammation, antibacterial and laxative agent while those of *A. wendelboi* have a wide application in folk medicine to treat cold, cough, headache and skin burns and are locally used as an edible kernel by people. Literature survey revealed that no investigation has been done on them by now. The aim of this study wasto determine the fatty acid profiles of the kernel oils of these two wild almonds. *Amygdalus lycioides* and *A. wendelboi* kernels were collected in August 2014 from Sirmand Mountains, and Genow protected area respectively, Bandar Abbas, Hormozgan Province, Iran. Specimens were identified by R. Asadpour and vouchers were deposited in the Herbarium of Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University (IAUPS), Tehran, under code numbers 418-pmp/A and 419-pmp/A. Oil extraction was performed with a soxhlet apparatus using n-hexan as the solvent. Fatty acid methyl esters of the extracted oils were prepared. GC/MS was performed to determine theoils chemical composition. *A. lycioides* kernel oil content was 35.5 % while *A. wendelboi* kernel oil content was measured as 42.7 %. Oleic acid (84.5 and 81.3%, for *A. lycioides*and *A. wendeboi* respectively) was fond tobe in maximum in both samples followed by palmitic acid (11.1 and 7.9%). Higher contents of oleic acid in analyzed oils were noteworthy. In conclusion regarding to the high content of oleic acid in both oil samples, pharmacologic properties such as heart diseases prevention are expected from them.

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PRODUCTION OF IRANIAN CHEESE WITH THYME FLAVOR AND STUDY OF IT'S EFFECT ON THE GROWTH AND SURVIVAL OF *E. COLI*O157 DURING STORAGE

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Thyme essential oil is used to increase the shelf life and producing desired organoleptic properties in food industries. *E. coli* O157 is a dangerous pathogenic bacterium and cause hemorrhagic colitis and HUS (Hemolytic Uremic syndrome) in man. The *E. coli* is causing the early blowing spoilage in cheese. Study on the effects of thyme essential oil on the growth and survival of *E. coli* O157 in produced cheese during storage times were the objectives of the present research. Analysis of constituents of the thyme essential oil, producing cheese containing *E. coli* O157, various concentrations of the thyme essential oil (zero, 50, 75 and 150 ppm) and performing *E. coli* count, and measurement pH in manufactured cheese during zero, 15, 30 45 and 60 days of storage were the methods used in the study. Various concentrations of the thyme essential oils significantly decreased the counts of *E. coli* in comparison with the control group ($p<0.01$). With increasing the storage time, pH values in cheese groups significantly reduced. On the other hand, *E. coli* count decreased with decreasing pH values of the cheeses produced.
Thus it can be concluded that thyme oil have inhibitory effect on the growth of *E. coli* O157: H7 in cheese.

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EFFECT OF *TRIGONELLA FOENUM GRAECUM L*. ON DIABETIC RAT MEMORY

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Diabetes mellitus can impair the processes relevant to learning, memory and cognition in humans and laboratory animals [1-3]. Considering the evidences on the curing effects of fenugreek on diabetes [4] and its role in strengthening memory and mental health, this study investigated chronic administration of intraperitoneal of aqueous extract of fenugreek on learning and memory and oxidative stress in the hippocampus in diabetic rats. In this study, 24 male rats were divided into 4 groups, 6 rats each one. Group I or control group: a simple nutrition (injection of normal saline). Group II or diabetic, diabetic with streptozotocin 60 mg/ kg and nicotine amide 110mg/ kg. Group III: diabetic treated with aqueous extract of fenugreek (8mg / kg / day), the Group IV: diabetic treated with aqueous extract of fenugreek dose (2mg / kg / day [5]. After four weeks of treatment. Glucose was measured by glucometer. Total antioxidant capacity measured by FRAP (Ferric Reducing Antioxidant Power)assay. Malondialdehyde was determined by the Spectophotometeric method [6,7] . Also, each of the groups were tested by water maze and shuttle box in order to check the memory. Treating diabetic rats with aqueous extract of fenugreek caused significant reduction ($P<0.01$) in their weight compared to diabetic rats group, increasing the level of total antioxidant protein ($P<0.001$ and decreasing the amount of lipid peroxidation (Group III $P<0.01$, Group IV $P<0.001$)) in the brain tissues .The results of studying spatial memory by water maze showed that the amount of time it takes for the animal to find the hidden platform (escape latency) ($P<0.001$), the distance to find a hidden platform (travel distance) ($P<0.001$), and the time remaining in the target quadrant (time in target quadrant) ($P<0.01$) in the treatment group was significantly lower compared to the aqueous extract of fenugreek diabetic one. The results of Passive-avoidance response and memory with shuttle box showed that the aqueous extract of Fenugreek can reduce the time of remaining in a dark room ($P<0.01$), as well as a significant reduction in Latency Time ($P<0.01$) in treated rats compared to diabetic. Administration of *Fenugreek* is effective in the capability of maintaining information in the memory stores and reminding them and also increased antioxidant activity in the diabetic rats with concentration related manner. It seems that high content of phenolic which are antioxidants, could affect memory improvement.

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COMBINED ANTIMICROBIAL EFFECT OF BASIL (*OCIMUM BASILICUM*) ESSENTIAL OILS AND NISINBACTERIOCIN

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The use of herbal essence in food industry for antibacterial, anti oxidative and flavoring is increasing. In the recent years, the increasing antibacterial effects of certain plants with other antibacterial factors have been studied by several researchers. In the present study, basil essential oil constituents and antibacterial effects separately and in combination with nisin, on *Escherichiacoli* O157(ATCC 25922) were studied. antibacterial effects of basil essential oil with micro dilution MIC and FIC testing method were determined. Plant was extracted via distillation by water. evaluations. constituents of the EO were analyzed by gas chromatograghy. Ocimum basilicum contains about one percent of the essential oil that contains objects such as linalool, Estragole,Eucalyptol. The result of antimicrobial sensitivity test showed that the MIC of Basil and nisin lonely on *E. coli*O157 is respectively mg/ml>10 and 1000 IU/ml.The result of FIC factor measurement showed that the antibacterial effects of Basil in combination with nisin on *E. coli*O157 increase synergistic so it can be concluded that Basil and nisin have considerable impact on the antibacterial effect of *E. coli* because of synergistic effect. So in order to raise the antimicrobial effect of Basil in invitro systems especially on *E.coli* 0157,it is suggested to mix it with nisin.

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ELECTROCHEMICAL BEHAVIOR AND CYCLIC VOLTAMMETRY FOR ASSESSMENT OF ANTIOXIDANT ACTIVITY OF *FEOENICULUM VULGARE* SEED EXTRACT

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The antioxidant properties of biological samples, foods, extracts, and pure substances are measured by using different methods involving free radicals, but none provide quantitative information on the relative ease of oxidation, an important factor in antioxidant properties. Compounds which are antioxidants by virtue of their ability to act as reluctants in solution tend to be easily oxidized at inert electrodes [1,2]. In the present study, aqueous extract of *Fennel (Foeniculum vulgare)* seed was investigated by cyclic and differential pulse voltammetry techniques in the biological pH at the surface of glassy carbon electrode at various concentrations and scan rates. The results revealed that the extract had an irreversible redox reaction. Oxidation peak currents are linearly dependent on the square root of the scan rate, which is typical of a diffusion controlled electrochemical process. Antioxidant activities of this extract was evaluated using the 2,2-diphenyl-2-picrylhydrazyl (DPPH) radical-scavenging method and it is directly related to its redox potential value. The results show the good antioxidant activity of the *Foeniculum vulgare* seed extract and the electrochemical behavior of the constituents in it, at glassy carbon electrode.

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EFFECT OF CINNAMON ON SPERM PARAMETERS IN DIABETIC RATS

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Cinnamon is one of the most ancient and well-known medicinal plants, and its role in the treatment of a wide range of diseases has been studied. The purpose of this study was to investigate the effect of *Cinnamon* on spermatogenesis, total antioxidant and MDA levels in male diabetic rats. In this experimental study, 24 male Wistar rats weighing approximately 200 gram were used. The rats were randomly divided into 4 groups of six each: group 1: control group(fed with normal diet); Group 2; diabetic with streptozotocin 60 mg / kg and nicotine amide 110mg / kg(fed with normal diet); Group 3: diabetic(fed with 8gram cinnamon/kg diet); group 4: diabetic (fed with 2gram cinnamon/kg diet. This treatment continued for 4 weeks. Blood glucose, total antioxidant capacity, malondialdehyde and sperm profiles were determined. Results were evaluated with SPSS and Tukey test. Blood glucose in diabetic rat which received cinnamon, significantly reduced compared with diabetic animals ($p<0.001$). Cinnamon also led to reduction of body weight ($p<0.001$) and malondialdehyde (MDA) levels ($p<0.001$). On the other hand, Cinnamon increased total antioxidant capacity ($p<0.01$) and normalized sperm profiles ($p<0.01$). According to the results of this study it can be concluded that consumption of Cinnamon extract reduce malondialdehyde (MDA) levels, body weight and normalized sperm profile and thus can be used to treat sexual dysfunction in males.

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NEUROPROTECTIVE EFFECT OF PUMPKIN SEEDS AGAINST SCOPOLAMINE-INDUCED COGNITIVE IMPAIRMENT IN MICS

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Given the pressing need to reduce alzheimer disease (AD), there has been a focus on optimizing dietary patterns to reduce the many contributing risk factors. The use of herbal remedies individually or in combination with standard medicines has been used in various medical treatises for the cure of different diseases such as AD. Over the past 2 decades, many studies have been conducted that have evaluated the effects of pumpkin seedsconsumption on AD risk factors.Pumpkin seedsisone of the well-known edible plants and has substantial medicinal properties due to the presence of unique natural edible substances [1-3]. 40 male NMRI mice (30-40g) were used. The animals were randomly divided into 4 groups (three treatment and control groups). Present study involves evaluation the nootropic effect of pumpkin seeds on scopolamine (1mg/kg) induced cognitive impairment in mices using three oral doses i.e. 1, 2 and 4g/kg (for 3 months) and control 1mg/kgthrought assessment of behavioural test (Elevated Plus Maze). A significantly improvment in learning of pumpkin seeds treated mices compared to control was observed. The results show that experimental groups 2 and 4 g/kg had asignificantly increased in learning time in the comparison to the control group ($p<0.05$).whereas experimental group 1 gr/kg did not reveal any significant difference in comparison to the control group ($p<0.05$). The findings show that pumpkin seeds has potential effects against scopolamine induced cognitive impairment by antioxidant and anticholinesterase properties, which may be useful in the managementof Alzheimer's disease [4,5].

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THE EFFECT OF THE ETHNIC FORMULATION ON BONE MARROW CELLS IN MICE MODEL OF ALZHEIMER

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Ethnic Formulation (EF) is a mixture of several medicinal plants which has been used in traditional medicine. Traditionally, this formulation has been used to cure diseases such as Alzheimer. EF was made from date, almond, pumpkin, cinnamon and candy. EF ingredients are a very good sources of many nutrients which can help to enhance the immunity and also to reduce free radicals. Moreover, the EF has flavonoids compounds which can protect the bone marrow tissues from toxic agents such as Scopolamine (Ef fectantioxidant) [1,2]. The objective of this study was to examine the immunologic effect of EFon bone marrow cells of 40 male NMRImice. The mousewere randomly divided into five groups (three treatment groups, positive and negative control groups). They were kept under identical conditions. Memory impairment was induced by administration of scopolamine (1mg/kg) intraperitoneally. The Scopolamin (1mg/kg) injected to the three treatment and positive control groups [3]. The animals in negative control group were received physiological saline serum. The EFin oral doses of 1, 2 and 4g/kg were used for treatment groups every other day for 3 months. After the examination, the blood samples were collected from heart directly and the bone marrow tissues were examined microscopically(with staining right and gimsa). The bone marrow cell types were myeloid and erythroid. Themyeloid/erythroid ratio was compared between different groupsusing ANOVA test. Results of the present study showed that the EFhad stimulating effects on bone marrow and myeloid/erythroid ratio increased in groups received 2 and 4 gr/kg doses while the increased ratios was still in the normal range ($P<0.01$).

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CONTACT AND FUMIGANT TOXICITY OF *CINNAMOMUM VERUM* ESSENTIAL OIL ON *TUTA ABSOLUTA* (LEPIDOPTERA: GELECHIIDAE)

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Tuta absoluta (Meyrick) (Lepidoptera: Gelechiidae) is one the most important insect pests of plants family of Solanaceae, especially tomato. This insect can cause up to 80–100% of yield losses in both greenhouse and open-field tomato production, if no control measures are taken. Due to the negative effects of insecticide use, many researchers have been considering another ways to control this pest. In the current study, an alternative solution based on the use of natural products as "bio-insecticide" has been suggested. Thus, the toxicity of essential oil of *Cinnamomum verum* was evaluated against larvae of *T. absoluta*. The aerial parts of the plant were obtained from Medicinal Plants and Drugs Research Institute of Shahid Beheshti University. Essential oil from *C. verum* was obtained by hydrodistillation with in situ steam generation in a Clevenger apparatus. Extracted essential oils were dried via anhydrous sodium sulphate. Toxicity of the essential oil against the fourth instar larvae of *T. absoluta* was evaluated by contact and fumigation method into small boxes (4.5×5×7 cm^3) at 25±1°C, 60±5% RH and photoperiod of 16:8 h light and dark. The experiments were replicated four times with at least 10 larvae in each replicate. In the contact method, essential oil solution was diluted with acetone and each larva was treated with 0.5 µl of every one using a micropipette. On the other hand, in the fumigant assay, different volumes of the essential oil were set on a filter paper (1 cm^2) pasted inside the door of the experimental boxes. Mortality was recorded after 24 hours post treatment. Probit analysis was done using polo-plus software. The Results showed that the LC_{50} value of *C. verum* in the contact method was 39201 (30822-39299) μgL^{-1} and in fumigation test showed 38.678 (35.210-41.524) μlL^{-1} (air), respectively. Also, concentrations caused 90 percent mortality in fumigant and contact tests were 53.707 (49.146-62.695) μlL^{-1} (air) and 122678 (72073-583710) μgL^{-1}, respectively. Chemical constituents of the oil had been determined previously by gas chromatography/mass spectrometry and twenty five components were identified where cinnamaldehyde, linalool, cinnamaldehyde para-methoxy, eugenol and trans-caryophyllene were the major constituents [1]. In the previous study, *C. verum* had been one the most powerful essential oils among 34 essential oils were tested for their nematicidal activities [2]. Likewise, in this study, the essential oil extracted from *C. verum* had potential to be employed effectively, against *T. absoluta*.

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IMPACTS OF COLCHICINE ON PHYSIOLOGICAL TRAITS IN 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].In vitro induction of polyploidy using mutation agents is one of the medicinal plant breeding methods which have been employed to increase potential of secondary metabolites production[2].The objective of present study was to investigate the impacts of different concentration and exposure times of colchicine on physiological traits in *Melissa officinalis*. In this regard, a factorial experiment was carried out based on randomized complete block design with two factors and three replicates. The factors were four different concentration of colchicine (control, 0.05%, 0.1% and 0.2%) and three exposure times of colchicine (24, 48 and 72 h). The results indicated that different concentration of colchicine had significant effect on the Chl.a,Chl.b, carotenoid, rosmarinic acid, phenol and flavenoid contents. The exposure times of colchicine also caused significant changesin anthocyanins, phenol، flavenoid، Chl.a, Chl.b, carotenoid, rosmarinic acid amounts ($P \leq 0.01$). Increasing in colchicine concentration, significantly increased mentioned physiological traits at0.05% and 0.1% colchicine concentrationin comparison to the control ($P \leq 0.01$). In contrast, the interaction of colchicine concentration and exposure time had significant effect on Chl.a, Chl.b, carotenoid, rosmarinic acid amounts. In agreement with the reports of Da Silva, et al. [3] the findings of this study indicated thatestimation ofphysiologicalchanges, size of stomata, contents of chlorophyll a, b and total of chlorophyll and secondary metabolites amontis an effective method in primary screening of polyploid plants in polyploidisation breeding program and it is recommended flow cytometry to be used for accurate identification of ploidy level in *Melissa officinalis*.

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MEASURING LETHAL TOXICITY OF *THYMUS DAENENSIS* CELAK AND *ZATARIA MULTIFLORA* BOISS ESSENTIAL OILS ON *TUTA ABSOLUTA* (LEPIDOPTERA: GELECHIIDAE) USING TWO DIFFERENT BIOASSAY METHODS

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Botanical insecticides are an attractive alternative to synthetic chemical insecticides in modern agriculture due to its safety for human health and non-target organisms [1]. Plants produce secondary low-molecular metabolites act as defense barriers against phytophagous insects [2]. In this study, short-term effects of essential oils extracted from *Thymus daenensis* Celak and *Zataria multiflora* Boiss were examined on survivorship of the tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), a key pest of Solanaceae crops, causing severe loses (up to 80–100%) in product and market favoring [3]. The plants had been taken from Medicinal Plants and Drugs Research Institute of Shahid Beheshti University. Essential oils from both plant materials were extracted by hydrodistillation using a Clevenger apparatus, after air drying. Extracted essential oils were dried via anhydrous sodium sulphate. Toxicity assays were conducted using contact and fumigation methods against the fourth instar larvae of the tomato leaf miner. Experimental units were small boxes (157.5 cm^3) keeping under laboratory conditions (25±1°C, 60±5% RH and photoperiod of 16:8 h light and dark). In the contact method, 0.5 µl volume of every essential oil solutions (1778, 4073, 9332, 21379, 50000 mgL^{-1} in *T. daenensis* and 3090, 6165, 12302, 24547, 50000 mgL^{-1} in *Z. multiflora* treatments), diluted with acetone was put on dorsal section of each larva of the two treatments using a micropipette. Also, in the fumigant assay, different volumes of the essential oils (25.47, 28.15, 31.21, 34.58, 38.21 µl/L air, in *T. daenensis* and 15.92, 19.10, 23.63, 28.79, 38.21 µl/L air, in *Z. multiflora* treatments) were set on a filter paper (1 cm^2) pasted inside the door of the experimental boxes. Control in contact test was treated only by acetone, but in fumigant experimental control, there wasn't applied any solution or solvent. Mortality was calculated after 24 hours and Probit analysis was done using polo-plus software. Both experiments were replicated three times. LC_{50} and 95% confidence interval in *T. daenensis* and *Z. multiflora* treatments in the contact method illustrated, 11284 (7269-21347) and 11130 (8975-13586) mgL^{-1}, respectively. But 50 percent mortality produced in *T. daenensis* and *Z. multiflora* treatments in fumigant assay were 26.46 (24.70-27.64) and 25.25 (23.37-27.52) µl/L air respectively. Thus, the essential oils extracted from *T. daenensis* and *Z. multiflora* can be considered as two powerful bio-insecticides with similar lethal effects against *T. absoluta* in the contact and fumigation manners and show efficient functions in the integrated pest management programs.

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WATER SOLUBLE CARBOHYDRATES FROM SAFFRON (*CROCUS SATIVUS* L.) FOR QUANTITATIVE DETERMINATION WITH ANTHRONE

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Saffron highly valued for its unique aroma, taste, color and medicinal Properties, belonging to the family of Iridaceae [1]. This plant primarily grown in the countries such as Iran, India, Spain, and Greece and also has been cultivated successfully in several other countries [2]. The present study aim, measuring water soluble carbohydrates of plants were investigated. Water extract of all tissues were extracted and water soluble carbohydrates were determined with the anthrone [3]. The results showed that petals have higher carbohydrates than stamens of saffron (0.04 and 0.019 g/kg, respectively).

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COMPARISON OF ESSENTIAL OILS EXTRACTED FROM SEVERAL *SATUREJA* SPECIES ON THE TOMATO LEAF MINER LARVAl SURVIVORSHIP UNDER LABORATORY CONDITION

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Essential oils modes of action are varied including inhibition of molting and respiration, cuticle disruption, decline in development and fecundity, and negative effect on the octopamine pathway [1] and are good candidates for insect pest management. The genus *Satureja* (Lamiaceae) are widely distributed in Mediterranean areas, Asia, and North America, constitutes about 200 species of often aromatic herbs and shrubs. This genus is represented in the flora of Iran by 16 species. *Satureja* secondary metabolites are mostly terpenoids, such as carvacrol, γ-terpinene, thymol, *p*-cymene, ß-caryophyllene, linalool, etc. [2]. Volatile activity of plant essential oils had been subject of many studies about the plant secondary metabolites [3] and in this study, fumigant assay of three medical plants from family of Lamiaceae, i.e. *Satureja khuzestanica*, *S. rechingeri* and *S. bakhtiarica* were examined against a destructive pest in tomato crops, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae). The *Satureja* species identified and screened by Medicinal Plants and Drugs Research Institute of Shahid Beheshti University. Essential oils were extracted according to Aslan et al. [4] using a Clevenger apparatus and after drying by anhydrous sodium sulphate, were stored at 4 °C in darkness. For evaluation of fumigant toxicity of the substances on the fourth instar larvae of *Tuta absoluta*, different volumes of the essential oils were put on a piece of filter paper (1 cm^2) pasted inside the door of the experimental boxes (157.5 cm^3). At least, 10 larvae were used in each replicate and the experiment replicated four times in the laboratory condition (25±1°C, 60±5% RH and photoperiod of 16:8 h light and dark). The control was conducted in a similar procedure, but without essential oils. Mortality was recorded after 24 hours post treatment. Probit analysis was done using polo-plus software. According to the data, LC_{50} value of *S. khuzestanica*, *S. rechingeri* and *S. bakhtiarica* was 17.53 (15.77-18.25), 34.34 (32.48-35.39) and 25.08 (21.71-31.80) μlL^{-1} (air), respectively and LC_{90} was estimated 28.85 (24.79-39.76), 42.44 (39.93-50.03) and 46.59 (35.32-94.55), respectively. The slope curves (± SE) were also showed as 5.92 (± 1.18), 13.94 (± 3.44) and 4.76 (± 0.77) in *S. khuzestanica*, *S. rechingeri* and *S. bakhtiarica*, respectively. Thus, *S. khuzestanica* had the most toxic effect on T. absoluta, but *S. rechingeri* had severe mortality on the larvae in a limit range of concentrations (33.12, 34.20, 35.79, 37.51 and 39.49 μlL^{-1} (air)).

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EFFECT OF CHICKEN MANURE ON REPRODUCTIVE CHARACTERISTICS AND YIELD OF SAFFRON (*CROCUS SATIVUS* L.)

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Saffron (*Crocus sativus* L.) is the most strategic and expensive crop in the Islamic Republic of Iran [1]. The present research was carried out to evaluate response of saffron to chicken manure under field conditions. Chicken manure was supplied in four levels (0, 5, 10 and 15 ton ha^{-1}). Flower fresh weight, fresh weight stigma, lenght stigma and style were assessed. The results showed that flower fresh weight, fresh weight stigma, lenght stigma and style were influenced by chicken manure. The highest saffron fresh weight flower was recorded with the application 5 ton ha^{-1} chicken manure but there was not significant difference between treatment 5 and 10 ton ha^{-1} chicken manure. The highest fresh saffron stigma was obtained in 5 ton ha^{-1} while the least fresh saffron stigma was obtained in control and there was not significant difference between treatment 10 and 15 ton ha^{-1} chicken manure. In relation to the fresh weight stigma study identified application animal manure increased fresh weight stigma [2]. The lowest lenght stigma and style of saffron was observed in control but the highest lenght these was obtained in treatment 5 ton ha^{-1}. The results of this study indicated that treatment 5 ton ha^{-1} was the most favorable condition for reproductive traits of saffron in this study.

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HOW DETOXIFICATION SYSTEM OF *TUTA ABSOLUTA* WORKS AGAINST SEVERAL MEDICAL PLANTS ESSENTIAL OILS, IN VIVO

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Essential oils (EOs) are complex compounds formed by aromatic plants as secondary metabolites, which are volatile and characterized by a strong odor. Recently, the use of essential oils in pest management programs has been noticeable, strongly. In insects, esterases represent very interesting enzymatic systems carrying out detoxification mechanism due to their involvement in change of xenobiotics to nontoxic materials. Carboxylesterases (CarEs, EC 3.1.1.1) are large and diverse groups of hydrolases that hydrolyze numerous substrates including esters and certain non-ester compounds. On the other hand, Acetylcholinesterase (AChE, EC 3.1.1.7.) is an important enzyme responsible for the rapid hydrolyses of acetylcholine at the cholinergic synapses, representing a biomarker of neurotoxicity widely used for identifying exposure to anticholinesterase chemicals. In this study, the fourth instar larvae of *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), one of the most harmful pests of solanaceous crops, were exposed to the sublethal concentrations (10.65, 27.79, 13.50, and 21.29 µl/L air) of several essential oils extracted from *Satureja khuzestanica*, *S. rechingeri*, *S. bakhtiarica*, and *Thymus daenensis*, respectively (all from family of Lamiaceae) through a fumigant toxicity assay. These concentrations caused 10 percent mortality in the individuals during 24 hours (in 25±1°C, 60±5% RH and photoperiod of 16:8 h light and dark). After exposure, survival larvae were collected for the enzyme assay. Carboxylesterase assay was conducted by two substrates of α- and β- naphthyl acetate (NA) according to Rahmani and Bandani [1] procedure and AChE assays was done basically according to Ellman et al. [2]. The experiments were conducted in three replicates under the above condition. Significance of biochemical results was obtained by randomized one-way ANOVA and the means were compared by Tukey's Studentized Range Test, admitting significant differences at $P<0.05$. The SAS software (version 9.1.3) was used for all analyses. In vivo assays showed that AChE in the low concentration, has been inhibited significantly by *T. daenensis* (df=14, 4; F=5.26; P= 0.0152). However, Carboxylesterase activity of the leaf miner larvae was increased in the treatments significantly when α-NA was used as a substrate (df=14, 4; F=3.62; P=0.045). However, there wasn't any significant changes in this enzyme when β-NA was used as a substrate (df=14, 4; F=3.10; P=0.066). 24-hour post-treated insects with all the EOs were subjected to the native-PAGE electrophoresis in order to study their carboxylesterase. Results showed that there were four esterase isozymes didn't changed clearly in comparison with the control, maybe because of using mixture of both substrates.

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ANTIDEPRESSANT EFFECT OF *ALLIUM JESDIANUM* HYDRO ALCOHOLIC EXTRACT ON ADULT MICE

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Depression is a common psychiatric condition that occurs in people of all ages.The life time prevalence of depression is 10%_15%in general population.[1] Due to side effects of some chemical agents, patients prefer herbal medicine to alleviateearly symptoms of the disease. *Allium Jesdianum* is an endemic plant of Zagross mountain of Iran and it has various applications in traditional food. The aim of this study was to evaluate antidepressant effect of *Allium Jesdianum* in adult male mice. In this research, 40 adult male mice weighting 20 to 25grams were randomly divided into five groups. First group (control) received distilled water. Second group received fluoxetine (10mg/kg) and the other three groups received one of the doses *Allium Jesdianum* extract (500, 1000 and 2000 mg/kg) by intra peritoneal injection for 10 days. In the 10th day, the antidepressant effect of *Allium Jesdianum* was evaluated using open field test (OFT) and forced swimming test (FST). In open field test, *Allium Jesdianum* extract significantly decreased number of lines crossed at the dose of500 mg/kg compared to thecontrol group ($p<0.05$) Moreover, it significantly increased the number of lines crossedat the doses of 1000 and 2000 mg/kg compared to thecontrol group ($p<0.01$) and fluoxetine group ($p<0.05$).In forced swimming test, the immobility time for all four groups that received fluoxetine and herb extract had significantly decreased compared to the control group ($p<0.01$). Results indicated that *Allium Jesdianum* extract has antidepressant effect with stimulator effect in adult mice.

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INVESTIGATION OF DIFFERENT TREATMENT ON DORMANCY OF BEAR GARLIC

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Bear garlic (*Allium ursinum*) is a wild plant of the Alliaceae family that grows in the Alborz and Zagros mountains. Due to phenolic and sulfur compounds, this medicinal plant is effective againstcardiovascular, cancer and degenerative diseases. Bear garlic is at risk of extinctionbecause of heavy logging. Seed dormancy is an obstacleto the domestication of this valuable medicinal plantand must be overcome. Therefore,a completely randomized designexperiment was conductedin triplicatewith seven treatments included scarification for 1 minute, sulfuric acid 75% for 10 minute, potassium nitrate 0.2% for 72 hours, GA 500 ppm and 1000 ppm for 72 hours, moist chilling at 4°C for 8 weeks and control.Results indicated that scarification with 32% germination, was the best and no germination was observed in the other treatments.

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OPTIMIZATION OF THE EXTRACTION OF POLYPHENOLS FROM NETTLE (*URTICA DIOICA*)

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The stinging nettle (*Urtica dioica*) is a well-known herb, are used for medical purposes since centuries [1]. The nettle plant contains many important phytochemicals, for example sterols, fatty acids, polysaccharides, polyphenols, minerals, etc [2]. The polyphenols have antioxidant effect, reduce the hematological disorders, but also have anti-cancer and anti-bacteriological effects [3]. In this study three kinds of extraction techniques and five kinds of solvents have been applied for extraction of polyphenols from nettle. The extraction techniques were dynamic extraction with magnetic stirrer, infusion with hot solvent and ultra-sonication. And the solvents were pure ethanol, deionized water and mixed of water and ethanol with three different proportions (25%, 50% and 75% ethanol to water). The extraction yield was measured as the ratio of gallic acid mass in milligram to dry plant mass in gram (mg/g). Comparing the yields of the extraction solvents established that the highest yield value was reached by the 75% ethanol to water solvent. Also the infusion with hot solvent was the best method for extraction of polyphenols. The extracted amount of polyphenols by infusion method in only 15min was 1.0 mg/g, while in dynamic method it was 0.87 mg/g during 24 hours. The results indicate that the optimum conditions for extraction of polyphenols from nettle are infusion of 2g dry sample in 40 ml solvent of 75% ethanol to water with temperature of 50 °C.

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STUDY OF MAJOR CARBOHYDRATES IN FLOWERS, LEAVES AND FRUITS OF SOME SEA BUCKTHORN WILD POPULATIONS IN IRAN

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Sea buckthorn (*Hippophae rhamnoides* L.) is a valuable medicinal plant that grows wild in nature in temperate areas of Europe and Asia. Sea buckthorn have a high content of bioactive compounds and is rich in carbohydrates, proteins, fatty acids, organic acids, amino acids and vitamins. It seems that different ecological conditions in study areas of medicinal plants could affect their vegetative and phytochemical characteristics. In this study we investigated the content of some major carbohydrates (glucose, fructose, xylose and arabinose) in flowers, leaves and fruits of some Iranian wild sea buckthorn populations in 10 natural habitats of them. The results showed that the maximum content of carbohydrates in flowers was related to zarabad (alamoot) region **(**glucose (165.506 mg/g), fructose (171.440 mg/g), xylose (99.166 mg/g) and arabinose (158.868 mg/g)**)**and the minimum content was in moallemkelaye region **(**glucose (56.349 mg/g), fructose (50.340 mg/g), xylose (36.416 mg/g) and arabinose (61.327 mg/g)**).** In leaves highest content was existed in zarabad (glucose (114.722 mg/g), fructose (114.340 mg/g), xylose (69.808 mg/g) and arabinose (113.950 mg/g)) but the lowest content was in shahrestanak **(**glucose (42.795 mg/g), fructose (35.540 mg/g), xylose (27.701 mg/g) and arabinose (49.524 mg/g)**)**. Also, the highest carbohydrates of fruits reported from guran **(**glucose (90.234 mg/g), fructose (88.240 mg/g), xylose (55.612 mg/g) and arabinose (92.229 mg/g)**)**, whereas the lowest amount was in disin **(**glucose (44.421 .g/g), fructose (37.040 mg/g), xylose (28.505 mg/g) and arabinose (50.754 mg/g**).**

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EFFECTIVE PARAMETERS ON THE EXTRACTION OF POLYPHENOLS FROM THE RED DELICIOUS APPLE

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Apples are a rich source of various phytochemicals including flavonoids (e.g., catechins, flavanols and quercetin) and other phenolic compounds (e.g., epicatechin and procyanidins) [1]. These polyphenols have health value in humans. The most famous effect of polyphenols is their antioxidant properties and therefore their ability to prevent cancers [2]. The goal of this study was to optimize the process of polyphenols extraction form Red Delicious apple. Since the concentration of phytochemicals varies greatly between the apple peels and the apple flesh [2, 3], the extraction process were investigated for these two parts of the apple separately and the results were compared. The effect of some parameters including solvent, time of extraction, temperature and the extraction method were examined on the extraction of polyphenols. The total phenolic content of the extractions were considered as a dependent variable. The results showed dynamic extraction method with the magnetic stirring speed of 10 rpm is the best extraction method. Also the 25% ethanol in water as the optimum solvent and the 22 hours as the best extraction time were obtained for extraction of polyphenols. The total polyphenol content of the best extraction was 2.8 mg/g for peel and was 0.73 mg/g for flesh (mg of gallic acid per g of dry sample). As can be seen the polyphenol content of the apple peel is higher than apple flesh. Therefore the apple peel is a better source of the antioxidants rather than apple flesh. This is in agreement with the scientific literature. Also the ultrasonic extraction method was used and the noticeable amount of polyphenol compounds (1.15 mg/g for peel and 0.6 mg/g for flesh) was extracted in only 30 min which is comparable with the amount obtained by 22h dynamic extraction. Therefore the ultrasonic extraction method is an economical extraction method in time.

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STUDY OF MEDICINAL PLANTS IN BOTH STEEPS OF SAVERZ MOUNTAIN IN KOHGILOYEH AND BOYERAHMAD PROVINCE

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The study of plant species varieties of country is of great importance as a necessary ground for ecological studies, range management, plant gene bank, agricultural , medical studies. This study investigates collecting, recognizing and determining medical plants in both steeps of Saverzmountain of Kohgiloye and Boyerahmad province. The objective of the present research was to identify the plant species of the region and introduce endangered, rare and endemic species in order to protect the fluorine of the region and also identify and introduce medicinal toxic waste species in order to provide the ground of scientific management and exploit plants economically. From the identified total 295 species, the number of 60 medical species were identified, which belonged to 57 genus and 29 plant families, were identified. Labiatae family with 9 genus and 9 medical species, Papillionaceae with 7 genus and 7 species, Compositae with 6 genus and 6 species, Rosaceae with 4 genus and 5 species and Cruciferae with 3 genus and 3 species are the greatest families. Among genus, Crataegus, Adonis and Allium have two medical species and other genera have one medical species. 3 species of 60 medical species are Endemic of Iran and 7 species are rare. Regarding ecological assessment (Raunkiaer classification) most of plants of area are Hemicryptophyta and major of medical plants of Saverzare related to Irano- Turanian region.

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THE EFFECTIVENESS OF THE BIOLOGICAL ACTIVITY OF ESSENTIAL OILS FORM FOUR SPECIES OF APIACEAE AGAINST *TRIBOLIUM CASTANEUM* HERBST.

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The red flour beetle, *Tribolium castaneum* is major and cosmopolitan insect. Adults of *T. castaneum* is insatiable feeders on a great variety of grains. This study was conducted to estimate the insecticidal effect of essential oils from four species *Pimpinella anisum* L., *Foeniculum vulgar* Miller, *Coriandrum sativum* L. and *Petroselinum crispum* (Miller) A. W. Hill against *T. castaneum*. Bioassays were performed to determine the insecticidal activity of essential oils from four species of Apiaceae against the red flour beetle, *T. castaneum*. Mortality of insects were determined through fumigant toxicity. Bioassay were conducted with airtight exposure chamber in lab conditions (27±1°C, 75 ± 5% R.H., dark cycle: 12:12 h). Essential oils were obtained by Clevenger-type water distillation. The LC_{50} after 24 h for *P. anisum* and *F. vulgar* were 43.57 and 91.28 µL/L air, respectively. At the 86µL/L air dose level, *P. anisum* and *F. vulgar* essential oil caused 100 and 36% mortality of *T. castaneum* adults within 24 hours of exposure, respectively. Based on the LC_{50} values, the essential oils from *P. anisum* and *F. vulgar* were the most active against *T. castaneum* than the essential oils from *C. sativum* and *P. crispum*. The results suggested that essential oil of *Pimpinella anisum* L. could be used as a potential bio-control agent for stored-product insects [1, 2].

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STUDYING FLORISTIC AND INVESTIGATING MEDICINAL PLANTS OF NORTH SARROD MOUNTAIN'S IN KOHGILOYEH AND BOYERAHMAD PROVINCE

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Medical plants of every area are national resources of society. Recognizing and cultivating and making tamed of important species in direction of reducing pressure on natural resources and conserving genetic resources is of great importance. Studied area is consisted of two mountainous and plain parts that is located with a minimum and maximum height(1542 and 2800 meter) from sea level and various kinds of natural habitats and plant coverage in southeast part of Yasuj in Kohgiloye and Boyerahmadprovince. This study aims to investigate plant species of target area and to introduce subjected to risk, rare, and endemic species in order to conserve area'sfluoride as well as to recognize and introduce medical species of area to provide the ground of scientific management and economic exploitation of plants. Studying scientific resources and doing field studies, plants of this area were collected and recognized and important species were studied flourestically, medically, ecological and corology assessment. Among 300 recognized plant species in area, there are 121 plant species that are medical. They belong to 45 family and 100 genus. Compositae with 12 genus and 15 species, Labiatae with 9 genus and 12 species, Papillionaceae with 8 genus and 8 species are the greatest family that have plant medical species in area. Allium with 4 species is the greatest medical genera of area. 10 species of 121 medical species are Endemic of Iran and 12 species are rare. Chorology plants of area show that the major of species are related to Irano- Turanian region. most of species of medical plants are Trophyta and hemicryptophytya with 37 percent.

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THE EFFECTIVENESS OF THE BIOLOGICAL ACTIVITY OF ESSENTIAL OILS FORM FOUR SPECIES OF APIACEAE AGAINST *TRIBOLIUM CASTANEUM* HERBST

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The red flour beetle, *Tribolium castaneum* is major and cosmopolitan insect. Adults of *T. castaneum* is insatiable feeders on a great variety of grains. This study was conducted to estimate the insecticidal effect of essential oils from four species *Pimpinella anisum* L., *Foeniculum vulgar* Miller, *Coriandrum sativum* L. and *Petroselinum crispum* (Miller) A. W. Hill against *T. castaneum*. Bioassays were performed to determine the insecticidal activity of essential oils from four species of Apiaceae against the red flour beetle, *T. castaneum*. Mortality of insects were determined through fumigant toxicity. Bioassay were conducted with airtight exposure chamber in lab conditions (27±1°C, 75 ± 5% R.H., dark cycle: 12:12 h). Essential oils were obtained by Clevenger-type water distillation. The LC_{50} after 24 h for *P. anisum* and *F. vulgar* were ۴۳,۵۷and ۹۱,۲۸µL/L air, respectively. At the 86µL/L air dose level, *P. anisum* and *F. vulgar* essential oil caused 100 and 36% mortality of *T. castaneum* adults within 24 hours of exposure, respectively. Based on the LC_{50} values, the essential oils from *P. anisum* and *F. vulgar* were the most active against *T. castaneum* than the essential oils from *C. sativum* and *P. crispum*. The results suggested that essential oil of *Pimpinella anisum* L. could be used as a potential bio-control agent for stored-product insects [1,2].

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RESPIRATORY TOXICITY EFFECTS OF FOUR SPECIES OF APIACEAE AGAINST *SITOPHILUS ORYZAE* L.

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The rice weevil, *Sitophilus oryzae* is major and cosmopolitan insect. Adults of *S. oryzae* is insatiable feeders on a great variety of grains. This study was conducted to estimate the insecticidal effect of essential oils from four species *Pimpinella anisum* L., *Foeniculum vulgar* Miller, *Coriandrum sativum* L. and *Petroselinum crispum* (Miller) A. W. Hill against *S. oryzae*. Bioassays were performed to determine the insecticidal activity of essential oils from four species of Apiaceae against the rice weevil, *S. oryzae*. Mortality of insects was determined through fumigant toxicity. Bioassay were conducted with airtight exposure chamber in lab conditions (27±1°C, 75 ± 5% R.H., dark cycle: 12:12 h). Essential oils were obtained by Clevenger-type water distillation. The LC_{50} after 72 h for *C. sativum, F. vulgar, P. anisum* and *P. crispum* were 161.29, 254.71, 292.04 and 306.43 µL/L air, respectively. At the 428 µL/L air dose level, *C. sativum, F. vulgar, P. anisum* and *P. crispum* essential oil caused 100, 35, 31 and 27% mortality of *S. oryzae* adults within 72 hours of exposure, respectively. The results suggested that essential oil of *Coriandrum sativum* L. could be used as a potential bio-control agent for stored-product insects [1,2].

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ASSESSMENT THE ANTIBACTERIAL EFFECT OF POMEGRANATE (*PUNICA GRANATUM)* PEEL, GARLIC (*ALIUM SATIVUM)*, THYME (*ZATARIA MULTIFLORA)* AND CINNAMON (*CINNAMOMUM VERUM)* EXTRACTS ON *E. COLI, SALMONELLA* AND MRSA (METHYCILLIN RESISTANCE *STAPHILOCCOCUS AUREOUS*) AND THE SYNERGISTIC ANTIBACTERIAL EFFECTS OF THESE EXTRACTS ON MENTIONED BACTERIAS

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Todays human societies involves with many diseases that bacterial infections are one the most common of them, now if the infection cause with a resistant bacteria, it·s much harder to treatment that infection and preventing the disease transmition and will require complex preparations. But we now that in most of the times complex drugs have more events, so, in this research project tried to reduce the side effects by using nature products and proven the antibacterial effects of these products on resistant bacterias. For this project first Pomegranate, Garlic, Cinnamon and Thyme were prepared, dried and powdered; then extracts of them were extracted (with pure water in Pomegranate and Garlic and with hydroalcoholic solvent in Thyme and Cinnamon); then the extracts were condensed and refers to where the antimicrobial effects were checked, now the condensed extracts again were dissolved in based solvents* and checked on E.coli, Salmonella and MRSA. At the first assessment all of extracts were checked on all of the mentioned bacterias in a special concentration, in this stage the extracts of Garlic and Cinnamon does not show the desired results and because of that they were excluded from the continued research; at the next part first the antibacterial effects of the remaining extracts were checked in different concentrations and after the ensuring of the proper effects, the synergistic effects of them were checked that it has good result in compared with antibutic disc. This research was showed that a natural dosage that based on Pomegranate peel and Thyme extracts can have good effect on E.coli, Salmonella and Methycillin Resistant Staphs; of course prove it, needs an *Invivo* & clinical checks that will be done soon.

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ANTIANXIETY EFFECT OF *ALLIUM JESDIANUM* HYDROALCOHOLIC EXTRACT ON ADULT MICE

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Generalized anxiety disorder (GAD) is a prevalent and disabling disorder characterized by persistent warring, anxiety symptom, and tension.[1]. For many years, various medicinal plants have been used for treatment of different neuropsychological disease, like anxiety. *Allium Jesdianum* is an endemic plant of Zagross mountain of Iran and it has various applications in traditional food. The aim of this study was to evaluate antianxiety effect of *Allium Jesdianum* in adult male mice. In this research, 40 adult male mice weighting 20 to 25 grams were randomly divided in to five groups. First group (control) received distilled water. Second group received diazepam (5mg/kg).The other three groups received one of the doses *Allium Jesdianum* extract (500, 1000 and 2000 mg/kg) by intra peritoneal injection for 10 days. In the 10th day, the antianxiety effect of *Allium Jesdianum* was evaluated using elevated plus maz and open field test. In open field test, *Allium Jesdainum* extract Significantly ($p<0.05$) decreased number of lines crossed at the dose of 500 mg/kg compared to the control and diazepam groups. Moreover, it significantly ($p<0.01$) increased number of lines crossed at the doses of 1000 and 2000 mg/kg compared to the control group. in elevated plus maz, *Allium Jesdainum* extract significantly increased time spent ($p<0.01$) and number of enters in open areas ($p<0.05$) at the doses 500 and 1000 mg/kg compared to the control group. Moreover it significantly ($p<0.01$) decreased time spent and number of enters in open areas compared to diazepam group. results indicated that *Allium Jesdianum* extract has antianxiety effect in adult mice dose dependently.

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CHEMICAL COMPOSITION OF ESSENTIAL OIL OF *NECTAROSCORDUM TRIPEDALE* (TRAUTV.) GROSSH. FROM IRAN

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Nectaroscordum tripedale (Trautv.) Grossh. is a weedy plant from liliaceae family.Summery onion (*N. tripedale*)have boll and tall strong stem with 50 to 150 cm length that in the head have umbel inflorescence [1]. We collect *N. tripedale* from the origin of this plant in DarrehShahr city in zagrosfoot a mountain, Iran, in March 2015. We evaporate plant in shadow and extract essential oil by SDE and analyze by gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS). Identification of the components was based on GC retention index 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]. GC and GC/MS analyze of the essential oil showed 72constituents were identified, of which the major ones, trans-anethole (23.67%), Methyl dodecanoate (16.46%), Dimethyl trisulfide (7.04%) and dibutyl phtalate (4.75%) accounted for 51.92% of the oil.

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THE EFFECT OF *ARTEMISIA AUCHERI* ESSENTIAL OIL IN RINEH REGION OF MAZANDARAN ONOXIDATIVE STABILITYOF SOY BEAN OIL

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Artemisia grows in Iran, especially in northern regions [1]. This plant has 34 varieties with one-year or older herbs scattered throughout Iran. The unique variety of Artemisia is Aucheri. [2].It has worthy properties such as anti-cough, anti-septic, appetizing, anti-ascaris, anti-flatulent, anti-febrile, anti-inflammatory, anti-diabetic, anti-bacterial and anti-parasite [2,3]. In this research, the active compounds from Artemisia aucherimedicinal plant were first extracted by Clevenger apparatus. Consequently, the components of essential oils extracted from Artemisia aucheriplant were identified and characterized using gas chromatography-mass spectrometry. After that, the effect of Artemisia aucheriessential oil was investigated on oxidative stability of soy bean oilat ambient storage temperature which was accomplished by measuring four parameters of color index, thiobarbituric acid, peroxide value and acidity at 0, 15, 30, 45 and 60 days; the gathered results were then compared with values obtained from evaluating synthetic antioxidant and control treatment. The results indicate better effect of essential oil when used at high concentrations which can be attributed to the increased amount of Monoterpenic and phenolic compounds and another antioxidant activity. Also, with increasing storage time, the amount of thiobarbituric acid in soybean oil increased, which has direct relation to the amount of peroxide. So that Artemisia aucheri essential oil with concentration value of 0.06% possesses a superior antioxidant activity in comparison to synthetic antioxidants with concentration value of 0.02% in soy bean oil.

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A COMPARATIVE STUDY ON PHENOLIC COMPOUNDS PRODUCTION IN DIPLOID AND INDUCED TETRAPLOID OF *LINUM ALBUM* CELL CULTURES

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Flavonoids and phenolic acids are the most persistent groups of plant natural products. These compounds play significant biological behavior that could indicate their potentials as therapeutic agents. Moreover, their function as reducing agents and free radical scavengers is well known [1]. *Linumalbum*due to havingimportant secondary metabolites has high medical importance. In this study, we investigated the effect of different concentrations of salicylic acid (SA) on phenolic compounds (naringenin, myricetin, catechin and daidzein, ferulic acid, coumaric acid, caffeic acid) intetraploid and diploidcallcultures of *Linum album*. For this experiment; 2 g oftetraploid and diploidcells were culturedinMS mediawith three concentrations SA (0,0.01 and 0.1mM at final concentration). Then after 4 weeks the flavenoids and phenolic acids contents were analyzed using HPLC system. The results showed thatproduction of myricetin(6.37 µg/g FW in 0.1 mM SA) and catechin (42.34 µg/gFW in 0.01 mM SA) in the elicited tetraploid cellsand ferulic acid (0.24 µg/g FW in 0.01 mM SA) and coumaric acid (0.14 µg/gFW in of 0.01 mM SA) in elicited diploid cells increased simultaneously,but naringenin detectedjust in treated diploid cells(0.54 µg/g FW in of 0.1 mM SA). Although a considerable decrease of caffeic acid content in elicited teraploid cells was observedbut there was nosignificant difference between treated and control ofdiploid cells.In conclude, application ofSAis significantfor the accumulation of phenolic compounds including flavonoids and phenolic acids in induced tetraploid and diploidcells.

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CYTOTOXIC COMPOUNDS FROM ROOT OF *SALVIA ATROPATANA*

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The *Salvia* is the largest genus in Lamiaceae family with a wide reportedbiological and pharmaceutical properties [1]. In a search for new anticancer compounds from Iranian medicinal plants we screened several extractsof *Salvia atropatana*. The aerial and root parts of *S. atropatana* were crushed and extracted with *n*-hexane, ethyl acetate and methanol at room temperature.Cytotoxic activity of these extracts was assessed on two human cancer cell lines MCF-7 (human breast adenocarcinoma cell line) and A549 (lung carcinomacell line).Among tested extracts an*n*-hexane extract from roots exhibited the highest inhibitory activity against MCF-7 and A549 cell lines with IC_{50} values of 78.8 and 90.8 µg/ml, respectively.In order to identify active compounds in the extract the phytochemical investigation of the root carried out by different chromatography techniques. Based on our results severaldabiaten type diterpenoids were identified and the bioactivity of purified compounds is ongoing.

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THE EFFECT OF *ACHILLEA BIEBERSTEINII* ESSENTIAL OIL IN RINEH REGION OF MAZANDARAN ON OXIDATIVE STABILITY OF CRUDE RAPESEED OIL

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Achillea (commonly referred to as yarrow) is a group of flowering plants in the family Asteraceae described as a native to Europe, temperate areas of Asia, which are mainly distributed in the northern hemisphere [1]. These plants typically have hairy, frilly, aromatic leaves. The flowers can be yellow, white, pink, orange or red (2). Yarrow is widely used to medicine, treat the soldiers' wounds, fevers, hypertension, rheumatic pain, pneumonia, gastrointestinal disorders, stop bleeding, and as an anti-haemorrhoid, and in wound healing [3]. In this research, the active compounds from Achilleabiebersteinii medicinal plant (flowering stage& leaves) was first extracted by Clevenger apparatus. Consequently, the components of essential oils extracted from *Achillea biebersteinii* plant were identified and characterized using gas chromatography -mass spectrometry. After that, the effect of *Achillea biebersteinii* essential oil was investigated on oxidative stability of rapeseed's crude oil at ambient storage temperature which was accomplished by measuring four parameters of peroxide value, thiobarbituric acid, acidity and color index at 0, 15, 30, 45 and 60 days; the gathered results were then compared with values obtained from evaluating synthetic antioxidant and control treatment. The results indicate better effect of essential oil when used at high concentrations which can be attributed to the increased amount of phenolic compounds and another antioxidant activity. So that *Achillea biebersteinii* essential oil with concentration value of 0.06% possess a superior antioxidant activity in comparison to synthetic antioxidants with concentration value of 0.02% in rapeseed oil.

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CYTOLOGICAL STUDY ON TWO MEDICINAL HERBS, *P. AVICULARE* AND *P. ARENASTRUM* (POLYGONACEAE) IN IRAN

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*P. aviculare*and *P. arenastrum* are two common medicinal herbs distributed in different parts of Iran. Aerial parts of *P. aviculare* contain Tannins, Salicylic Acid and Saponins and used to treat disease of liver and kidney. It has been traditionally used in mild urinary tract inflammation too [1, 2].Young leaves of *P. arenastrum* are rich in Zinc and can be used as potherb or tea substitute.Moreover it is mainly reported for treatment of dysentery, hemorrhoidsand diarrhoea [3]. In order to know the chromosomenumbers of thesespecies, this study was done for the first time in Iran. Five populations of *P. aviculare* and *P. arenastrum*were used in this study.Mature achenes weregerminated at 24°C on moist filter paper in Petri dishes. Growing root tips with 0.5-1 cm in length were pretreated with 0.002 mol 8-hydroxyquinolin for 2-3 h at 4°C. The materials were fixed with Carnoy for 24 h at 4°C and stored in 70%ethanol at 4°C until use. Aceto-orcein 2% was used for staining. Karyotype parameters as TF %, CV and karyotype symmetry were determined. The studied species had metacentric (m) chromosomes. Stebbins' symmetry class of *P. aviculare* and *P. arenastrum* were 3B and 3A respectively. *P. arenastrum* populations showed 2n=2x=50 while *P. aviculare* populations showed 2n=3x=30 and 2n=4x=40 supporting previous studies.

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THE EFFECTS OF HYDRO-ALCOHOLIC EXTRACT OF *CANTHARELLUS CIBARIUS* ON EXPRESSION LEVEL OF NT3 GENE AFTER SCIATIC NERVE COMPRESSION IN RAT.

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The expression of neurotrophic factors, increasing effects of the survival and regeneration of neurons, is changed in response to nerve injury. *Cantharellus cibarius*, has antioxidant and anti-inflammatory effects so that the aim of present study was to determine the effects of hydro-alcoholic extract of Cantharellus cibarius on expression level of NT3 gene after sciatic nerve compression in rat. First the hydro-alcoholic extract of Cantharellus cibarius was prepared by the Soxhlet method. In this study, 36 Wistar male rats , 250-300 gr, were randomly divided into 3 groups consisted 12 rats in each group and included control, compression (1, 7, 14 and 28 days) and experimental (1, 7, 14 and 28 days) groups. Experimental groups were treated by 75 mg / kg of hydro-alcoholic extract of Cantharellus cibarius and to induce the stress in control group, saline serum was injected. In compression and experimental groups, the sciatic nerve of right leg was compressed for 60 seconds. The first injection of extract in experimental group was performed intraperitoneally and immediately after the compression and the second one was injected 7 days later. Then the sampling was performed of lumbar spinal cord on 1, 7, 14 and 28 days in compression and experimental groups and the total RNA was extracted from the spinal cord segments , cDNA was synthesized and after that the alteration of gene expression of NT3 samples was studied in both samples, without treatment and treated with hydro-alcoholic extract. The expression of NT3 showed significant increase in compression group compared to the control group, ($p < 0.001$).also it is show significant increase of expression of NT3 in experimental group compared to the compression group, ($p<0.001$). According to these findings, Hydro Alcoholic extract of Cantharellus cibarius has a anti oxidant and anti-inflammatory effects.that induce regeneration process expression of NT3 in experimental group compared to the compression groupis increase.

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ALLELOPATHIC EFFECTS OF AQUEOUS AND ETHANOLIC EXTRACTS FROM *ALHAGI MAURORUM* L. ON GROWTH PARAMETERS OF BLACK CUMIN AND HARMEL

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Allelopathy is defined as the directly or indirectly harmful or beneficial effects of one plant on another through the production of chemical compounds that escape into the environment. Allelopathy as mechanism of plant interference in agro ecosystems offers an opportunity to manage weeds in a cropsequence, but could also adversely affect crop fields [1]. *Alhagi maurorum*is a shrubby evergreen perennial herb, very much branched with rigid spiny twigs. The plant belongs to family leguminasae and native to Middle East [2]. Both of Black cumin and Harmel are weeds. The aim of this study was evaluation of allelopathic effect of medicinal plant *Alhagi maurorum* L. against germination of Black cumin (*Nigella sativus* L.) and Harmel (*Peganum harmala* L.) plants. Aqueous and ethanolic extracts from aerial parts of *Alhagi* prepared in concentrations of 0, 0.25%, 0.5%, 0.75% and 1% and their effects was evaluated on growth parameters like germination percentage, radicle and plumule lengths, fresh and dry weights of Black cumin and Harmel plants under laboratory conditions. Our results showed that seed germination significantly ($P<0.05$) inhibited by extracts of *Alhagi*, also radicle and plumule lengths, fresh and dry weights were decreased under treatments of extracts. The effects of ethanoic extracts were significantly higher than aqueous. Aqueous extracts of *Alhagi* significantly ($P<0.05$) decreased germination, length and dry weight of Hermel, but its effects on germination of Black cumin were not significant. The effects of ethanolic extracts of *Alhagi* on growth factors of both plants were significant. It seems that the effects of aqueous and ethanolic extracts of *Alhagi* on growth parameters of Harmel plant was higher than Black cumin. There was positive significant correlation ($P<0.05$, $r^2>0.9$) between germination and plant length or dry weights in both plants.

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EFFECT OF WITHHOLDING IRRIGATION AT DIFFERENT GROWTH STAGES ON GROWTH, YIELD, ESSENTIAL OIL AND PHENOLIC CONTENT OF ANISE HYSSOP (*AGASTACHE FOENICULUM* L.)

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Anise hyssop (*Agastache foeniculum* L.) is a medicinal and perennial herb plant belonging to the Lamiaceae family. Anise hyssop's essential oil used in pharmaceutical and food industries. To investigate the effects of deficit irrigation on some morphological and phytochemical characteristics of Anise hyssop, a field experiment was conducted as completely randomized block design with four replications. Deficit irrigation treatments were imposed by withholding irrigation at different growth stages (T_1= control, normal irrigation; T_2= irrigation withholding at 20 days after transplanting; T_3= irrigation withholding at flower bud initiation stage; T_4= irrigation withholding at flowering stage and T_5= T_2+T_3). The results showed that deficit irrigation treatments have significant effects on dry herb yield, essential oil content and yield and total phenolic content. There was no significant difference among treatments for plant height and stem diameter. Irrigation withholding in different stages caused a significant increase in essential oil content. On the other hand, dry herb and essential oil yield and total phenolic content was decreased by withholding irrigation. The highest and lowest of dry herb and essential oil yield and total phenolic content was obtained in T_1 and T_5, respectively. Since the difference between T_1 and T_4 treatments was not significant for essential oil yield so it can be recommended irrigation withholding at flowering stage.

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COMPARATVE STUDY ON ALLELOPATHIC EFFECTS OF *CARDARIA DRABA* L. AND *ACHILLEA MILLEFOLIUM* L. ON GERMINATION OF PURSLANE AND HARMEL WEEDS

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Allelopathy is the effects of chemicals produced by plants on the growth and development of other plants in natural agricultural systems [1]. The allelopathic interaction can be one of the significant factors contributing to species distribution and abundance within plant communities and can be important in the success of invasive plants [2]. Since *Cardaria*as a weed plant and *achillea* as a medicinal plant have strong allelopathic properties, evaluation of theirallelopathic potential on weeds seems to benecessary.The aim of this study was comparative evaluation of allelopathic effect of weed plant *Cardariadraba* L. and medicinal plant *Achillea millefolium* L. against germination of weeds Purslane (*Portulaca Oleracea* L.) and Harmel (*Peganum harmala* L.) plants. Aqueous and ethanolic extracts from leaves of *Cardaria* and *Achillea* prepared in five concentrations (0, 0.25%, 0.5%, 0.75% and 1%) and their effects was evaluated on growth parameters –germination percentage, radicle and plumule lengths, fresh and dry weights- of Purslane and Harmel plants. Our results showed that seed germination, radicle and plumule lengths, fresh and dry weights of Purslane and Harmel plants significantly ($P<0.05$) decreased under treatments of leaves extracts of *Cardaria* and *Achillea*. The effects of ethanoic extracts were significantly higher than aqueous. Aqueous extracts of *Achillea* significantly ($P<0.05$) decreased germination, length and dry weight of Purslane, but effects of *Cardaria* extractson germination of Harmel were not significant. The effects of ethanolic extracts of *Cardaria* and *Achillea* on growth factors of both plants were significant. There was positive significant correlation ($P<0.05$, $r^2>0.87$) between germination and plant length or dry weights in both plants treated with both extracts. It seems that the negative effects of aqueous and ethanolic extracts of *Cardaria* and *Achillea* on growth parameters of Purslane plant was higher than Harmel.

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EFFECTE OF *SATUREJA KHUZESTANICA* EXTRACT ON ANTIBODY RESPONSES TO NEWCASTLE DISEASE VACCINATION IN BROILERS

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Recently, herbal feed additives like essential oils and herbal extracts are considered as alternatives to antibiotics due to their fewer biological harmful effects. *Satureja Khuzestanicais* one of the herbal extracts that is considered as a therapeutic agent which contains essential oils, flavonoids and triterpenoids and was shown to have beneficial effects on FCR [1]. 135 one-day old broiler chickens (Ross 308) from both sexes were randomly divided into three groups of 45 chickens (15 birds/ replicate). The experimental groups included control group, 250 ppm and 500 ppm *Satureja Khuzestanica* (Barij Essence Pharmaceutical Co.) from day 11. The *Satureja Khuzestanica* extract was added to the drinking water of treatment groups and all the groups received feed and water *ad libitum* till the end of the experiment. Vaccination against Newcastle disease was performed equally with live lentogenic vaccines. At the end of the experiment, blood was collected from 9 birds whose body weights were closer to the group average. Assessments of humoral immunity responses were carried out with HA and HI tests. The humoral antibody response to Newcastle disease vaccination was best in 500 ppm Satureja treatment ($p<0.05$). It could be concluded that addition of *Satureja Khuzestanica* extract to the drinking water at 500 ppm dosage might have beneficial effects for obtaining better humoral antibody responses after Newcastle diseases vaccination.

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ETHNOBOTANICAL INVESTIGATION IN PAKDASHT (TEHRAN PROVINCE)

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Pakdasht is located at south east of Tehran province with an area about 750 km^2 and a population about 267,512 people. This city located at 51° 42'14.98" and 35° 26' 39.13". according to phytogeographical divisions, Pakdasht is a part of Irano-Touranian region[1]. Its average annual rainfall is 160 mm with an average annual temprature about 17°C. Inhabitants use many of medicinal plants for different purposes. Plants which are used by local people are: *Artemisia* L., *Astragalus* L., *Atriplex* L., *Althea officinalis* L., *Mentha pulegium* L., *Portulaca oleraceae* L. etc. [2]. In present investigation interviews were done with native people to find informations about medicinal plants and their local propertis. It is very important to find the way that local inhabitatnts use a medicinal plants. These findings are discussed and remedies has been considered.

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AN ETHNOBOTANICAL STUDY OF PLANTS IN ROWSHANKUH; FORBIDDEN HUNTING REGION OF NEYRIZ & BAVANAT IN FARS PROVINCE

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Ethnobotany is the study of the relationship between plants and people: From “ethno”–study of people and “botany”-study of plants. Ethnobotany is considered a branch of ethnobiology. Ethnobotanystudies the complex relationships between (uses of) plants and cultures. The focus of ethnobotany is on how plants have been or are used, managed andperceived in human societies and includes plants usedfor food, medicine, for building, tools and etc. [1]. This article presents the results of a study on identification of important medicinal plants, used to treat diseases in Rowshankuh for bidden hunting region of Neyriz & Bavanat Fars province, by local residents. It is also the first field research into medicinal plants conducted in the area with ethnobotanical methodology. Plant species are collected from various locations in the region and were identified byvariousflora and preserved at the Herbarium of the Department of Botany, Yasouj University [2]. This work is based on observations, interviews, and guided trips during their flowering season. For each plant species a scientific name, local name,Plant parts used,Medicinal uses, Preparation mode (s) and other applications form was recorded. The information was collected between 2014 to in 2015. The results of the research showed that many plants collected have medicinal properties and have been used by local people to treat various ailments. Of these plants, 39 families, 87 genera and 106 species belonged are used. Among them, Compositae & Labiatea with 13 species and *Asteragalus* & *Amygdalus* with 4 species were the largest families and genera, are used respectively. These plants are often used as decoction and as powder to medicinal plants. Also, the fruit of these plants are used most often. Besides being used as medicinal plants, they have other uses such as food, fuel, etc.

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STUDY ON QUALITY AND QUANTITY OF ESSENTIAL OILS AND ESTRAGOLEIN *ARTEMISIA DRACUNCULUS* L. (TARRAGON) AFFECTED BY SOIL TYPE

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Artemisia dracunculus L. (tarragon) is a perennial herb in the Asteraceae (daisy) family, which has a long history of use in culinary traditions. It also possesses a wide range of health benefits and has therefore been widely used as a herbal medicine [1]. Sustainable agriculture is based on organic fertilizers consuming for purpose of eliminating or substantially reducing the use of chemical inputs or is the optimal solution to overcome these problems [2]. Organic fertilizers include preservative materials with a dense population of beneficial soil organisms or one or more of these metabolic products that are available improving soil fertility and adequate supply of nutrients in a sustainable agricultural systems [3]. In this study in two consecutive years,the effects of vermicompost and peat moss in soil on the quality and quantity essential oils and estragole of *Artemisia dracunculus* L. was investigated. This study was done on the base of factorial experiment in randomized complete block design with three replications and 6 treatments.Treatments including three levels of 0, 15 and 30 percent of peat moss weight and 0, 15 and 30 percent of vermicompost in the vases. The level of essential oils and Estragole of Tarragon have been analyzed. Thevolatile oil was extracted by hydro-distillation using clevenger-type apparatus and analyzed byGC-MS.The results indicated that peat moss and the biologic fertilizer vermicompost have positive effect on mentioned characteristics. The maximum level of essential oil (2.3%) and the maximum level of Estragole existing in essential oil (78%) have been obtained in the mediums containing the maximum level of peat moss and vermicompost fertilizers.

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A COMPARATIVE DETERMINATION OF PARTHENOLIDE IN *TANCETUM* SPECIES GROW IN IRAN BY HPLC-DAD AND HPTLC

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Tanacetum species (commonly known as tansies) are a genus of about 160 species of flowering plants in the Asteraceae family. More than 30 species of this genus are represented in Iran. They are rich in essential oils and sesquiterpene lactones. Plants from the genus *Tanacetum* L. have been used in traditional medicine over a long period of time; of these *Tanacetum parthenium* (L.) Schultz-Bip (feverfew) is the most prominent species and a known remedy for the treatment of various diseases, including arthritis, fever, migraine, vertigo, menstrual disorders, stomach-ache, toothache, insect bites and psoriasis. The main constitute of *Tanacetum parthenium* is parthenolide which is a sesquiterpene lactone with many known biological actives [1]. Looking for new sources of parthenolides, two validated methods for the determination of parthenolide by high performance thin layer chromatography (HPTLC)-densitometry [2] and reverse-phase high-performance liquid chromatography procedure coupled with photodiode array detector (RP-HPLC-DAD) [3] were developed and compared. For HPTLC silica gel Kieselgel 60 F 254 plates with ethyl acetate/ethyactate/formic acid (2:1:0.1) as mobile phase were used. Densitometric determination of parthenolide by HPTLC was performed at 220 nm; while an isocratic RP-HPLC-DAD method was carried out at 220 nm using ACN: Water in 45:55 ratios. Both the methods were validated for linearity, precision, limit of detection (LOD), limit of quantitation (LOQ), system suitability and accuracy. Eventually 37 species of *Tancetum* flower extracted cleaned by RP-C18 cartridge and finally exposed to validated HPLC and HPTLC. Our results shows, from both statistical and resolution power point of view HPLC are moreauthentic compered to HPTLC. Our results confirmed*Tanacetum parthenuim* is more reliable sources of parthenolide.

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DISCRIMINATION AND CLASSFICATION OF *TANACETUM* SPECIES GROWN IN IRAN BASED ON HPLC-DAD FINGERPRINTS

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In many parts of the world, herbal medicines provide health care to a significant portion of the papulation as a part of the general health services. Choosing a reliable and right source of medicinal plants is crucial in the phytopharmaceutical, cosmetic and food industries. It is well known that the chemical content of herbals varies greatly according to many factors such as species variation, growthlactation, and climate harvesting season, storage condition, processing and sometimesadulteration. On the other hand, plants matrices contain complex varieties of compounds and then using few marker compounds couldn't show a true image of natural media of a plant matrix. Recently, combination of chromatographic fingerprinting and high throughput data analysis methods have showed a more reliable and comparable image of plant media [1]. Superiority of these techniques is that the fingerprint could be based on both known and unknown chemical constituents. The genus *Tanacetum* is represented in Iran by more than 30 species. They are rich in essential oils and sesquiterpene lactones and some of them have been used in traditional medicine over a long period of time (such as *Tanacetum parthenium* (feverfew), *Tancetum vulgar* or *Tancetum sonboli*). One of the problems from botany point of view of *Tancetum* species is their morphological similarity. in this study and since different components exist in *tanacetum* spices, firstly we set up a revered-phase solid phase extraction to obtain a rich fraction of sequiterpene lactones. This continued to a developed HPLC-DAD for fingerprinting. HPLC-DAD data from duplicate of 30 *tanacetum* species (a total of 60 chromatographic runs) was done. Then they were exported to asci and then csv format and finally exported to r program. The data binning, baseline correction, normalization was performed using rprogram. Eventually our method could differentiated between *tanacetum* species and showed it is possible to authenticate *tanacetum* species with chromatographic profiles. This could extend to a library establishment that could be used for quality control of other medicinal plants.

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A COMPARISON STUDY ON DETERMINATION OF MAIN CONSTITUENTS OF SAFFRON BASED ON HPLC & HPTLC

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Saffron,the dried stigma of *Crocus sativus* L.is an ancient spice which according to some documents its cultivation dates back to as early as 2300 B.C. [1]. Thereare just few countries that cultivate and export this valuable spice,which among them Iranis by far the biggest producer and exporter of saffron in the world. According to United Nations Industrial Development Organization (UNIDO), total area under cultivation in Iran was about 85000 ha while for Sapin (the second saffron producer in the world) was 650 ha.Saffron main constitutes are Crocins, Safranal,Picrocrocin and Crocetin [9]. They are responsible for odor, bitter taste and color of Saffron recepectively. One of major problem with Crocins apocartenoids are diversity of their derivatives in saffron and then the main challenges for saffron is its quality of control. ISO3632 is the common method of saffron quality control in which the measurement is done at three wave length in cluding 250, 310, 440 nm that areλ_{max} of Picrocrocin, Safranal and Crocins respectively. Although this method is fast and inexpensive but crocins have adsorptionat the λ_{max} of picrocrocin and Safranal which could interfere in the measurement of safranal and picrocrocin. Another problem with saffron is complexity behind crocins chemistry so that there are no complete collection of crocins reference standards. Looking for a reliablemethod of quality control, we developed and validated two common analytical methods, HPLC-DAD and HPTLC. Firstly we optimized a preparative HPLC for isolation and purification of Crocins from saffron ethanolic extract. After that their structure was confirmusing LC-MS. Then for TLC we applied a normal phase adsorption chromatography on Silica-60 F254 and a mixture of ethyl acetate: hexane as a mobile phase. Also for HPLC we applied a liner gradient in of ACN:Water for simultaneous isolation of picrocrocin, saffranal, crocetin and three maincrocins (crocin I, II and III). Three samples with different geographic origins in Iran were obtained from the local supplier. These three samples were in three different grades but with the same harvesting year. Finally metabolite contents of Saffron using HPTLC and HPLC in both external and standard addition modes were determined. Our result showed HPLC-DAD data especially for picrcrocin and Saffranl are reliable than HPTLC.

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STUDY OF ALLELOPATHIC EFFECTS OF *SALVIA LIMBATA* C.A.MEY. ON SEED GERMINATION CHARACTERISTICS OF *CARUM COPTICUM* L.

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Germination is one of the essential periods of plants growth that can be affected harmfully by chemical agents released by other plants. The allelopathic effects of *Salvia limbata* were investigated on germination characteristics of *Carum copticum* L. seeds in a growth chamber experiment. Experimental treatments were extracted by distillation from dried leaves of Salvia limbata that applied by four concentrations included: zero (distilled water),2, 5.0 and 10 volume percent (w / v) was applied on the seeds of *Carum copticum* L. Experimental design was factorial experiment in a completely randomized design with three replications. The aqueous extracts applied to seed, significantly inhibited percent of germination, germination rate, radicle and hypocotyl length and fresh and dried weight of plants with increasing of extract concentration. Results showed that extract from leaves and flowers of *Salvia limbata* had the most inhibition effect than roots on germination characteristics of *Carum copticum* seeds.

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PRODUCTION OF IRANIAN WHITE CHEESE WITH DILL FLAVOR AND STUDY OF ITS EFFECT ON THE GROWTH AND SURVIVAL OF *E.COLI* O157 DURING STORAGE

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Dill essential oil is used to increase the shelf life and producing desired organoleptic properties in food industries. *E. coli* O157:H7 is a dangerous pathogenic bacterium and cause hemorrhagic colitis and HUS (Hemolytic Uremic syndrome) in man. The *E. coli* is causing the early blowing spoilage in cheese. Study on the effects of dill essential oil separately and in combination with probiotic bacterium *Lactobacillus acidophilus* la-5 on the growth and survival of *E. coli* in produced cheese during storage times were the objectives of the present research. Analysis of constituents of the dill essential oil, producing cheese containing *E.coli*, various concentrations of the dill essential oil (zero, 50, 75 and 150ppm), and performing *E. coli* count, and measurement pH in manufactured cheese during zero, 15, 30 45 and 60 days of storage were the methods used in the study. Various concentrations of the dill essential oils significantly decreased the counts of *E. coli* in comparison with the control group ($p<0.01$). The effects of different concentration of dill essential oil on *E. coli* count between the cheese groups were not significant ($p>0.05$). With increasing the storage time, pH values in white cheese groups significantly reduced. The pH value between the cheese groups showed no significant difference. On the other hand, *E. coli* count decreased with decreasing pH values of the cheeses produced. Thus it can be concluded that dill oil have inhibitory effect on the growth of *E. coli* in white cheese.

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1-D AND 2D-NMR ASSIGNMENTS OF TRICIN FROM *ALLIUM ATROVIOLACEUM* BOISIS.

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4', 5, 7-Trihydroxy-3',5'-dimethoxyflavone (Tricin), a naturally occurring flavone, was isolated from *A. atroviolaceum* by column chromatography and recrystallization method. The chemical structure of isolate was elucidated on the basis of 1 and 2 D-NMR spectra (COSY, NOESY, HMBC and HSQC).This plant is one of the richest and commonly consumed sources of dietary flavonoids. The EtOAC fraction from methanol extract of Aerial parts of *A. atroviolaceum* was subjected to silica gel chromatography, eluted initially, with *n*-hexane, then gradually increasing polarity with EtOAC. After 100% EtOAC the column was eluted with EtOAC-MeOH gradient system (100:0→0:100). The G-subfraction purified by Sephadex LH-20 ($CHCl_3/CH_3OH$ 1:1) and further recrystallized (EtOH) to afford Tricin and found to be major compound (yield: 0.21%). Tricin was identified by UV, MS, IR, ^{1}H-NMR, ^{13}C-NMR, COSY, NOSEY, HMBC, HSQC techniques. The compound was isolated as a yellow needle crystals with a molecular ion peak on EIYMS at m/z of 330 $[M]^+$. This suggested a molecular weight of 330m/z. Analysis of compound by ^{1}H, ^{13}C, and 2D NMR (COSY, NOSEY, HSQC and HMBC), IR, UV and MS techniques and comparison of its data with literatures data confirmed the structure as Tricin. Its identity was confirmed by comparison of its spectroscopic data with the published data for the compoundby UV, FBMS, I.R., 1H-NMR, and 13C-NMR [1, 2]. The 1H-NMR was recorded on a Bruker AMX 500 NMR (Avance) instruments using the UNIX data system at 500 MHz using DMSO-d6 as solvent. 1H-13C HMBC and HMQC were recorded at 500 MHZ (proton) and 125 MHZ (carbon), respectively. The ^{1}H NMR showed the presence five aromatic protons and a methoxyl group.The ^{13}C NMR spectrum showed 14 discrete signals for the 17 carbons in the molecule.

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CHEMICAL COMPOSITION OF THE HYDRODISTILLED ESSENTIAL OIL FROM AERIAL PARTS OF *MALVA NEGLECTA* GROWN IN DESERT REGIONS OF TORBAT-E HEYDARIEH, IRAN

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Common mallow, *Malva neglecta* with fast growing potential and broad leaves is one of the most hazardous weeds, which compete with saffron. *Malva neglecta* Wallr is a perennial plant with high mucilage content, expectorant and cough-suppressing actions. The leaves and flowers of *M. neglecta* and some *Malva* species are used in traditional phytotherapy [1]. In some parts of Turkey, this plant is frequently used by the local population to cure multiple medical conditions, such as promoting maturation of abscesses, wound healing, abdominal pains and cancer [2]. The aim of the present work is to evaluate the chemical composition of the essential oils of *Malva neglecta* from Torbat-e Heydarieh region. The essential oils from the aerial parts of this plant were isolated by hydrodistillation and were subsequently analysed by GC and GC-MS. The essential oils were characterized by high percentage of spathulenol (27.0%), 1,7-diepi-α-cedrenal (10.6%), valencene (6.0%), tetrametyl neophytadiene (4.1%) and carotol (3.7%) as the most abundant compounds. Based upon the respective chemical profile, oxygenated sesquiterpenes (49.8%) constitute about half of the total structure whereas the second, third, fourth and fifth ranks are respectively due to non-terpene hydrocarbons, sesquiterpene hydrocarbons, dieterpene hydrocarbons and oxygenated monoterpenes which respectively contribute to 26.2%, 6.0%, 4.0% and 2.0% of the corresponding chemical composition.

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ACTEOSIDE PRODUCTION THROUGH METHYL JASMONATE –INDUCIBLE OXIDATIVE STRESS IN *SCROPHULARIA STRIATA* SUSPENSION CELLS

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Scrophularia striata naturally produces medicinal metabolites, such as acteoside effective against many human illnesses [1]. Exposure to methyl jasmonate (MeJA) affects plant growth, effectively induces pharmaceutical production, promotes production of reactive oxygen species (ROS) and inserts oxidative stress at the cellular level [2]. Here, cell suspension cultures of *Scrophularia striata* were treated with optimum concentration MeJA (100 µM) at the end of log phase of growth (14 day). Biomass growth, acteoside accumulation and activities of three antioxidant enzymes (superoxide dismutase (SOD), catalase (CAT), Guaiacol peroxidase (GPx)) were measured in cultured cells of *S. striata* following MeJA elicitation for 48 h. MeJA lowered the cellular fresh weight by 9.4%, increased the acteoside content by 2 fold and significantly improved the activity levels of all antioxidant enzymes compared with control cells. Analysis of cell growth and induction of acteoside production in cell suspension culture of *S. striata* indicated that MeJA may elicit the phenylethanoid-glycosides production through increase the population of non-cycling cells with pharmaceutical benefits.

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VOLATILE CONSTITUENTS OF AERIAL PARTS OF *SATUREJA HORTENSIS* GROWN IN SEMNAN PROVINCE, IRAN USING HEAD SPACE SOLID PHASE MICROEXTRACTION (HS-SPME) COUPLED TO GC-MS

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Satureja hortensis is an annual plant (10-35 cm tall) and an aromatic herb with lilac, purplish or white flowers and linear to linear-oblanceolate leaves [1]. The head-space volatiles separated from aerial parts of *S. hortensis*, a growing wild plant, collected in the Semnan Province of Iran were investigated. A 100-µm polydimethylsiloxane (PDMS) fiber was conditioned to trap the volatiles prior to GC and GC-MS analyses. Eleven compounds were identified in the samples analyzed, representing 100% of the total composition. In terms of general categories, monoterpene hydrocarbons dominated the chemical profile (99.5%) with γ-terpinene (46.0%), *p*-cymene (11.8%), α-terpinene (11.1%), α-pinene (10.4%) and α-thujene (6.8%) as the main constituent components. The other constituents were found to be myrcene (5.2%), β-pinene (3.9%), *o*-cymene (2.6%), α-phellandrene (1.1%), camphene (0.6%) and thymol (0.5%). Accordingly, only 0.5% of the profile included oxygenated monoterpenes. Despite of negligible differences, the results are in good agreements with those obtained from analysis of the volatile essential oil using traditional hydrodistillation. In short, both profiles were mainly consisted of monoterpene hydrocarbons.

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CHEMICAL COMPOSITION OF THE ESSENTIAL OIL FROM THE AERIAL PARTS OF *STACHYS INFLATA BENTH.*: AN ENDEMIC PLANT OF SEMNAN PROVINCE

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The genus *Stachys* (family Lamiaceae) is represented by about 270 species which are distributed extensively in the tropical and subtropical countries. Thirty four species of this genus are found in Iran of which 13 species are endemic [1-2]. Nowadays, various effective techniques have been developed to extract a wide spectrum of natural products from plants. The most important superiorities of these approaches are: shorter extraction times, lower consumption of the solvents, higher extraction yield and oil qualities. Among the proposed techniques, microwave assisted hydrodistillation (MAHD), serves as one of the best alternatives for the extraction of the essential oil or volatile compounds from aromatic plants [3-4]. The essential oils obtained by using MAHD approach from the leaves of *Stachys inflata* Benth. during the flowering stage were analyzed by GC and GC-MS instrumentations. Thirty-one components were identified in the corresponding chemical profile totally representing 99.3% of the structure. The isolated essential oil was mainly characterized by high amounts of limonene (32.1%), α-pinene (15.6%), camphene (11.3%) and germacrene-D (7.5 %), respectively. The simple perusal of the chemical profile explicitly exhibits that the monoterpene hydrocarbons are the dominant groups of the natural products in the isolated essential oils.

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EVALUATION OFGRAIN YIELD AND ESSENTIAL OIL OF DILL HERB (*ANETHUM GRAVEOLENS* L.) AFFECTED BY PLANTING DATE AND PLANT DENSITY ON SECOND CROPPING

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After harvesting of many crops in summer, it could be use short growing season crops, there are some crops that would be benefit from the opportunities, with providing appropriate crop rotating with suitable inputs could also lead to an increase in income for farmers. In this study, to evaluate of yield and essential oil of dill *(Anethum graveolens* L.) affected by planting dates and plant density on the second crop, a factorial experiment based on randomized complete block design with three replications carried out in research field of Imam Khomeini International University, Qazvin,Iran. Planting date with two levels,2013/07/23 and 2013/08/22 dates and density with planting distances in row with three levels such as 10, 12.5, 15 cm. Row spacing was fixed in 50 cm. Analysis of variance showed that the treatments had no significant effects in seed weight.The biological yield had shown a significant difference on effect of planting date and the first planting date with 4230 kg was superior. Anova results indicated that the seeds weight per hectare showed no significant difference, but the second planting date was better with 1929 kg per hectare. Essential oil content of seed was significant in A novaresults (one percent level) so second planting date was the highest with 3.28 %. The essential oil of seeds per hectare was significant in Anova results (in 5% Probability level) so the first planting date was more suitable with 70.1 kg per hectare.

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COMPARATIVE STUDY ON DETERRENCY OF AQUEOUS AND ETHANOLIC EXTRACTS FROM *BERBERIS VULGARIS* L. ON STORED PRODUCT INSECT

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The red flour beetle, *Tribolium castaneum* (Herbst), is one of the most serious secondary pests that feeds on the wide range of durable stored products including cereals, cereal products and other high value produce such as cocoa beans and dried fruits [1]. Several studies have assessed the ability of essential oils as antifeedants against this pest. *Carum copticum* C. B. Clarke and *Vitex pseudo-negundo* (Hausskn.) Hand.-Mzt. essential oils have an antifeedant activity against *T. castaneum* [3]. Gamma radiation and *Perovskia atriplicifolia* essential oil combination have antifeedant activities on larvae and adults of *T. castaneum* [2]. In this study, the aqueous and ethanolic extracts from aerial parts of *Berberis vulgaris* L. were tested against the stored product insect, *T. castaneum* for antifeedant activity. Several experiments were designed to measure the nutritional indices such as relative growth rate (RGR), relative consumption rate (RCR), efficiency of conversion of ingested food (ECI) and feeding deterrence index (FDI). Treatments were evaluated by the method of flour disc bioassay in the dark, at 27±1°C and 60±5 % R.H. Aliquots of 10 µl of each extract several concentrations (0.25, 0.5, 0.75, 1.0, 1.5 and 2.0%) with control were spread evenly on the flour discs. The solvent was allowed to evaporate and then 10 adult insects were introduced into each treatment. After 72 h, nutritional indices were calculated. Results indicated that nutritional indices were significantly varied as extract concentrations increased. The difference between extracts and treatments was significant ($P<0.05$). Ethanolic extract decreased RGR, RCR and ECI significantly higher than that of aqueous extract. Both of plant extracts increased FDI as the extract concentrations was increased, showing high feeding deterrence activity against *T. castaneum*. Generally, antifeedant activity of ethanolic extract from *B. vulgaris* was more effective than aqueous extract. There was significant positive correlations ($P<0.05$, $r^2>0.9$) between RGR and RCR or ECI, also there was significant negative correlation between RGR and FDI. The use of plant materials such as *B. vulgaris* ethanolic extracts may be a safe, cost-effective method of grain preservation against pest infestation.

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ANTIFEEDANT ACTIVITY OF AQUEOUS AND ETHANOLIC EXTRACTS FROM *ALHAGI CAMELORUM* FISCH. ON STORED PRODUCT INSECT

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Tribolium castaneum (Herbst), has been found to be the most destructive pests of stored products throughout the world, causing considerable qualitative and quantitative losses to a wide range of stored products such as flour, cereals and legumes [2]. Natural products or botanical pesticides are an excellent alternative to synthetic pesticides as a means to reduce negative impacts on the human health and the environment [1]. In this study, the aqueous and ethanolic extracts from aerial parts of *Alhagi camelorum* Fisch. were evaluated for nutritional indices of the adults of *T. castaneum*. Relative growth rate (RGR), relative consumption rate (RCR), efficiency of conversion of ingested food (ECI) and feeding deterrence index (FDI) were measured. Treatments were evaluated by the method of flour disc bioassay in the dark, at 27±1°C and 60±5 % R.H. Aliquots of 10 µl of each extract several concentrations (0.25, 0.5, 0.75, 1.0, 1.5 and 2.0%) with control were spread evenly on the flour discs. The solvent was allowed to evaporate and then 10 adult insects were introduced into each treatment. After 72 h, nutritional indices were calculated. Results indicated that nutritional indices were significantly varied as extract concentrations increased. The difference between extracts and treatments was significant ($P<0.05$). Ethanolic extract decreased RGR, RCR and ECI significantly higher than that of aqueous extract. Both of plant extracts increased FDI as the extract concentrations was increased, showing high feeding deterrence activity against *T. castaneum*. Generally, antifeedant activity of ethanolic extract from *A. camelorum* was more effective than aqueous extract. There was significant positive correlations ($P<0.05$, $r^2>0.9$) between RGR and RCR or ECI, also there was significant negative correlation between RGR and FDI. These plant materials such as *A. camelorum* ethanolic extracts can be used as potential control agents against *T. castaneum.*

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STUDYING THE ANTIFUNGAL EFFECT OF ESSENTIAL OIL OF *SALVIA HYDRANGEA* ON VAGINAL *CANDIDA ALBICANS*

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The trend of Herbal therapy, especially for infectious diseases has been growing in recent years [1]. Since side effects of herbal drugs are significantly lower than chemical drugs, clinical microbiologists are interested using herbal drugs to treat infections. Because of the global epidemic of AIDS, infections caused by pathogenic and opportunistic fungal have increased so the need for new antifungal drugs are felt more and more [2]. *Candida albicans* yeast is one of the opportunistic fungal. The aim of this study is to evaluate the antifungal effect of essential oil of *salvia hydrangea* on *Candida albicans*. In this regard, 50 clinical samples collected from patients in the city of Arak and after examining microscopic and macroscopic (looking Lams, germ-tube, Klamydoconidia and sugar fermentation) 15 samples of *Candida albicans* was isolates from others. Salvia hydrangea flowers are gathered from mountains of Arak city and GC-MS is used to analyze compounds. In order to measure Anti-fungal properties, drilling well and disk diffusion methods against two pathogenic and standard fungi are tested and the minimum inhibitory and fatal concentration MIC & MFC are measured. Calculated Results from this study showed that the use of Salvia hydrangea flower essence as an anti-growth is not effective on fungus *Candida albicans*. In general, all concentrations of flower essence tested on standard and pathogen type of *Candida albicans* are ineffective.

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A REVIEW STUDY ON THE ANTIBACTERIAL EFFECTS OF IRANIAN MEDICINAL PLANTS AGAINST *HELICOBACTER PYLORI*

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*Helicobacter pylori*is a gram negative, microaerophilic bacteriumthat can inhabit variousareas of the stomach(1). Around 50% of the world's human population is infected with *H.pylori* (2). The intimate correlation of *H.pylori* infection with duodenal or gastric ulcer and gastric carcinoma has been thoroughly investigated(3,4). Eradication of *H. pylori* results in healing of gastric ulcer and may also reduce the incidence of gastric carcinoma (5).Various drug regimens have been used for the eradication of *H. pylori* such as triple or quadruple drug therapy (6). However, alarming increase in the resistance to antibiotics, high cost of combination therapy and undesirable side effects, resulted in an emerging surge in alternative approaches such as antioxidants, anti-inflammatory agents, probiotics and herbal extracts (7,8,9,10). Extracts from medicinal plants has shown multiple activities against *H. pylori* and associated pathogenesis such as bactericidal, anti-inflammatory, antioxidant, anti-adhesion and anti-mitogenic activities. In this review, the researches about antibacterial potential effects of Iranian medicinal plants against *H.pylori*will be presented as the following: there are many research documents about antibacterial effects of various Iranian plant extracts against *Helicobacter pylori* using different plant families includes: Lamiaceae (17 plant), Rosaceae (5 plant) , Apiaceae (9 plant), Asteraceae (8 plant), Zingiberaceae (3 plant), Oleaceae (2plant), Rutaceae (2 plant) ,and from the families Anacardiaceae, Amaryllidaceae, *Fabaceae*, Juglandaceae, Punicaceae, Lauraceae, Caryophylaceae, Zygophyllaceae, Ranunculaceae, *Combretaceae*, *Myrtaceae*, Meliaceae, Scrophulariaceae, Urticaceae, Cannabaceae, Polygonaceae, Apocynaceae, Acanthaceae, Hypericaceae, Iridaceae, each one, 1 plant was investigated (11-41). In between these plants, *Mentha piperita* , *Zataria multiflora*, *Salvia mirzayani*, *Geumiranicum*, *Heracleum persicum*, *Trachyspermum ammi* , *Artemisia absinthium*, *Glycyrrhiza glabra* , *Olea europaea* and *Punica granatum* as plants that was shown the most anti *H.pylori* effect was recogenized. Taken together, these studies are flawed for the following few points:

1- Except one research, in the other ones, the antibacterial activity of plant extract evaluated only at in vitro situation.
2- From 66 evaluated plants, the effective materials were recognized only at 11 plants.
3- The same plants that cultivated at different regions may have different antibacterial activities, thereby it must be consider about the antibacterial activity of specific plant.
4- In these studies,scientists used the different strain of *H.pylori* and thereby, the results of experiments with using the same plant extract against different strains of *H.pylori*may be not identical that was tested on the Finally, future studies about the in vivo activities of these plant extracts and determination of the main compounds of them could be prescious.

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A COMPARATIVE STUDY OF ANTIBACTERIAL EFFECTS OF METHANOLIC EXTRACT OF RHIZOME AND LEAF IN *ACORUS CALAMUS*

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Acorus calamus L. have traditionally been used for treating several diseases; epilepsy, mental ailments, chronic diarrhea, dysentery, bronchial catarrh, intermittent fevers, cough, throat irritations, bronchitis, as expectorant, and tumors [1]. In this study we investigated the antibacterial effects of leaf and rhizome methnolic extracts of the species by using plant material from natural habitat in Northern area of Iran (Mazandaran-Sari) for the first time. The antibacterial activities of extracts were assessed with different concentrations; 50, 100, 200, 300 and 400 mg/ml against Streptococcus faecalis (gram positive) and Escherichia coli (gram negative) based on disc diffusion method. The Minimal Inhibitory Concentration (MIC) and Minimal Bactericidal Concentrations (MBCs) were assessed. Our results indicated that all extract have inhibitory property against two tested bacteria but the 400 mg/ml concentration of leaf extract have the most antibacterial effect on Streptococcus faecalis. MIC test showed that the minimum concentration of leaf extract was 6.25 mg/ml for Streptococcus faecalis and Escherichia coli. The methanol extract of leaf possess more than antibacterial activity in comparison with rhizomes extract, the result is not in accordance with previous study [2].

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EVALUATION OF MORPHOLOGICAL CHARACTERISTICS OF CUMIN LOCAL VARIETIES UNDER DROUGHT STRESS

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In this research the evaluation of the effect of drought stress on morphological characteristics of local varieties of cumin based on factorial complete randomized design with three replications carried out. Treatments consisted of six genotypes of cumin and different levels of field capacity (40%, 70% and 100%). The results showed that variety effect on traits including shoot height, leaf number, umbrella number, umbel number, fresh weight of aerial parts and root and shoot dry weight was statistically significant, and different treatments of drought stress has significant effects on root height, leaf number, umbel number and root and shoot dry weight. With increased drought, root and shoot dry weight, leaf number root height, shoot height and umbel number was significantly decreased and also increasing drought stress caused nonsignificant decrease in aerial and underground fresh weight and shoot height. In terms of all parameters that examined in this study Ardestan landrace had the relative superiority.

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EFFECS OF DIFFERENT LEVELS OF NITROGEN FERTILIZER ON SOME QUANTITY AND BIOCHEMICAL CHARACTERISTICS OF PURPLE CONEFLOWER (*ECHINACEA PURPUREA* L.) MIDICINAL PLANT UNDRE DROUGHT STRESS

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Drought is a complex physical–chemical–biological process, in which many biological macromolecules and small molecules (colloid and its interface conversion) are involved [1]. Plants have evoluted enzymatic mechanisms under water stress, in which enzymes include superoxide dismutase (SOD), catalase (CAT), malondialdehyde (MDA) and so on [2]. In order to investigate the effects of different levels of nitrogen fertilizer on some quantity and biochemical characteristics of purple coneflower (*Echinacea purpurea* L.) medicinal plants under drought stress, field experiments was conducted in 2013–2014 cultivation year in a farm, Chaharmahal and Bakhteyari, lordegan. The Experimental design was split plot in in randomized complete block with three replications. Drought stress based on Field Capacity (25% FC, 50% FC and 75% FC) was allocated as main-plot, and five levels of nitrogen fertilizer (urea fertilizer: 80 kg/h (F1), urea fertilizer: 160 Kg/h (F2), Nitroxin: 5L/h (F3), combined: 80 kg/h urea fertilizer + Niroxin: 5L/h (F4) and control: without nitrogen (F0)) were allocated as sub-plot factor. In this experiment, leave yield, stem yield, flower yield, total yield and enzyme activities of superoxide dismutase (SOD), catalase (CAT), malondialdehyde (MDA) and protein were determined. Results of this experiment showed that there was significant interaction between drought stress and different levels of nitrogen for all quantity and biochemical (except MAD) characteristics. Based on results, leave yield, stem yield, flower yield and total yield decreased under drought stress conditions. Enzyme activities of superoxide dismutase (SOD), catalase (CAT), malondialdehyde (MDA) and protein were increased under drought stress condition. Nitrogen increased all quantity and biochemical characteristics compared with control (without nitrogen). Highest and lowest of total yield obtained from F4 at irrigation 50% FC and F0 at irrigation 75% FC respectively. Maximum of SOD and CAT obtained from F3 at irrigation 75% FC. Highest of MAD obtained from F4 and irrigation at irrigation 75% FC.

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STUDY OF YEILD AND YEILD COMPONENTS IN FOUR IRANIAN THYME SPECIES IN MASHHAD ENVIRONMENTAL CONDITIONS

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Thymus, an aromatic medicinal plant, is a well-known, perennial and woody herb from Lamiaceae family. The use of the extracts and herb of thyme plants as antibacterial, antioxidant, natural food preservative and in cosmetic industry has increased the economic importance of this medicinal crop worldwide [1]. Thymus is taxonomically a very complex genus with a high frequency of hybridization and introgression among sympatric pecies, and some species of this herb are endemic to Iran[2]. This study was carried out in order to evaluate yield and yield components in fourspecies of*T.daenensis, T. migricus, T. kotschyanus* and *T. pubescens* collected from Semnan, west Azerbaijan, Qazvin and East Azerbaijan respectively. This experiment was performed in a randomized completeblocks design with three replications at the Research Station of the Faculty of Agriculture, Ferdowsi University of Mashhad. Inflorescence length, number of flowers per inflorescence, shoot height, leaf length, leaf width, the largest and smallest diameter of canopy, 1000-grain weight, fresh and dry herb yield, were measured.Analysis of variance the data showed that there was considerable variation for all studied characters. Results of mean comparisons showed that the highest dry and fresh herb yield per plant were 117.8 and 400.6 gr for *T. daenensis*, respectively. The lowest yield was recorded for *T. migricus*. Maximum inflorescencelength, number of flowers per inflorescence, the largest diameter of canopy and leaf length was also recorded for *T. daenensis*. A positive significant correlation was observed between dry yield per plant and the largest diameter of canopy, leaf length, and fresh yield. Correlation between dry herb yield per plant and leaf width was strongly negative. *T. daenensis* produced more essential oil as compared to another thyme species. Salami and Rahimmalek reported that the fresh and dry shoot yield of *T. daenensis* were 7197 and 1321(kg per ha) in first years, 10310 and 1176 (kg per ha) in second year [3].

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ANTIBACTRIAL ACTIVITY OF HYDRO-ALCOHLIC EXTRACT ASTRAGALUS VERUS OLIVIER (BLACK MILK VETCH) ON *ESCHERICHIA COLI AND STAPHYLOCOCCUS AUREUS IN KURDISH ETHNOMEDICINE*

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Astragalus verus Olivier, has been used as an immuno promoting remedy in Kurdish ethno medicine, Asia(traditional medicine) On the other hand anomalous applying of chemical drugs has resulted in resistant microbe development .Plants and their derivatives have potentials to be used instead of chemical drugs, while their side effects are less and aim of present survey was to determine antibacterial effects of extract.[1]. To achieve the aims, in this study hydro-alcoholic extract of Astragalus verus oliver(black milk vetch) was used.The Aerial flowering parts of plant were collected from Mountains at Krmansha Province and air-dried in the shade. The air dried parts were subjected the extract were prepared in different dilutions (800, 400, 200, 100, 50 and 25mg/ml) applied on *Escherichia coli (ATCC10536)* and *Staphylococcus aureus (ATCC25923)* by Macro broth dilution and Disk diffusion methods. Tetracycline, Vancomycin and distilled water were used as positive and negative control respectively. Minimum inhibitory concentration (MIC) and Minimum bactericidal concentration (MBC) were determined. Based on the results, MIC value extract is reported at 400 mg/ml for E. coli. About *S. aureus*, astragalus verus olivier2*00*, 400 and 800 mg/ml dilutions could prevent from its growth. Thus, 200 mg/ml is considered as MIC and 800 mg/ml is calculated as MBCvalue. Disk diffusion test results showed Average Diagonal zone of growth inhibition dilution to200,400 and 800mg/ml Extract, were respectively, 11/19±0/51, 11/23±0/50,12/64±0/57 mm and Vancomycin19±0/33mm for S. aureus and9/33±0/57, 9/66±0/57mm (400&800mg/ml) and Tetracycline 17±0/39mm for *E.coli*. The results showed ‹Diagonal zone of growth inhibition increased with increas concentration. The extract was observed inhibition zone diameter have the greatest impact on S.aureus (12/64±0/57 mm) and had the least impact on *E. coli* (9/66±0/57mm). The results achieved in this study showed that: Astragalus verus Olivier extract has growth inhibitory impact on both *E. coli* and *S. aureus* (*S.aureus* is known as more sensitive to the extract than *E. coli).*

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STUDY ANTIBACTRIAL EFFECTOF POLYSACCHARIDE EXTRACT ASTRAGALUS VERUS OLIVER *(RASHA GAVAN)IN KURDISH ETHNOMEDICINE* ON *ESCHERICHIA COLI AND STAPHYLOCOCCUS AUREUS*

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The genus Astragalus, Fabaceae family, comprises more than2,500 species; of these, Astragalus verus Olivier, known as black milk vetch or Rasha Gavan in Kurdish ethnomedicine, is a medicinal plant that originated in Northwest Persia and Asia Minor. Astragalus species are natural medicinal factories that produce various bioactive compounds with different properties (saponins, falvanoids, fatty acids , alkanes, and various aliphatic and aromatic terpenoids). The Kurds used Astragalus verus as a remedy to enhance the body's natural defense mechanisms against several diseases.aim of the present study was to determine antibactrial effects polysaccharide extract, which could be related to the traditional usage. The Root parts A. verus were collected from Mountains at Kermansha Province of Iran and air-dried in the shade. polysaccharide extract of A. verus were prepared by boiling powder in distilled water at 50°C for 12 h and allowed to cool for 45 min. The contents of the flasks were dried in a rotary evaporator to obtain the extract (POL, 3.7 g, 5.11 % w/w).The method agar diffusion and Disk diffusion, MIC and MBC of dilution series were used in Mueller Hinton Broth.The various concentrations of extract (800, 400, 200, 100, 50 and 25mg/ml) prepared and applied on *E.Coli* (ATCC10536), *S. aureus* (ATCC25923). Tetracycline, Vancomycin and distilled water were used as positive and negative control respectively. Disk diffusion test results showed Average Diagonal zone of growth inhibition dilution to 25, 50, 100, 200, 400 and 800mg/ml Extract, were respectively 8±0/50 ,8±0/50, 9±0/57,11/33±0/57, 11/66±0/57,12/66±0/57 mm and Vancomycin19±0/33mm for S. aureus and 7±0/50, 7±0/22, 7±0/57,8/33±0/57, 9/66±0/57, 10/66±0/32 mm and Tetracycline17±0/39 mm for E.Coli. The results showed, Diagonal zone of growth inhibition increased with increas concentration. The extract was observed inhibition zone diameter have the greatest impact on *S.aureus* (12/66±0/57 mm) and had the least impact on *E. coli* (10/66±0/32mm). Moreover ,MICvalue for S. aureus 200,400,800 mg/ml andforE.coli800mg/mlhave been showed. The results achieved in this study showed that Astragalus verus Olivier polysacharid extract have Antibacterial Activity and growth inhibitory impact on both E. coli and S. aureus (S.aureus is known as more sensitive to the extract than *E. Coli*).

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EFFECT OF PLANT DENSITY AND HUMIC ACID APPLICATION ON PHYTOCHEMICAL ATTRIBUTEOF MALLOW (*MALVA SYLVESTRIS* L.)

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To evaluate the effect of the plant density and humicacid applicationon some of phytochemical characteristics of the Mallow (*Malva sylvestris* L.), the research was conducted as a factorial experiment on the basis of randomized complete block design with 9 treatments and three replications. All of the results were obtained at the Agricultural Research Station of Ferdowsi University of Mashhad during summer 2014. The treatments were density of plants (4, 6 and 9 plants per square meter) and humic acid concentration (0, 3 and 6 ml per liter). In this experiment the characteristics such as anthocyanins and the antioxidant capacity were analyzed and reported. The results indicate that, the plant density have a significant effect on antioxidant capacity of *Malva sylvestris* L. However, the humic acid concentration has a significant effect on all phytochemical properties of the plant. The interactions between these two factors were statistically significant on all measured traits. Based on the results, the maximum anthocyanin content (132.97 mg per liter) was obtained in the interaction between plant density (4 plants per square meter) and humic acid concentration (6 ml per liter). In addition, the highest antioxidant capacity (87.53 percent) was observed in the plant density (4 plants per square meter) and humic acid concentration (3 ml per liter). According to the results, it seems that the density of 4 plants per square meter and humic acid concentration equal to 3 ml per liter is the best treatment for *Malva sylvestris* L. production.

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EFFECTS OF HYDRO-ALCOHOLIC EXTRACT OF *MORINGA PEREGRINE* ON *TRICHOMONAS VAGINALIS*

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Trichomonas vaginalis is the most common non-viral sexually transmitted disease worldwide [1]. Metronidazole and tinidazole are the only drugs recommended by the FDA for the treatment of *T. vaginalis* infection [2]; however, some resistant isolates have been reported [3]. Furthermore, high doses of this drugs results in development of side effects including nausea, headache, dizziness, dry mouth and a metallic taste sensation. Accordingly, new drugs with high activity and low toxicity are required to overcome these problems. This study aims to evaluate the effect of *Moringa peregrina* on *T. vaginalisin-vitro*. *T. vaginalis* was cultured in vitro in trypticase-yeast extract-maltose (TYM) media (6.4 pH) supplemented with 10% (v/v) heat-inactivated bovine serum. The effect of *M. peregrina* hydro-alcoholic extract in concentrations of 0.25,0.5, 1, 2 and 4 mg/ml were evaluated on *T. vaginalis* in two time points; 24h and 48h. Metronidazole drug is used as standard drug at concentrations of 0.25, 0.5, 1, 2, 4 and 8µg/ml**.** Live parasites were stained with Trypan blue and their numbers were counted using a hemocytometer. Then the value of IC50 was calculated using Prism software for both groups. *M. peregrina* extract in concentration of 4mg/ml have the inhibitoriest effect on *T. vaginalis* after 24 and 48h. The IC50 values of *M.peregrina* extracts and Metronidazole were calculated respectively. Our studies showed that different concentrations of *M. peregrina* extract have a good anti *T. Vaginalis* activities. Therefore it is recommended to test in other clinical studies.

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SIGNIFICANT ENHANCEMENT OF LIGNAN ACCUMULATION IN HAIRY ROOT CULTURES OF *LINUM ALBUM* USING FUNGAL CELL WALL

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Linum album has been shown to accumulate some lignans with antiviral and anticancer properties such as podophyllotoxin (PTOX), 6-methoxy podophyllotoxin (MPTOX) and lariciresinol, which were originally isolated from an endangered species *Podophyllum* [1]. Biotechnological methods and using biotic and abiotic elicitors are being developmentally studied for their application as alternative ways of obtaining lignans as valuable metabolites [2]. Among biotic elicitors, fungal elicitors such as *Piriformospora indica* as arbuscular mycorrhiza-like fungi have resulted in significant enhancement in the production of phytochemicals in plant tissue cultures [3]. In this study, we perused the metabolite responses of *L. album* hairy roots to elicitor activity of different concentration of *P. indica* cell wall on lignans content. Hairy root cultures were obtained after genetic transformation of plant tissue with *Agrobacterium rhizogenes* strain LBA9402 [4]. Fungal Cell wall extraction was done upon De Pietro et al. (2009) [5]. In continue, 10 days hairy roots were supplemented by 0, 0.5, 1, 2.5 and 5% (v/v) of fungal cell wall filtrated (CWF) and growth and lignans accumulation were analyzed after 5 days of elicitation. Results showed that *P. indica* CWF with ratio 1% (v/v) induced the highest amount of PTOX and lariciresinolin the hairy roots 135.1 and 128.8 µg g^{-1} dry weight (DW) respectively. Although hairy root growth was decreased with the increase of fungal concentration in the media butthe greatest amount of MPTOX was observed in 2.5 % (v/v) of CWF (19 mg g^{-1} DW). As results described here, CWF can be considered for accumulation of lignans in the hairy roots. Also, our results mention potential on-demand metabolic engineering of lignan biosynthesis using differential fungal elicitors.

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OPTIMIZATION OF SAFFRON CELL GROWTH IN STIRRED BIOREACTOR

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The cell suspension cultures system as an attractive method is now using for production of secondary metabolites with application in pharmaceutical, cosmetic and additive industry. Cell cultures not only have a higher rate of metabolism than differentiated plants, but also have shorter biosynthetic cycles. Saffron (*Crocus sativus* L.) is the most expensive spice in the world and Iran is the biggest saffron producer with around 95% of world production.Nevertheless saffron has several proven medicinal properties;there is a limited application in related industries due to its high price. Some new technologies like*in vitro* tissue and cell culture have being developed to increase the amounts of valuable plant secondary metabolites and consequently reduction of price. Saffron is one of the promosing medicinal plants that can be considered for cell suspension culture system because of valuable its main constituents, crocin, picrocrocin and safranal. Along to this, application of bioreactors can give rise the cell biomass and metabolite production. The main purpose of this study was determination of possibility ofcrocin production via cell suspension cultures of *C. sativus* L in a stirred bioreactor. To that purpose the optimization of conditions for increament of cell biomass was investigated. After callus induction and establishment of the cell suspension culturesin B_5liquid medium in flask-shaker, inoculation was achieved in a 3-l stirred bioreactorat a rate of 1 to 10 (v/v), containing B_5 basal medium supplemented with 0.5 mg/l 2,4-Dand 0.3 mg/l Kinetin 3% sucrose. RPM and air flow was dramatically increased due to the cell growth in the medium from 50 to 95 and 500 to 800 ml/minrespectively. To trace the biomass increment, the sugar conception was determined daily. Results also showed that the cell biomass increased 5.5 times after six weeks. Crocin production from saffron cells derived from this system was also proved by thin layer chromatography (TLC) and spectrophotometry after ethanol extraction.

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THE EFFECT OF SEED BIO-PRIMING WITH *PSEUDOMONAS FLUORESCENT* ON GERMINATION AND SEED LINGINDICES OF CUMIN (*CUMINUM CYMINUM* L.)

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The optimum water use in agricultural production is especially important as one of the most important environmental factors affecting plant growth and development of medicinal plants, particularly in arid and semi-arid regions of Iran [1]. Cumin is one of the most important plants of the Apiaceae family that has many medicinal uses. Seed bio-priming as one method to enhancing seed quality, allows some of the metabolic processes necessary for germination is occur without actual germination. Primed seeds usually exhibit increased germination rate, greater germination uniformity, and sometimes greater total germination percentage [2]. In order to assess the effect of seed bio-priming with *Pseudomonas fluorescent* on germination and seedling indices of Cumin (*Cuminum cyminum*) an experiment was conducted as factorial using randomized completely design with four replications. Experimental factors were included bio-priming in five levels (bio-priming with four strains ofPf1, Pf2, Pf75 and Chaoof *Pseudomonas fluorescent* and hydro-priming) and three levels of drought stress (0, -3 and -6 bar imposed by PEG 6000). The results indicated that the influence of *P. fluorescent*,drought stress and their interaction was significant on germination percentage,germination rate, length vigor, weight vigor, mean germination time and coefficient velocity germination. The highestgermination rate (3.84 seed.d^{-1}), coefficient velocity germination (0.0967) and lowest mean germination time (7.80 d) from interaction the treatment ofPf1 anddrought stress 0 barand the most germination percentage (90.83), length vigor (6.40) and weight vigor (12.90)was obtained from interaction of Chao and drought stress 0 bar. Likely the bacteria of *P. fluorescent* has a wide range of plant growth promoting characteristics such as oxygen, salicylic acid, chitinase and hydrogen cyanide, which enhanced directly or indirectly plant growth. According to obtained results can indicated that seed bio-priming with *P. fluorescent* under drought stress conditions can improve germination and seedling indices of cumin and to be suggested as alternate treatment for enhancing germination and vigor of herb plants.

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STUDY ON THE TISSUE CULTURE OF MEDICINAL PLANT VAJ (*ACORUS CALAMUS*) IN IRAN

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Vaj (*Acorus calamus* L.) from the family Acoraceae is a herbaceous, perennial and semiaquatic plant are widely used in prevent and treatment of some diseases, health care and food industry [1]. *Acorus calamus* that grows naturally in tropical, subtropical and temperate region of Asia, Europe and North America, is considered as a rare plant in Iran [2]. Vaj propagates by rhizome only, because of the plant is a triploid species therefore the mas multiplication of plant by tissue culture is necessary. In this research liquid and solid medium MS supplemented with different concentration of auxins , 2-4, D, NAA, IAA, IBA (0/5, 1,2, 3 mgl^{-1}) and cytokinins , Kin,BAP(0/5, 1,2, 3 mgl^{-1}) in separation and in combination with together with 3 replicate were used. For sterilization the rhizome explant directly washed under running tap water for 30 minutes, disinfected whit detergent, sodium hypochlorite (1% w/v) and 70% ethanol. The best medium for regeneration of the species has been occurring in 1 mgl^{-1} Kin and 2 mgl^{-1} BAP concentrations. The optimal condition for producing root was obtained with 1 mgl^{-1} IBA. Additionally bud break was obtained faster in media 0.5 mgl^{-1} NAA in combination with 0.5 mgl^{-1} Kin. According to the result the solid medium is better than the liquid medium. The results are in accordance with other studies in the world [3].

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INHIBITORY ACTIVITIES OF UMBELIPRENIN AGAINST HUMAN A172 AND MOUSE GL26 COLON CARCINOMA CELL LINES

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Due to increased resistance to chemotherapy, phyto-derived agents have drawn attention of many scientists for treatment of cancer. Umbelliprenin is a Coumarin synthesized by many species of Ferula. In the present study, cytotoxic effect of Umbelliprenin on human A172 and mouse GL26 cell lines was investigated. The A172 and GL26 cells were cultured in RPMI-1640 medium supplemented with 10% FBS at a density of 5 × 103 cells/well, incubated at 37 °C for 24 h in the presence of 5% CO2. The cells were then treated with different concentrations of Umbelliprenin dissolved in DMSO (3.125, 6.25, 12.5, 25, 50, 100, and 200 µg/ml), and were incubated for 24, 48, and 72 h. Finally, the cell viability was measured by MTT assay, and the IC50 was calculated using GraphPad Prism 5 software. Umbelliprenin inhibited growth of both A172 and GL26 cell lines in a dose-dependent manner. With 95% confidence intervals, the least estimated concentrations of Umbelliprenin for growth inhibition of 50% (IC50) of the A172 cell lines, for 24-, 48-, and 72-h incubation times were calculated as; 51.87 (40.46 to 66.51), 38.79 (33.93 to 42.30) and 43.61 (35.97 to 52.88) µg/ml, respectively, and for inhibition of 50% of the GL26 cell lines as; 50.16 (41.96 to 59.97), 46.09 (40.78 to 52.10) and 51.50 (46.44 to 57.11) µg/ml, respectively. There was no significant difference between the IC50 values of three different incubation times in the case of both A172 and GL26 cell lines (P>0.05). It seems that Umbelliprenin can effectively inhibit the growth of the human A172 and the mouse CT56 colon carcinoma cell lines in a dose-dependent (but not time-dependent) manner. Also, a lower concentration of Umbelliprenin is required to prevent the proliferation of human A172 cell lines compared to the mouse GL26 cell lines. However, further studies are mandatory to understand the mechanism(s) underlying inhibitory effects of Umbelliprenin in future.

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COMPARISON OF ESSENTIAL OILS COMPONENT OF *SALVIA MACILENTA BOISS.* FROM IRAN, POPULATION KERMAN AND BALUCHISTAN

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Salvia macilenta Boiss. is an aromatic subshrub which grows wild in some parts of Iran (Kerman, Hormozgan, Baluchistan, and Yazd provinces) [1]. This plant is a member of the genus *Salvia* (Laminaceae) whose antioxidant activity and neuroprotective action has been shown previously [2]. In this study, *Salvia macilenta Boiss.* samples were collected from wild populations Kerman and Baluchistan Provinces in June 2014. The essential oils of two populations were isolated by hydrodistillation method. The chemical composition of the essential oils was examined by GC and GC–MS and then compared. The main ingredients in the Kerman sample were α-pinene (29.01%), p-cymene (10.67%), veridiflorol (9.08%), α-eudesmol (8.68%), bornyl acetate (7.31%) and borneol (4.86%) whereas principal components identified from Baluchistan spacemen were α-eudesmol (35.59%), α-pinene (7.67%), bornyl acetate (7.62%), E-nerolidol (6.49%) and veridiflorol (5.93%). The results showed that the diversity in the volatile compounds could be considered as chemotaxonomic importance and it may be attributed to their different ecological and geographical origin.

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COMPARATIVE EVALUATION OF FOUR TYPES OF SULFUR FERTILIZERS AND THIOBACILLUS BACTERIA ON ANTIOXIDANT ACTIVITY OF ESSENTIAL OIL OF *OCIMUM BASILICUM* L. BY FRAP AND DPPH ASSAY

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In the present study, we investigated the effects of four types of sulfur fertilizers and thiobacillusbacteria (sulfur Powderfertilizer which content 95% sulfur, granola bentonite sulfur which content 85% sulfur and 15% bentonite, thiobacillusgranola bentonite sulfur which content 85% sulfur and 15% bentonite with inoculation of thiobacillus bacteria, organic granola sulfur which content 40% sulfur, 20% bentonite and 40% organic matter) on antioxidant activity of essential oil of *Ocimum basilicum* L. by FRAP and DPPH assay. The examination was conducted as a factorial complete randomized block design (RCBD) with four replications. We observed a significant different ($P \leq 0.01$) among the fertilizer treatments, using thiobacillus granola bentonite sulfur had the most affect on increasing the antioxidant activity of *Ocimum basilicum* L. essential oil (IC_{50}=8.01 mg/ml), in DPPH assay,whereas the sulfur Powder fertilizer showed the less effect (IC_{50}=29.82 mg/ml), in FRAP assay. There were lower than that of synthetic antioxidant BHT (IC_{50}=13.47µg/ml) and vitamin C (IC_{50}=9.17µg/ml), in DPPH assay. Also we obtained a significant different ($P \leq 0.01$) among the methods (FRAP & DPPH). The results suggested that sulfur fertilizer with inoculation *thiobacillus bacterium* and organic matter was the potential source to increased the antioxidant activity of *Ocimum basilicum* L. essential oil.

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THE STUDY OF GERMINATION STAGE IN *CARTHAMUS TINCTORIUS* AND *CICHORIUM INTYBUS* L. UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Carthamus tinctorius* and *Cichorium intybus* L., this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 4 levels of salinity (control, 2 dS/m, 4 dS/m, 6 dS/m). The results showed that salinity levels hadn't effect on germination percentage, radical and plumule length and fresh weight. The increase of salinity did not reduce the germination percentage and radical and plumule length and fresh weight significantly. Since the classification of saline soils begins from 40 mM [1], so *Carthamus tinctorius* and *Cichorium intybus* L. can be known as a tolerant plant to salinity in germination stage.

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EFFICACY OF FOUR TRADITIONAL HRBAL MIXTURE AS AN ANTI-OBESITY SUPPLEMENT IN OBESE ADULT SUBJECTS; ARANDOMIZED CONTROLLED TRIAL

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Obesity and overweight are a critical public health problem, recognized by excessive fat gain [1]. Worldwide, many natural products for treatment of obesity and weight loss have been used [2]. It seems natural supplement usage, based on traditional plants is a safest approach for obesity and recent experiments revealed many herbal medicinal products as a useful treatment of obesity [3]. In this study, we used an herbal formulation consist of four traditional plants including Origanum vulgare,Carum carvi, *Trachyspermum copticum* and *Ruta Graveolen*. A 12-week clinical trial, double-blind and randomized placebo-controlled study were undertaken in adult obese subjects.Sixty-eight subjects were randomly assigned into two groups of placebo (n = 34) and treated (n = 34). Anthropometric indices, dietary intake and biochemical parameters were measured at baseline and after the intervention. The results indicatedbody weight, BMI and body fat composition in treatment group was significantly lower than control ($p< 0.05$). Moreover,there was significant reduction in TC, LDL-c and TG in the herbal supplement group as compared to the placebo($p< 0.05$).The supplement was generally well tolerated and no remarkableadverse events were reported in treated group.In conclusion, this herbal mixtureeffectively reducedbody weight and fat mass in adult obese subjects.It also showed potential efficiency in controlling lipid profile level in obesity individuals.

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STUDY IMMUNOMODULATORY ACTIVITY OF ACETONE EXTRACT OF *ASTRAGALUS VERUS (RASHA GAVAN)* IN NMRI MICE

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Astragalus verus Olivier (rasha gavan), has been used as an immuno promoting remedy in Kurdish ethno medicine, Asia (traditional medicine) and aim of present survey was to determine of the effects of immunomodulatory activities of acetone extract of A. verus in a mice model. Animals injected with the acetone extracts (5, 10 and 20mg/kg) of Astragalus verus Olivier, intra peritoneal ,and Hem agglutinating antibody titers of serum, as a factor of humeral mediated immunity were investigated at days 0 and 14 .Also, Footpad swelling test was used to determine delayed type hyper sensitivity (DTH) for cell mediated immunity in animals that received extract via gavage. It was found that the acetone extract (5, 10, 20 mg/kg) of *Astragalus verus* Olivier (Rasha gavan) did not appear to have hem agglutinating activity on SRBC, indicating that this extract have not Lectin-like activity. Moreover, the DTH reaction promotes on 14 days after administration of 10mg/kg ($p<0.05$). of *Astragalus verus* Olivier (Rasha Gavan), showing the CMI response of the extract. In this study, by attention to the above lines, we could conclude that *Astragalus verus* Olivier has the potential in vivo immunomodulation activities and these new findings support our pervious in vitro studies.

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EFFECTS OF NITROGEN AND IRON FERTILIZERS ON PLANT GROWTH CHARACTERISTICS AND ESSENTIAL OIL PRODUCTION OF BASIL (*OCIMUM BASILICUM* L.)

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Essential oil derived from basil has traditionally been used for a wide range of applications such as cooking spices, aromatherapy, perfumery, medicinal treatments, pesticides, and food preservatives [1]. Iron is a cofactor for approximately 140 enzymes that catalyze unique biochemical reactions [2] and is an essential element for growth of plants. Nitrogen is one of the major nutrients in fertilizers and key factor controlling crop growth and productivity [3]. A balanced fertilization program with macro and micronutrients in plant nutrition is very important in the production of high yield with high quality products [4]. In this study, application of nitrogen and foliar application of iron on growth characteristics, fresh and dry weight of foliage and essential oilcontent and yield was investigated. Various concentrations of nitrogen (0, 60, 120, 180 $kg.ha^{-1}$) and iron (0, 2, 4 $mg.l^{-1}$) were applied three times starting from about 2 true leaf stage with 15 days intervals. Factors including number of lateral branches, number of nodes, plant height, fresh and dry weight, essential oil content and total essential oil production were studied. Results showed that nitrogen and iron applications significantly influenced on above mentioned characteristics. The highest contentof essential oil i.e. 0.84% was recorded in 2 $mg.l^{-1}$ ironfollowed by the combination of 2 $mg.l^{-1}$ iron plus 180 $kg.ha^{-1}$nitrogen (i.e. 0.79%) compared to 0.51% essential oil in control treatment, and the highest fresh and dry weight was recorded in 2$mg.l^{-1}$ iron in combination with 180 $kg.ha^{-1}$ nitrogen. Also the combination of 2$mg.l^{-1}$ iron plus 180 $kg.ha^{-1}$nitrogen resulted in highest total essential oil production. Collectively the results showed that the best treatment for highest vegetative growth leading to high fresh and dry weight and essential oil production achieved in2$mg.l^{-1}$ iron in combination with 180 $kg.ha^{-1}$nitrogen.

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ANTIBACTERIAL EFFECT OF HONEY AGAINST *E. COLI* STRAINS WITH INCREASED EXPRESSION OF ACRAB_TOLC PUMP

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Honey is a unique food product that contains bioactive compounds derived from bees and plants. This bio active compounds can be associated with antimicrobial activity and have the ability to destroy or inhibit the growth of some pathogenic microorganisms. The purpose of this study is to evaluate the antimicrobial effect of several Iranian honey against E.coli strains with increased expression of AcrAB_TolC pump. Three samples of Seder, Gavan and Avishan honey were prepared from Kohgiluyeh and Boyer Ahmad Province. The antibacterial properties of honey were determined by serial dilution in LB broth and various concentration of honey in LB agar. In this study, Gavan honey in a dilution of 80% has the greatest impact on *E.coli* strains with increased expression of AcrAB_TolC pump., that this effect can be ascribed to compounds such as H2O2 and Antioxidants [1].

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EFFECTS OF FOLIAR APPLICATION OF GA_3 ON PLANT GROWTH CHARACTERISTICS AND SEED PRODUCTION OF MEDICINAL PUMPKIN (*CUCURBITA PEPO* VAR. STYRIACA)

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The seeds of medicinal pumpkin (*Cucurbita pepo* var. styriaca) are considered as valuable raw material in pharmaceutical industry. Extracted oil from the seeds is used to formulate prostatic hypertrophy drugs and can be beneficial source of oil for human diet [1,2]. One of the main challenges in production of medicinal pumpkin is modest yield of harvested seeds and therefore improvement of growth conditions leading to higher seed production is prioritized. Gibberellins regulate developmental processes such as stem elongation, leaf expansion, sex expression and productivity of various crops [3]. In this study, foliar application of GA_3 on growth characteristics and seed production was investigated. Various concentrations of GA_3 (0, 50, 100, 150 mgl^{-1}) were applied three times starting from 2 to 4 true leaf stage with 20 days intervals. Factors including internode length, stem diameter, 100 seed weight, seed yield were studied. Results showed that GA_3 application significantly influenced on above mentioned characteristics. The highest values on all studied factors (except internode length) were recorded in 50 mgl^{-1} GA_3. Yield of seed in this treatment was reached to 1140 kg/ha compared to 753 kg/ha in control treatment.

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BIOTECHNOLOGICAL SYNTHESIS OF SILVER NANOPARTICLES OF *HELICHRYSUM ARMENIUM* FLOWERS EXTRACT

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Since some plants have good ability in heavy metal accumulation and detoxification, they are suitable choises for nanoparticle synthesis. Synthesis of silver nanoparticles using plant extracts is beneficial as an economical, energy efficient, low cost and supplemented to that it protecting human health and environment leading to lesser wast and safer products [2]. Asteraceae family is the one of the great families of the nearly one handred seventy genus and thousands species [1]. The genus *Helichrysum* is represented in Iran by nineteen species.This genus is one of the most important enera of the Asteraceae family [3]. In this study, the plant material (aerial parts) was collected in Khalkhal – Ardabil road area, at an altitude of 1650 m in Northwest of Iran.Plant materials were air dried and to develop a simple rapid procedure for biologically synthesis of silver nanoparticles (AgNPs) using methanol extracted of *Helichrysum armenium*, the synthesized of nanoparticles were characterized by UV- visible spectrotometry, Xray diffraction (XRD) showed that the particle are crystalline in nature with a face centered cubic structure, scanning electron microscopy (SEM) showed the formation of silver nanoparticles with a mean size of 53.33 nm, transmission electron microscopy (TEM) showed the formation of silver nanoparticles in the 41.27-69 nm range and average 53.33 in size. And Fourier transforms infrared (FT-IR) spectroscopy.The approach of phytosynthesized silver nanoparticles using H. armenium appears to be cost efficient, eco-friendly and easy alternative to conventional methods of synthesis.

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ALTERATIONS IN ESSENTIAL OIL CONSTITUENTS OF *SALVIA OFFICINALIS* SUBJECTED TO VARIOUS LEVELS OF DROUGHT STRESS

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Environmental stresses such as water scarcity induce particular secondary metabolite pathways. Plants produce different types of secondary metabolites to improve their performance upon exposure to biotic and abiotic stresses. *Salvia officinalis* is one the most common medicinal and aromatic plant species belonging Lamaiceae, native to the Mediterranean region, although it has been naturalized in many places throughout the world mainly because of its high medicinal value [1]. This study examined the effects of various drought stress levels, *i.e.* 20% (W_1), 40% (W_2), 60% (W_3) and 80% (W_4) water depletion of field capacity (FC) on essential oil constituents of *S. Officinalis* plant under greenhouse conditions. Essential oils were obtained by hydrodistillation method and analyzed using GC and GC/MS apparathus. Data were subjected to analysis of variance in a completely randomized design (CRD) with three replications. The results showed that essential oil of aerial parts of plant predominantly consisted of monoterpenes such as 1,8-cineol, *cis*-thujene, camphor, borneol and *trans*-thujon. The content of these compounds significantly varied among different employed treatments. The highest content of 1,8-cineol (34.2%) and *cis*-thujene (24.6%) were observed at W_3 stress treatment. However, maximum value of camphor (28.4%) and borneol (24.8%) were achived under W_2 condition. Furthermore, maximum (25.5%) and minimum (18.9%) content of *trans*-thujon were obtained at W_3 and W_1 drought stress subjected plants, respectively. The biosynthesis of monoterpenes occurs in glandular trichomes of the leaf surface [2]. It has been reported that the higher density of non-glandular and glandular trichomes under stress conditions could be related to water conservation and high amount of essential oil conetnts in medicinal plants [3].

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ACCUMULATION OF PODOPHYLLOTOXIN IN *LINUM ALBUM* HAIRY ROOTS IN PRESENCE OF *PIRIFORMOSPORA INDICA* AND METHYLJASMONATE

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Podophyllotoxin (PTOX) is a aryltetralin lignan and used for the preparation of the anticancer agents: etoposide, etopophos and teniposide which show effects against several types of neoplasms [1,2]. *Linum album* is a medicinal plant that is known due to have PTOX and related lignans [3]. In present research, we investigated PTOX accumulation in hairy roots of *Linum album* co-cultured with arbuscular mycorrhiza-like fungus of *Piriformospora indica* (Strain: AVPI-1) in presence of methyl jasmonate (MeJA). In order to, fungal mycelia at ratio 2.5 % (v/v) and 0.01 mM MeJA were added to hairy roots culture on 12th day of their cultivation and PTOX accumulation was assayed at the determinated time-course (24, 48 and 72 hour after feeding) by HPLC. The results showed the co-cultured roots with fungus observed PTOX content in the hairy roots (138.7 µg g^{-1} DW), after 24 hours. Although the elicitation of the hairy roots with MeJA enhanced the PTOX content about 1.6-fold compared with co-cultured media but combined MeJA with co-cultures root and fungus increased PTOX accumulation about 222 µg g^{-1} DW. Furthermore, the secretion PTOX to media was increased in the co-cultured media and elicited co-culture media. Moreover, the PTOX content was observed 1.3 mg l^{-1}, in the hairy root media after 72 h of co-culture with the fungus. But in the elicited co-culture media the amount of PTOX was tiny. It seems fungus over time, with increasing cell membrane damage, induced plant defense responses that led to the dramatic extracellular release of PTOX. This can be used as technology in industrial systems using bioreactors to mass production this important medicinal metabolite.

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STUDY OF NUTRITION VALUE OF *ACACIA OERFOTA* SEEDS AND OIL FATTY ACID COMPOSITION BY GC/MS METHOD

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Acacia is a genus belonging to the Fabaceae family and comprises about 135 species of trees which are widely spread throughout the arid and semi-arid tropics [1]. *A. oerfota*, commonly known as acacia belongs to the sub family Mimosoideae. It is a small shrub 1-2 m tall with a flattened top, hence triangular funnel-shaped in vertical profile and with numerous grey branches starting from soil surface. Flowers are whit and very fragrant. Pods are flat elongated-ellipsoid in shape and 5-10 cm long by 1.2-1.3 cm wide. Each pod contains 5-10 seeds with an olive-green color and greasy texture [2]. The seeds of some *Acacia* species were reported to be used as food and have been assessed for nutritional compositions and were shown to contain considerable amount of oil [3]. Literature survey revealed that there was no phytochemical investigation on *A. oerfota* seed oil worldwide. Hence the current study includes extraction and characterization of *A. oerfota* seed oil to evaluate its oil potential and explore a new source of fatty acid for nutritional purposes. A.*oerfota*seeds were collected in August 2014 from Sarkhun village, Bandar Abbas, Hormozgan Province, Iran. Specimen was identified by R. Asadpour and voucher was deposited in the Herbarium of Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University (IAUPS). Tehran under code number 417-PMP/A. Oil extraction was performed with a soxhlet apparatus using *n*-hexan as the solvent. Fatty acid methyl esters of the extracted oil were prepared according to the method previously reported by Metcalfe et al. GC/MS was performed todetermine the composition of the oil. In this study, the chemical profile of *A. oerfota* seed oil native to south of Iran was determined. The oil extracted was viscous and yellow-green in color with the total oil content of 4.3%. The oleic acid (65.2 %) was found to be in maximum in A.oerfota seed oil Followed by palmitic acid (12.4). the present study revealed that the seed oil of *A. oerfota* growing in south of Iran could be a new source of high oleic acidrich edible oil and its full potential should be exploited. The use of oil from the seeds is of potential economic benefit to the poor native population of the areas where it is cultivated. Hence the seed oil of *A. oerfota* could be a new source of edible vegetable oil after the future toxicological studies.

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THE ANTIOXIDANT CAPACITIES AND TOTAL PHENOLIC CONTENTS OF PLANTAIN (*PLANTAGO LANCEOLATA*) ULTARASOUND ASSISTED EXTRACTS IN IRAN

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Plantain is a herbaceous herb belonging to the family Plantaginaceae and vastly grows in Europe, north and central parts of Asia. This plant grows in almost all regions of Iran. Overall, the reported effects of this plant include: anti-Alzheimer's disease, anti-arthritic, anti-atherosclerosis, anti-bacterial, anti-cancer, anti worm, anti-fragility of blood vessels, anti-edema, anti-inflammatory, anti-oxidant, anti-fever, anti-rheumatic, anti-fungus Candida, antiseptic, anti-tumor, anti-cough, anti-internal wounds, astringent, opening the bronchi, laxative, mosaic, food digestion, diuretic, mucus, liver protective, immune stimulant, milk increase, decreasing fat, uterine tonic, secreting of uric acid in the urine and treating wounds (1). Ultrasound-assisted extraction is simple and advanced among the extraction methods for extracting the active ingredients from natural substances. This method has many advantages such as simplicity, low cost, and increase in efficiency and it can also be used with any type of solvent extraction. In this study, we investigated the herb *plantain*. Extract was prepared using two methods: classical method and ultrasonic wave method. Folin-Ciocalteu method was used to measure the amount of phenolic compounds. Then antioxidant properties was carried out by two tests: Trvlks (TEAC) and Radical Scavening Capacity with 2,2- D Fnyl1- Pykryl Hydrazyl (DPPH), where all mechanisms are based on electron donation. The result indicated that the plantain plant has high antioxidant properties that increase its use in traditional medicine. Also when was used the ultrasound to extract the active compounds, not only the amount of phenolic compounds in the juice increased but also the amount of antioxidant activity by DPPH and TEAC methods are significantly higher than the extract in the classical method. Accordingly, the antioxidant activity based on TEAC increased from 735 to 768 micromoles Trvlks per grams extract and based on DPPH it showed increase from1836 to 1902 micromoles Trvlks per gram of extract. This study clearly demonstrated that plantain extract exhibits significant antioxidant activity when UAM was used as an extraction method.

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ANTIBACTERIAL EFFECT EVALUATION OF METHANOL EXTRACT LICHENS PHYSCIA CAESIA, COLLEMA CRITATUM AND ALTHAEA OFFICINALIS PLANT COLLECTED IN ILAM ON SOME PATHOGENIC BACTERIA

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Having side effects of chemical drugs, the use of herbal medicines is growing[1] Althaea officinalis plant mallow dark as anti mucuc and softener respiratory tract used flowers and roots this plant as anti disinfection dermal wounds traditional consumption[2]. Lichens produce secondary.metabolites the "lichensubstances", which comprise depsides, depsidones,dibenzofurans, xanthones and terpene derivatives. Lichens and their metabolites havemanifold biological activity: antiviral, antibiotic, antitumor,allergenic, plant growth inhibitory, antiherbivore,ecological roles and enzyme inhibitory the purpose of this study antibacterial effect evaluation of methanol extract lichens physcia caesia, collema critatum and althaea officinalis plant collected in ilam on some pathogenic bacteria. Lichens and A. officinalis plant collected from different parts of Ilam province methanol extract which were prepared using the soxhlet device extracts. The alcoholic extract lichens (physcia caesia, collema critatum) and Althaea officinalis their antibacterial activity at 5different concentrations (25, 50, 100,200,400, mg/ml) was determined by disk-diffusion agar method and the dilution method on، pathogenic (E. coli, P. aeroginosa ,V. cholera, Bacillus cereus Staphylococcus aureus, Klebsiella pneumoniae,Listeria monocytogenes,Salmonellatyphi . The antibiotics Tetracycline and Gentamicin and Erythromycin as a positive control and dimethyl sulfoxide(DMSO)10% was used as negative control and the MIC and MBC were determined . The results of this study showed that were no statistically significant differences in V. cholera in different Althaea officinalis L concentrations and E.coli least sensitive ratio Althaea officinalis L. The results showed of bacteria P. aeroginosa highest sensitivity and Listeria monocytogenes least sensitive ratio Physcia caesia, and V. cholera cerotype ogava Most sensitive and Bacillus cereus lowest sensitivity ratio lichen Collema critatum. amount MICand MBC respectictively for Althaea officinalis L, 200 mg/ml ،400 mg/ml) and for Physcia caesia, 100 mg/ml ،200 mg/ml and for Collema critatum. respectictively100 mg/ml، 400 mg/ml).Extrac the lichens(Physcia caesia, Collema critatum) and Althaea officinalis L can be used as antibacterial as products used in the treatment of infections Caused by bacteria.

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BIOSORPTION OF CADMIUM AND LEAD IONS FROM AQUEOUS SOLUTION BY LICHEN PHYSCONIA DISTORTA

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Lichens as one of the most valuable biological screens for heavy metals consider and can be used as sensitive in dicators sensitive used. It has been shown The absorption On the surface Lichens production Secondarycompoundssuch asacetic acidParityn linked. That can bind to metals [1] .Cadmium and lead are the most toxic heavy metals due to a strong tendency to accumulate in organisms Significant threat to the environment and human health [2]. In this study, the biosorption of cadmium and lead ions onto the dry biomass of lichen physconiadistorta. Lichens collected from different parts of Ilam province The lichen physconiadistorta was first Then clean, washed two times with tap water, and finally washed three with distilled water without ions before theywere isolated in pieces 0.1-0.4 mm in diamete. For non-activation of samples for 8hours in the at 30 degrees were. In all the experiments, distilled water was used to which knownamounts of cadmium and lead ions were added before the lichen were introduced into the solution. The metal ionconcentrations in the solution were measured using the atomic absorption spectrophotometer before and after themetal came into contact with the lichen**.**The time required for the biosorption of the metal cadmium equilibrium was 65 minutes and for lead ions 90 minutes indica. The optimum pH for the adsorption of cadmiu and lead, 5 *and* 7 respectively. The adsorption capacities using the Langmuir isotherm were determinedcadmium and lead metals by lichen mentioned 50 and 48/6 mg /g, respectively. The optimum treatment sorption and 20°C was shown. These results indicated that the lichen physconiadistorta can be an excellent candidate to remove cadmium and lead ions from aqueous solution.

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THE EFFECT OF POLLINATION BY HONEYBEE ON SEDD PRODUCTION Of FENNEL (*FOENICULUM VULGARE* MILL)

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Bees are the main animal pollinators of crops, worldwide. Up to 35% of food crops production in the world depends on animal pollinators, including honeybees [2]. The increasing effect of bee pollination on crop yield has been previously reported on many crops [1], but information on the role of pollination by honeybee (*Apis mellifera*) to increase fennel yield is lacking. The main aim of this study was to evaluate the efficiency of pollination by honeybee on fennel seed production. Five ecotypes of fennel previously collected from different regions of Iran plus a European genotype were planted in the field according to a randomized complete block design. In spring, plots were isolated by net cages, then a beehive containing 2000 bees was placed in each cage to be used for pollination. The analysis of variance showed that mean squares of ecotypes for all of the studied traits were significant. The results showed that the number of seeds per each umbel, seed numbers per each umbellet and seed weight in each umbel in fennel populations were respectively 2.34, 2.62 and 2.67 times higher in the presence of the pollinators compared to those lacking the pollinators (umbels covered for self-pollination). There were significant differences among the ecotypes for the number of seeds per each umbel. Also, there was significant interaction between the ecotype and pollination type for all the traits except for the number of umbellets per umble. The highest number of seeds per umbel was observed in Varamin (181.2) and Yazd (67.9) for bee-pollinated ecotypes and those self-pollinated, respectively. Varamin had the highest number of seeds per umbellet (8.2) and Shiraz was among the ecotypes with the lowest number of seeds per umbellet (2.3). It is concluded that pollination by honeybees could increase the crop yield and probably essential oil of fennel.

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THE PHYLOGENY OF TRIBE PERSICARIEAE (POLYGONACEAE) BASED ON CHLOROPLAST *MAT*K GENE

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Tribe Rumiceae belongs to Polygonoideae subfamily in the Polygonaceae family. This tribe include four genera: *Bistorta*, *Aconogonon*, *Koenigia* and *Persicaria*. *Persicaria* is the largest genus in the tribe. In this study, phylogenetic analyses, based on chloroplast matK gene, were performed on 16 taxa consisting of 12 *Persicaria* species, 1 species of *Bistorta*, *Aconogonon* and *Koenigia* as ingroups plus one species of *Persicaria*, as outgroup. The matK gene was amplified using appropriate primers by PCR and automated DNA sequencing in the cycle sequencing reaction mode. In next step, the sequences were edited and aligned with Muscle program, and followed by manual adjustment. Phylogenetic analyses were performed based on the Maximum Parsimony, Bayesian and Maximum Likelihood methods, as implemented in the PAUP*, MrBayes and RAxML softwares, respectively. In the analyses, supports for clades were evaluated by posterior probability and bootstrapping. The result revealed that *Koenigia islandica* and *Aconogonon alpinum* formed a clade with high support (MP/ML/PP = 99/99/1.00), and *Bistorta major* was strongly (99/96/1.00) linked with them. Within *Persicaria* there appears to be a deep split between *P. amphibia* and the remaining species; all of *Persicaria* species formed a well supported clade (100/100/1.00) that *Persicaria amphibia* is first branch and sister to them (100/100/1.00).

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SECRETORY STRUCTURES IN ROSEMARY (*ROSMARINUS OFFICINALIS* L.): DISTRIBUTION, TYPE AND ACTIVITY DURING LEAF DEVELOPMENT

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Although Rosemary (*Rosmarinus officinalis* L.) leaf is touted for its ability to essential oil production and high commercial value in food industry [1], perfumery and pharmaceutical compounds [2, 3], no data exists on its anatomy and secretory structures in relation to development. Light microscope studies were performed on Rosemary leaf in relation to the organ development. Leaves were collected from Eram Botanical garden of Shiraz University. Apical bud and four successive stages of leaf development were double fixed in glutaraldehyde and osmium tetroxide, embedded in resin and 2µm thick cross sections were stained with toluidine blue. Dermal, vascular and ground tissue systems were respectively differentiated from transitional tissues. Leaf developmental changes were mainly: thickening of the cuticle on adaxial surface, increase in the number of stomata on abaxial surface, expansion of the intercellular space in mesophyll and differentiation of collenchyma. Three kinds of glandular trichomes, i.e, peltate, capitate and conoidal and two types of non-glandular trichomes, branched and unbranched, were observed on both leaf surfaces. All kinds of trichomes initiated and differentiated from the early stage of leaf development. The density of trichomes decreased with leaf maturity. The highest density and secretion activity of trichomes were confined to the emerging leaf. The antioxidant and antimicrobial property of oil can corresponded with the density of glandular trichomes and their secretory activity during leaf development, so this stage is can be suggested for the best essential oil production and medicinal use of this popular herb.

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THE EFFECT OF DRYING METHODS ON MEDICINAL PROPERTIES AND FINANCIAL EXPENSES OF PRODUCTION OF MEDICINAL PLANTS DRY EXTRACT

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Rosemary (*Rosmarinus officinalis*) is a member of Lamiaceae family. This plant is one of the most useful medicinal plants because of its numerous medicinal properties such as anti-inflammatory, antibacterial, antidiabetic, antitumor, cytoprotective and hepatoprotective properties [1]. Rosemary is used in medicinal field in the forms of herbal tea, soft extract and dry extract. Dry extract in compared with soft extract has more advantages in industrial purposes such as high stability, easier to handle, standardise, transport and storage [2]. Freeze drying, vacuum tray drying and spray drying are most common methods for producing rosemary dry extract. Choosing unsuitable drying method can influence final quality of finished product in terms of pharmaceutical and increasing current and fixed costs of it in industrial scale. Therefore, in this study these drying methods were studied in their effect in final amount of total flavonoids of rosemary dry extract and financial expenses. Rosemary soft extract (produced according to British Pharmacopeia) was used as primary substance for drying in freeze dryer, vacuum tray dryer and spray dryer in laboratory scale. Time of each process was recorded and finished product's total flavonoid contents were measured according to a modified method based on Rolim et al. [3]. For financial calculations, acquisition cost of freeze dryer, tray vacuum dryer and spray dryer in industrial scale were estimated by using market price. In addition, their current expenses were calculated in cost accounting by calculating the time of drying, labor cost and the cost of electricity. The results were compared together and finally, the best method of drying in terms of quality and cost was determined.

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EVALUATION OF BIOACTIVE COMPOUNDSIN DIFFERENT POPULATIONS OF *PRANGOS FERULACEA* (L.) LINDL.

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Prangos ferulacea (L.) Lindl. (Jashir in Persian) is a medicinal plant, native to southern Iran and used in traditional medicine for many disorders. In traditional medicine, *P. ferulacea* has been used in pain relief, inflammation, diabetes recovery, and fight against various microorganism including bacteria and fungi. Arial parts of this plant are highly valuable for animal feeding [1]. *P. ferulacea*leaves were collected in May 2015 from natural habitat in Isfahan (Daran, Fereidun shahr) and Kohgiluyeh-v-boyerahmad (Margoon, Gorgue, Dishmook).This study have been conducted to evaluate the diversity of *P. ferulacea* populationsusing morphological, and phytochemical properties. These properties are due to their many active phytochemicals such as phenolic compounds, flavanoids, terpenoids and carotenoids [2; 3]. Phenolic, flavonoid and antioxidant activity offive *P. ferulacea* population were evaluated. Total phenolic content of leaf extracts varied from 22.23 (Daran) to 113.52 (Margoon) mgTAEg $^{-1}$DW. The similar trend obtained for total flavonoid content. Antioxidant activity of leaves was assessed using two food model systems including DPPH, and reducing power. Leaf extractsin Margoon province showed higher radical scavenging activity (78%) as compared to other populations and BHT. In overall, *Prangos* populations collected from Margoon revealed higher phenolic content, and antioxidant activity. *Prangos* ecotypes collected from Fereidoonshar (Isfahan) possessed the highest morphological traits. Probably that low temperature and more appropriate environmental conditions in the Margoon province affected on Phenolic, and antioxidant activity in this ecotype.

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ANTIOXIDANT ACTIVITY AND TOTAL PHENOLIC CONTENTS OF METHANOL EXTRACT LICHENS *MEGASPORA RIMISOREDIATA, PSORADECIPIENS* IN ILAM

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Oxidative stress can lead to the production of free radicals which may cause many degenerative diseases. These free radicals can be eliminated with the help of antioxidants which may be of a natural origin [1, 2]. The aim of this study was to examine the antioxidant activity Total Phenolic Contents of two lichens Megaspora rimisorediata, Psoradecipiens in Ilam. Lichens collected from different parts of Ilam province methanol extract which were prepared using the soxhlet device extracts. The antioxidant activity of different concentration of methanolic extracts of lichens was determined with analysed by five different parameter. DPPH radical scavenging activity, total antioxidant activity, reducing power ability, flavonoid and phenolic content.The antioxidant activities of extracts were evaluated with 2,2-dipheny1-1-picryl hydrazyl (DPPH) method and the results were compared with synthetic antioxidant BHT. Statistical analysis was carried out using the SPSS software, version 16. total phenolic Then contents and total flavonoid cotents were determined using spectrophotometer. The DPPH radical scavenging 16.41% , 39.2% for methanol extracts of Megaspora rimisorediata, Psoradecipiens respectively. and for reducing power measured of absorbance varied from 0.285, 0.395 methanol extracts of Megaspora rimisorediata, Psoradecipiens respectively. Total phenolic content of tested extracts of Megaspora rimisorediata, Psoradecipiens were 11.45 ±1/045, 44.77 ±0/581 µg tannic acid equivalent (mg TAN/gdry sample) Megaspora rimisorediata, Psoradecipiens respectively and flavonoid content extracts 21.56±0/453 and 34/67±0/741 µg quercetine quivalent (mg QE/g dry sample) Megaspora rimisorediata, Psoradecipiens respectively. Result study showed that tested lichen extracts demonstrated a strong antioxidant and amounts of phenolic comoundes. That suggest that lichens may be used as as possible natural antioxidant for food and pharmaceutical industry.

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ANALYSIS OF CHEMICAL COMPOSITION IN *HYPERICUM PERFORATUM* L. FROM IRAN AND ITS PESTICIDAL EFFECTS AGAINST THE RED FLOUR BEETLE

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In some countries, essential oils isolated from aromatic plants are used customarily and commercially through fumigant action to protect grains against storage pests (Isman 2006; Isman et al. 2011; Zarubova et al. 2015). Aerial parts of *Hypericum perforatum* L. (Hypericaceae) were collected from its wild populations in Iran, aiming to investigate the chemical composition along with fumigant toxicity and feeding detergency against the adults of red flour beetle, Tribolium castaneum Herbst. *H. perforatum* essential oil was obtained by steam distillation and analyzed by GC-MS. The yield of essential oil obtained 0.45% based on dry weight. Fourteen components were identified in the essential oil that characterized by the following main constituents: decane (59.58%), dodecane (12.93%), ethylcyclohexane (6.84%), 5-methylnonane (4.71%), 3-methylnonane (4.32%) and tetradecane (3.82%). Results of fumigant toxicity showed that the essential oil of *H. perforatum* has very toxic and its toxicity depended on essential oil concentrations and exposure time. *H. perforatum* can be an natural alternativeto harmful chemical insecticide in the integrated management of T. castaneum.

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EVALUATION THE EFFECT OF CONSUMING IRANIAN WALNUT ON IRON ABSORPTION AND IRON CARRIERS SERUM LEVELS

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Iron is an important element in human body which exists in the structure of hemoglobin, myoglobin, coenzymes such as catalase and peroxidase. Iron deficiency leads to disorders in many aspects of human health including reduced physical and mental ability in working, reduced antioxidant enzymes activity and creating oxidative stress in the body. Based on estimations by World Health Organization, iron deficiency anemia is frequent among adolescents. Use of medicinal herbs to cure diseases has been prevalent in human communities since old times. Given the unwanted side effects of some chemical medicines, more focus on potential effects of medicinal herbs on the functions of different parts of the body is justified. Walnut with a particular place in human nutrition is important, thus in this study, the effect of using walnut on iron absorption in boys (15-18) has been considered. 15 people were randomly chosen as experiment sample and first stage of blood taking from each person as much as 5cc was performed. Then each person was given 75g of walnut per day for one month. Then second stage of blood taking was conducted too and all blood samples of both stages were transferred to laboratory in the least of time. Using special kits levels of serum iron, ferritin and transferrin (TIBC) were obtained. Serum saturated transferrin was obtained using this formula (serum iron ×TIBC +100) then results were analyzed by paired t test. Statistical analysis indicated that taking walnut for one month increased serum iron, ferritin serum and serum saturated transferrin at a significant level ($P<0.001$). Also serum(TIBC) transferrin decreased at a significant level ($P< 0.001$). Based on results obtained, using 75g walnut per day for one month can lead to more iron absorption and increased serum iron and iron carriers in the body.

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A CASE REPORT ON REVERSAL OF LIVER ENZYMES ABNORMALITIES IN A PATIENT WHOM TREATED WITH THE COMBINATION OF THREE KNOWN MEDICINAL PLANTS

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The use of medicinal plants has been increasingly grown in the whole of the world during the last decades for treatment of liver diseases. In this regard, some of natural based medicines with hepatoprotective effects such as *Cichorium intybus* (CI), *Silybum marianum* (SM) and *Ziziphus vulgaris* (ZV) have merit to use them for treatment of liver disorders [1-2]. In this present study we report a case of a middle aged man who effected by hepatitis C like syndrome and presented with increased levels of serum enzymes of AST and ALT and after 4 weeks of taking the combination of CI , SM and ZV his enzyme markers for detection of liver injury were reversed to near normal levels. A 46 year old man who affected by hepatitis C like symptoms and got used to smoking and without any prescription medication and initially presented with average increase of AST and ALT enzymes of 69.2 ± 8.52 and 80.0 ± 14.46 IU/L, respectively was started on taking the combination of treatment of CI extract (240 mg /kg of body weight /day), SM pulverized seeds (5.5 mg/kg of body weight /day) and ZV(167 mg/kg of body weight/day) which continued for 4 weeks. After this period all herbal medicines were discontinued except with CI `s which followed by another one month treatment. At the end of this period, the patient was referred to lab and blood samples taken. The samples were then centrifuged at 3500 rpm and the activity of AST and ALT were measured spectrophotometrically at 340 nm based on IFCC method [3]. The results of this study showed that; there were seen a significant reduction in serum enzymes of AST and ALT in the patient whom received together the combination of CI, SM and ZV. The results revealed that the increased level of AST and ALT in this patient efficiently reduced to values of 46.0 ± 4.24 and 47.0 ± 2.83 IU/L, respectively. Since a single drug cannot be effective for all liver disorders based on this study we can conclude that combination therapy of these medicinal plants seem to have proper efficacy to cure some liver diseases and will pave the way for development of new drugs.

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STUDY ON MEASURING THE TOTAL PHENOLIC CONTENTS IN INFUSIONS MADE FROM IRANAIN GREEN AND BLACK TEAS

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Green and black teas comprise of rich compounds of phenols, flavonoids and tannins and their valuable components through infusion process can be released from their matrix and in this direction put protective effect in treatment of some chronic, inflammatory diseases and also may be beneficial for prevention of development of some cancers[1, 2]. It is obvious the time of brewing may affect the total phenol amount in infusions made from these kinds of tea and accordingly the antioxidant effects and the relevant properties will be changed [3]. The aim of the present study was to determine the total phenol contents in infusions made from two kinds of Iranian teas which are most popular and their consumption have been increasingly grown recently. Samples of green and black Teas were provided by Lahijan city. Then, they were measured for their dry weight and a 5/100 concentration (w/v) was made for each of tea samples and serially diluted. The diluted samples were analysed for total phenol amounts using Folin- Ciocalteu reagent and in accordance with Singleton and Rossi `s method [4]. The total phenol amount was finally obtained based on Gallic acid for each gram of dry weight in different infusion times which were ranged from 3 to 60 minutes. The most amount of total phenol obtained from green tea infusion (GTI) and black tea *infusion (BTI)* had been in times of 18 and 36 min., which were equalled to 39.06 ± 0.78 and 21.56 ± 0.29 mg GAE / g of dry weight, respectively. Based on this study, we can conclude that the oxidazable phenol groups released from GTI and BTI within 18 and 36 minutes of brewing are linear and the resultant antioxidant activity of GTI significantly higher than the other one.

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JASMONATE IS INVOLVED IN THE SIGNALING PATHWAY PODOPHYLLOTOXIN ACCUMULATION IN CELL CULTURE OF *LINUM ALBUM*

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Linum album Kotschy ex Boiss (Linaceae), an endemic species in Iran, is also known to accumulate podophyllotoxin (PTOX) and its related lignans and has been targeted as a possible alternative source of PTOX. Lignans are characterized as phenylpropanoid dimers which form a large group of secondary metabolites. These compounds have antiviral and anticancer properties. The phenylpropanoid pathway is linked to the biosynthesis of major secondary metabolites in plants, such as flavonoids, anthocyanins, lignins, and lignans. Jasmonic acid is a well-characterized plant signaling molecule that mediates plant defense responses. To investigate whether JA is required for lignan production, cells of linum album were treated with JA inhibitors ibuprofen (IBU). In single treatment experiments, sterile ibuprofen (IBU) in concentrations (0, 50, 100, 250 µM) and jasmonate (100 µM) were added to 7-day-old cell cultures and were harvested after 5 days. They were separated from medium by filtration under suction, weighted and immediately frozen in liquid nitrogen. The results showed that jasmonate at concentration 100µM stimulated PTOX formation (21 µg/g FW). Minimum PTOX production was achieved by the addition of 100 µM IBU 1.1 µg/g FW in compared to control 5.009 µg/g FW. Thise results suggested cells strongly suppressed by jasmonic acid biosynthesis inhibitors IBU.

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EFFECT OF METHYL JASMONATE ON CINNAMATE 4-HYDROXYLASE GENE EXPRESSION IN *AGASTACHE FOENICULUM*

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Methylchavicol is the main essential oil component of *Agastache foeniculum* that is produced through the phenylpropanoid pathway. [2]. Cinnamate 4-hydroxylase (C4H) catalyzes the hydroxylation of trans-cinnamic acid to 4-hydroxycinnamate (*p*-coumaric acid) and is known as a key enzyme of phenylpropanoid biosynthetic pathway [1]. The aim of this study was to evaluate the effect of methyl jasmonate (MeJa) on gene expression of C4H in *A. foeniculum* under a hydroponic system. The six leaves stage plants transferred from field to a hydroponic system and treated by 0, 0.1 or 1 mM MeJa solutions. After 12h of treatment the aerial parts of plants were harvested and used for molecular analysis. Total RNA was extracted by the RNX™-Plus Kit and Expression analysis done by Semi quantitative RT-PCR. Tubulin was used as internal control. Partial cDNA related to C4H gene were isolated and sequenced for the first time. This sequence is available at NCBI with AB594197.1 accession number. Gene expression analyses showed that MeJa in both concentrations of 1 and 0.1 mM resulted in increments in C4H gene expression 12h after treatment compared with control plants. The highest amount of C4H gene expression was obtained in the plants treated with 1mM MeJa wich was 4.2 times of control. The results of this research showed that MeJa affects the levels of C4H transcripts in aerial parts of *A. foeniculum*.

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ANTI BACTERIAL EFFECTS OF *SCROPHULARIA STRIATA, FRITILLARIA IMPERIALIS,* OLIVERIA DECUMBENS AQUEOUS AND ALCOHOLIC EXTRACTS ON MULTI-RESISTANT BACTERIA

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Bacterial resistance to antibiotics is a global problem. Thus, discovery of newer antibacterial agents is always necessary. As a result of this problem, researchers are usually focusing on natural products to develop better medications against drug- resistant microbial strains [1, 2]. This study aimed to investigate the antibacterial activityaqueous and alcoholicextractsnative plant Ilam (scrophulariastriata, fritillariaimperialis, oliveriade cumbens) on multi-resistant bacteriaisolated from patients with urinary tract infection .The leaves and flowers of plants was collected from naturalhabitats and then dried from dark room. The aqueous and methanolic extract ofplants was carried using succulate apparatus. The aqueous and alcoholic Extracts Their antibacterial activity at 4 different concentrations (100,200,400, 800) was determined by disk-diffusion agar method and the dilution method on *Escherichia coli, Staphylococcus epidemidis, Staphylococcus aureus, proteus mirabilis, Staphylococcus saprophyticus.* The methods was repeated three times for each test, the mean diameter of inhibition zone was measured. The antibiotics Tetracycline and Gentamicin as a positive control and DMSO was used as negative control and the MIC and MBC were determined. The results of this study showed, the most Inhibitory activity of the extract of *fritillaria imperialis* at least minimum inhibitory concentration (MIC) 9/7 mg/ml and as well as at leastInhibitory activity related aqueous extracts *Scrophularia, Fritillaria imperialis, Oliveria decumbens and* extract alcoholic *Scrophularia striata* minimum in hibitory Concentration (MIC) 12/16 mg/ml. The most sensitivity observed in the *Escherichia coli* to *Fritillaria imperialis* and *Oliveria decumbens* extracts. And antimicrobial compounds in the extracts were determined using GC-Mass.can plant extracts as natural antimicrobial compounds Used in the treatment of urinary tract infections.

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EVALUATION OF MORPHOLOGICAL CHARACTERISTICS OF CARAWAY LOCAL VARIETIES UNDER DROUGHT STRESS

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A biotic environmental stresses, especially drought is one of the most important problems of arid and semi-arid regions. Drought stress occurs when the amount of water intake by plant is less than its losses. In this research the evaluation of the effect of drought stress on morphological characteristics of local varieties of caraway based on factorial complete randomized design with three replications carried out. Experimental factors consisted of four genotypes of caraway and different levels of field capacity (40%, 70% and 100%). At the present research traits including root height, shoot height, leaf number, umbel number, fresh weight of aerial parts, fresh weight of underground parts, root and shoot dry weight were studied. The results showed that the variety factor has significant effects on all studied traits except root height and leaf number and different treatments of drought stress have remarkable significant effects on all traits except umbel number. With increased drought, all traits were decreased.

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MAGHLISA, AN IRANIAN TRADITIONAL DRUG CAN REDUCE CLINICAL MANIFESTATIONS OF ULCERATIVE COLITIS: A PILOT STUDY

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Ulcerative Colitis represents an important public health problem because it mostly affects young people in the most active period of their private and professional lives. Therefore, finding new ways of treatment have been considered in recent decades. Under the title of Sahaj-ul-Am'a, Iranian traditional medicine describes IBD including UC [1]. Maghliasa (Mq) is one of the most frequent traditional prescriptions for UC. The aim of this study was to investigate therapeutic effects of Mq on clinical manifestations of patient with active UC. The ingredients of Mq were mixed thoroughly and were filled in capsule to form a 660 mg capsule. A four-week before/ after clinical trial was conducted. Outpatients from gastroenterology clinic with active mild to moderate ulcerative colitis confirmed by colonoscopy were eligible. Only patients whose Lichtiger colitis activity index. in spite of mesalazine consumption, was ≥6 were enrolled. Criteria for exclusion from the study were pregnancy or lactation, symptoms of peptic ulcer, and lack of medication for three weeks, do not on time follow up visit. After written informed consent was obtained, eligible patients were dispensed coated mesalazine 1-5 g daily and Mq capsule TDS. Treatment with oral or topical steroids, topical mesalazine, immunosuppressors or antioxidants was discontinued at least three weeks before commencement of the trial. A symptomatic assessment was completed at each biweekly follow up. Data was analysis via repeated measure ANOVA by SPSS software. $P<0.01$ was considered significant. All patients completed the one month study. The mean age of patients was 36.3±11.26. The mean activity score of the disease at the beginning, 2 and 4 weeks later were 7.83±2.04, 5.92±2.19, and 3.5±2.24, respectively. This reduction in disease score was statistically significant ($P<0.001$). It means that Mq as a traditional formulation can play a complimentary role in controlling the signs and symptoms of UC. A double blind clinical trial with a larger population can clarify the exact role of this medication in treatment of IBD.

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EFFECT OF LOW SOIL WATER LEVEL ON MORPHOLOGICAL CHARACTERS AND ESSENCE YIELD OF SOME *THYMUS DAENENSIS* POPULATIONS

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Thymus daenensis is one of 4 endemic species in Iran, which has used extensively in health, medicine and the food industry. In order to study the effect of different soil water levels on growth and essence yield of *thymus daenensis*, a factorial experiment conducted in completely randomized design with 5 replication. The first factor was 13 population *thymus daenensis* and second 3 irrigation levels in 80% field capacity (normal irrigation), 60% FC (mild stress) and 40% FC (severe stress). Analysis of variance showed significant difference among soil water levels for all the traits. Soil water reduction causes decrease of shoot height and leaf relative water content while increases root length. Majority amount of the traits as essential oil yield enhanced in 60% FC and reduced in 40% FC comparied with Control treatment. Correlations between traits and essential oil yield in both normal and stress conditions, revealed plant different pattern in confronting water stress. So that all the main traits at stress condition, were associated with essential oil yield; while different result in normal irrigation was obtained. Generally Foreign and Markazi1, Isfahan1 and Zanjan, were unfolded high oil yield potential, in terms of mild water stress, severe stress and various water conditions, respectively. These appropriate potentials can be useful for the economic cultivation and plant breeding studies of this valuable plant in different ecosystems of country.

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SOME BIOCHEMICAL CHANGES AND PATTERNS OF PROTEIN DURING SOMATIC EMBRYOGENESIS OF *RUMEX TUBEROSUS* L. SUBSP. *HORIZENTALIS*

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An attempt was made to study the somatic embryogenesis (SE) and plant regeneration from the in vitro explants of *Rumex tuberosus* L. a renowned medicinal plant, which belongs to Polygonaceae family. This genus has several species, which are distributed in Alborz and Zagros mountains, some of them have been used in traditional medicine for treatment of tumours, hepatic diseases, constipation, heart troubles, diseases of the spleen, hiccough, flatulence, asthma, bronchitis, dyspepsi, leucoderma, toothache and nausea. The main chemical constituents of *Rumex* are anthraquinones and Phenolic compounds. Since there are no reports available on the changes of phenolic compounds and patterns of protein during SE, the present study is undertaken to appraise embryos maturation processes and changes in protein using by spectrophotometry and SDS-PAGE. Different explants of *R. tuberosus* were cultured for profuse callusing and regeneration on MS medium with different combinations of growth regulators. SE and adventitious buds were obtained on MS media were supplemented with 2,4-D and Kin, 6% (w/v) sucrose and 1 $gr.l^{-1}$ charcoal. SE germinated and developed in to plantlets, After transferring to MS medium PGRs free. Based on our findings, synthesis of protein increased during embryo maturation. Also the presence of 11, 26, 32, and 43 KDa proteins in the heart-shaped embryos and more developed ones were distinguished. The synthesis and deposition of those storage and LEA proteins during somatic and zygotic embryogenesis are usually regulated. Through ABA and water stress induced gene expression. Our results supported polyphenol oxidase and proxidase activities were increased during somatic embryo development. In addition total phenols were determined in calli and regenerated plantlets during SE .Total phenolic content were increased by adding of auxin.

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GENETIC VARIABILITY IN IRANIAN THYME BASED ON ISSR MARKER

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Thymus is one of the most important and valuable medicinal plants in the world. In order to Genetic diversity in 22 populations of Iranian thyme from 4 species; *Th. deanensis,Th. Pubescence, Th. Kotschyanus and Th. Lancifolius* as well as a population of *Th.vulgaris* was evaluated by 12 ISSR primers.Ten of the ISSR primers produced detectable bands with 57 alleles. The amplified products made bands in the range of 150–2000 base pairs. The primers having AC and AG motifs produced clearer bands. Cluster analysis based on molecular data grouped the populations in two separate classes. The range of genetic distance among populations varied from 0.03 to 0.4. On the basis of Neidiversity index and Shanon information index, Daran-Isfahan population demonstrated the highest (I=0.43, h= 0.29) and *Th. Vulgaris* the lowest (I=0.43, h= 0.29) intra-population variation. The intra- and inter-population diversity contributed 23 and 77% to total diversity, respectively. The results showeda great genetic variation in Iranian thymes which could be considered in breeding programs.

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THE VOLATILE CONSTITUENT ANALYSIS OF *DIGITALIS PURPUREA* FROM IRAN

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Digitalis purpurea is a species of flowering plant in the genus *Digitalis*, in the family Scrophulariaceae, native and widespread throughout most of temperate Europe [1].*Digitalis purpurea* is an herbaceous biennial or short-lived perennial plant. The plants are well known as the original source of the heart medicine digoxin (also called digitalis or digitalin) [2].There is some report in which some biological activity was appeared from essential oils of other speciesof this plant. Then analysis of essential oil of this plant could lead to introduction of new source. In this study we investigate essential oil composition of aerial parts (flowers and leaves) of this plant. The essential oil was obtained by hydro distillation method for 3 hours and their chemical components of essential oil were identified by GC/MS. Our results show 65 and 59 components could be identified in the essential oil obtained from leaves and flower of *Digitalispurpurea* which constituting approximately more than 95% of the oil. The maincomponents of oil from leaves was Phytol isomer (20%), Pentadecanone, 6, 10, 14-trimethyl (13%),Nonacosane (6%), Methyl dodecanoate (5%), Thymol (3) and 1, 8-Cineole (2.5%) while oil from flower was rich teracosane (20%).

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THE VOLATILE CONSTITUENT ANALYSIS OF *FRANGULA GRANDIFOLIA* FROM IRAN

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Frangula grandifolia is a medicinal plant in the family Rhamnaceae. It is a native medicinal plant of Iran. The dispersion of this plant is north of Iran. It has two species which are shrubplant that especially grows in forest area. It is perennial plant which in third years could reach to flowering step of life.There is some report in which some biological activity was appeared from essential oils of other species of this plant. Then analysis of essential oil of this plant could lead to introduction of new source. In this study we investigate essential oil composition of aerial parts (leafs and young bark) of this plant. It was collected from 1100 meter of Gilan forest province in July 2015. The essential oil was obtained by hydro distillation method for 3 hours and their chemical components of essential oil were identified by GC/MS. Our results show 65 and 59 components could be identified in the essential oil obtained from leaves and flower of *Digitalispurpurea* which constituting approximately more than 95% of the oil. The main components of oil from root wereγ-Terpinene in 55% while oil from bark was rich in n-Decane (18%), Menthol (15%) and epi-α-Cadinol (15%).

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SOPHORA PACHYCARPA ENHANCES OSTEOGENESIS IN ADIPOSE DERIVED-MESENCHYMAL STEM CELLS

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Bone impairment is becoming a major challenge in public health. Although current antiosteoporotic medications such as hormone replacement therapy (HRT) could enhance osteogenesis and decrease bone fractures, long-tem usage of these agents have adverse effects [1]. Thus, natural antiosteoporotic compounds could be safer choice for improving bone diseases [2]. The present study aimed to explore the osteogenic effects of *Sophora pachycarpa* root extract on mesenchymal stem cells. To do so, human mesenchymal stem cells were isolated from adipose tissue and then exposed to various concentration of methanolic extract of *S. pachycarpa*. The cytotoxic effects of extract were determined by MTT assay. After that, the cells were grown in osteogenic media supplemented with different amount of *S. pachycarpa* extract for 21 days. Finally, treated cells were subjected for osteogeinc differentiation and maturation by alkalin phosphatase (ALP) activity and staining as well as alizarin red staining. Moreover, real-time PCR was executed to determine the effects of *S. pachycarpa* on the expression of bone-related genes. Results of MTT assay revealed that *S. pachkarpa* root extract did not have any toxic effects in applied concentrations. Treatment of the cells with different dosages (0.1, 1, 5, 10 µg/ml) dramatically promoted ALP activity, calcified nodules formation and the mRNA expression of *Runx2*, *osteocalcin*, *osteopontin* and *type I collagen*. Meanwhile, the most pronounced osteogenic effects were seen in the cells subjected to 0.1 µg/ml *S. pachycarpa* extract. Oste oprotective effects of *S. pachycarpa* root extract might be due to the phytochemicals with estrogen-like structure. So *S. pachycarpa*-derived compounds could be suitable components for improvement bone defects.

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THE EFFECT OF *SATUREJA AVROMANICA* PLANT EXTRACT ON THE ACTIVITY OF LIVER ENZYMES IN MALE RATS TREATED WITH MALATHION

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Material Plants Savory (*Satureja*) in traditional medicine for the treatment of chronic diseases such as colic, muscle aches, nausea, indigestion, diarrhea and infectious diseases have been used. Today, studies for pharmaceutical and therapeutic effects such as anti-flatulence, gastrointestinal effects, anticonvulsant, mucus, fungicidal, anti-diarrhea, anti-oxidant housing and it is done .The excessive use of pesticides, organophosphate intoxication (severe poisoning and 220,000 deaths every year about 3 million developing countries) have been reported. Of the organophosphate malathion, which studies have shown that liver toxicity is one of its damaging effects. And with respect to the application of summer savory in traditional medicine and experimental properties from it, we decided to investigate the effects of *Satureja avromanica* in the face of factors including organophosphate insecticides such as malathion considered harmful to the liver [1-3]. In this experimental study, 19 male Wistar rats were randomly divided into four groups and were treated for 7 days as IP (healthy control group, Group malathion dose150 mg / kg / day , the group treated with the plant extract20 mg / kg , the group treated with the extract and malathion). At the end of treatment, animals were sacrificed and their blood samples were sent to a laboratory biomarkers of ALT, AST and ALP were measured. AST group treated with malathion compared to the control group and the group treated with malathion and savory ALP and AST compared to the control group treated with malathion compared to the group treated with savory significant difference. But in general, no significant change in ALT, AST and ALP were observed between the four groups of mice. The results showed administration of Satureja can reduce malathion hepatotoxicity

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GREEN SYNTHESIS OF GOLD AND SILVER NANOPARTICLES USING AQUEOUS EXTRACT OF *AJUGA CHAMAECISTUS*

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Metallic nanoparticles show various applications in medicine, biology, biotechnology, and electronics [1]. Among the nanoparticles, silver and gold in particular have attracted attention as anti-microbials, therapeutics, biosensors, and catalysis [2,3]. Many methodologies have been used for the synthesis of nanoparticles, such as physical routs, chemical and photochemical reduction, electrochemical techniques and radiolysis methods. However, these methods are extremely expensive and potentially dangerous to the health and environment. Thus, from both environmental and economic points of view, preparation of nanoparticles *via* a simple method without any hazardous chemicals is highly desirable. This report presents a green synthesis of gold nanoparticles (AuNPs) and silver nanoparticles (AgNPs) by reduction of chloroauric acid and silver nitrate solutions, respectively, using aqueous extract of *Ajuga chamaecistus* aerial parts as a bioreducer and a stabilizer agent. This approach is simple, rapid, cost-effective and stable for a long time, reproducible at room temperature and in an eco-friendly manner to obtain a self-assembly of AuNPs and AgNPs. The resulting nanoparticles were characterized using UV–Vis, FE-SEM and XRD spectroscopic techniques. The formation of the AgNPs and AuNPs were confirmed by surface plasmon spectra using UV–Vis spectrophotometer and absorbance peaks at 425 and 540 nm, respectively. FE-SEM analysis revealed the shape of AgNPs being spherical morphology with an average size range of 20–25 nm, whereas the size of AuNPs is around 30 nm and the particles are spherical in shape. The effects of silver and gold ion concentration, extract quantity and reaction temperature were also investigated on nanoparticles synthesis.

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EVALUATION THE SYNTHESIS OF CAROTENOID AND PHOTOSYNTHETIC PIGMENTS BY CALLUS CULTURE IN ALYSSUM SPECIES

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Chlorophylls and carotenoids are very common pigments, which give color to vegetables and several fruits [1]. An accurate quantitative determination of chlorophyll and carotenoids could be done by callus culture. The seeds of Alyssum species are known to contain a large amount of mucilaginous substance and have been used as a traditional herbal medicine in Iran [2]. This study was conducted to evaluate the possibility of chlorophyll (chlorophyll a, chlorophyll b, total chlorophyll) and carotenoid synthesis by callus culture in different species of Alyssum. Different species of Alyssum were collected from various geographical regions of Iran including *A. lepidium* (Kerman, Yazd, Jiroft), *A. Inflatum* (Isfahan) and *A. Strigosum* (Qom). Different combinations of 2,4 D (2,4 Dichlorophenoxyaceic acid) and Kinetin were used for callus induction by hypocotyls culture. The experiment was carried out as a factorial based in a completely randomized design with three replications. Analysis of variance showed significant for hormones and genotypes and genotype × hormone interaction for evaluated traits. The highest value for total chlorophyll (0.22 mg/ml) and carotenoid (0.19 mg/ml) were observed at *A.inflatum* (Isfahahn) and *A. lepidium* (Kerman). The combination of 2.5 mgL^{-1} (2,4D) + 0.5mgL^{-1}(Kin) showed the best content for total chlorophyll and carotenoid. This study proposes the exploitation of Iranian species of Alyssum for production of mentioned pigments by callus culture.

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PHYTOCHEMICAL INVESTIGATION OF THE ESSENTIAL OIL OF DOREMA AMMONIACUM D. IN THE WESTERN AREAS OF ISFAHAN PROVINCE

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Dorema ammoniacum D. (ammoniac plant) belongs to Apiaceae family and *dorema* genus. It is one of the most important endemic medicinal plants in its family which grows in the arid and semi-arid areas in the regions of Iran and some of the Asian countries such as Turkmenistan, Afghanistan, Pakistan and India [1]. Also, the mentioned plant has various applications in the fields of food, cosmetic and detergent industries. This study was carried out with aim of the extraction and identification of constituents of *Dorema ammoniacum* D. in Isfahan province. For this purpose, after the plant collecting from one of the habitats its target organs namely stem and leaf were separated, air dried, milled and in the certain amount weighed. Then the essential oil of the plant was isolated by hydro-distillation method and analyzed by GC/MS device. The results indicated that major components were limonene (49.18%), neophytadiene (10.21%), beta-caryophyllene (3.54%), phytol (2.61%), neryl aceton (1.46%). Overall, the plants extract constituents and their secondary metabolisms are provided use to efficacious on human and animal health that can be used to cure maladies [2]. Several therapuetic cases have been reported in traditional medicine for this plant so that some of them are include the treatment of cough, vasodilator, anti flatulence and anti microbial. Also, in the modern medicine the resin of this plant has been utilized for the treatment of asthma that study about this case is still ongoing [3].

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ELECTROCHEMICAL OXIDATION OF *CORIANDRUM SATIVUM L.* LEAF EXTRACT: HIGH ANTIOXIDANT ACTIVITY AT THE BIOLOGICAL pH

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Electrochemical measurements have advantages for the determination of antioxidant activity such as their use as a rapid proof of the antioxidant capacity of a lot of organics. The oxidation potentials measured by cyclic voltammetry (CV) have been used to compare the antioxidant strength of compounds such as phenolic acids, flavonoids, cinnamic acids, *etc.* [1,2], being the glassy carbon electrode (GCE) the more frequently used electrode. Coriander (*Coriandrum sativum* L.) is an annual and herbaceous plant, belonging to the Apiaceae family. Coriander is of economic importance since it has been used as flavoring agent in food products, perfumes and cosmetics [3]. In the present work the electrochemical oxidation of aquatic leaf extract of *Coriandrum sativum* L. which is cultivated in Nahavand has been investigated by cyclic and differential pulse voltammetry (DPV) techniques. The results show that aquatic leaf extract of *Coriandrum sativum* L. has strong scavenging capabilities and oxidized at low potentials in comparison of quercetin as a standard antioxidant. Also the effect of extract concentration and scan rates has been studied in the biological pH.

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GREEN SYNTHESIS OF SILVER NANOPARTICLES USING LEAF AND STEM EXTRACT OF DOREMA AMMONIACUM D. AND ITS ANTIBACTERIAL ACTIVITY

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Synthesis of silver nanoparticles using chemical and physical methods is hazardous for human and environment because of this compositions have a lot of risky chemical content. Hence, the biosynthesis of silver nanoparticles using plant extract due to low cost and adapting with environment is more successful [1,2]. The aim of the present study was to evaluate the effect of plant synthesized silver nanoparticles (AgNPs) using aquatic stem and leaf extract of *Dorema ammoniacum* D. and its antibacterial properties. The first vsible sign of silver nanoparticles formation was color change of reaction solution silver nitrate and plant extract from green to dark brown. The properties of silver nanoparticles such as structure, type, size and production were investigated respectively by UV–vis spectroscopy, field emission scanning electron microscopy (FESEM), X–ray diffraction (XRD), fourier transform infrared spectroscopy (FTIR) and transmission electron microscopy (TEM). In recent decades numerous studies have been done about anti-bacterial properties of silver nanoparticles which their effectiveness in treatment of microbial and infectious diseases has confirmed and on the other hand indiscriminate consumption of antibiotics has caused increasing bacterial resistance in some strains of bacteria [3]. Therefore, silver nanoparticles contain anti-bacterial properties can be used with higher performance and fewer side effects. In this present study, antibacterial activity of silver nanoparticles was measured using prevalent methods of anti-bacterial tests such as disk diffusion, minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) on gram–positive (*Staphyloccocus aureus* and *Bacillus cereus*) and gram–negative (*Salmonella typhimurium* and *Escherichia coli*) bacteria.

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EFFECTS OF SALT STRESS ON SOME ANATOMICAL, PHYSIOLOGICAL AND BIOCHEMICAL CHANGES IN MEDICINAL PLANT LEMON BALM (*MELISSA OFFICINALIS* L.)

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The effect of salt stress on growth and physiological, biochemical and anatomical responses in *Melissa officinalis* was studied. Plants were grown in peat soil and then were transplanted to perlite hydroponic culture and were treated with 0,50, 100.150 and 200 mMNaCl. Obtained data showed that salt concentrations decreased plant grow. Protein content significantly reduced undersalt stress.Catalase and ascorbate peroxidase activity decreased under salt stress up to 100mM then increased at higher levels of salinities.superoxide dismutase and peroxidase activity increased under salt stress up to 100mM then decreased at higher levels of salinities.polyphenole oxidase activity increased under salt stress. Hydrogen peroxide content as an oxidant in plants significantly increased under salt stress up to 100mM NaClthen significantly reduced at higher levels of salinities. Proline content as a compatible osmolytes increased under salt stress up to 150mM NaCland then suddenly decreased in 200mM NaCl. Malondialdehyde content that produced by reactive oxygen species significantly reduced undersalt stressthat showed the plant antioxidant systems partly inhibited effects of destructive reactive oxygen species. The effect of salinity stress on photosynthetic pigments showed that increasing The salt concentration led to chlorophyll a, chlorophyll b and carotenoid content decrease. Anatomical treats were affected by various levels of salinities such as radius of root vascular area, length of petiole abaxial surface trichomes, size of precycle reduced under salt stress up to 100 mMNaclthen increased at higher salinities; radius of cortex, radius of petiole vascular area, radius of leaf vascular area, length of petiole adaxial surface trichomes increased up to 100mM NaClthen decreased at higher salinities. Increasing the salt concentration led to length increase of leaf adaxial surface trichomes and lengthdecrease of leaf abaxial surface trichomes.

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THE EFFECT OF SATUREJA AVROMANICA PLANT EXTRACT ON THE ACTIVITY OF KIDNY ENZYMES IN MALE RATS TREATED WITH MALATHION

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Material Plants Savory (Satureja) in traditional medicine for the treatment of chronic diseases such as colic, muscle aches, nausea, indigestion, diarrhea and infectious diseases have been used. Today, studies for pharmaceutical and therapeutic effects such as anti-flatulence, gastrointestinal effects, anticonvulsant, mucus, fungicidal, anti-diarrhea, anti-oxidant housing and it is done [1]. Reactive oxygen species because they have unpaired electrons that living organisms are constantly rotate and irreparable damages to Makrvmvlkvl¬Hay living bodies, such as the import of toxic reactive oxygen species, leading to membrane lipid peroxidation Tvanndasyb and can cause tissue. Malathion effect on oxidative stress studies show a direct relationship Dadnd.az Since oxidative stress is involved in the creation of more than 250 diseases and due to the widespread use of medicinal plants in the community, including various forms of fennel, we decided to investigate the effect of Satureja avromanica on the kidney damage caused by malathion review [2]. 19 male Wistar rats were randomly divided into four groups and were treated for 7 days as IP (healthy control group, Group malathion dose mg / kg / day 150, the group treated with the plant extract mg / kg 20 , the group treated with the extract and malathion) At the end of treatment, animals were sacrificed and their blood samples were sent to a laboratory biomarkers of BUN , CRE were measured.BUN group treated with malathion compared to the control group, CRE Savory treated group compared to the control group, BUN-treated group compared to the group receiving malathion malathion Savory, CRE Savory malathion-treated group compared to the group receiving fennel showed significant changes. But in general, no significant change in CRE and BUN were observed between the four groups of mice.

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INVESTIGATION OF NARINGIN FLAVONOID IN IMMATURE DIFFERENT FRUIT TISSUES OF TWO CULTIVARS (MARS AND HAMLIN) ON CITROMELO AND SOUR ORANGE ROOTSTOCKS

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Immature citrus fruits contain flavonoids that can cause numerous medicinal properties such as anti-cancer and anti-varicose. Naringin is one of the flavonoid that is antioxidant and cholesterol reducer. Also naringin effect has been proved in breast cancer treatment. So they have many application in pharmaceutical and cosmetics industry. The aim of this study was to evaluate the effect of rootstock on naringin, total flavonoid and antioxidant features in Hamlin and Mars Orange. In this study, a factorial experiment was done based on completely randomized design with three replications. The measured parameters include wet and dry weight, total flavonoid, antioxidant properties and the amount of Naringin. Antioxidant features and the amount of total flavonoid were measured by using DPPH, chloride aluminum and potassium acetate reagent respectively and with spectrophotometer. The measurement of naringin was done by High Performance Liquid Chromatography (HPLC). Based on results the measured parameters had impressed by rootstock, variety and the fruit tissue. The highest wet (72.5 gr) and dry weight (32.5 gr) was in Hamlin orange skin on Citromelo rootstock and the highest amount of Naringin (2.25 mg/g $_{DM}$) was observed in flesh of Mars orange on sour orange rootstock. Also the maximum amount of total flavonoid (0.46 mg/g $_{DM}$) and antioxidant features (73%) were in skin and flash of hamlin on citromelo rootstock respectively. Rootstock type can effect fruit quality physiologically. Therefore, change of some approaches can highlighted the role of this factor in citrus production. Based on the results of this study and similar researches, reaching to the best quality of citrus fruits were obtained by choosing the suitable rootstock which can be useful for producer, consumer and pharmaceutical industries.

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SPECTROPHOTOMETRIC DETERMINATION OF CHLOROPHYLLS AND CAROTENOIDS FROM *DUNALIELLA SALINA* AND *CHLORELLA VULGARIS*

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Microalgae are the most important photosynthetic organisms on earth and make several kinds of pigments which include chlorophyll a, b and c, β-carotene, xanthophylls and phycobiliproteins. Currently, synthetic colour additives are used in food, cosmetic, nutraceutical and pharmaceutical industries. However, due to harmful toxic properties associated with the dangerous health problems of synthetic dyes, economic exploitation of microalgal pigments as a source of natural colours becomes an attractive option. *Dunaliella salina* and *Chlorella vulgaris* are unicellular green microalgae that are commercially produced worldwide. These microalgae are rich and sustainable sources of valuable biochemicals, such as carotenoids. The aim of this work was to determine photosynthetic pigments content (chlorophyll a, chlorophyll b, pheophytin a and β-carotene) from two different microalgae by spectrophotometric method, using 80% acetone as extraction solution. The carotenoids and chlorophyll pigments extracted in 80% acetone, were determined based on the absorbance of six wavelengths: 412 nm, 431 nm, 460 nm, 480 nm, 535-551 nm and 663 nm. Quantitative analysis of pigments were performed by UV-Visible light spectrophotometer (Shimadzu, UV-1800). Results indicated that concentrations of chlorophyll a, chlorophyll b, pheophytin a and β-carotene in *Dunaliella salina* was 16.259, 3.819, 2.799 and 8.266 µM and in *Chlorella vulgaris* was 8.805, 3.627, 2.879 and 9.331 µM respectively.

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THE EFFECT OF DIFFERENT PLANITING DEPTH ON SEED EMERGENCE OF *ZIZIPHUS LOTUS* L.

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Ziziphus Lotus L., a deciduous plant from Rhamnaceae family and native to Mediterranean regions, is known as Kazerooni lotus in Iran. It is of prime ecological, economic and indigenous significance in dry and quasi-dry areas in Iran. Among the idiosyncrasies of various *Ziziphus* species, one can refer to their resistance to environmental tensions and water shortages, avoidance of soil erosion, tremendous adaptability and pharmaceutical properties. This research study was conducted in an attempt to assess the impact of different planting depths (2, 4, 6, 8, 10, and 12) on seed emergence of *Ziziphus Lotus* L. and in five repetitions, each including 10 seeds. The analyses of data gathered from the effects of planting depth treatments on the parameters of seed emergence reveal that as far as these parameters regard planting depth was significant at %1. Comparing and analyzing the results (%82 the highest and %12.6 the lowest) shows that seed emergence was fixed at 2 and 12 centimeters deep, respectively. As for the mean time required for seeds to germinate at 2, 4 and 6-centimeter depths no significant difference was observed. Generally, the data registered show a downtrend in terms of percentage and seed emergence speed with an increase in planting depth. In fact, the effect of planting depth in a similar paradigm to that of burying seeds under the shifting sands of the nature shows that the deeper the seeds are planted, the lower the rates of seed emergence become[1,2,3].

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EXTRACTION AND EVALUATION OF TOTAL LIPID CONTENT OF GREEN MICROALGAE *DUNALIELLA SALINA* AND *CHLORELLA VULGARIS*

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Oil-accumulating microalgae are an alternative source of fatty acids (FA) and fatty acid-based lipids of promising interest in preparation of useful health products. Unlike land plants, these photosynthetic microorganisms can directly synthesize polyunsaturated fatty acids (PUFA) and, although microalgae are not recommended for direct human consumption, their nutritional benefits can also be exploited if added to animal feeds. Within the last few decades, the interest in microalgal fatty acids has elevated as a consequence of the consideration that they can be a suitable alternative feedstock for the production of third generation biofuels such as crude oil (triacylglycerols) or after conversion to methyl esters (biodiesel). In this research, total lipid content of two green microalgae (*Dunaliella salina* and *Chlorella vulgaris*) was investigated. Samples (200 mg) were homogenized in 8 ml of a 2:1 mixture of chloroform and methanol (v/v). The biomass was manually suspended by strongly shaking the tube for a few second and 2 ml of a 0.73% NaCl water solution was added. After phase separation the chloroform layer was removed and then evaporated in an oven. The lipid content was calculated by weighing the residues and was expressed as a percentage. The simple and effective analytical procedure used here allowed estimation of total lipid extracts from different samples of green microalgae with quantitative yields.

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EVALUATION OF PHENOLIC, FLAVONOID AND ANTIOXIDANT ACTIVITY IN DIFFERENT FLOWER COLORS OF *CHRYSANTHEMUM MORIFOLIUM*

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Chrysanthemum is an important medicinal herb of the Asteraceae family. *C. morifolium* is traditionally used in China to protect the cardiovascular system, to lower blood glucose and fat levels, to regulate blood pressure, excrete lead, and to scavenge free radicals. This study aimed to evaluate the antioxidant potential of leaves from different flower color cultivars of *Chrysanthemum morifolium* including Dorna2 (white), Fariba2 (yellow), Taraneh (purple). Methanolic extract of three *C. morifolium* cultivars were measured for their inhibition of linoleic acid peroxidation by ferric thiocyanate (FTC) against the standards Butylated hydroxytoluene (BHT), polyphenolic and flavonoid content. The phenolic content was measured according to Folin-Ciocalteu method. Results revealed relatively high phenolic content in studied cultivars. Fariba2 (38.57 mg/gDw) and Taraneh (35.9 mg/gDw) possessed higher amount of phenolics as compared with Dorna2 (20.20 mg/gDw), while Dorna2 had the highest inhibitory power in respect to linoleic acid peroxidation inhibition as compared with synthetic antioxidant (BHT). The highest flavonoid content was obtanied in Taraneh (51.25 mg CE/g). These findings showed that Taraneh (purple flower color) had the most phenolic and flavnoid content, whereas Dorna2 (white flower color) possesed the most inhibition of linoleic acid peroxidation. These cultivars could be considered as new sources of safe natural antioxidants.

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BIOPRODUCTION OF RESVERATROL BY PLANT CELL CULTURE OF *SCROPHULARIA STRIATA* BOISS. IN BIOREACTOR

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Phenolic compounds are one of the most important groups that have presenting antioxidant capacity [1]. Also flavonoids are a group of polyphenolic compounds that exist widely in the plant kingdom. They have been suggested to possess many properties like antioxidant activity, ROS scavengers, defense against phytopathogens and UV-light protection, signal molecules in plant-microbe interactions, legume nodulation, male fertility[2].Several studies report that these compounds show a preventive effect against chronic disease which related to excess of free radicals. Resveratrol which are a class of polyphenols compounds that have been distributed in various plants. These have been reported many pharmaceutical effects such as anti-inflammatory, heart-healthy and anti-cancer properties. During the past decade, a considerable progress has been made to stimulate formation and accumulation of secondary metabolites using plant cell cultures. Bioreactors are important tools for industrial production of secondary metabolites in biotechnology. In this study, initially, is prepared of plant cell culture of *S.striata* and then be proceed in bioreactor. The optimal conditions provided for the growth in the bioreactor such as light, temperature, pH. Growth parameters are measured by dry weight, Fresh weight, survival rate and growth rate. Growth curve of *S.striata* showed in bioreactor 25 days periods. Total phenol, flavonoid, flavonol were quantified by spectro-photometry and resveratrol analysed by HPLC method. The results showed that maximum growth and production of resveratrol were in dark conditions, temp=25°C, pH =4.8, aggregation speed=110-170 rpm and flow= 0.5-1.5 lpm for control of aeration. . The highest amount of resveratrol was in 25th day about 59.84 fold increase compared to the shake-flasks.Total flavonoids were 926 µg/g DW in 25th and total phenol were 5208.5 µg/g DW in 5th . The present study showed the optimized condition for cell suspension cultures of *S. striata* and maximum production of resveratrol in bioreactor.

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ENVESTIGATION OF ANTICANCER EFFECTS OF *ONCORHYNCHUS MYKISS* ENRICHED WITH CANOLA OIL BY MTT ASSAY

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Canola oil due to haveing suitable combination of saturated fatty acids, mono-unsaturated and multi-unsaturated, is from the particular practical advantages. There are considerable amounts of oleic acid (mono-unsaturated) in *Brasica* sp. (canola oil) has caused good resistance to thermal processes such as deep frying. Rainbow trout is the main fish species farmed in about 85% of the total rate allocated to producing aquaculture fish in our country. This fish is also beacause of its high nutritional value, has been found special position in people's food basket. The effect of various concentrations (250, 50, 10, 5 and 0.5 µg/ml) extracted of *O. Mykiss* at regular intervals 24, 48 and 72, was made their impact on the parameters of the survival of Epidermoid cell cancer (C204) by MTT assay in vitro comparison. Reviewing the results of hexane extract effect was extracted from muscle at intervals varying the mortality of cells, shows extracts of the death of cancer cells contributed to the increased concentrations of the extract significantly causing the cells death is cancerous. The time factor in the effect of the extract was effective against cancer cells. Extract 0.025 µg/ml at 24 hours, were killing 50 percent of Epidermoid cell cancer. The addition of canola oil as a dietary supplement is required to fish rations, since the extracts inhibited the growth of cancer cells in the present study were due to the extract can be used as an anticancer agent for the operation of this lineage.

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SILYMARIN POTENTIATED ANTI-OXIDATIVE BARRIER IN THE SCN OF 6-OHDA HEMI-PARKINSON RATES

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Enhanced oxidative stress is a common feature of neurodegenerative diseases such as Parkinson's disease (PD) [1]. Dopaminergic neurons are particularly more vulnerable to oxidative stress than the other brain cells [2]. Silymarin is the most famous compound of the flavonoids, extracted from the seeds and fruit of *Silybummarianum* that has been presented lately as a hepatoprotective agent [3]. In the present study, we investigated the pre-treatment effect of intraperitoneal (ip) administration of silymarin on 6-hydroxydopamine-induced (6-OHDA-induced) oxidative stress in the rat substantial nigra pars compact (SNc) after the development of Parkinsonism symptoms of intra SNc injection of 6-OHDA. Male Wistar rats were pre-treated with i.p. injections of Silymarin (100, 200 and 300 mg/kg) for 5 consecutive days. Then, parkinsonism was induced by unilateral infusion of 6-OHDA (8 µg/2 µl/rat) into the central region of the SNc. SNc content of total glutathione (GSH & GSSG) and antioxidant enzymes (SOD and catalase) activity were assessed 3 weeks after 6-OHDA injection. Our data demonstrated that silymarin pre-treatment, significantly increased the ratio of reduced glutathione (GSH) to oxidized glutathione (GSSG) (GSH and GSH/GSSG ratio)in a dose dependent manner. The most antioxidant effect was observed at a dose of 300 mg/kg of silymarin ($p<0.001$). There was a significant ($p<0.001$) increase in GSSG level of 6-OHDA-lesioned rats; whereas, in silymarin (in all 3 doses, i.p. for 5 days) pre-treated hemi-parkinsonian rats, GSSG content was decreased markedly ($p<0.001$). Furthermore, pretreatment with silymarin significantly, and dose dependently preventedsuperoxide dismutase (SOD) and catalase activity suppressionin the rat brain (SNc), in the animal models of Parkinson's disease. Pre-treatment with silymarin could be prevented from oxidative damage in 6-OHDA-lesioned rats, by decreasing nigral level of GSSG and restoring SNC concentration of GSH, GSH/GSSG ratio and antioxidant enzyme activity to the levels of normal non-Parkinsonian rats. Therefore, this method has a great potential as a future therapy for Parkinson's disease.

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STUDY OF CYTOTOXIC, ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY OF LEAVES FROM GREEN FIG TREE

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Green fig tree also known as common green fig is an Asian species of flowering plants in the mulberry family. It has a green edible fruit with a high nutritional value and many uses in eastern traditional medicine [1, 2]. In this study, the methanol extract from the leaves of fig tree, cultivated in Zanjan, was evaluated for its cytotoxic, antibacterial and antioxidant activity. Results confirmed that the extract has an efficient cytotoxic activity with the IC_{50} of 701.5 µg/ml in the brine shrimp lethality assay. Measuring antioxidant activity via DPPH bleaching assay, didn't show high activity for the mentioned sample, compared with BHT standard antioxidant. Antimicrobial activity was evaluated using disc diffusion assay via measuring growth inhibition zoom against five important gram-positive and gram-negative bacterial strains of food-borne pathogens. Results exhibited that *Escherichia coli*, which is one of the most important pathogenic bacteria, is sensitive to the methanol extract of the green fig tree leaves.

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EFFECT OF SEED PRIMING ON PLANT GROWTH, MORPHOLOGICAL, PHYSIOLOGICAL, BIOCHEMICAL CHARACTERISTICS AND SALT TOLERANCE OF SWEET BASIL (*OCIMUM BASILICUM*)

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The pot experiment was carried out as completely randomized design with three replications to investigate the effect of seed priming with potassium nitrate, salicylic acid and distilled water on plant growth, morphological characteristics, physiological and biochemical basil under salt stress in Ferdowsi University of Mashhad. First factor included seed priming with 3% potassium nitrate for 6 hours, 0.5 mM salicylic acid for 12 hours and hydro priming with distilled water for 24 hours and the second factor included values of NaCl solution at three levels (0, 50 and 100 mM). Analysis of variance showed that the interaction of salinity stress and priming on chlorophyll b, carotenoids, antioxidant activity, total phenol, electrolyte leakage, chlorophyll index, relative water content (RWC), inflorescence height, weight of leaves and stems was significant at the 1% level, and on chlorophyll a, total chlorophyll, number of branches, number of flowering branches, the leaves and stem dry weight was significant at the 5% level. The results showed that priming improved morphological characteristics and plant growth especially in non-salinity stress condition. Mean comparison showed the highest amount of total chlorophyll was obtained from plants which the seeds priming with distilled water and were grown in non-salinity stress condition (14.4 mg/g wet weight) and lowest seen in priming with distilled water and 100 mM NaCl stress (4/01 mg/g fresh weight). The highest and lowest total phenol was obtained from plants which the seeds primed with potassium nitrate and were grown in 50 mM and of 100 mM NaCl, respectively. The highest antioxidant activity of leaf extract obtained from plants which the seeds primed with distilled water and were grown in 50 mM NaCl. The highest percentage of electrolyte leakage of leaf was achieved from plants which seeds treated with sterile water and were grown in 100 mM NaCl. Therefore priming accelerate the germination and early growth of basil and improved biochemical and physiological of plants in salinity stress condition.

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ANTIBACTERIAL ACTION OF TRANS-CINNAMALDEHYDE AND 1,8-CINEOL NANOEMULSION AGAINST SELECTED MICROORGANISM

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Trans-Cinnamaldehyde is a natural compound with promised antibacterial activity [1]. Nanoemulsification of this compound is a way to increase its bioavailability and bactericidal action [2]. In the present study, nanoemulsions containing cinnamaldehyde as an active agent and 1,8 cineol as ripening inhibitor were formulated by the use of probe sonicator, and 3 different determining factors were optimized in order to obtain more stable characteristics, namely; time of sonication, surfactant to oil ratio and type of emulsifier (Tween 80 and Tween 20). In addition, the effect of changes in particle size and type of emulsifier were investigated on *Escherichia coli*, *Pseudomonas aeruginosa* and *staphylococcus aureus* inhibition ability by the use of agar dilution method. The data showed that a 15 minute sonication of the formulation containing Tween 80 as emulsifier with surfactant to oil ratio of 2:1 resulted in a significant stable formulation with acceptable properties at least for a 6 months period with considerably small particle size of 27.76 ± 0.37 nm. Furthermore, the mentioned formulation showed great antibacterial activity, and could reduce the minimum inhibitory concentration (MIC) from 8 to 1mg/mL against *E. coli* and *S. aureus*, and from 16 to 2 mg/mL against *p. aeruginosa.*

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HEPATOPROTECTIVE EFFECT OF METHANOLIC EXTRACT OF AVOCADO SEED AGAINST ON APOPTOSIS IN TYPE 2 DIABETIC MICE

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The medicinal relevance of the various parts of avocado is enormous. The effect of avocado seed extracts on blood pressure and plasma and tissue lipids [1] were investigated. Several preliminary clinical studies suggest that avocados can support weight control. It was also reported that aqueous extract from the avocado's seed has hypoglycemic agents, which act protecting against toxicity and oxidative stress and stimulate pancreatic β-cells to secrete more insulin but there is no data to support effect of avocado seed extract on apoptotic index of hepatocytes. So, this study was conducted to survey the hepatoprotective effect of methanolic extract of avocado (*Persea americana*) seed against on apoptosis. In this study, 40 adult male mice were divided into 8 groups including: control, diabetic, 3 sham and 3 treatment groups. Diabetes type 2 was induced by high fat diet and low dose of streptozotocin (STZ). One week after STZ injection, sham and treatment groups received 50, 100 and 150 mg/kg methanolic extract of avocado seed for 40 consecutive days orally via gavage. At the end of experimental period, animals were euthanized and the liver was removed and fixed in 10% neutral buffered formalin. The liver tissue samples were processed by routine and standard paraffin embedding and sectioned at 5 µm thickness. Detection of apoptotic cells was performed by nonradioactive in situ end labeling method using TUNEL immunohistochemical technique. Finally, SPSS (ver. 19) software was performed for data analysis. Statistically significant differences among the groups were determined by one-way ANOVA followed by the Tukey post hoc. A P-value of less than 0.05 was considered significant. Results indicated that methanolic extract of avocado seed reduced apoptotic index of hepatocyte in normal mice but, this decreasing was only significant in high dose compared to control ($p<0.05$). Immunohistochemical data showed that diabetes severely increased apoptotic index in hepatocyte and administration of extract could inhibit increasing of apoptotic index in a dose-dependent manner. However all doses of extract reduced apoptotic index significantly compared to diabetic mice ($p<0.05$) but apoptotic index of hepatocyte in diabetic mice treated by 150 mg/kg had no significant differences with it in control animals. Our results revealed that methanolic extract of avocado could apoptotic index in both normal and diabetic mice. Therefore, it can be concluded that methanolic extract of avocado has a hepatoprotective effect against apoptosis especially in type 2 diabetes.

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EVALUATION THE CORRELATION OF ATHEROGENIC INDEX AND TOTAL ANTIOXIDANT CAPACITY

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Diabetes mellitus is characterized by Increased Blood glucose levels besides deterioration of lipidic profile [1], altered level of atherogenic index [2] and impaired balance in oxidant and antioxidant status. Antioxidant can play Commiphora mukul (Burseraceae) has a gum resin with profound antioxidant properties [3]. The aim in present study was to evaluate the effect of COM gum resin on total antioxidant capacity and its correlation with atherogenic index on diabetic male rats.Thirty two male wistar rats were randomly divided into 4 groups. Normal Control, diabetic control, normal treated with 300 mg/kg b.w. COM gum resin extract and diabetic treated with 300 mg/kg b.w. COM gum resin extract. Induction of diabetes was done by intra peritoneal injection of STZ (60mg/kg b.w.) [1]. The treatment period lasts for 8 weeks by normal saline or COM in control or treatment group, respectively. At the end of experiment animals were anesthetized and blood samples were analyzed. Diabetes decreased TAC in comparison to normal rats. Administration of COM , to both of normal and diabetic rats can alleviate altered levels of TAC (0.38 ± 0.04, 0.27±0.03) in comparison to control groups (0.20±0.02, 0.16±0.02). On the other hand HDL/ LDL as one of the atherogenic indices (1.53 ± 0.11, 3.35±0.37) improved in treatment groups in comparison to control groups (3.02 ± 0.47, 0.36±0.33).

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EFFECT OF NITRIC OXIDE (NO) ON THE ACTIVITY OF ANTIOXIDANT ENZYMES AND PROTEIN CONTENT OF PURPLE CONEFLOWER (*ECHINACEA PURPUREA* L.) SEEDLINGS UNDER SALINITY STRESS

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Salinity is one of the major environmental factors that reduce the productivity of many crops worldwide as a result of imposing osmotic stress, ionic toxicity, nutritional imbalance and oxidative stress conditions [1]. Nitric oxide (NO), an important signaling molecule in plants, is known to play crucial roles in the regulation of both defense responses and inducing resistance to fungal pathogens [2]. *Echinacea purpurea* L. is one of the top selling medicinal plants widely used to alleviate colds, sore throats and other upper respiratory infections [3]. In this study,to find the effect of sodium nitroprusside (SNP) as the nitric oxide (NO) donor in reducing oxidative damage induced by salinity stress in *Echinacea* seedlings, a CRD based factorial experiment with four replications was conducted in research greenhouse of Sana Institute of Higher Education, in 2015. The experimental treatments consisted of four SNP levels (0, 0.1, 0.2 and 0.4 mM) andthree amount of NaCl (0 as control, 75 and 150 mM NaCl). 14 days after the onset of the experiment, superoxide dismutase (SOD), peroxidase (POD), catalase(CAT) and ascorbate peroxidase (APX) activities and oxidation of proteins content in leaves were measured.Results indicated that the 0.2 mM SNP treatment was increased the activity of antioxidant enzymes under stress condition. With increasing salinity levels, also reduced the protein content and increased CAT enzyme activity in the leaves of *Echinacea*. Overall, it could be concluded that sodium nitroprusside as NO donor could improve coneflower seedling negative effects of salinity.

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THE EFFECT OF METHANOLIC EXTRACT OF *STACHYS SCHTSCHEGLEEVII* ON VOLUME OF KIDNEY AND GLOMERULE IN TYPE 2 DIABETIC RATS

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Diabetes mellitus is (DM) one of the major chronic metabolic diseases and health care challenges which currently affects more than 387 million people worldwide and by 2035 will climb to almost 600 million people [1]. In Iran, similar to other developing countries, diabetes is a major health problem and has a high prevalence [2]. It has multiple etiologies and characterized by chronic hyperglycemia and altered metabolism of lipids, carbohydrates and proteins. and can affect function of many organ such as kidney and damage nephrons and urinary filtration [1, 4]. *Stachys schtschegleevii* is an endemic medical herb in Iran. It has anti-inflammatory and antioxidant effect and used widely in Iranian folk medicine. This study was conducted to investigate the effect of *S. schtschegleevii* on diabetic nephropathy by three- dimension quantitative histo-pathological methods. In this study, 30 adult male rats were divided into 6 groups including: control, diabetic, diabetic treated by glybenclamid and diabetic treated by 100, 200 and 300 mg/kg methanolic extract of *Stachys schtschegleevii* for 40 consecutive days orally via gavage. Diabetes type II was induced by high fat diet (HFD) and low dose of streptozotocin. After 2 weeks of dietary manipulation, and an overnight fast, the rats on the HFD were injected intraperitoneally with 35 mg/kg STZ. At end of experimental period, animals were euthanized and their kidneys were removed and fixed in 10% neutral buffered formalin. The samples were processed by routine and standard paraffin embedding and serially sections stained by H&E. Unbiased-stereological methods using by Cavalieri's technique were performed to analyze kidney and glomerule volume. Finally, data were analyzed by one-way ANOVA and Tukey post hoc. Results indicated that volume of kidney and glomerule were increased following diabetes and glybenclamid could inhibit these changes significantly ($P<0.05$). Results showed that methanolic extract of *Stachys schtschegleevii* could reduce volume of kidney and glomerule in diabetic rats in a dose-dependent manner ($P<0.05$). However, volume of kidney and glomerule were decreased in dose of 100 and 200 mg/kg extract compared to diabetic group but this reduction was significant compared to glybenclamid treated animals and only dose of 300 mg/kg had similar effect to glybenclamid treated diabetic rats. It can be concluded that methanolic extract of *Stachys schtschegleevii* can reduce structural changes in kidney of patients with type II diabetes so its administration is suitable protective strategy for reduction of diabetes side effects in kidney.

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BIOLOGICAL ACTIVITIES AND CHEMICAL COMPOSITION OF *ORNITHOGALUM CUSPIDATUM* BERTOL FROM IRAN

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Ornithogalum cuspidatum is an Iranian species of the genus *Ornithogalum* L. (family: Liliaceae). The species of *Ornithogalum* are used widely in Iranian traditional medicine for treatment of inflammatory and respiratory disease. The purpose of the present study is to evaluate antioxidant and antimicrobial activities of n-hexane, ethyl acetate, methanol and aqueous extracts of *O. cuspidatum* leaves and to determine their relationship with the phenolic composition. The antioxidant activities of different extracts of *O. cuspidatum* were evaluated with DPPH radical-scavenging activity. The amounts of total phenolics were also determined spectrophotometerically. Antimicrobial activities of different extracts were examined against five Gram-positive and four Gram-negative bacteria. Methanol extract of *O. cuspidatum* showed the strongest antioxidant activity (IC50= 35.7 µg/ml) and the highest total phenolic content (94.1 mg GA/g extract). n-hexane, methanol and ethyl acetate extracts demonstrated antibacterial effect against Bacillus cereus strain in concentration of 7.5 mg/ml. The volatile constituents in the essential oil of *Ornithogalum cuspidatum*, were investigated by capillary gas chromatography and gas chromatography–mass spectrometry. The major components of essential oil were ethyl linoleolate, tetracosane, hexacosane, Palmitic acid and linolenic acid methyl ester.

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THE EFFECT OF METHANOLIC EXTRACT OF *STACHYS SCHTSCHEGLEEVII* ON BODY WEIGHT AND BLOOD GLUCOSE LEVEL IN TYPE 2 DIABETIC RATS

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Diabetes mellitus is a methabolic disorder of endocrine system resulting from a deficiency in insulin secretion or its action [1]. The number of people diagnosed with diabetes increased so dramatically all over the world in the last twenty years [2]. *Stachys schtschegleevii* wich commonly known as Poulak has been used in Iranian traditional medicine due to its analgesic, antibacterial, anti-inflammatory and antioxidant properties. Previous studies on *S. schtschegleevii* revealed the presence of phenolic compounds. This study is first report of hypoglycemic effect of methanolic extract of *Stachys schtschegleevii* in diabetic rats. In this study, 30 adult male rats were divided into 6 groups including: control, diabetic, diabetic treated by glybenclamid and diabetic treated by 100, 200 and 300 mg/kg methanolic extract of *Stachys schtschegleevii* for 40 consecutive days orally via gavage. Diabetes type II was induced by high fat diet (HFD) and low dose of streptozotocin (STZ). After 2 weeks of dietary manipulation, and an overnight fast, the rats on the HFD were injected intraperitoneally with 35 mg/kg STZ. At 72 hours after STZ injection and the end of experimental period body weight and blood glucose of animals were recorded. Finally, data were analyzed by SPSS (ver. 19) software. Statistically significant differences among the groups were determined by one-way analysis of variance followed by the Tukey post hoc. A P-value of less than 0.05 was considered significant. Results indicated that LD_{50} of extract was > 6000 mg/kg. Data showed that extract could inhibit reduction of body mass gain due to diabetes similar to glybenclamid. Body mass gain was no significant differences in animals which treated by 300mg/kg of extract compared to normal control animals. Results revealed this extract had a hypoglycemic effect and could decrease blood glucose in a dose-dependent manner. However all doses of extract reduced significantly blood glucose compared to diabetic group ($p<0.05$). Blood glucose level in rats treated by 100 and 200 mg/kg was higher than glybenclamid treated rats. However this reduction in dose 300 mg/kg was higher than glybenclamid treated animals but there was no significant difference statistically and had similar effect to glybenclamid ($P>0.05$). It can be concluded that methanolic extract of *Stachys schtschegleevii* has a hypoglycemic effect and can reduce blood glucose level in diabetic type II patients and its administration is suitable protective strategy for reduction of diabetes side effects.

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THE EFFECT OF MICROWAVE IRRADIATION ON THE EXTRACTION YIELD AND COMPONENTS OF FENNEL'S ESSENTIAL OIL

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Fennel, is one of the widespread annual and perennial plants with aromatic odor. It was native tosouthern Europe and Mediterranean region. Hamedan is one of the largest producers for this plant and Fennel cultivated in Hamadan is one of the highest quality ones in Iran.Generally, conventional methods such as thermal steam or hydro-distillation are used to extract the fennel's essential oil. Recently, microwave-assisted extraction (MAE) has been recognized as a technique with several advantages over other extraction methods, such as reduction of costs, extraction time, and energy consumption. In this study, MAE was compared with the general thermal hydrodistillation (HD) method to obtain essential oils from fennel's seeds. Chemical composition and yield percentage of essential oils from MAE were compared. Amount of oxygenated compounds in the essential oil of microwave extraction was higher than that of HD method. The percentage of anethole which was the major component in both method was higher for MAE than HD method (85.93% and 80.63 % respectively).

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EFFECTS OF LEAD AND CADMIUM HEAVY METALS ON GERMINATION TRAITS OF *HYPERICUM PERFORATUM*

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Here are two aspects on the interaction of plants and heavy metals. On one hand, heavy metals show negative effects on plants. On the other hand, plants have their own resistance mechanisms against toxic effects and for detoxifying heavy metal pollution. Heavy metals affect plant physiology by inducing stress symptoms, but many plants have adapted to avoid the damaging effects of metal toxicity, using strategies such as metal chelation, transport and compartmentalization. In order to investigate the effects of lead and cadmium heavy metals on germination traits of *Hypericum perforatum*, an experiment was conducted as factorial based on completely randomized design in laboratory of Payam Noor University of Mashhad in 2013. Treatments included heavy metals of lead and cadmium in 4 levels (0, 50, 100 and 150 ppm). The measured traits were germination rate and percentage, root and shoot length, seedling weight and fungus pollution percentage in Petri dishes. The results indicated that the interaction of lead and cadmium affected germination rate in *Hypericum perforatum.* The highest germination rate was obtained in 50 ppm of cadmium and lead. In this species, fungus pollution percentage in petri dishes was different for levels of lead and interaction between lead and cadmium treatments, significantly. The highest fungus pollution percentage was obtained in 50 ppm lead and 0 ppm cadmium treatment. In general, the highest value of germination traits such as germination rate and percentage, seedling weight and fungus pollution of Petri dishes of *Hypericum perforatum* was obtained in 50 ppm lead and 0 ppm cadmium treatment.

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THE INVESTIGATION OF THE RHIZOSPHERE TRAITS OF TWO SPECIES OF FABACEAE FAMILY

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In order to investigate the rhizosphere traits of two species of Fabaceae family, an experiment was conducted on the rhizosphere of *Securigera securidaca* and *Trigonella foenum-graecum* with 3 replications at agricultural research station of Ferdowsi University of Mashhad. Studied traits in soil were pH, activity of acid phosphatase, alkaline phosphatase, dehydrogenase enzymes, microbial biomass and respiration, metabolic quotient and microbial quotient. Results indicated that *Securigera securidaca* was superior to *Trigonella foenum-graecum* for microbial respiration and biomass in the soil, significantly. Also, activity of acid phosphatase, alkaline phosphatase, dehydrogenase enzymes, metabolic quotient and microbial quotient of this species were the higher than *Trigonella foenum-graecum*. In general, results of this study showed that species can affect rhizosphere traits and microbial activity in soil.

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CALLUS INDUCTION AND PLANT REGENERATION FROM CONEFLOWER (*ECHINACEA PURPUREA*) BY COTYLEDONARY PETIOLECULTURE

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Echinacea is well-known for both, its medicinal and ornamental properties and is owned by a Asteraceae family. This plant has long been used in the treatment of many diseases. Studies have proven that the germination of Echinacea seeds are difficult because of its dormancy. The current study was aimed at regeneration and proliferation of Echinacea seeds using *in vitro* environment. To induce callus and plant regeneration cotyledonary petiole explants were placed on Murashige and Skoog medium supplemented with various levels of 6-benzylaminopurine, BAP (0, 0.5, 1 and 2 mg/lit) and naphthaleneacetic acid, NAA (0, 0.02, 0.05 and 0.1 mg/lit) combinations. The results showed that the hormonal treatment with 0.5 mg/lit BAP and 0.02 mg/lit NAA and 0.5 mg/lit BAP and 0.05 mg/lit NAA had the greatest impact on callus volume. In addition, the hormonal treatment with 1 mg/lit BAP and 0.05 mg/lit NAA had the greatest impact on plant regeneration.

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ISOLATION AND YIELD DETERMINATION OF A NEW POLYSACCHARIDE FROM ARCTIUM PALLADINII ROOTS

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Arctium plant, commonly known as burdock and popularly called “Baba-adam” in Iran, belongs to the Asteraceae family. It has been widely consumed as a vegetable in Europe, North America and Asia for centuries, where it is valued for its nutritional value and medicinal qualities. *Arctium palladinii*, called ‘‘Baba-adam khuii’’ in Iran, is one of the most important species from this genus. It grows well in Iran, Eastern Europe, Anatolia, Caucasus and Turkmenistan [1]. The people locally use the hypogeal organs (roots) of this plant to cure tonsillitis, throat pain, arthritis, rashes, and various skin problems, and as a diuretic, diaphoretic, and blood purifier [2]. Roots of medical plants are important resources of interesting bioactive polysaccharide, many of which have been reported to possess various biological functions [3]. In the present study a new crude polysaccharide (CAPP) was isolated from the roots of *A. palladinii* by warm-water extraction (70 °C), deproteinization and ethanol precipitation. CAPP was further successively purified with DEAE-cellulose column and the procedure was monitored by phenol-sulfuric acid method. The main fraction was collected, vacuum-dried and named as APPS-1. The total yields of CAPP and APPS-1 were about 36 and 11% of the dried material, respectively.

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GREEN SYNTHESIS AND ANTIBACTERIAL ACTIVITY OF SILVER NANOPARTICLES USING AQUEOUS EXTRACT OF *THYMUS KOTSCHYANUS* AS BIOREDUCING AGENT

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Silver nanoparticles (Ag-NPs) have attracted ample attention owing to their unique properties and potential applications in photonics, biosensors, pharmaceuticals, catalysis and water purification [1]. Accordingly, preparation of Ag-NPs *via* economic and eco-friendly processes without the use of toxic chemicals is highly desirable and in demand. Nowadays, green chemistry procedures using various biological systems like microorganisms [2], enzymes and plant extracts [3] for the synthesis of Ag-NPs are commonly employed. However, the synthesis of nanoparticles by means of plant extracts excel microbial route due to their simple and user friendly process, economical and less reaction time. We herein report the green synthesis of Ag-NPs by reduction of silver nitrate using aqueous extract of *Thymus kotschyanus* aerial parts as a reducing and a capping agent.The successful formation of Ag-NPs was confirmed by UV–visible, FE-SEM, XRD and FT-IR spectroscopic techniques. FE-SEM analysis revealed the shape of Ag-NPs being spherical morphology with an average size of 20 nm.The synthesized Ag-NPs exhibited a good activity against both Gram-positive and Gram-negative bacteria and hence have potential applications in biomedical field.

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DETERMINATION OF WITHANOLIDES IN STEM, ROOT, AND LEAF OF *WITHANIA SOMNIFERA* BY HPLC-DAD

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Withania somnifera (Ashwagandha or winter cherry) is widely used in the traditional system of medicine in India. The plant extracts have also been reported to possess antimicrobial activity. A reversed-phase HPLC-DAD method for analysis of two similar withanolides, namely, withaferin A and withanolide A in stem, root, and leaf [3]. Withanolides extraction in different part of *Withania somnifera* was performed using three different solvent included ethanol 30, ethanol 50 and ethanol 70% (v/v). Quantitative determination of its most prominent withanolides of *Withania somnifera* were performed on a C_{18} column (Eurospher) at gradient elution at 227 nm and acetonitrile and buffer solution (KH_2PO_4, 0.14gr in 1000ml H_2O) as mobile phase [1, 2]. Results indicated that ethanol 70% (v/v) leaf extract have the highest of active ingredients.

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THE EFFECT OF DIFFERENT METHODS OF DRYING-SUN, SHADE AND OVEN ON THE CONSTITUENTS OF MEDICINAL PLANTS IN THE FLOWERING GOLDENROD "*SOLIDAGO CANADENSIS* "

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Solidago "Solidago canadensis" (known as Canada goldenrod or Canadian goldenrod) is an herbaceous perennial and long days to 30-120 cm height plant of the family Asteraceae native to northeastern and north-central North America but established as an invasive plant in other parts of the continent and in other countries as well. It is often grown as an ornamental in flower gardens.The plant is erect, often forming colonies, long, rod-like, alternate leaves, narrow, long, pointed, sessile and attached to the stem, and tiny yellow flowers at the stem end appear at the top of flowering plant. Flowers are small yellow heads held above the foliage on a branching inflorescence. This plant in Asia, South America and Europe grows, grown in a wide range of weather conditions and is highly resistant to heat and cold. Goldenrod flowering branches extract 60% having at least 2.5% of active ingredient "Hayprosyd" to supply drugs used to treat inflammation of the urinary tract. To investigate the effects of drying conditions on the active substance "Hayprosyd" was designed. This is a cross-sectional study. The project is a study population consisted of four Authentication sun drying methods (experimental and industrial samples), the terms and conditions Shadow Avon - were selected. At the time of flowering field, samples were harvested and dry conditions were defined. Three samples at random from the plant with sun dried sample was used for industrial applications. During these studies, statistical comparison was done by Duncan's multiple range test results showed that there is a significant difference between the methods of drying. Mean comparison showed that the oven method with the Hayprosyd 5.8% and 6.3% Hayprosyd shadow with no significant difference between the highest active ingredient in the drying method was found. However, drying in the sun significantly reduced active ingredient.

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INFLUENCE OF ELICITOR ON ACCUMULATION OF MENTHOL IN *MENTHA PIPERITA*

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Peppermint (*Mentha piperita*) is herbaceous and perennial plant that used as a medical and aromatic plant [1, 2]. It's essential oil was used extensively for the medical and food. Peppermint essential oil includes menthol, menthone, methylacetat, menthofuran and pulegone has medical effect [1, 2]. In the flowering stage, the plants treated with different methyl jasmonate concentrations (0, 0.1 and 0.5 mM) and 48 h-treated plant was analyzed for their component of essential oil by GC/MS method. In this study, amount of methylacetate, β-pinene and 1, 8-Cineole compounds is increased but Menthol, neomenthol and linalool content is reduced. These results showed that the percent of essential oil composition and medicinal value of *Mentha piperita* is changed by MeJA.

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THE EFFECT OF PRIMING ON *CUCURBITA PEPO* SEED GERMINATION UNDER SUBOPTIMAL TEMPERATURES

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In order to study the effect of priming on seed germination in *Cucurbita pepo*, this experiment was conducted in the University of Nahavand, using a factorial experiment with completely randomized design with three replications. Treatments included 4 levels of temperatures (10, 15, 20 and 25°C) and three kinds of priming (control, KNO_3 and salicylic acid). The results showed that the interaction of temperature and priming had very significant effect ($P \leq 0.01$) on germination percentage, radical and plumule length. Priming with salicylic acid (0.3%) hadn't any significant effect on measured traits. Priming with KNO_3 produced the highest germination percentage in all temperatures even under suboptimal temperatures.

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THE EFFECT OF DECAYED BIOLOGICAL FERTILIZER ON *CARTHAMUS TINCTORIUS* VEGITATIVE GROWTH STAGE

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In order to study the effect of decayed biological fertilizer including different portions of shrimp skin on *Carthamus tinctorius* vegetative growth, this experiment was conducted in the University of Nahavand, using a completely randomized design with three replications. Treatments included 6 levels of biological fertilizer (control, 1.5 gr on the soil, 3 gr on the soil, 1.5 gr incorporated with soil, 3 gr incorporated and urea). The results showed that application of decayed biological fertilizer had very significant effect on leave number, plant height, fresh and dry weight. The most leave number, plant height, fresh and dry weight was obtained in 1.5 g shrimp skin incorporated with soil.

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OPTIMIZATION OF MICRO-PROPAGATION OF DAMASK ROSA (*ROSA DAMASCENA*) UNDER IN VITR CONDITION

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In vitro propagation has facilitated rapid and mass multiplication of diseases-free plants and acts as a new tool for modern breeding through genetic manipulation. Explants were cultured on two medium formulations, namely Murashige and Skoog (MS) and Van der Salm (VS) supplemented with various concentrations of Benzyl amino purin (BAP) and Indol 3-acetic acid (IAA) and Indol 3-butyric acid (IBA). Most of shoot number (5.8 axillary shoots/ explant) was achieved in Vs medium supplemented with 1 mg l^{-1} BAP and 0.5 mg l^{-1} IAA. Shoots were induced from cultured shoot tips on agar based VS medium, Quoirin and Lepoivre (QL) and VS mediums (solid and liquid) supplemented with modified calcium gluconate salt and BAP (1 mg l^{-1}) in combination with IAA. The maximum length (8.4 cm) of plantlet and number of axillary shoot (8/08 cm) were achieved on vs medium. The plantlets were cultured on rooting medium supplemented with IAA (0, 1, 2, 3 and 4 mgl^{-1}). The highest percentage of root induction (91.66 %), was obtained on VS medium supplemented with 4 mg l^{-1} of IAA. However, the highest root elongation (4.74 cm) was obtained on VS medium containing 3 mg l^{-1} of IAA. Rooted plantlets were successfully acclimatized in soil and grown normally in greenhouse and their natural habitat without showing any morphological variations.

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ENVIRONMENTAL TEMPERATURE INFLUENCE ON MONOTERPENES AND SESQUITERPENES IN *SALVIA LIMBATA* ESSENTIAL OIL

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The genus *Salvia* (Lamiaceae) contains 58 species in Iran, and *Salvia limbata* C.A. Meyer with proven medical effects grows widely in the north and central parts of the country [1, 2]. In this study, we evaluated the qualitative variability of the essential oil of this species cultivated in new conditions (Karaj and Abhar) Compared with wild population (Semnan). The essential oil obtained from these plants at the flowering stage by hydrodistillation using a Clevenger-type apparatus and analyzed by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). The major components of the essential oil of wild population (collected from semnan) were 1,8-cineole (18.98%), α-Pinene (11.91%) and β-mircene (9.69%). Two main constituents of essential oil of cultivated plants in Karaj and Abhar were α-Pinene (23.49% and 2821%, respectively) and β-Pinene (19.21% and 22.42%, respectively). Monoterpenes was more dominant in Abhar (86.55%) than in Karaj (80.42%) and Semnan (71.38%), while sesquiterpenes was more abundant in in Semnan (20.95%) rather than Karaj (13.26%) and Abhar (20.95%). The amounts of monoterpene hydrocarbons were 71.26%, 53.35% and 41.96% in Abhar, Karaj and Semnan, respectively. Climatic data showed that annual average temperature of Abhar (sea level= 1537 m), Karaj (sea level= 1349 m) and Semnan (sea level= 1127 m) are 12.1, 14.4 and 17.1 °C, respectively. It suggested there is a positive correlation between monoterpenes and environmental temperature. On the other hand, increase in altitude and subsequently decrease in environmental temperature lead to decrease monoterpene hydrocarbons in this plant.

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ANALYSIS OF THREE SPECIES OF SAVORY ESSENTIAL OIL AND COMPARISON THEIR ANTIOXIDANT ACTIVITY WITH DPPH AND FRAP METHODS

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Savory is an annual plant from the family Lamiaceae, with numerous branches and a reddish color, which grow to great in the wild in southern Europe and Asia (including Iran). In this study, three species of savory include *Satureja khuzistanica*, *Satureja hortensis*, and *Satureja mutica* collected and dried to determine chemical constituents of the essential oil and antioxidant activity. After studying the chemical composition of essential oil by gas chromatography (GC), it was found that the amount of major component, carvacrol, in essential oil of *Satureja khuzistanica*, *Satureja hortensis*, and *Satureja mutica* are 44.01, 54.06, and 92.61, respectively. Also, antioxidant activity of essential oils were evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging test and ferric reducingantioxidant potential (FRAP) assay. Among the three species studied, *Satureja khuzistanica* shows the highest antioxidant activity.

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STUDY THE POTENTIAL APPLICATION OF OKRA SEED OIL IN HERBAL MEDICINE AND MAKEUP PRODUCTS

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Okra is a warm season crop which mainly planted for its immature fresh and tasty pods. Okra seed is known as new source of herbal oil. Therefore, investigation on okra seed oil quality has been considered recently for its application in different industries created. Although Iran is one of the most favorite places to grown okra, there is lack of information about Iranian okra seed oil profile and its applications. This study was conducted at research farm and agronomy laboratory of Tarbiat Modares University to determine potential application of dwarf Iranian okra seed oil in herbal medicine and beauty makeup industries. Results showed that, Iranian dwarf okra ecotype is rich in high value fatty acids such as C16:0, C18:1 and C18:2. Near to 38% of seed oil content of this type of okra is a polyunsaturated omega-6 fatty acid (Linoleic acid). Linoleic acid has become very favorite in the herbal medicine and beauty products industry because of its beneficial properties on the skin. It keeps skin improbable to water in addition to other positive influences in skin such as anti-inflammatory, acne reductive, and moisture retentive properties when applied topically on the skin. Palmetic acid (C16:0) with 29% of total fatty acids is another major compounds of Iranian dwarf okra cultivar is another major. Plametic acid is widely been use in cosmetic industries such assoap production or detergent emollient. Oleic acid (C18:1) is another major component of okra seed oil (23%). It make the cream to be richer and heavier while it also has an anti-inflammatory effects. Therefore, we are recommended okra seed oil as the main parts of cosmetic product formulations, especially in beauty products such as herbal creams and soaps.

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THE STUDY OF GERMINATION STAGE IN *SILYBUM MARIANUM* AND *CALENDULA OFFICINALIS* AND *NIGELLA SATIVA* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Silybum Marianum* and *Calendula officinalis* and *Nigella Sativa*, this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 8 levels of salinity (control, 2 dS/m, 3dS/m, 4 dS/m, 5dS/m, 6 dS/m, 7 dS/m 8 dS/m). The results showed that salinity levels hadn't effect on germination percentage, radical and plumule length and fresh weight. The increase of salinity did not reduce the germination percentage and radical and plumule length and fresh weight significantly. Since the classification of saline soils begins from 40 mM [1], so *Silybum Marianum* and *Calendula officinalis* and *Nigella Sativa* can be known as a tolerant plant to salinity in germination stage.

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THE STUDY OF GERMINATION STAGE IN *BORAGO OFFICINALIS* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Borago officinalis*, this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 4 levels of salinity (control, 2 dS/m, 3dS/m, 4 dS/m, 5dS/m, 6 dS/m, 7 dS/m), The source of salinity was prepared from Persian Gulf. The results showed that salinity levels had very significant effect ($P \leq 0.01$) on germination percentage. The increase of salinity up to 7 dS/m did not reduce the germination percentage plumule length and fresh weight significantly. The results showed that the highest germination percentage 100% was observed in 5 dS/m. Since the classification of saline soils begins from 4 dS/m [1], so *Borago officinalis* can be known as a tolerant plant to salinity in germination stage.

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THE STUDY OF GERMINATION STAGE IN *CALENDULA OFFICINALIS* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Calendula officinalis*, this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 4 levels of salinity (control, 3 dS/m, 5 dS/m, 7 dS/m). The source of salinity was prepared from Persian Gulf. The results showed that salinity levels didn't affect on germination percentage, radical and plumule length and fresh weight. The increase of salinity did not reduce the germination percentage and radical and plumule length and fresh weight significantly. Since the classification of saline soils begins from 40 mM, so *Calendula officinalis* can be known as a tolerant plant to salinity in germination stage.

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THE STUDY OF GERMINATION STAGE IN *MORINGA PEREGRINA* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Moringa peregrina*, this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 4 levels of salinity (control, 3 dS/m, 5 dS/m, 7 dS/m). The source of salinity was prepared from Persian Gulf. The results showed that salinity levels didn't affect on radical and plumule length, fresh and dry weight but the germination percentage was affected. The increase of salinity did not reduce the germination percentage up to 5 dS/m significantly. The highest germination percentage was observed in 5dS/m. Since the classification of saline soils begins from 40 mM, so *Moringa peregrina* can be known as a tolerant plant to salinity in germination stage.

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GREEN SYNTHESIS AND CHARACTERIZATION OF CDS NANOPARTICLES PRODUCED USING *ARTEMISIA ANNUA* L. EXTRACT AND ITS ANTIBACTERIAL ACTIVITY

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In recent years nanomaterials fabrication and their uses is emerging as a critical technology with applications in many industrial sectors. Nanoparticles, due to their specific electrical, optical, magnetic, chemical and mechanical properties are currently used in many high technology areas, such as the medical sector for diagnosis, antimicrobial, drug delivery, as well as in the electronic and optoelectronic industry or in the chemical sector for catalysis, for environmental protection and energy conversion. In this study, biosynthesis of stable cadmium sulfide (CdS) nanoparticles was done using *Artemisia annua* L. extract. These biosynthesized nanoparticles were characterized with the help of UV–Vis spectrophotometer, Dynamic light scattering (DLS), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and Transmission electron microscopy (TEM). Stability of bioreduced CdS nanoparticles was analyzed using UV–Vis absorption spectra, and their antimicrobial activity was screened against both gram-negative and gram-positive microorganisms. It was observed that *Artemisia annua* L. extract can reduce cadmium sulfide ions into CdS nanoparticles within 12 min of reaction time. Thus, this method can be used for rapid and ecofriendly biosynthesis of stable CdS nanoparticles of size range 10–50 nm possessing antimicrobial activity suggesting their possible application in medical industry [1-4].

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IN VITRO PHYTOCHEMICAL SCREENING OF MICROWAVE ASSISTED EXTRACTION (MAE) OF METHANOLIC EXTRACTS OF LEAVES OF *URTICA DIOICA* L. FROM RAMSAR-IRAN

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Plants contain pharmacologically active compounds that enable their use in a wide variety of medicinal and other health-related applications. These phytochemicals possess therapeutic properties that help reduce oxidative damage and protect humans from cancer and coronary heart diseases. The chemical characterization of indigenous flora in a given locality is a logical prerequisite to the isolation of bioactive chemical components for drug development [1, 2]. The aim of this study was to evaluate the phytochemical activity of methanolic extract of leaves of *Urtica dioica* L. belonging to the family Urticaceae. The leaves of *Urtica dioica* L. were collected and extract prepared from methanol by microwave assisted extraction (MAE) method. *In vitro* antioxidant activity of methanol extracts were assayed by $DPPH^0$ free radical scavenging assay method. Whereas, *In vitro* total Flavonoids were determined by the Aluminium Chloride Colorimetric method and total Phenolic content of methanol extracts were estimated by Folin–Ciocalteau method. *In vitro* qualitative analysis, the phytochemical compounds such as Cardiac glycosides, Flavonoids, phenols, Quinones, Di-Terpenes, Saponins, Coumarins, Phlobatannins, Tannins and Terpenoids were tested in methanolic extracts by using standard methods. Methanolic extracts from leaves of *Urtica dioica* L. showed total phenolic content of (48.23±0.09) mg GAE/g dry plant material respectively. Total flavonoid content of methanolic extracts from leaves of *Urtica dioica* L. was (27.36±0.14) mg QE/g dry plant material, respectively**.** The antioxidant activity of the investigated methanolic extract of leaves of *Urtica dioica* L. has a scavenging ability of $DPPH^0$ radical scavenging activity (78.47%). Whereas, the IC_{50} of methanolic extract of leaves of *Urtica dioica* L. for $DPPH^0$ assay was (1.23±0.04) mg/ml respectively, while that of ascorbic acid used as the reference control was (0.0116) mg/ml. The results of the phytochemical screening of methanolic extract of leaves of *Urtica dioica* L. Tannins, Di-Terpenes, Phenols, Coumarins, Terpenoids, Flavonoids, Quinones, Phlobatannins, Saponins and Cardiac glycosides were presented. Each active compound shows different activities against different type of diseases like cancer, liver disorders, diabetes, atherosclerosis and inflammatory diseases etc. It also possesses antioxidant properties. According to their characteristics, they can be involved into medicinal plant category.

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USING TWO MEDICINAL PLANTS IN NON-CHEMICAL CONTROL OF PURSLANE

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Weeds are one of the most important factors resulting in crops yield because of their competition ability [1]. Therefore, primary goal of weed management in agronomical systems is reducing their negative effect on crops. Since chemical control of weeds have destructive effects on environment, using non-chemical methods, like allelopathy, have been emphasized [3]. Some medicinal plants, like Artemisia and Salvia, produce allelopathy chemicals which can reduce the growth of weeds [2]. Thus, the effect of type and concentration of allelopathy extract was evaluated on seed germination and seedling growth of purslane in a laboratory test carried out as factorial in two factors based on RCD in three replications. The first factor was plant kind (*Artemisia* and *Salvia*) and the second factor was extract concentration (0.0, 5, 10, 15 and 20 percent). Results indicated that increasing in extract concentration resulted in reduction of germination speed and percentage and purslane seedling growth properties including number, width, length and dry weight of leaf and length and dry weight of stem. In a complementary experiment, the effect plant residue of *Artemisia* and *Saliva* at 0.0, 1, 2, 3 and 4 g.kg-1 (soil) was evaluated in a factorial experiment base on RCBD in three replications. The results of field experiment showed that plant residue reduced significantly ($P \leq 0.01$) capsule number per plant, grain number per capsule, grain production ($kg.ha^{-1}$) and shoot dry weight, while its effect on grain number per capsule and 1000-grain weight was not significant. Effect of plant kind and the interaction of plant and concentration had no significant effect on above properties. Increasing in plant residue in soil, resulted in the reduction of growth and seed production of purslane induced by plant number per unit area and capsule per plant [2]. In general, *Artemisia* and *Salvia* residue can be successfully used for non-chemical control of purslane.

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EFFECT OF DIFFERENT LEVELS OF MANURE FERTILIZER ON MACRO AND MICRO ELEMENTS OF LAVENDER (*LAVANDULA OFFICINALIS* L.)

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In order to investigate effect of manure on elements of lavender (*Lavandula officinalis*), this experiment was conducted in the form of randomized completed block design with three replication in Alborz research station, Research Institute of Forests and Rangelands in 2013. Treatment used included application manure in four levels 0, 10, 20 and 30 ton/ha. The result of analysis variance indicated that significant difference between treatments Percent of Nitrogen and Phosphorus (%N and %P), the concentration of Mn, Zn, Cu ($p \leq 0.01$) and uptake of Manganese ($p \leq 0/05$). Mean comparison indicated that maximum total shoot yield (9717 kg/ha) obtained from 30 ton/ha of manure. maximum percent of Nitrogen and Phosphorus (N=%2.09 and P=%0.15) and the maximum concentration of Iron, Manganese and Phosphorus uptake (Fe= 527 ppm, Mn=60 ppm, P=14 kg/ha) belongs to consumption 10 ton/ha manure and lowest the mount of these factors were obtained from other treatments (control, 20 and 310 ton/ha of manure). Obtained the highest amount of Zinc concentration of control (Zn=41 ppm). Control and 20 ton/ha had the highest concentration of Copper (Cu=16 ppm) and the lowest concentrations (14 ppm) obtained from 30 ton/ha manure. Lowest the Manganese uptake (450 g/ha) belong to control and using manure, at all levels (10, 20 and 30 ton/ha) have the greatest concentration (542 g/ha) of Mn uptake. Other parameters such as percent of Potassium; uptake of Nitrogen, Potassium, Iron, Zinc and Coper in all treatments were in one group.

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ESTABLISHMENT OF HAIRY ROOTS CULTURE AND EFFECT OF ELICITATION ON PRODUCTION OF TROPANE ALKALOIDS IN *HYOSCYAMUS RETICULATUS* HAIRY ROOT CULTURES

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Hyoscyamus reticulatus is an important medicinal plant which reported for the treatment of various ailments. *H. reticulatus* contains two distinguished tropane alkaloids, hyoscyamine and scopolamine. Both of them possess potential acute or chronic toxicity [1, 2]. A simple and efficient protocol was established for *in vitro* hairy roots induction in lattice henbane. Effect of Different factors including; *Agrobacterium rhizogenes* strains (A7, 15834, A13 and D7), various explants type (Cotyledon, Hypocotyl, two weeks old leaf, four weeks old leaf, two weeks old internode and four weeks old internode), two inoculation methods (immersion and injection) and although, four types of culture media (MS, ½ MS, ¼ MS and B5) on hairy roots induction efficiency and secondary metabolites production were tested. In second part of experiments, elicitations with different concentrations of colchicine (0, 0.01, 0.03 and 0.05% (w/v)) were used to improve Hyoscyamine and Scopolamine production. Transgenic status of hairy roots was confirmed by polymerase chain reaction analysis using specific primers of the *rolB* gene. The results showed that, induction of hairy roots in *H. reticulatus* is affected by bacterial strain and explant type. A7 strain and cotyledon explants were detected as the best explants for induction of hairy root in *H. reticulatus*. There was no significant difference between different inoculation methods. Hairy roots growth was significantly affected by medium type. The highest fresh weight produced in MS and B5 medium. Fresh and dry weight of hairy root reached to 1.44 and 0.134 mg at 0.05 percentage of colchicine after 48 h respectively. In addition, antioxidant activity of hairy root samples treated with colchicine was increased to 27% in compared with antioxidant activity level in non-transgenic roots (12%) and transgenic roots (18%). Transformed cultures showed significant differences ($p < 0.05$) in Hyoscyamine content. The highest amount of Hyoscyamine and Scopolamine (0.58% and 1.9 %) which found in elicited hairy root cultures was 3.2 and 5.1 folds higher than non-transformed roots (0.18% and 0.37%) respectively.

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THE STUDY OF EFFECTIVE FACTORS ON EMBRYOGENIC CALLUS INDUCTION AND *IN VITRO* REGENERATION OF *PAPAVER SOMNIFERUM*

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Opium poppy, *Papaver somniferum*, is one of the most important medicinal plants in pharmaceutical industry. In this study, the effects of different basal media on seed germination, different plant growth regulators, copper sulfide and glutamine amino acid on embryogenic callus induction and glutamine amino acid on germination of embryogenic callus were investigated. Results of seed culture on four different basal media, MS, 1/2 MS, LS and B5 indicated that culturing on 1/2 MS medium resulted in the highest seed germination and plant growth and this medium was selected as the best seed germination medium. Among the applied explant types (cotyledons, hypocotyls and leaves), hypocotyls of 7 day-old seedlings were selected as the best explant type. The study of the effects of plant growth regulators, including three auxins (2,4-D, 2,4,5-T and NAA alone or combination with BAP), in different combinations, proved that maximum callus induction was obtained by 1 mgl^{-1} of auxins (2,4-D, 2,4,5-T and NAA) in combination with 0.1 mgl^{-1} BAP. The results of our experiments showed that transferring of callus to B5 medium, supplemented with 100 mg/l glutamine, and bottom cooling of cultures were effective for induction, growth and development of somatic embryos. The optimum temperature for the callus induction and somatic embryogenesis was 18 and 23 ºC, respectively. Our results showed that tissue culture and *in vitro* regeneration of *Opium poppy* are difficult and encountered many problems and can be affected by different agents. This paper presents useful information about different aspects of Opium poppy *in vitro* culture.

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THE IMPROVING EFFECTS OF HYDROALCOHOLIC STEM EXTRACT OF *CICHORIUM INTYBUS* 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 cichorium intybus 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.

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INDUCTION OF TRANSGENIC HAIRY ROOTS IN CAPER (*CAPPARIS SPINOSA*) USING *AGROBACTERIUM RHIZOGENES*

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The Caper (*Capparis spinosa* L.) is an important medicinal plant used in traditional medicine to treat the infection and rheumatic disorders. In this investigation the effects of different factors affecting the production of hairy roots induced by *Agrobacterium rhizogenes* were studied in this plant. The Caper seeds from the Tabriz ecotype were germinated on solidified MS medium and grown in a growth chamber at 20-25 °C temperature and photoperiod of 16 hours of light and 8 hours of darkness. Leaf and stem segments in sterile conditions were immersed in suspension culture medium and were infected with different strains of *Agrobacterium rhizogenes* (A4, ATCC15834 and 1326) in three inoculation treatment (15, 20 and 30 minutes) and then explants were co-cultivated for 24 or 48 hours at 25 °C. After removing bacteria, co-cultivated explants were transferred onto hormone-free MS or 1/2MS medium containing 350 mg/l of cefotaxime. After two to three weeks hairy roots were emerged and transformation frequency and the root number were used to describe virulence efficiency. Hairy root transformation was confirmed by polymerase chain reaction (PCR) using gene-specific primers for *rol*B gene of *Agrobacterium rhizogenes*. The analysis of variance showed that there were significant differences between strains of bacteria, explants type, inoculation duration, co-cultivation time and culture medium for hairy root induction percentage and the number of hairy roots per explants. Results showed that all of the strains were efficient in hairy root induction, but the A4 strain with average 40.1%, had the highest, and 1326 strain with average 20.8% had the lowest percentage of hairy root induction. Also, hairy root frequency and number in the leaf explants were significantly higher than the stem explants. Comparison between the different inoculation treatments, showed that the highest hairy root percentage with average of 40.5% is belongs to 30 minute inoculation and 48 hour co-cultivation period. In both explants the hairy root percentage and number in MS medium was significantly greater than 1/2MS medium. The overall results showed that the optimum condition for induction of hairy roots in *Capparis spinosa* was infection of leaf explants with A4 strain for 30 minute of inoculation time and 48 hour of co-cultivation period.

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INTRODUCTION OF A PROMISING PLANT (*CISTANCHE TUBULOSA)* FOR DRUG DISCOVERY REGARDING CANCER TREATMENT

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Cistanche tubulosa is a rare plant species in the desert of Iran. It has been used for many years in oriental countries as the source of medicine and food [1]. Since this plant does not have root or chloroplast, it is not able to photosynthesize and this feature makes it a unique plant of desert. Acute lymphoblastic leukemia, is an acute form of cancer of the white blood cells. There is no certain treatment option for this desease and scientist are seeking for new and promising sources of drugs. In the present work, the essential oil of *Cistanche tubulosa* collected from Zabol was assessed for screening of its effectiveness on MOLT-4 (human acute lymphoblastic leukemia cell line) cell line. Cell viability was determined using the standard MTT assay [2]. In brief, exponentially growing cells were harvested and plated in 96-well plates (5 × 103/well). Control wells contained no drug and blank wells contained growth medium only for background correction. After 24 h incubation at 37 °C under a humidified 5% CO2, plate was centrifuged, 50 ul of medium was removed and the cells were supplemented with 50 ul of the different concentrations of essential oil dissolved in growth medium as triplicate. Cells were incubated for further 72 h then the growth medium was removed and 100 µL of MTT solution (0.5 mg/mL) was added to the wells. After 4 h incubation, the formazan crystals formed was dissolved in 200 ul of DMSO. Its amount was measured spectrophotometrically at 570 nm with background correction at 655 nm using a Bio-Rad microplate reader (model 680). Cell viability was calculated from the mean values of data from three wells by using the following equation: Cell viability (%)= [(Abs(test samples) -Abs(blank))/(Abs(control) -Abs(blank))] ×100 Growth inhibition percentage of MOLT-4 by the essential oil was found to be 30.7%, (2.5 ug/ml) which is a promising sign of the effectiveness of the essential oil against lukemia cancer when it is compared with the growth inhibition percentage of 65.8% by cisplatin (10 uM) as the standard drug.

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PRODUCTION AND COMPOSITION OF TARRAGON ACTIVE SUBSTANCES CULTIVATED IN "KARAJ" REGION

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Tarragon, *Artemisia dracunculus* L., is a herbaceousplant belonging to the Asteraceae. French tarragon is mainly used as a culinary herbin oil, sauces, vinegars, mustards and spices, and the French call it the 'king of herbs'.Tarragon possesses many biological activities, such as anti-epileptic, anti-diabetic, anti-inflammatory, antibiotic and etc. The most important classes of biologically active substancesin the herbage are essential oils, coumarins, flavonoids, and phenolcarbonic acids. 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-FIDand GC-MS. Nineteen compounds were identified, which represented about 99.7% of the total detected constituents. The main constituents of the essential oil were Estragole (82.47%), Beta-phellandrene (6.03%), E-beta-ocimene (4.71%), Allo-ocimene (1.81%), limonene (1.70%), Alpha-pinene (1.19%) and Spathulenol (1.01%).

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CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *HYMENOCRATER BITUMINOSUS* FISH. &. C.A. MEY. FROM IRAN BY GC AND GC/MS INSTRUMENT.

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The genus *Hymenocrater* is comprised of about 9 species in Iran that Four genus of them are endemic [1], in this investigation *Hymenocrater Bituminosus* collected from shahrood, semnan Province, Iran. Plant material dried in the shed and suitable air condition the essential oil of plant obtaind whit hydrodistillation and investigated by GC-FID and GC-MS. Essential oil of plant were separately subjected to hydrodistillation using a Clevenger–type apparatus for 3h. The composition of the volatile essential oils was investigated by GC-FID and GC-MS. Kovat's retention indices were calculated using co-chromatographed standards hydrocarbons. The individual compounds were identify by MS and their identity was confirmed by comparing their retention indices relatives to C8 –C32 n- alkanes and by comparing their mass spectra and retention times with those of authentic samples or with data already available in the NIST library and literature Adams [2]. Investigation on the essential oil obtained with hydrodistillation showed that P-Menthyl acetate (21.03%), Caryophyllene oxide (5.99%), 1,8-Cineole (5.89%), Spathulenol (5.53%), α-pinene (4.7%) and Asarone (4.46%) were the main copoment in Fifty three components, representing of the total components were identified in the essential oil (91.09%). the oils from *Hymenocrater Bituminosus* are rich in monoterpenes (61.19%), while the sesquiterpenes (28.55%) smaller amounts than monoterpenes.

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CNSTITUENT OF THE ESSENTIAL OIL OF *TANACETUM POLYCEPHALUM* FROM IRAN

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The Flora of Iran comprises 26 species of *Tanacetum* of which 12 are endemic [1]. *Tanactum* species are reported to possess anthelminic, carminative, antispasmodic and anti-migraine properties having a repellent effect against the Colorado potato beetle [2, 3]. Previous investigations have been focused on different species of *Tanacetum* of Iranian origin recognize the presence of sesquiterpene lactones, and essential oils. In this investigation *Tanacetum polycephalum* collected from shahrood, semnan Province, Iran. Plant material dried in the shed and suitable air condition the essential oil of plant obtaind whit hydrodistillation and investigated by GC-FID and GC-MS. The composition of the volatile essential oils was investigated by GC-FID and GC-MS. Kovat's retention indices were calculated using co-chromatographed standards hydrocarbons. The individual compounds were identify by MS and their identity was confirmed by comparing their retention indices relatives to C8 –C32 n- alkanes and by comparing their mass spectra and retention times with those of authentic samples or with data already available in the NIST library and literature Adams. analysis of the essential Oils obtaind from flower, leaf and stem of *Tanacetum polycephalum* showed that 1,8-Cineole (15.50%, 37.64% and 29.30% respectively), Camphor (22.16%, 19.28% and 26.97% respectively), Camphene (6.07%, 4.60% and 3.94% respectively) and α-Pinene (8.20%, 8.20% and 7.75% respectively) were the main component in the identified flowers, leaf and stem essential oil (92.79%, 96.32% and 94.9% respectively).

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COLLECTION, IDENTIFICATION AND SURVEY THE TRADITIONAL MEDICINAL USES OF MEDICINAL PLANTS OF MANEH AND SEMELGHAN REGION IN NORTH KHORASAN PROVINCE

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The Maneh and semelghan region in North Khorasan province due to the diversity of climates and topography, the vegetation is very diverse and has valuable plant resources that a high percentage of them are medicinal plants. Some portions of this region is located at the crossroads of two important climate included Mediterranean and Caspian (Ecotone area on the border between the provinces of North Khorasan and Golestan) that it has added to the richness of vegetation in this area.Because people have been familiar with the local names and uses of medicinal plants, many of these plants are known and used in traditional medicine widespread. During a survey that was conducted for 5 years (In the years 2011 till 2015), 123 species of medicinal plants belonging to 32 plant families, from different parts of the regionwere collected and identified.Species identified include the scientific name of the species, plant families, Persian name, organs used in traditional medicine and medicinal uses of the collected species were recorded in the corresponding form.Based on the results of this research, Asteraceae family with 20 species had the highest number of medicinal species.In the next step Lamiaceae family with 18 species had the most medicinal plantspecies.Apiaceae andRosaceaefamilies with 12 and 13 species were followed respectively.

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EFFECTS OF SEED PRIMING ON REDUCTION OF DROUGHT STRESS AND IMPROVING OF GERMINATION, EMERGENCE, SEEDLING GROWTH AND THE AMOUNT OF ESSENTIAL OILS IN SAVORY (*SATUREJA MUTICA* FISCH.& C. A. MEY)

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The use of seed priming techniques to speed up the germination process specially, in stress conditions has recommended by many researchers. Therefore a laboratory and greenhouse experiment on Savory (*Satureja mutica*) by seed priming under drought stress conditions was conducted. Both experiments were factorial based on completely randomized design with four replications. In the first experiment the effect of seed priming solutions included KNO_3, $CaCl_2$, KCl , NaCl (as Halo priming treatments) at a concentration of 200 mEq per liter and distilled water (as Hydro priming treatment) and drought stress levels (included 0, -4, - 8, -12 and -16 bar) due to the polyethylene glycol (PEG 6000) to assessing the different characteristics of germination and seedling growth under drought stress were studied. In the second experiment, the effect of seed priming and drought levels (included 20, 40, 60 and 80% of field capacity) on seed germination, seedling growth and essential oil content under controlled conditions (greenhouse) were evaluated. The results of the first experiment showed that seeds priming with KNO_3, had the greatest positive impact on improving germination characteristics and seedling growth rate. The second experiment results showed seedling growth characteristics and essential oil content of Savoryin primed seeds were significantly higher than other treatments.

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EVALUATION OF MORPHOLOGY AND ANTIOXIDANT ACTIVITY OF ROOTS AND SHOOTS OF"*EREMOSTACHYS LACINIATA* L."IN AZERBAYJAN

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Chelledaghi "*Eremostachys laciniata* (L) Bunge" is a medicinal herb that is used traditionally in Iran to treat some diseases like allergies, headache and liver diseases. Its parts, especially roots are strong anti-inflammatory effect is due to iridoid glycosides. Some of the species traditionally used in reducing the pain of insect bites. In this research, roots and aerial parts of Chelledaghi were harvested at different stages of its life. Morphological traits of the plant were evaluated in two stages; before and after flowering and were measured some characteristics like: plant height, leaves number and height and width, inflorescence number and height. Antioxidant activity was measured by two ethanolic and methanolic extracts. On the basis of our results, the ethanolic extract of pre-flowering stage of aerial parts showed the highest (78.47) and methanolic extract of root at the first stage of harvest led to the best antioxidant activity (75.85). Our findings clearly indicated that antioxidant activity of *E. laciniata* varied significantly with the physiological stage of the plant. And we recommend use of pre-flowering stage of plant growth cycle to have more antioxidant activity.

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CINNAMALDEHYDE AND EUGENOL COULD SHORTEN THE TELOMERE LENGTHS OF THE HUMAN ADIPOSE-DERIVED STEM CELLS

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Phytochemicals may protect the stem cells from DNA damage enhancing their survival and maintaining their function.Telomere lengthening by active telomerase (TERT) enzyme may indicate the stem cells rejuvenation.The aim of this study is to evaluate the effect of Cinnamaldehyde and Eugenol, two active ingredients of herbs, onthe aged human adipose-derived stem cells (ADSCs). Pure Cinnamaldehyde and Eugenol were dissolved in 0.01% DMSO at first. ADSCs were then obtained from the aged woman who have had liposuction surgery and allowed to growth in DMEM+10% fetal bovine serum plus antibiotics. Then, cells treated separately with 0.01% DMSO, or 2.5µM/ml Cinnamaldehyde, or 0.1µg/mlEugenol, or kept untreated as the control group for 48 hours. Telomere lengths and TERT gene expression were measured using real-time semi-quantitative PCR (qPCR). Statistical analysis was done using ANOVA and Tukey-HSD with 0.95 confidence interval. Telomere lengths of the Cinnamaldehyde and Eugenol-treated ADSCs were significantly decreased compared to untreated cells ($P<0.05$) but insignificantly than DMSO-treated cells ($P>0.05$). TERT gene expression was undetectable in all investigated groups and any treatment group did not change its folds to detectable levels. The eventually effect of Cinnamaldehyde and Eugenol on the ADSCs were the enhancement of stem cell aging through telomere shortening. Then, these phytochemicals may be unfavorable for stem cell's proliferation.

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CINNAMALDEHYDE DECREASES ADIPOGENESIS BUT INCREASES OSTEOGENESIS OF THE HUMAN ADIPOSE-DERIVED STEM CELLS

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Herbal ingredients,such as Cinnamaldehyde, may regulate the stem cells growth and differentiation. The aim is to evaluate the effect of a low concentration of Cinnamaldehyde on the human adipose-derived stem cells (ADSCs). ADSCs were prepared from adipose tissue of a 38 year old women. Then, cells were grownin adipogenic or osteogenic differentiation media for 19 and 16 days. Pure Cinnamaldehyde dissolved in 0.01% DMSO and ADSCs were also treated with 0.01% DMSO, or treated with 2.5µM/ml Cinnamaldehyde or kept untreated.Adipogenesis and osteogenesis were analyzed with ImageJ and TotalLab TL120 software, after staining with Oil-red and Alizarin-red, respectively. Statistical analysis was done using ANOVA and Tukey-HSD with 0.95 confidence interval. Cinnamaldehyde did not potentiate adipogenesis compared to untreated cells ($P=0.917$) but significantly did decrease it compared to DMSO-treated ADSCs ($P=0.001$).Cinnamaldehyde did not increase osteogenesis compared to untreated ADSCs ($P=1.000$) but increased it compared with DMSO-treated ones ($P=0.002$). The pure effect of Cinnamaldehyde on the ADSCs differentiation was osteogenesis enhancement of ADSCs rather than the adipogenesis reduction. Then, Cinnamaldehyde may be beneficial in tissue engineering and regenerative medicine especially for induction of osteogenesis and inhibition of adipogenesis of ADSCs.

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ANTIFUNGAL EFFECTS OF *ECHINOPHORA PLATYLOBA* EXTRACTS ON FUNGAL POPULATION OF FETA AND NATIVE IRANIAN CHEESE

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Increasing interest and attention to replace chemical preservatives with natural ones lead to several studies about herbal sources and finding several herbal extracts and essence to explore an appropriate and natural replacement for chemical preservatives. *EchinophoraPlatyloba* is one the native plants of ChaharmahalvaBakhtiari province which is used as a flavoring agent in some foods such as tomato paste, cheese and pickles. This plant also is consumed with yogurt and dough as a freshener. According to these facts, current study is designed to evaluate the antifungal effect of *E. platyloba* extracts as a flavoring and natural preservative in Iranian Feta cheese.In this study, the *E. platyloba* was gathered from Shahrekord suburbs in spring and after drying in shade, it was converted to powder. After weighting the powder and adding appropriate amount of distilled water and 96% ethanol, the water and ethanol extract were obtained by rotary evaporator. The extracts were passed from Millipore filter and store in dark and cold place. The extracts in 2, 4 and 6 concentrations were mixed with industrial and native cheeses and incubated at two different temperature conditions (4 and 25ºC). The cheeses without any extracts were used as control.Antifungal effects of extracts on fungal population of cheeses were determined by preparing the culture in 0,7 and 14 days using PDA medium. According to the results only 6% ethanol extract in industrial cheese in refrigerator temperature (4 ºC) and room temperature (25 ºC), also native cheese at 4 ºC were able to reduce the fungal population in Feta and native cheese significantly. About native cheese at 4 ºC, 4 and 6% ethanol extract reduced the fungal colonies significantly.

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AMELIORATIVE EFFECTS OF *SOPHORA PACHYCARPA* ROOT EXTRACT ON DERUM LEVELS OF SEX HORMONES IN CARBON TETRACHLORIDE-INTOXICATED MALE RATS

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Male sexual dysfunction composed of several problems associated with sperm concentration, motility and hormonal imbalance e.g., low testosterone level, which are caused by alcoholism, drug abuse, aging and cigarette smoking, anti-depressant drugs and exposure of toxic chemicals. Carbon tetrachloride is an industrial solvent cause kidney, lungs and testicular damages in experimental animals [1]. Previous studies on the chemical composition of *S. pachycarpa* have shown the presence of antioxidant compounds such as flavonoids [2]. The purpose of this study was to investigate the protective effects of *Sophora pachycarpa* roots extracts on serum level of sex hormones in carbon tetrachloride-intoxicated in male rats. Thirty six male Wistar rats (195-200 g) were selected and randomly divided into 6 groups (n=6): pre-treatment groups I,II,III received *S. pachycarpa* extract at doses 50 mg/kg/day, 100 mg/kg/day and 250 mg/kg/day by gavage for 21 days prior to intraperitoneal injection of CCl_4 500 µl/kg on 21st day, control group, CCl_4 group received 500 µl/kg CCl_4 on the 21st day, post-treatment group received extract at doses 100 mg/kg/day for 10 day at 12h after CCl_4 250 µl/kg injection. At the end of the treatment, blood was collected by cardiac puncture from all of the animals and serum levels of Follicle Stimulating Hormone, Luteinizing Hormone and Testosterone were assessed. Serum levels of testosterone and follicle stimulating hormone were significantly increased in serum of pre-treatment group III and serum level of luteinizing hormone in serum of pre-treatment group III compared to CCl_4 was significantly increased ($p<0.05$). According to results it is suggested that *Sophora pachycarpa* extract can partly ameliorate toxic effects of CCl_4 in male reproductive system, possibly through antioxidant effects of its bioactive compounds.

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METHANOL AND ITS DIETARY INTAKE BY HERBACEOUS DRINKS CONSUMPTION IN HAMADAN, IRAN

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Methanol, a neurotoxic agent, occurs naturally at different levels during the production of distillated herbaceous drinks. The aim of this study was to evaluate contamination and dietary intake of methanol by herbaceous drinks consumption in Hamadan, Iran. Sixty samples from five types of distillated herbaceous drinks were analyzed for methanol and ethanol by gas chromatography. The results showed that thirty-three samples were positive for methanol at levels that ranged from 8.35 to 31.90 mg/dl. Additionally, in the positive samples, the ratio of methanol/ ethanol was greater than the European Union acceptable limit. Although methanol intake was estimated within acceptable limits, some of the Iranian consumers might need to moderate their herbal distillate consumption.

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EFFECT OF GIBBERELLIC ACID ON THE GROWTH AND ANATOMY OF DRAGONHEAD (*DRACOCEPHALUM MOLDAVICA* L.)

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Dragonhead (*Dracocephalum moldavica* L.) is an annual and herbaceousplant of *Lamiaceae*familywhich have been shown to have antibacterial, antimicrobial, and antioxidant properties in of plant.It is used in folk medicine as painkiller and for treatments of kidney complaints, toothache and colds. Gibberellic acid (GA), is a naturally occurring plant growth regulator which may cause a variety of effects including the stimulating plant growth and development.it is a tetracyclic di-terpenoid compound.westudiedgrowth and morphological responses of Dragonhead to different concentration of Gibberellic acid (0, 30, 60 and 90 mg l^{-1}) were sprayed of Dragonhead plants shoots, 30 days after planting. Gibberellic acid affected morphological characteristics like stem diameter, number of lateral stems, plant height, leaf area, number of leaves and fresh weight. Higher concentration of exogenous GA resulted in the highest stem diameter (13.852), number of diameter stem (25.417), plant height (172.785), leaf area (551.107), number of leaves (95.721), and plant fresh weight (95.451). We concluded that applying exogenous GA can increase growth and yield of Dragonhead.

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DIVERSITY IN CHIMICAL COMPOSITION AND YIELD OF ESSENTIAL OIL FROM FOUR ECOTYPES OF PEPPERMINT (*MENTHA PIPERITA* L.) IN IRAN

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Peppermint (*Mentha piperita* L.) belongs the family Lamiaceae, is one of the most important medicinal plants which used in food, sanitary and cosmetic industries. Peppermint cultivated in the temperate, Mediterranean and subtropical regions of the world [1]. Peppermint (*Mentha piperita* L.) which is tetraploid ($2n=72$), is a sterile natural hybrid of *M. aquatica* L. ($2n=96$) and *M. spicata* L. ($2n=48$) [2]. The aim of this study was to identification of the components of Peppermint cultivated in Iran climatic conditions. The study carries out in Isfahan, Chaharmahal and Bakhtiari provinces, Central and Southwest of Iran, on 2014. The essential oils of samples were obtained by hydro-distillation, and analyzed using GC/MS. The essential oil yields were obtained from the aerial of *M. piperita*, 1.87, 1.52, 1.48 and 1.32 ml / 100 g dry matter identified in Saman, Kuhrang,Kamu and Chadeganprovince, respectively. The chemical constituents identified by GC-MS analyses resulted in *M. piperita*essential oil, 25, 23, 27 and 30 compounds were identified in Saman, Kuhrang, Kamu and Chadegan province, respectively. The major constituents of the oil Saman were menthol (47.36%), menthone (12.96%), menthofuran (7.26%), menthyl acetate (6.89%) and 1,8-cineole (6.86%). The major constituents of the oil Kuhrang were menthol (41.42%), menthone (15.25%), menthofuran (10.85%), 1,8-cineole (8.38%) and menthyl acetate (5.71%). The major constituents of the oil Kamu were menthol (38.67%), menthone (18.68%), menthofuran (8.24%), isomenthone (6.82%) and menthyl acetate (5.24%). The major constituents of the oil Chadegan were menthol (44.68%), menthone (14.35%), menthofuran (6.83%) and 1,8-cineole (8.76%).

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THREE ECOTYPES OF (*OCIMUM BASILICUM* L.) IN IRAN; PHYTOCHEMICAL STUDY

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Sweet basil (*Ocimumbasilicum*L.) belong to the family Lamiaceae is an annual, herbaceous, white to purple flowering plant, 20–60 cm tall, that originated in Iran and India. The genus *Ocimum* includes 50-150 species and subspecies [1], distributed throughout the tropical regions of Asia, Africa and Central and South America [2]. The aim of this study was to identification of the components of sweet basil cultivated in Iran. The study carries out in Isfahan provinces, Central of Iran, on 2014. The essential oils of samples were obtained by hydro-distillation, and analyzed using GC/MS. The essential oil yields were obtained from the aerial of *O. basilicum*, 0.68, 0.71 and 0.96 ml / 100 g dry matter identified in Baghe-Bahadoran, Shahreza and Falavarjan province, respectively. In total, 30, 32 and 38 compounds were identified in Baghe-Bahadoran, Shahreza and Falavarjan province, respectively. The major constituents of the oil Baghe-Bahadoran were methyl chavicol (58.35%), neral (11.64%), linalool (9.34%) and 1,8-cineole (4.13%).The major constituents of the oil Shahrezawere methyl chavicol (45.82%), linalool (17.31%), neral (13.21%), 1,8-cineole (5.73%), geranial (5.84%) and the major constituents of the oil Falavarjan were methyl chavicol (62.69%), geranial (7.36%), linalool (6.91%), β-caryophyllene (4.68%) and neral (4.67%).

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BREAKING SEED DORMANCY OF *SALVIA LERIIFOLIA*, A MEDICINAL PLANT OF THE IRAN

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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 Norouzak, Mashhadi maryam goli, Kaboli maryam goli, Chebleh, Cheblak, Chapaleh, and Jobleh (Rechinger, 1982). All parts of this plant (flowers, branches, seeds and even roots) are used for medicinal purposes (Hosseinzadeh et al., 2009). There are many references about pharmacological effects of *S. leriifolia* as: sedative and hypnotic (Hosseinzadeh and Imamshahidi, 1999), antihyperglycemic effect (Hosseinzadeh et al., 1998), skeletal muscle relaxant (Hosseinzadeh and Hassanzadeh, 2001), analgesic and anti-inflammatory (Hosseinzadeh et al., 2003), anticonvulsant (Hosseinzadeh and Arabsanavy, 2001), neuroprotective (Sadeghnia et al., 2003), inhibition of opioid and withdraval syndrome (Hosseinzadeh and Lari, 2000) and anti-ulcer effect (Hosseinzadeh et al., 2000). The objective of this experiment was to find an effective method for breaking seed dormancy of Norouzak. Different treatments were used including Sulfuric acid (98%, 20 and 30 min), hot water (70 °C, 5 and 10 min), hot water (90 °C, 5 and 10 min), soaking seeds (4 hr), potassium nitrate (0.2% for 4 hr), stratification (4 °C for 7, 14 and 28 days) and removing the seed coat. Results showed that scarification with hot water had no effect on germination. However Sulfuric acid could improve germination of Norouzak but the highest percentage of germination (81%) was occurred by removing the seed coats. It seems that seeds of this plant had induced dormancy which is derived from the seed coat. So, the hardseededness and seed coat impermeability were the main limiting factors in the germination of Norouzak seeds.

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EVALUATING THE IMPRESSION OF FAKHRI WHITE GRAPE IN SHORT PERIOD OF USING ON OXIDATIVE STRESS VIA MEASURING THE AMOUNT OF SERUM TOTAL ANTIOXIDANTCAPACITY (TAC) ON OVERWEIGHT WOMEN AT MALAYER

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Free radicals contribute in many chronic diseases such as cancer[1]. Antioxidants are powerful detergents of free radical and regenerator of the immune system. Antioxidant defense includes two endogenous defense system (the first line of defense against free radicals) and exogenous (the second line of defense that obtained from food) [2]. Total antioxidant capacity (TAC) indicative of total activity of both groups antioxidants in plasma and body fluids [3]. An imbalance between the production of free radicals and antioxidant defense leading to oxidative stress in the body and damage to cell components. Grapes have antioxidant properties and its Phenols can effectively combat free radicals and reduce the oxidative stress level. So, the purpose of this study is investigation of effect grape consumption on serum levels of TAC. This study was done in simple random method، at the Joorab village of Malayer city in Hamedan state of Iran. Initially were assessed the relationship between BMI and age with serum TAC level. Despitesignificant relationship between TAC level with BMI and age, serum TAC levels in three groups of individuals with different BMI and age was evaluated by ELISA technique in two consecutive weeks of lack of consumption and consumption of fresh grapes. Participants, during the experiment used a diet with low-flavonoid content and precise control of consumption. Result showed that grape consumption in short period hadn't significant effect on TAC levels.

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CEMPARE EFFECT OF *SWERTIA LONGIFOLIA* BOISS AND *SALVIA HYDRANGEA* ON DIABETIC BLOOD SUGAR LEVELS

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Diabetes is a multi–factorial illness with high contagion and a universal challenge, but its remedy is constraint and has side effects [1, 2]. So purpose of this article is compare effect usswertialeongifoliaBoiss and salvia Hydrangea an blood sugar levels. Material and Method: In this research 48 Male Wister rats Divided in to 6 groups: Control group, diabetic control and 4 experimental groups. Daily control group received the food, diabetic control group received normal saline and 4 experimental groups received extract of Alcoholic extract of suertialongifolia100 and 200 doses, extract of Alcoholic extract of salvia hydrangea 100 and 200 doses, freely. For induction of diabetes, streptozotocin inject to peritoneum, 60 mg/kg. Blood sugar level analyze before and after become diabetic and at the end of test period [3]. Blood sugar level is diabetic groups has increased after 2 days received stz, meaningfully; but after 3 weeks and prescription salvia Hydrangea and swertia longifolia Boiss blood glucose level has decreased meaningfully in control group. Insulin level in diabetic control fro up than control group has decreased but in all empirical groups than diabetic control group has increased. Insulin level in empirical group/ maximum dosage of salvia Hydrangea increased than received groups of swertialongifoliaBoiss. (p</05). Salvia Hydrangea has more effective on Insulin secretion but use of 2 extracts with increase of Insulin and decrease of blood sugar Amy have effects on about diabetic symptoms and its side effects.

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ANTILEISHMANIAL ACTIVITY OF *NIGELLA SATIVA* L. EXTRACTS AGAINST LEISHMANIA MAJOR, AN IN VITRO STUDY

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Leishmaniasisis the most prevalentvector-born parasitic disease affecting humans in the tropicaland subtropical countries worldwide.Although chemotropic is the most effective choice to treat leishmaniasis, but many current drugs are toxic and also drug-resistance has been reported to some drugs. The aim of the present in vitro study was to evaluate the *anti-leishmainal* activity of *N. Sativa* Ethanolic and aqueous extracts against L.major. Ethanolic extract of *N. sativa* with 80% concentrations possessed the highest activity on promastigotes of *L. major* with 92.4 % inhibition (EC50 value=39.56µg/ml) after72 hours and had more effect on promastigote population ($p<0.05$). Other concentrations (50%–70%) showed significant effects against parasite, with a percentage of growth inhibition between 47.2% and 77.7%. Parasite viability results suggest that the Ethanolic extract of *N. Sativa* regarded as non-cytotoxic could be a promising candidate drug for treating *L. major* infection.

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CHEMICAL COMPOSITION EVALUATION OF *MYRTUS COMMUNIS* L. DISTILLED WATER, AND COMPARISON WITH ITS OIL EXTRACTED WITH HYDRODISTILLATION METHOD

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Myrtus communis L. (Myrtaceae) is an evergreen shrub which grows spontaneously in many countries. It is used for medicinal, food and spice purposes. In this study, the distilled water and essential oil were prepared using simple distillation method and then they were investigated by gas chromatography/mass spectrometry (GC/MS). The most abundant components present in the distilled water of the leaves of *Myrtus communis* L. were 1,8-Cineol, Linalool, α-Terpineol, Thymol and Carvacrol however Caryophyllene oxide and Caryophylla-4(12), 8(13)-dien-5α-ol were the most ones in its essential oil. The results of this work provided a scientific viewpoint into the different distribution of the effective compounds of the leaves of *Myrtus communis* L. in its distilled water and essential oil, and unravel a way to select the extraction methods for efficient therapeutic and other applications of this plant.

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CHEMICAL COMPOSITION OF THE FLOWER, LEAF AND STEM OIL OF *HYMENOCRATER BITUMINOSUS* FISH. &. C.A. MEY. FROM IRAN

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The genus *Hymenocrater* is comprised of about 9 species in IRAN that Four genus of them are endemic[1], Hymenocrater genus has been previously investigated such as identification of essential oils compounds [2] and anti-microbial effects [3]. In this investigation *Hymenocrater Bituminosus* collected from shahrood, semnan Province, Iran. Plant material dried in the shed and suitable air condition. The water- distilled essential oils of *Hymenocrater Bituminosus* were analyzed by using GC and GC/MS instruments. Investigation on the essential oil obtained with hydrodistillation showed that Linalool (13.14%), Spathulenol (11%), Linalyl acetate (7.17%), α-Pinene (6.54%), α-Terpineol (5.94%) and 1,8-Cineole (4.48%) were the main component in representing of the total compounds were identified in the flowers essential oil(92.88%). α-Cadinol (11.01%), 1,8-Cineole (6.86%), Caryophyllene (6.78%), Spathulenol (6.67%) and Germacrene D (5.06%) were the main constituent of the representing leafs essential oil(94.25%). Octane (31.79%), Spathulenol (4.29%), 1,8-Cineole (4.61%), α-Pinene (4.25%), Caryophyllene oxide (3.65%) and α-Cadinol (3.56%) were the main constituent of the representing stem oil(83.92%).

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IMPROVEMENT OF YIELD AND WATER USE EFFICIENCY OF ROSELLE MEDICINAL PLANT BY MYCORRHIZAL INOCULATION

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The use of chemicals in the production of medicinal plants in addition to environmental pollution decreases the quality of drug. Thus, the use of free and symbiotic micro organisms such as mycorrhizal fungi is a sustainable method for production of chemical-free and high quality medicinal plants. Roselle (*Hibiscus sabdariffa* L.) as a member of Malvaceae family is a subtropical medicinal plant with many medical applications [1, 3]. So far, the use of mycorrhizal symbiosis has not been properly investigated in Roselle cultivation. Therefore, in this experiment the influence of mycorrhizal inoculation [*Glomus versiforme* (GV), *Glomus intraradices* (GI) and control] was investigated on sepals yield and water use efficiency of Roselle. The study was conducted based on a Randomized Complete Block Design with three replications at Research Field of Sarayan Faculty of Agriculture (33ºN, 58ºE and 1,450 masl) in South Khorasan province. Mycorrhizal inoculation had a significent effect on all the studied indices ($P \leq 0.01$). The highest amount of sepals dry yield was obtaind in GI treatment (18.2 $g.m^{-2}$), followed by GV (13.68 $g.m^{-2}$) and control (12.9 $g.m^{-2}$) treatments. A similar result was obtained about biological yield, where the amount of this criterion in GI was 25 and 35% higher than GV and control, respectively. Two used mycorrhiza species exerted a positive effect on water use efficency based on sepals (WUEs) and biological (WUEb) yields. The amount of WUEs in GI, GV and control treatments was 0.0206, 0.0166 and 0.0135 kg. m^{-3}, respectively. In addition, WUEb in GI and GV treatments was 36 and 21% higher than control. The positive effect of some biofertilizers including *Azospirillum* sp., *Bacillus polymyxa* and a mixture of *Glomus* sp., *Gigaspora* sp. and *Scutellospora* sp. on growth, yield and quality of roselle has been reported in similar studies, previously [1, 3]. It seems that improvement of plant growth criteria in response to mycorrhiza innoculation is mainly related to better water uptake by increasing the effective soil volume. In addition, mycorrhiza fungi facilitates the absorption of available forms of phosphorus and other nutrients which are not directly available to plants [3]. Other mechanisms such as hormonal effects through abscisic acid, improved soil-hyphal contact, more effective scavenging for water in micropores, direct uptake of water by hyphae, and increased photosynthesis through sink stimulation are also effective on enhacement of yield and water use efficiency in plants inoculated with mycorrhiza [2].

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PREPARATION STRATEGIES FOR ISOLATION OF VINBLASTINE AND VINCRISTINE FROM *CATHARANTHUS ROSEUS*

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Catharanthus roseus is a medicinal plant belonging to the family Apocynaceae which produces more than 130 terpenoid indole alkaloids (TIAs) in which vincristine (VCR) and vinblastine (VBL) have the most important used in pharmaceutical industry. They have been applied in the treatment of several type of cancer, such as Hodgkin's disease, lymphosarcoma, choriocarcinoma, neuroblastoma, carcinoma of the breast, and chronic leukemia [1]. Because of the trace amounts (0.01−0.1 mg/g DW) of VBL and VCR in the plant of origin [2], their quantitative analysis in the plant is difficult. Annual demand of these two alkaloids are 300 kg, while its annual sales is about 200 million USD in world. While its production via plant cell cultures unsuccessful so far and since complexity of plant extract media made its isolation horboring[3].In this study we are presenting 2D HPLC method for preparative isolation of VCR and VBL from it natural origin based on a combination of reversed-phase liquid chromatography followed by Hydrophilic Interaction Liquid Chromatography (HILIC). Because of media complexity and low amount of compounds of interest, we optimized a reversed-phase solid phase extraction (RP-SPE) for both pre-purification and pre-concentration. Then VCR and VBL-rich fraction of leaf extract was found Based on HPLC-DAD. Optimum separation condition on analytical HPLC-DAD (250×4.6 mm, 5 µm, both C18 and Silica columns) were scaled- up to preparative HPLC (250 ×16 mm, 10 µm, 10 $mlmin^{-1}$). For confirmation of vinblastine and vincristine in fraction, mass spectrometry technique was used. Two characteristic quasi-molecular ions [M+H] at *m/z* 811 and 825 related to the molecular weights of the investigated compounds observed in the positive ion mode MS spectrum. Finally the preparative 2D HPLC was used for purification of the compounds. Vinblastine and vincristine was achieved with purity of 98% .

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THE INTERACTION OF MOLYBDENUM STRESS AND SALICYLIC ACID TREATMENT ON SOME MORPHOPHYSIOLOGICAL PARAMETERS IN ARIAL PARTS OF *PETROSELINUM CRISPUM* L.

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Parsley (*Petroselinum crispum* L.) as one of medicinal plants, is rich in poly-phenolic flavonoid antioxidants, including apiin, apigenin, crisoeriol, and luteolin; and has been rated as one of the plant sources with quality antioxidant activities. The purpose of this research was to study the effect of salicylic acid (SA) priming on growth and some morphophysiological parameters in arial parts of parsley in molybdenum (Mo) stress condition. Sterilized seeds soaked for 6 hours in SA solution (0, 0.5, 1, 2, 5 Mm), then transferred to pots contain perlit and irrigated with Hoagland nutrient solution in different Mo concentration (control, 0.5, 2.5, 5 and 10 Mm) in duration of 30 days. After harvesting the plantlets, the growth parameters (dry weight and length of roots and shoots), photosynthetic pigment characters (Chl.a , Chl.b, Chl a/b, total Chl. and carotenoid) and relative water content (RWC) of leaves was analyzed. The results showed that Mo had toxic effects as it linearly decreased organ dry weight and length, relative water content and reduced the contents of leaf photosynthetic pigments, significantly. However, treatment with various concentrations of SA confirmed that this priming could decrease Mo stress and it was so concluded to improve Mo-related stress symptoms of Parsley.

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EVALUATION OF ESSENTIAL OIL CONTENT OF *FERULA ASSA-FOETIDA* WITH CONVENTIONAL AND MICROWAVE-ASSISTED HYDRODISTILATION, AND SOLVENT-FREE MICROWAVE EXTRACTION METHODS

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Ferula assa- foetida L. is an herbaceous perennial herb belongs to Apiaceae family [1]. This is a pasture and industrial plant that has anticonvulsant effects and is anti-parasitic, appetizer, anti-rheumatic, anti-cramps and relief neurological diseases, fix lazy bowel & kidney pain and remove harmful effects of greasy foods on blood pressure [2]. In this study, the plant's gum was collected from Sepidan region located in Fars Province. Three different essential oil (EO) extraction methods were used. Solvent-free microwave extraction (SFME) and microwave-assisted hydrodistilation (MAHD) were compared with a conventional technique, hydro-distillation (HD). SFME is a combination of microwave heating and dry distillation without adding any solvent or water while in MAHD, water or solvent is used. In SFME, the gum was heated using a fixed power of 300 W for 30 min while in MAHD method, the water was added to the gum and heated for 5 min at 1000 W power until the water starts to boil, and then the power was fixed on 300 W for 30 min. The results showed that the different extraction methods had significant effect on the EO content. The highest content of EO (2.9 % w/w) was obtained by HD. The EO content of MAHD method was 2.5 % w/w that did not show any significant difference ($p \leq 0.05$) with HD. The lowest content of EO (1.76 % w/w) was obtained by SFEM. The amount of extracted EO by MAHD for 35 min was similar to that obtained by HD for 4 h. The MAHD method results in saving of costs, in terms of time and energy. In conclusion, MAHD might be applied as a potential alternative for the extraction of EOs.

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EFFECT OF ASCORBIC ACID AND SILICIUM TREATMENT ON SOME GROWTH PARAMETERS AND PIGMENT CONTENT IN *OCIMUM BACILICUM* L. UNDER SALT STRESS

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Basil (*Ocimum basilicum* L.) is uasually used in traditional medicine and contains a wide range of essential oils rich in phenolic compounds and a wide array of other natural products including polyphenols such as flavonoids and anthocyanins. This plant is a relatively sensitive plant to salinity. Salinity is one of the most important factors that limits plant growth and development. Ascorbic acid (ASA) and silicon (Si) as the second most abundant mineral element in the soil have ability to alleviate the adverse effects of salinity on plant. In order to study the effect of salinity stress in some morphological parameters and pigment characters (Chl.a , Chl.b, Chl. a/b, total Chl. and carotenoid) in a greenhouse experiment was conducted in a 3-replicant completely randomized factorial design. The seedlings were treated with Si (0, 1 and 2 mM) and ASA (0, 50 and 100 mM) concentrations under salinity stress (0, 100 and 200 mM NaCl). The results showed that salinity significantly decreased pigment parameters, dry weight and length of roots/shoots and leaf area (LA) of *Ocimum basilicum*. Results of analysis showed that this morphological parameters and leaf area specially and chlorophyll *a* and *b* content were positively affected by different concentration of ASA and Si applications. Regarding Our survay, it provides strong support to the hypothesis that exogenous application of ascorbic acid and silicium reduces the harmful effects of salinity and so increases the resistance of *Ocimum basilicum* to salinity by improving growth parameters (e.g. root dry weight and leaf area) and pigment contents.

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EVALUATION OF THERAPEUTIC EFFECT HESA-A (HERBAL-MARINE) ON NON-ALCOHOLIC FATTY LIVER DESEASE IN RATS

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Non-alcoholic fatty liver syndrome are with high prevalence in our society, due to high-fat diets and lack of exercise, liver cells begin to collect the fat droplets. Non-alcoholic fatty liver disease included clinical spectrum, from simple steatosis to cirrhosis and carcinoma liver [1]. Given the severe and irreversible Complications of the disease in advanced stages, Treatment on time, especially with herbal medicines can be considered as an important strategy in the treatment. This study aimed to investigate the effect of the combination drug (herbal-marine) hesa-a on Treatment of fatty liver in rats with measuring the biochemical and histological parameters was performed. In this study, 28 male wistae rats (weighing 180±20 g), in 2 group fed a standard diet (7 n) and ahigh-fat diet (21 n) were divided to 8 weeks. The control group with 7 rats of the HFD group were randomly selected,and killed, by considering biochemical parameters and histopathological changes ,fatty liver was confirmed. 14 rats fed with HFD divided to 2 group: 1- group fed with HFD + HESA (500 mg/kg/day), 2- group fed with HFD + atorvastatin (30 mg/kg/day) were treated for 30 days. Finally, Biomarker serum of liver damage, serum lipid profiles and histopathological changes has been studied. After 8 weeks of fed, high fat diet causes metabolic harmful effects, including hypertriglyceridemia, Hypercholesterolemiaand liverdysfunction. The rats that were fed of HFD, showed increase activity of liver enzymes and serum. HESA-A treatment significantly decreased parameters amountof liver tissue damage which in serum showed. Histopathology of the liver, changes caused by high fat diet and protective effects HESA-A on liver was approved. According to the results, Marine-herbal compound HESA-A, national production, can be an effective therapeutic without side effects chemical drugs used in non-alcoholic fatty liver.

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INHIBITORY EFFECTS OF CURCUMIN FROM PLANT *CURCUMA LONGA* (ZINGIBERACEAE FAMILY) ON THE FORMATION OF ADVANCED GLYCATION END PRODUCTS

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Medicinal plants are plants that one or some of their organs contain active ingredients that have properties that affect living things. Some of these active ingredients can noted be combinations of polyphenols such as curcumin. Curcumin (bis-α,β-unsaturated β-dike tone), the chief constituent of turmeric plant (Curcuma longa),plays significant role in prevention of various diseases including diabetes [3]**.** Diabetes and diabetic complications are recognized as degenerativediseases that frequently occur with age, and oxidative stress andnon-enzymatic glycation areimplicated in both diseases [2]. Glycation is the non-enzymatic reaction between a protein and a reducing sugar, such as glucose, that forms advancedglycation end products (AGEs) and free radicals.Glycation alters the structure and function of protein, leading to dysfunction [1]. In this studyinvestigation is anti-glycation effectof Curcumin on the model protein albumin. The level of glycation, conformation alterationwere assessed by specific fluorescence, TNBS, Congo red binding and circular dichroism. Our results represent the anti-glycation and anti-oxidant properties of Curcumin and its application for treatment of diabetic.

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INHIBITORY EFFECTS OF A SERIES OF SYNTHETIC 4-AMINOCOUMARINS ON THE FORMATION OF FREE RADICALS

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Medicinal plants are plants that one or some of their organs contain active ingredients that have properties that affect living things. Some of these active ingredients can noted be combinations of polyphenols such as Coumarin. Coumarins (derivatives of 2H-1-benzopyran-2-one) comprise a large group of important plant-derived polyphenolic secondary metabolites.It is a natural substance found in many plantssuch as Tonka beans and sweet clover [3]. Diabetes and diabetic complications are recognized as degenerativediseases that frequently occur with age, and oxidative stress andnon-enzymatic glycation areimplicated in both diseases [2]. Glycation is the non-enzymatic reaction between a protein and a reducing sugar, such as glucose, that forms advancedglycation end products (AGEs) and free radicals.Glycation and free radicals alters the structure and function of protein, leading to dysfunction [1]. In this studyinvestigation is anti-oxidative effectof synthetic 4-amionocoumarin on the model protein albumin. The level of oxidative, conformation alterationwere assessed by DPPH, TNBS and Ferric cyanide (Fe3+) reducing antioxidant power assay. Our results represent the anti-oxidant properties of 4-aminocoumarin and its application for treatment of diabetic.

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EFFECT OF DROUGHT STRESS ON THE SHOOT ROSMARINIC ACID OF *MELISSA OFFICINALIS* L.

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Drought is one of the most common environmental stress that may limit agriculture production worldwide. Lemon balm is a perennial herb which is extensively used in pharmaceutics and food industries. Rosmarinic acid (RA) is an ester of caffeic acid and 3,4-dihydroxyphenyllactic acid. It is commonly found in the species of the Boraginaceae and the subfamily Nepetoideae of the Lamiaceae (petersen 2003). This matter has caused to increase the demand and price of the plant. Therefore, finding other plants containing high amount of RA is very important to introduce as new sources. Rosmarinic acid has been found in *Melissa officinalis.* In this study, *M. officinalis* seedlings planted in 12 pots were watered three times a week and water treatment applied to them after 33 days. In this way, the factors studied included 4 levels of water deficit stress that were T1 (100% field capacity), T2 (80% field capacity), T3 (60% field capacity) and T4 (40% field capacity). The amounts of rosmarinic acid in shoots had the highest content in T3 (60% field capacity). The highest amount of RA in T3 was 0.51744 µmol/gDW. In this treatment, the amount of rosmarinic acid has increased 23/25% in comparison with the control. According to our results, the use of lemon balm under drought stress especially 60% field capacity could useful for increasing of RA.

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STUDY OF MEDICINAL PLANT OF NILE MOUNTAIN IN THE KOHGILOYEHAND BOYERAHMAD PROVINCE

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In this research the flora of Nile Mountainin the Boyerahmad country from Kohgiloyehand Boyerahmad province has been investigated. The mention region of floristic that has gone investigated is located in the 130 kilometers away in the northwest of Yasouj. Theresearch by collecting the essential information in order to floristic study started. The plants of region has collected and pressed, then we provide a samples of herbarium and in centeral herbarium of YasoujUniversity and plant systematic laboratory of science faculty with use of existing flora resources have been identified. This investigation showed that in the Nile Mountain, there are 64 families, 179 genous, 280 species.60 of medicine species of total of 280 species has identified and determined.Lamiaceae family with 7 species, Asteraceae family with 5 species Rosaceae family with5species and Brassicaceae family with4 species and Papillonaceae family 4 species were most important species in the region [1, 2].

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THE EFFECT OF HORMONE COMPOSITION AND EXPLANT TYPE ON CALLUS INDUCTION IN PERSIAN OAK (*QUERCUS BRANTII* L.)

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Oak with scientific name of *Quercus sp*., is one of the most important genera among Iranian forest trees. Oak fruits is used in food, medicinal, forage and industries. Oak seed has recalcitrant behavior, therefore propagation and storage in this seeds is very difficult [1]. A solution of this problem is using micro propagation techniques by tissue culture. To evaluate Callus induction in Persian oak (*Q. brantii* L.) were used a factorial experiment with two factor in CRD with four replication. Factors were including explant type and hormone combination. Explant type were leaf and internode segment. Hormones level were combined from three NAA concentration (1, 2, 4 mg/l) and three BAP (0.5, 1, 2 mg/l) concentration, no hormone treatment used as control [2]. Also effect of light and dark was evaluated on callus induction. Two month old seedling, were used as source of original explants, which were grown in greenhouse. After washing and sterilizing the explant were culture in Murashige and skoog (MS). Then cultured samples were placed in chamber room with the temperature 25◦ C in 16h photoperiod. The results showed that explants were kept in light and dark produced callus in three and two weeks, respectively. After 8-week characteristics of callus (fresh weight, dry weight, length, width and volume) were measured. 95% Callus Induction were observed in all hormone compositions. Type of explants and explants × hormone interactions has non-significant effect on the studied traits. Combination of 1mg/l NAA+ 1mg/l BAP had better effected on callus length and width whereas for two characteristics of fresh weight and callus volume free hormone MS was the best that had nonsignificant different with 2 mg/l NAA + 0.5 mg/l BAP, 2 mg/l NAA + 2 mg/l BAP, 4 mg/l NAA + 0.5 mg/l BAP and 4 mg/l NAA+ 2 mg/l BAP.

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OPTIMAIZATION THE EXTRACTION SYSTEMS OF VITEXIN AS THE MAJOR BIOACTIVE FLAVONOID IN *PROSOPIS FARCTA* LEAVES, CALLUS AND TRANSGENIC HAIRY ROOT

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The use of *Prosopis farcta* (Leguminosae, subfamily Mimosoideae) as a traditional medicine for treatment of some diseases and disorders was well known from ancient times in Iran and the plant is valuable for its pharmaceutical properties. During this study vitexin was isolated by HPLC method from *Prosopis farcta* by 3 different extraction methods in which parameters as the type, concentration and pH of the extracting solvents considered. Extraction is the first crucial step in preparation of active ingredients from plant materials. Optimizing the extraction process with high yield may be the result of a synergistic combination of fundamental factors as extraction technique and efficacy of solvent extraction. Among different solvent systems used, methanol-water (40%, containing acetic acid 0.5%) was found to be the best solvent for vitexin extraction [1- 3]. The amount of vitexin extracted from the leaves was 0.554 mg g^{-1} DW. Whereas, vitexin was detected neither in the callus nor hairy root. It is likely that callus and transgenic hairy roots need some degree of differentiation to produce more and complicated flavonoids such as vitexin before a special flavonoid product can be synthesized. The present work suggest an efficient method for estimation the greatest content of vitexin analyzed by HPLC technique and introduced Iranian *P. farcta* as a suitable source of vitexin with anti-tumor activity.

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INFLUENCE OF HUMIC ACID ON FLOWER AND STIGMA YIELD OF SAFFRON (*CROCUS SATIVUS* L.)

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Saffron as a native medicinal plant of Iran has several applications in the food industry. In addition, its stigma has much health, cosmetic and medicinal usages. Due to the strategic position of saffron in Iran agriculture and the importance of organic production of this crop, the improving of its nutritional management based on ecological principles can ensure the quality and quantity of production [1]. Therefore, in this experiment the effect of different levels of humic acid (0, 10, 20, 30 and 40 kg.ha^{-1}) was studied on yield indices of Saffron, during 2014 and 2015. The study was conducted based on a Randomized Complete Block Design with three replications at Research Field of Sarayan Faculty of Agriculture (33ºN, 58ºE and 1450 masl) in South Khorasan province. The amount of total humic extract was 85% (fulvic acid= 17% and humic acid= 78% with 12.7% K_2O). Results showed that application of 40 kg.ha^{-1} humic acid was the best treatment in terms of improving all the yield indices of Saffron. The highest amount of flower number (165 flower.m^{-2}) was obtained by using of 40 kg.ha^{-1} humic acid, that was 22% higher than control. Similar results was observed about flower yield, where the amout of this criterion in 40 kg.ha^{-1} humic acid application was 16% more than control (633 and 533.3 kg.ha^{-1}, respectively). The amount of fresh stigme + style yield in the best treatment was 15% higher than control and in addition, the amount of dry petals yield was 74.3 and 62.6 kg.ha^{-1} in the best treatment and control, respectively. Moroevere, there was no clear difference between various levels of himic acid application and control, in terms of the number of stigma with more than three branches. Overall, application of humic acid at the rate of 40 kg.ha^{-1} improved the yield criteria in Saffron. Similar results were reported by Koocheki *et al*., [1], where the application of humic acid increased the growth of replacement corms and flower yield of Saffron. Humic substances as eco-friendly fertilizers are very important components of soil that positively affect biological, physical and chemical properties and improve soil fertility. The positive effect of humic acid on growth and yield of plants is because of various factors such as producing of hormonal compounds, increasing water and nutrient absorption, increasing the availability of elements, developing of plant root system and changes in plant enzymes activity [1, 2].

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PROTECTIVE EFFECTS OF HYDROALCOHOLIC EXTRACT OF *CYDONIA OBLONGA* MILLER (QUINCE) ON SPERMATOGENESIS IN RATS TREATED WITH CYCLOPHOSPHAMIDE

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Cyclophosphamide is used in cancer chemotherapy and is an alkylating agent. Recently, many herbs and fruits have been suggested to decrease the side effects of anti-cancer drugs. Many studies revealed that these plants have useful compounds. *Cydonia oblonga* miller (Quince) is a source of antioxidants and is used widely in many countries. In this experimental study, the protective effects of this fruit have been analyzed in rats treated with cyclophosphamide. Thirty-six male Wistar rats were divided in 6 groups (the control group, and groups 1, 2, 3 were received 200, 500, 1000 mg/kg/day of *C. oblonga* miller and cyclophosphamide, the group 4 received only cyclophosphamide, and the group 6 received only *C. oblonga* miller). After 21 days the testis tissue slides were prepared and spermatogenic parameters were studied. The results showed that cyclophosphamide decreases the spermatogenic factors and in the groups with cyclophosphamide that also received *C. oblonga* miller, spermatogenic parameters increased toward group 4. It was found that *C. oblonga* miller fruit's extract can improve the harmful effects of cyclophosphamide on spermatogenic parameters.

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HISTOMETRICAL CHANGES OF MUSCULATURE OF DUODENUM AND BLOOD GLUCOSE LEVEL IN SURRI MICE FOLLOWING SOYBEAN CONSUMPTION

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The protein of soy bean has been resulted in many therapeutic attributes and during recent years researchers have interested in finding its other specifications[1]. The objective of this study is surveying histometrical changes of duodenum and blood glucose level in the mice fed on soy bean. For this study a total of immature 30 female Surri mice were used. After adaptation with environment for one week, 20 mice were randomly selected and divided into two groups. The control group was fed with a diet without soy bean and the experimental group received a diet containing 20% soy meal. One day after the end of treatment the mice were anesthetized and blood samples for determination of the glucose rate were taken the heart. After euthanizing, from duodenum some histological sections were prepared, stained with H&E and mucosa and submucosa and muscles were histometrically studied by a light microscope connected to pc and equipped with Axiovision software. Then the data were analyzed statistically using ANOVA and the significant level was considered as P<0/05. The results of histometric studies showed that the thickness of submucosa in the groups consumed soy bean (443.5±61.7) had a significant increase compared with the control group (288.5±17.5), (P<0/05) .Whereas the thickness of mucosa in the group consuming a diet containing 20% of soy bean (1507.5±123.13) did not show any significant change compared with the control group (1482. 7 ±65.6). Also thickness of muscular wall in the groups consumed soy bean (167.3±18.2) a significant increase compared with the control group (72.8±7.35)was observed (P<0/05) .Also blood glucose level in the experimental group (62.58±6.47) compared with the control group (53.90±5.48) showed a significant decrease (P<0/05). Long term consumption of soy bean could cause significant changes in duodenal submucosa. Increase in thickness of lamina propria might be a compensatory reaction to reduction of cellular resistance which leads to more vessels for more rapid absorption. This change is dose dependent which in the higher dose, perhaps specific receptors for synthesis of protein have been resisted and lesser reaction has been deduced. Also The thickness of muscular layers could be a compensatory reaction for increasing mechanical activity against decreasing enzymatic activity induced by soy bean. Also long term consumption of soy bean by decreasing blood glucose, might be useful for diabetics. However individuals with diabetes or with hypo glycosemia should be careful in soy consumption.

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EFFECT OF SALICYLIC ACID ON PHENOLIC COMPOUNDS AND ANTIOXIDANT ACTIVITY OF *MENTHA LONGIFOLIA* L.

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Phenolic compounds in plants provide an array of natural sources of antioxidants for use in foods and nutraceuticals. Among the commercially available natural. Antioxidant is defined as any substance that when present at low concentration compared to those of an oxidisable substrate significantly delays or prevents oxidation of that substrate. The aim of the study was to evaluate the effects of salicylic acid on the amount of essential oil,content of phenolic, flavonoid compounds and antioxidant activity in (*Mentha longifolia L.*). Salicylic acid is a chemical stimulus that cause to enhance the strength and antioxidant activity of the plant, as well as increasing phenolic compounds as a regulator of the internal growth. Firstly the *Mentha longifolia* samples were grown up for a 5 week period and then were treated with 0, 40 and 80µm of salicylic acid. Then total phenolic and flavonoid contents were determined using spectrophotometry and finally antioxidant activities of extracts were evaluated with 2,2dipheny-1-picryl hydrazyl (DPPH) method. Salicylic acid treatment (40,80 µM) increase amount of essential oil, antioxidant activity and total phenolic compound ($P<0.01$). It was concluded that the tested spices are good sources of phenolic materials and may be used in different applications to preserve foods and human health.

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THE FEASIBILITY OF USING DIFFERENT SPECIES OF MEDICINAL PLANTS IN LANDSCAPE

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In general, the services in agricultural ecosystems provided as a result of functional biodiversity. Increasing diversity of functional groups, have improved processes of agricultural agroecosystem. In order to investigate the feasibility of using different species of medicinal plants in landscape, 13 medicinal plants were studied based on randomized complete block design with three replications at the agricultural research station, Ferdowsi University of Mashhad, Iran, during 2012 to 2013. The studied traits were land coverage percent, the duration of flowering and plant height. The results indicated that total evaluated plants, in the second year had more leaf area than the first year. Among different medicinal plants, the highest and the lowest coverage percent were observed in *Securigera securidaca* and *Ruta graveolens*, respectively, but, in the second year, with the establishment of medicinal plants in the ground, the highest and the lowest coverage was obtained in *Althaea officinalis* and *Trigonella foenum-graecum* (as an annual plant), respectively. Also, the highest plant height was observed in *Oenothera erythrosepala* and the highest shoot diameter was in *Althaea officinalis* and *Hypericum perforatum*. In general, perennial medicinal plants establish in the soil over time and they will be able to cover more ground. Therefore these plants could be used in the landscape. However, in addition to plant coverage, medicinal species have other functions in agroecosystem.

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THE INVESTIGATION OF TEMPERATURE EFFECT DURING POST HARVEST PROCESS ON ESSENTIAL OIL OF SOME MEDICINAL PLANTS OF LABIATAE FAMILY

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Iran is favorable for the cultivation of medicinal plants due to the climatic and geographical characteristics and it has great potential in this field. The active ingredients of medicinal plants can be affected by environmental factors and post-harvest processes. In this experiment, the effect of different temperatures (drying in the shade and in oven with temperatures of 35, 45, 55 and 65 Celsius degree) during post harvest process of 4 medicinal plants of Labiatae family (*Ziziphora clinopodioides*, *Melissa officinalis*, *Thymus vulgaris*, and *Mentha piperita*) were studied as factorial based on completely randomized design with three replications in research laboratory of specialized plants, Ferdowsi University of Mashhad. The results indicated that essential oil was affected by plant species and temperature. The highest essential oil percentage under drying in the shade condition was observed in *Ziziphora clinopodioides* and *Mentha piperita* with 0.48 and 0.4%, respectively. The investigation of the interaction effect of species and drying temperature on essential oil of different species of Labiatae family showed that the highest amount of this qualitative characteristic was obtained in *Ziziphora clinopodioides* under 35 Celsius degree. Therefore we can alter the quality of medicinal plants by optimum management of post harvest condition, significantly.

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INVESTIGATION OF CHEMICAL COMPOSITION OF DERIVED ESSENTIAL OILS FROM HYDRODISTILLATION OF RESIN OF *PINUS ELDARICA MEDW.* AT VARIOUS DISCONNECTED PERIODS OF TIME

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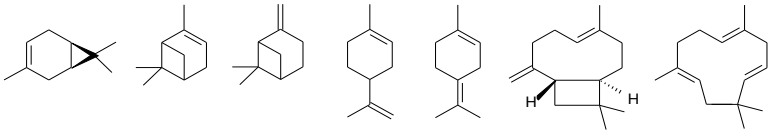
Pinus eldarica Medw. is one of the most widespread pine species planted in Iran [1]. The chemical compositions analysis of essential oils derived from hydrodistillation of resin of this plant has not been investigated at various disconnected periods of time. Hence, this analysis was carried out on the resin of a population of this species of pine in the planted forest in eastern of Isfahan city. At first, hydrodistillation of resin was continuously done in six hours and the GC/MS analysis of derived essential oil showed that the main components are 3-carene (16.20%), α-pinene (14.95%), β-pinene (11.98%), caryophyllene (10.35%), limonene (7.48%) and terpinolene (6.70%).



3-Carene α-Pinene β-Pinene Limonene Terpinolene Caryophyllene Humulene

Then hydrodistillation of resin was done in six discontinuous periods of time (0-15 min, 16-30 min, 31-60 min, 61-120 min, 121-240 min, 241-360 min) and the GC/MS analysis of derived essential oils has been shown in table 1.

Table1; Main components of derived essential oils from hydrodistillation of resin of *Pinus eldarica Medw.* at various periods of time.

	0-15 min	16-30 min	31-60 min	61-120 min	121-240 min	241-360 min
1	α-Pinene (48.58%)	α-Pinene (48.91%)	α-Pinene (42.40%)	α-Pinene (27.54%)	α-Pinene (30.37%)	Caryophyllene (65.62%)
2	3-Carene (19.86%)	3-Carene (18.68%)	3-Carene (19.47%)	3-Carene (22.35%)	Caryophyllene (26.88%)	Humulene (17.30%)
3	β-Pinene (8.92%)	β-Pinene (7.65%)	Caryophyllene (12.17%)	Caryophyllene (20.13%)	3-Carene (18.82%)	Caryophyllene oxide (4.54%)
4	Caryophyllene (6.75%)	Caryophyllene (7.60%)	β-Pinene (7.88%)	Limonene (6.47%)	Humulene (6.12%)	Longifolene (3.79%)
5	Limonene (6.06%)	Limonene (5.67%)	Limonene (5.76%)	Terpinolene (5.59%)	Terpinolene (4.70%)	3-Carene (2.55%)
6	Terpinolene (3.83%)	Terpinolene (3.79%)	Terpinolene (4.49%)	Humulene (4.41%)	β-Pinene (4.70%)	α-Pinene (1.22%)

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APPLICATION METHOD AND LEVEL OF SALICYLIC ACID ON SOME MORPHOLOGICAL CHARACTERISTICS OF *OCIMUM BASILICUM* L. LEAVES UNDER SODIUM CHLORIDE SALINITY STRESS

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Salinity is one of the most important agricultural production barriers in arid and semiarid regions which lead to limitations for plants growth and production. Salicylic acid (SA) is a hormone-like substance which causes plant resistance to environmental stresses (heat, coldness, salinity and dryness). To examine interaction between salinity, foliar application and application method of SA on some morphological indexes of Basil (*Ocimum basilicum* L.) leaf, a factorial experiment was done. Factor A included application method of SA, factor B was four different levels of SA and factor C included the levels of salinity. The collected data were analyzed by SAS statistical software. The results showed that application method of SA, its concentration and the concentration of salinity influenced leaf length, width and dry weight. However, for the rest of the indexes the effect was not significant. Also the interaction between application method of SA and salinity concentration had significant effect on the fresh weight of the leaf and the percentage of its dry weight. The interaction between application method of SA and its concentration influenced the number of leaves. Moreover, the simple effect of SA concentration affects the leaf fresh and dry weight was significant [1, 2].

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ANALYSIS OF CADMIUM ACCUMULATION AND SOME OF ITS PHYSIOLOGICAL EFFECTS ON BASIL PLANTS (*OCIMUM BASILICUM*)

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Basil (*Ocimum basilicum*) is a high using edible and medicinal plant. As some places of Zanjan province in which basil plant is cultured are contaminated by heavy metals, such as toxic cadmium metal, a research for analyzing Cd accumulation and its effects on some physiological traits of this plant was performed.Seeds were cultured in plastic pots containing perlite and ½ concentrations of Hoagland's culture medium in a hydroponic conditions. Seedlings with enough growth were treated by different concentrations of Cd including: 0, 2, 4 and 8 mMfor three weeks. Results showed that, root and shoot length, root and shoot dry weight as well as total chlorophyll content in all Cd treatments were decreased in compare to the control plants in such away that they reached to about half of the control plants in all of measured traits at 8 mM Cd treatment. The content of soluble sugars in root and shoot of 8 mM Cd treated plants increased 1.07 and 4.15 times more than that of control plants respectively. The amount of Cd in root and shoot at 8 mM Cd treatment were 164 and 117 times more than control plants respectively. This demonstrate that basil plants are not able to prevent Cd translocation from root to the aerial parts of plant, so if these plants are subjected to Cd, the edible parts of plant will be highly contaminated which is too harmful for man.

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LIPID PROFILING CHANGES OF THYME PLANTS (*THYMUS* SPP) IN RESPONSE TO THE LONG-TERM WATER DEFICIT

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Thyme is one of the best known genera within *Labiatae* or *Lamiaceae* family, because of its more than 200 species and its medicinal and culinary uses. Understanding plant response to drought is of great importance and forms part of strategies aimed at making the plant stress tolerant. Plant lipids like other chemicals are affected by genetic make-up and environmental factors. The effect of prolonged water deficit stress on lipid composition was studied on tolerant and sensitive thyme plants (*T. serpyllum* and *T. vulgaris* respectively). Non-targeted non-polar metabolite profiling were carried out using FT-ICR mass spectrometry along with morpho-physiological parameters performed on one month old plants subsequent to water withholding before the plants wilted. Tolerant and sensitive plants had clearly different response at physiological level. Different trends for a number of non-polar metabolites were observed when comparing stressed and control conditions for both sensitive and tolerant plants. Tolerant thyme plants that experienced drought stress showed an elevation in membrane lipids in comparison with the watered except for lyso PC. However, sensitive plants showed the most alteration in 1-18:2 lyso PE for up-regulated and decreased lipids across the diverse categories lipids including MGDG, DGDG, PC, PS. The majority of lipids belonging to diverse classes increased in tolerant plants (*T. serpyllum*) under drought. Notable lipids changing included classes of MGDG, DGDG, PD, PC, PI while lyso PC decreased. The combination of lipid profiling and physiological parameters assisted to understand precisely the mechanisms of plant response at non-polar metabolome level.

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COMPARATIVE VOLATILE PROFILING PLATFORM REVEALS THE ROLE OF VOLATILE ORGANIC COMPOUNDS (VOCS) IN DROUGHT STRESS TOLERANCE

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Thyme (*Thymus vulgaris*) volatiles predominantly consisting monoterpenes and sesquiterpenes, serve as antimicrobial, antiseptic and antioxidant. Plant volatiles like other chemicals are affected by genetic make-up and environmental factors. The effect of prolonged water deficit stress on volatile composition was studied on tolerant and sensitive thyme plants (Varico3 and German winter thyme(Wagner) respectively). Volatile sampling along with morpho-physiological parameters such as soil moisture, shoot water potential, shoot dry weight and water content performed on one month old plants subsequent to water withholding at 4 days intervals until the plants wilted. Tolerant and sensitive plants had clearly different response at physiological level. Sensitive plants showed an increased then decreased trend at major terpenes apart from thymol, alpha-cubebene and germacrene D. In contrast, tolerant populations had unchanged terpenes during the water stress period with an elevation at last day. These results suggesting that the two populations are employing different strategies. Increasing terpenes for sensitive plants can be attributed to divergence of carbon allocation from photosynthesis to produce defence molecules and further decrease is likely related to photosynthesis substrate limitation due to water stress effects. Likewise, maintaining volatiles at the fixed levels with a later increase for tolerant plants is consistent with plant response to oxidative stress by producing antioxidant agent. The combination of volatile profiling and physiological parameters assisted to understand precisely the mechanisms of plant response at volatile metabolome level.

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OPTIMIZATION OF HPLC-FLD METHOD FOR ANALYSIS OF MYCOTOXIN IN HUMAN FOOD AND ANIMAL FEED BY IMMUNOAFFINITY TEST

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Nowadays one of the most important problem in using marine product by human is their toxic residue from marine bio toxin. Mycotoxins are the secondary metabolites of the mold fungi. To date, approximately 300-400 mycotoxins are known that 20 of them were found in food in amounts which were sufficient for harmful to human and animal. These toxins are produced mainly by five fungi genera: Aspergillus, Penicillium, Fusarium, Alternaria, and Claviceps. The aflatoxins are highly toxic and carcinogenic compounds which produce by Aspergillus [1]. In the present study, we optimized the analysis of Aflatoxins (B and G) by HPLC with fluorescence detection and post column UVE system. Chromatographic conditions include isocratic system with H2O/MeOH(45/55) as mobile phase on a C18 column (4.6 mm×250 mm, 5 µm) at flow rate of 1 ml min^{-1}. In this work sample preparation is validated for various sample import to Bandarabbas. Sample preparation included extract with MeOH/H2O (80:20) and purification with immunoaffinity column. The matrix-matched calibration graphs for Aflatoxins (B and G) were prepared by injecting the extracted blank spiked with increasing amount of standards at 3-5µg kg^{-1}levels, giving an acceptable linearity (R^2 = 0.999) over the test range. The comparison between blank and spiked sample peaks showed a minimum recovery 70% for Soybean meal and maximum 90% for Rice. The LOD and LOQ for Aflatoxin B1 were 0.018 and 0.059 ng ml^{-1}, respectively. Finally, we investigated the amount of Aflatoxin B1 and B2 in Calf milk replacer, Fish feed, Millet, Soybean meal, Poultry's Feed Concentrate and Aflatoxin B1, B2, G1, G2 in Rice. Maximum and Minimum level obtained (1.458ppb, ND) Afla B1 and (0.327ppb, ND) Afla B2 for Soybean meal and Calf milk replacer, respectively that all amount were lower on account of Iranian standard.

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CLINICAL CURATIVE EFFECT OF IRANIAN *PISTACIA ATLANTICA* (PMP-817) FOR TREATING GASTEROESOPHAGEAL REFLUX DISEASE

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Systematic assessments of the onset of symptom relief in the treatment of gastroesophageal reflux disease (GERD) are lacking [1]. It is generally believedthat the gastric contents regurgitated during gastroesophageal reflux irritates or damages tissues or organsoutside the esophagus to cause extra esophageal symptoms [2]. To study the clinical curative effect and safety of action of *Pistacia atlantica* desf (Pa) in treating gastro esophageal reflux disease (GERD). A total of 60 patients with confirmed GERD were randomly divided into two groups: the *pistacia atlantica* desf therapy group and the control group, with 30 cases in each group. Each case in the Pa group was treated with oral administration of 3g *Pistacia atlantica* three times daily after meals. The control group was given oral administration of 1g of placebo (starch) three times daily after meals.The treatment course for both was 4 weeks.The short and long-term total efficacy rates in the Pa therapy group showed significant superiority to control group ($P<0.05$). The symptom score and esophageal pressure obviously decreased in Pa therapy group ($P < 0.05$). No serious adverse reactions were found in the two groups.Therapy of *pistacia atlantica* desf (Pa) a new approach for GERD treatment with Iranian Traditional Medicine, prominent effects and less adverse reaction, and is easily be accepted by patients.

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INVESTIGATION OF IN VITRO ANTIMICROBIAL ACTIVITY OF *MYRTUS COMMUNIS*, METHANOL, ETHYL ACETATE AND CHOLOROFORM EXTRACTS AGAINST ACINETOBACTERBAUMANII ISOLATED FROM HOSPITALIZED PATIENTS IN ICU

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Due to an increase in uti bacterial infections rate,it requires an urgent need for the cure. Also today,inhancing resistance to antibiotics (which is a serious problem) needs new resources to eliminate the cause of this disease. Although antibiotics are the first line treatment for *Acintobacter baumanii* infections, the long-term use of synthetic antibiotics may have many various side effects. Therefore, an alternative treatment based on natural products is required. *Myrtus communis* is a useful natural product with an antibacterial effect that has synergistic effect with many antibiotics. The aim of this survey, was to investigate in vitro antimicrobial activity of, *Myrtus communis* methanol, ethyl acetate and choloroform extracts against *Acinetobacter baumanii* isolated from hospitalized patients in ICU. During a priode of10.month descriptive study, 40 A. baumannii isolated from hospitalized patients in ICU were investigated. Antibacterial effects of ethyl acetate, choloroform, methanol extracts were determined by micro-broth dilution method. And put them on medium Mueller Hinton agar.the bacteria were cultured in the concentration of 0.5 McFarland The results of Ethyl acetat extract of *Myrtus communis* Exhibited that out of 40 isolates investigated 25 isolates (62.5%) were inhibited in MIC=400mg and 5 isolates (12.5%) were inhibited in MIC=200mg,5 isolates (12.5%) were inhibited in MIC=100mg and 5isolates (12.5%) were inhibited in MIC=50mg.and The results of methanol extract of *Myrtus communis* Exhibited that out of 40 isolates investigated 20 isolates (50%) were inhibited in MIC=400mg and 11 isolates (27.5%)were inhibited in MIC=200mg,5 isolates (12.5%) were inhibited in MIC=100mg and 4 isolates (10%)were inhibited in MIC=50mg and The results of choloroform extract of *Myrtus communis* Exhibited that out of 40 isolates investigated 25 isolates (62.5%) were inhibited in MIC=400mg and 6 isolates (15%)were inhibited in MIC=200mg, 5 isolates (12.5%)were inhibited in MIC=100mg and 4 isolates (10%)were inhibited in MIC=50mg.and. the results of Ethyl acetat extract of *Myrtus communis* Exhibited that 25 isolates (62.5%) were killed in MBC=800mg and 5 isolates (12.5%) were killed in MBC=400mg,5 isolates (12.5%)were killed in MBC=200mg and 5 isolates (12.5%) were killed in MBC=100mg.and the results of methanol extract of *Myrtus communis* Exhibited that 20 isolates (50%) were killed in MBC=800mg and 11 isolates (27.5%) were killed in MBC=400mg,5 isolates (12.5%)were killed in MBC=200mg and 4 isolates (10%)were killed in MBC=100mg.and and the results of choloroform extract of *Myrtus communis* Exhibited that 25 isolates (62.5%) were killed in MBC=800mg and 6 isolates (15%)were killed in MBC=400mg,5 isolates (12.5%)were killed in MBC=200mg and 4 isolates (10%)were killed in MBC=100mg. After all, we totally conclude that extract of *Myrtus communis* have good antibacterial effects on acintobacter baumanii and we can use it instead of synthetic antibiotics and produce the production of *Myrtus communis* and use it as a drug in market.

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VARIATION ESSENTIAL OIL PERCENTAGE AND ESSENTIAL OIL YIELD OF PEPPERMINT (*MENTHA PIPERITA* L.) IN RESPONSE TO DIFFERENT LEVELS OF VERMICOMPOST AND WATER DEFICIT STRESS

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Effect of vermicompost and water deficit stress essential oil percentage and essential oil yield of peppermint (*Mentha piperita* L.) was investigated in Kermanshah, in 2010. Treatments were 3 levels (0, 5 and 10 ton/ha) of vermicompost and water deficit at 3 levels (100% FC, 75% FC and 50% FC). This experiment was conducted by use factor as randomized complete block design with 3 replications. The results showed that there was a significant difference between the traits. Mean comparisons showed that the highest percentage of essential oil with 1.6% belong to first time harvest. The highest essential oil content 1.7% was belonging to 100% FC. Mean comparisons between harvest time * vermicompost showed that the highest percentage of essential oil with 1.9% achieved in first time harvest and use of 10 tons per hectare vermicompost. Compare the average essential oil yield indicated that the highest yield with about 120 kg/ha belong to use of 10 tons of vermicompost * first time harvest. The maximum essential oil yield of about 122 kg per hectare achieved of 100% FC. Mean comparisons of the treatments showed the highest essential oil yield in all treatments were similar to the first time harvest. The results showed that peppermint is a hydrophyte plant and to increase the percentage of essential oils and essential oil yield use of enough food and water is necessary.

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TOTAL PHENOLIC CONTENTS AND BIOLOGICAL ACTIVITY OF TWO *GLYCYRRHIZA* SPECIES (*GLYCYRRHIZA GLABRA* L. AND *GLYCYRRHIZA TRIPHYLLA* FISCH.) FROM IRAN

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Free radicals such as reactive oxygen species are formed naturally in the living things cells that have important roles in cell signalling, also in environment some toxins may contain free radicals or stimulate the cells to produce free radicals [1]. High amount of this compounds are hazardous to the cells and damage all major its components [2]. Also infections due to bacterial species remain a serious therapeutic problem [3]. Emerging resistance of these species is seriously decreasing the number of effective antibiotics. Plant extracts and essential oils can be used as potentially useful sources of antimicrobial and antioxidant compounds. In this research the aim is to determine *in vitro* total phenolic contents, antioxidant activities and antibacterial activity of the methanolic extracts of leaves and stems of two *Glycyrrhiza* species, namely *G. glabra* L. and *G. triphylla* Fisch. Total phenol and flavonoid content of the *Glycyrrhiza* extracts was determined by Folin-Ciocalteu and aluminum chloride methods, respectively. Antioxidants activities were screened by 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radicals scavenging model system. Also antibacterial activity of the methanolic extracts was determined by disc diffusion method against four Gram-positive and negative bacteria. Results indicated that the extract of the leaf of *G.triphylla* contains the highest total phenol content (10.26 ± 0.46 mg GAE/g of dry extract) and stem of *G.glabra* the highest total flavonoid (3.86 ± 0.62 mg QE/g of dry extract).The methanolic extracts of *Glycyrrhiza* species possess strong antioxidant activity (IC_{50}; 0.112 ± 0.008 to 0.119 ± 0.005 mg/ml) and had significant activity in comparison to ascorbic acid as synthetic antioxidant (IC_{50}; 0.143 ± 005 mg/ml). Also results showed that the methanolic extracts of the leaves and stems had inhibition activity against bacterial tested especially on *Ralstonia solanacearum* (-), (15 ± 0.55 mm to 16 ± 0.34 mm in 1 mg/ml concentration). Our results showed that examined *Glycyrrhiza* extracts represent strong biological activity; hence, they can be suggested as antioxidant and antibacterial agents for special use in future.

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THE EFFECT OF *G. HOI* ON COMPOSITION OF ESSENTIAL OIL OF *CALENDULA OFFICINALIS* L. FLOWERS UNDER WATER DEFICIT CONDITION

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Calendula officinalis L., Asteraceae, is a fast-growing herb that originated in southern Europe. It is harvested throughout the world, and its pharmaceutical uses are described in many pharmacopeias. Yield in crops inoculated with Arbuscular Mycorrhizal Fungi were enhanced due to the improved morpho-physiological qualities. Mycorrhizal symbiosis clearly increased the seed yield, leaf proline content, total soluble carbohydrate, leaf relative water content, leaf nitrogen, leaf phosphorus, leaf chlorophyll index, root length, root volume and root dry weight in mycorrhizal plants compared to the non-mycorrhizal plants in all the tested irrigation regimes [1, 2].In order to evaluate the effect of *G. hoi* on percentage and essential oil composition of *Calendula officinalis* under irrigation at 50% field capacity (FC), an experiment was conducted at Urmia University, Urmia, Iran in 2014. The essential oils obtained by hydrodistillation from the flowers of *Calendula officinalis* were analyzed by gas chromatography (GC) and gas chromatography coupled with mass spectrometry [3]. Forty components of the flower oil contents under 50% FC were identified. The major components of the oil were 1,8-Cineol, Geraniol, α –Muurolene, Delta-cadinene, α –cadinol and T-Muurolene. Amount of 1,8-Cineol (8.75%), α –Muurolene (5.4%) and Delta-cadinene (7.8%) in treated plants with *G. hoi* was greater than control but the amount of Geraniol (8.28%), α –cadinol (9.82%) and T-Muurolene (8.50%), in control plants was greater. Some of major essential oil composition are given in Table 1.

Table 1: The major essential oil composition of *Calendula officinalis* L.

Treatments	1,8-Cineol	α -cadinol	T-Muurolene	Geraniol	α -Muurolene	Delta-cadinene	α-Pinene	Menthone
Control	6.95	9.82	8.5	8.28	4.81	7.1	1	2
G. hoi	8.75	8.71	7.53	6.35	5.4	7.8	1.3	2.1

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ESSENTIAL OIL COMPONENTS OF DRAGON'S HEAD (*LALLEMANTIAIBERICA* L.) UNDER TWO (RAINFED AND SUPPLEMENTARY) IRRIGATION REGIMES

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Dragon's head (*Lallemantia iberica* L. Fisch. EtMey.) is an annual medicinal herb that belongs to Lamiaceae family and distributed throughout South Western Asia and Europe [1]. It grows well in arid zones and requires a light well-drained soil. Dragon's head is a valuable species, i.e. all plant parts (leaves or seeds) can be economically used. A small decrease in the availability of water to a growing plant immediately reduces its metabolic and physiological functions [2]. Thus for achieve high yield, an adequate water supply is required during the growing season. The period at the beginning of flowering stage is most sensitive to water shortage.While maximum yield and yield components were obtained with full irrigation; almost the maximum yield generally was obtained when irrigation was made to provide adequate water during flowering and fruit formation periods [3].To determine the essential oil components of *Lallemantia iberica* under supplementary irrigation andrainfed condition, an experiment was conducted based on randomized complete block design with three replications at Research Farm of Shahid Beheshti Agriculture College (Latitude 38° 51´ N and Longitude 41° 44´ E and 1313 m above sea level), Urmia West Azerbayjan Iran, during 2014.The essential oils obtained by hydrodistillation from the flowers of *Calendula officinalis* were analyzed by gas chromatography (GC) and gas chromatography coupled with mass spectrometry [4]. The essential oil components were given in Table 1.

Table 1- Essential oil components (%) of *Lallemantiaiberica*obtained fromrainfed and supplementary irrigation.

Components	Supplementary irrigation	Rainfed	Components	Supplementary irrigation	Rainfed	Components	Supplementary irrigation	Rainfed
Octen-7-methyl	0.90	0.27	Benzyl alcohol	1.23	1.40	cis-Sabinene-hydrate	0.90	1.33
Alpha thujone	1.10	1.03	B-Ocimene	1.17	0.97	cis-Carveol	1.13	0.80
α- Pinene	1.30	1.23	Gama- Terpinene	1.30	1.23	Pulegone	0.83	1.50
1-octen-3-ol	0.57	0.77	Butyl butyrate	1.00	1.27	Bornyl acetate	1.37	1.03
2-methyl-3-buten-2-ol	1.00	1.30	Terpinolene	1.53	1.13	Carvacrol	0.93	0.97
3-octanone	0.77	0.80	Linalool	9.10	11.2	Trans-Pinocarvyl acetate	0.93	1.03
Anhydrolinalool	0.80	1.30	Dehydro Sabina keton	1.07	1.20	α- Longipinene	1.43	1.03
Sabinene	1.37	1.33	Pinocarvone	4.00	2.60	β- Bourbonene	1.37	0.93
Myrcene	1.17	1.40	3-Thujen-2-one	7.20	6.70	β- Cubebene	14.6	13.7
α- phellandrene	1.13	1.23	Myrtenal	1.33	1.00	β-Caryophyllene	4.80	5.10
α- Terpinene	1.00	1.57	B-fencyl alcohol	1.20	1.40	β-cis-Farnesene	1.30	0.93
Dehydro-1,8-Cineole	1.27	1.00	Verbenone	9.80	11.9	Germcrene A	0.90	1.20
P-Cymene	1.33	1.27	Geraniol	1.23	1.40	Gama-cadinene	0.87	1.27
Limonene	3.67	5.10	Trans-Carveol	2.00	1.03	Spathulenol	5.83	6.87

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THE STUDY OF TDZ EFFECT IN ORGAN CULTURE OF HYSSOP PLANTS

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The medicinal plant "hyssop" or "*Hyssopus Officinalis*" is belonging to the "Lamiaceae" family. Because of limitations for growth of this plant and its reproduction in soil, the plant tissue culture techniques are considered as a useful system for the protection, proliferation and increase of secondary metabolite production in the plant [1]. In this study, hyssop plants were cultured in MS medium containing progressive concentration of TDZ (0, 0.2, 1, 1.5 and 2 ppm) and the amount of photosynthetic pigments and total phenol and flavonoid production as well as some plant growth parameters were measured. The results showed that the amount of chlorophyll a and b and carotenoid pigments increased with progressive concentrations of the hormone and the maximum amount of total phenol and flavonoid corresponded to the concentration of 2 ppm of TDZ. In the case of plant growth parameters the index of fresh weight increased with progressive concentrations of TDZ, while other growth parameters such as the number of nodes, number of leaves, number and length of shoots and roots decreased in the same situation. We can conclude that the presence of TDZ in the culture medium does not have a grand effect on the morphological characteristics of *Hyssopus officinalis* plants but it may increase the amount of secondary metabolites and photosynthetic pigments.

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THE STUDY OF DIFFERENT HORMONES EFFECT IN ORGAN CULTURE OF *HYSSOPUS OFFICINALIS* PLANTS

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Medicinal plants have long been used for treatment of diseases. Hyssop or "Hyssopus Officinalis" belongs to the "Lamiaceae" family and is usied in different fungal and viral diseases. Because of limitations for growth of this plant and its reproduction in soil, the plant tissue culture techniques are considered as a useful system for the protection, proliferation and increase of secondary metabolite production in the plant [1]. In this study, hyssop plants were cultured in MS mediums containing 1 mg/L of 4 different hormones (BA, kin, 2,4-D and TDZ) and the amount of photosynthetic pigments and total phenol and flavonoid production as well as some plant growth parameters were measured. Our results showed that the maximal amount of chlorophyll a, b and carotenoid pigments was produced in the presence of TDZ. Concerning to the production of phenol and flavonoids, the control plants showed the highest level of the secondary metabolites compared to the hormonal condition. To increase the amount of secondary metabolites in the plant, combination of different hormones or higher level of hormones used in the culture medium is recommended.

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INFLUENCE OF BIO- REGULATORS ON MORPH-PHYSIOLOGICAL TRAITS OF PEPPERMINT (*MENTHA PIPERITA* L.)

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Peppermint (*Mentha piperita* L.) is a valuable medicinal plant that can be used in numerous forms i.e. essential oil, leaf, and leaf extract. This herbal preparation is used in cosmeceuticals, personal hygiene products, foods, and pharmaceutical products for both its flavoring and fragrance properties [1, 2]. According to the importance of peppermint, the evaluation of bio-regulators effects on its growth and development is necessary. This study was aimed to investigate the effect of bio-regulators including gibberellic acid (GA3), indole butyric acid (IBA) and methanol (MeOH) on morpho-physiological traits of peppermint. This study was done in a randomized complete block design (RCBD) with 10 treatments and 3 repelications at research greenhouse of Institute for Medicinal Plants, ACECR. The treatments was consisted of control or distilled water (A1), 5% v/v of methanol solution (A2) (MeOH), 40 ppm of gibberellic acid (GA_3) + 5% v/v of methanol (A_3) (MeOH), 80 ppm of gibberellic acid (GA_3) + 5% v/v of methanol (A4), 40 ppm of indole butyric acid (IBA) + 5% v/v of methanol (A5), 80 ppm of solution indole butyric acid (IBA) + 5% v/v of methanol (A6), 40 ppm solution of gibberellic acid (GA_3) + 80 ppm indole butyric acid (IBA) + 5% v/v of methanol (A7), 80 ppm of gibberellic acid (GA_3) + 40 ppm indole butyric acid (IBA) + 5% v/v of methanol (A8), 40 ppm of gibberellic acid (GA_3) + 40 ppm of indole butyric acid (IBA) + 5 % v/v of methanol (A9), 80 ppm of gibberellic acid (GA_3) + 80 ppm of indole butyric acid (IBA) + 5% v/v of methanol (A10). The results showed that the bio-regulators had significant effect ($p \leq 0.05$) on morpho-physiological characteristics such as plant height, leaf width, lateral shoots No, leaf fresh weight, root fresh weight, number of internodes, leaf dry weight and stem dry weight of peppermint. Pearson correlation coefficients showed that the dry weight of leaf showed a significant positive correlation with leaf length, leaf width and petiole length. In general, the bio-regulators can be increase the plant morpho-physiological and biomass of peppermint.

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EFFECT OF TRADITIONAL OMID BAKHSH® DRUG ON MALE FERTILITY AND QUALITY AND QUANTITY OF SPERM IN PATIENTS WITH OLIGOSPERMIA

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Infertility is lack of pregnancy one year after marriage without contraception [1]. In Iranian traditional medicine, the effects of Honey, Royal jelly[2], Zingierofficinal, Propolis and Pepper longum on male fertility were investigated. In this study effect of compound drug containing above mentioned herbs(OMIDBAKHSH POWDER®)on male fertility was investigated. This study is a quasi experimental that carried out on all Oligospermia men that went to ACECR center, Qom Branch for infertility treatment. After filling satisfaction letter, Patients with a diagnosis of Oligospermiain first were treated withtraditional medical method. All components of this drug package include:(TaghviatMaghz&Asaab Capsules, Royal jelly capsule, OmidBakhsh mixture and OmidBakhsh powder) with brand of OmidBakhsh drug were made in BooAliDarooPharmaceutical company. Semen test for patients such as quantity, shape and motility of sperm, before and after drug administration were measured in ACECR center for infertility treatment. FromTwenty-twopatients with Oligospermia. All patients aged 22-40 years with 31.4±4.56 years. Among people who received drug, four participants (18.2%) were pregnant. Of course there is one case of abortion. For this reason none of them Second step of Semen test doesn't carried out. Among other 18 patients there are no cases of pregnancy, but their second test showed that count average from 18.57±13.31 reached to 29.33±21.77 (P=0.047).Total count values from 70.81±60.02 reached to 96.72±83.7 (P=0.257). Motility values from 26±19.35reached to 34.3±21.17 (P=0.08). B-Class Percentfrom 8.33±8.16 reached to 6.17±7.08 (P=0.581). morphology Percentfrom 5.68±8.64 reached to 7.21±13.01 (P=0.297). But there is no many change in A-class of sperms. Administration of this traditional compound drug can increase the level of fertility in men. Due to the effects ofthe drug has increased semen parameters, but generally these changes were not statistically significant, Therefore, it is predicted that the increase the number of samples lead to show precise results.

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Jazayeri, Katiya, Gharzi, Ahmad, Amiri, Hamzeh, Abbasi, Mohsen, Gholami, Mohamad Reza

Daphne mucronata has anti-oxidant and anti -inflammatory properties and it can have a quick effect on the recovery of the skin wound and bruises. The purpose of this research was to study the effects of Daphne mucronata on the cure of rat skin. This study included 45 male rats, which were treated in four different random methanol essences groups and a control group. They were treated for twenty two days. A circular cut was produced in the neck of the rats. The samples on the third, seventh, fourteenth and twenty second days after treatment were collected for microscopic analysis. The data were analyzed using Kruskal-Wallis and freedman by the SPSS software. From a macroscopic point of view and based on the measurement of the surface of the scratches and wounds in the groups under study, the healing trend of the scratches and wounds was increased considerably, so that in the fourteenth day of the treatment, a full recovery of the wounds was obtained, and on the twenty second day, the cuts and bruises were fully cared. The results of this study also showed that on the fourteenth and twenty two days, there was a significant difference between the control and treatment groups (P<0.05). Histopathologic results showed that treatment with Daphne mucronata can recover wound in the comparison with control considerably. The results of this research showed that the methanol essential made from the flower, stem and leaves of Daphne mucronata is effective in the recovery of the skin wound and speed of the process of healing the skin bruises.

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METHYL JASMONATE IMPACTS ON SEED GERMINATION INDICES IN MEDICINAL PLANT NAEIN-E HAVANDI (*ANDROGRAPHIS PANICULATA* L.)

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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]. Research showed that the use of MJ causes the decrease processes of germination inhibitors [2], and also increase the antioxidant and oxidative stress reduction can improve plant growth [3]. Germination is a critical stage in the life cycle of weeds, medicinal and crop plants. The objective of present study was to investigate the methyl jasmonate effects on seed germination indices of *Andrographis paniculata*. In this regard, an experiment was carried out based on completely randomized design with five methyl jasmonate levels (control, 75, 150, 225, 300 µM) and three replicates. The results indicated that methyl jasmonate levels had significant effect on the seed germination percentage (GP), mean germination time and germination rate. After three days of methyl jasmonate exposure the highest (25.33%) and lowest (10.67%) germination percentage were obtained from the 300µM methyl jasmonate level, respectively. Exposing the seeds with methyl jasmonate showed that increasing the methyl jasmonate levels led to decrease in germination percentage and rate Although, the high methyl jasmonate 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 75µM was the lowest (2.22 days) and in 225 µM methyl jasmonate level was the highest (3.62 days). In agreement with the reports of Bialeca and Kepczynski. [3], the findings of this study indicated that methyl jasmonate caused delay on germination rate of the *Andrographis paniculata* seeds, but no absolute inhibition was observed in total germination percentages of the seeds in different methyl jasmonate levels**.**

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EXPEIMENTAL EFFECT OF SOME MEDICINAL PLANTS IN THE TREATMENT OF MORIN CUTANEOUS LEISHMANIASIS

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Cutaneous leishmaniasis is the most common form of leishmaniasis in Iran [1]. Intralesional or systemic antimonials are the gold standard for the treatment of with cutaneous leishmaniasis. Pentavalent antimonial compounds (sodium stibogluconate and meglumine antimoniate) have been the first drugs of choice in last decades for the treatment of this disorder and they are associated with significant side effects [2].The aim of this study was to assess anti-leishmanial activity of some medicinal plants against Leishmania major. 40Male BALB/c mice were inoculated subcutaneously 2×10^6 L. major Promastigotes (MHROM/IR/75/ER) at the base of tail .These were randomly divided into 4 groups. In group 1 Glucantime® was administered to the BALB/c mice in regimen of 60 mg per kg of body weight for 28 days by intraperitoneal injections per day, in group 2 the gum obtained *Pistacia atlantica var*. Kurdica with *Aloe vera* aqua extract and in group3 Henna Lipstick were tested by rubbing of local lesions for 28 days, group 4 infected but non-treated. Comparisons of treated groups and untreated group were done by two-way analysis of variance. Topically rubbing administration of gum obtained *P. atlantica* var. kurdica *Aloe vera* aqua extract daily for 28 days like Glucantime® decreased skin lesion size in the BALB/c mice infected with L. major compared with that in the control ($P< 0.05$). Our results show that Lipstick the gum of *P. atlantica var*. Kurdica with *Aloe vera* aqua extract can be used for controlling cutaneous leishmaniasis caused by L. major and inhibiting development of cutaneous leishmaniasis lesions in Morin model.

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THE EFFECT OF BRONCHOBARIJ SYRUP ON COUGH AND ITS COMPARISON WITH DEXTROMETHORPHAN

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Cough is a normal mechanism of the respiratory system and the most common complaint of patients attending the outpatient clinic. Bronchobarij is a herbal syrup containing Zataria multiflora and Althaea officinalis L that both of them are known plants in the treatment of cough [1], in this study the effect of this syrup on cough compared with Dextromethorphan. In this double-blind clinical trial 195 patients with Idiopathic and persecutor cough divided to group receive either 5 ml syrup Bronchobarij or Dextromethorphan syrup, every 8 hours for 4 days randomly. Cough severity based on VAS and review questions from patient to assess improvement. Visit of people at the beginning and end of the study was presence and at 24 and 48 hours after intervention was conducted by phone. Results showed severity of cough decreased in both group at all stages examined ($p<0.001$). Difference between two groups in reduce the severity of cough was significant. After 96 hours of treatment, complete amelioration in cough was 65.5% in Bronchobarij group and 39.4% in Dextromethorphan group ($p=0.001$). Conclusion: Bronchobarij with good efficacy and more than Dextromethorphan can be a suitable herbal alternative for Dextromethorphan.

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STUDY OF ANTIMICROBIAL ACTIVITY FOR ESSENTIAL OIL OF *FERULAGO TRIFIDA* BOISS FROM ALAMUT REGION

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Essential oils extracted from aromatic plants are known since ancient times for their fragrance, antiseptic, food preservative and medicinal properties [1]. *Ferulago trifida* Boiss. is one of the nine *Ferulago* species represented in flora of Iran [2]. This species grows as an endemic plant in northwest of Iran [2]. In this study, flowers, stems and leaves of *Ferulagotrifida* were collected from Alamut, Ghazvin province, Iran. The plant was dried and extracted by Clevenger apparatus, antimicrobial activities of the mentioned oil were tested against some gram positive and gram negative bacteria via disk diffusion method and the activity was expressed as minimal inhibitory concentration (MIC) [3]. Although the oil samples were inactive on E. coli, they exhibited a moderate (IZ: 10-15 mm) to very strong (IZ: >20 mm) antibacterial activity on the other seven bacterial strains (Table 4). Among the essential oils, antibacterial activity of the flowers oil on *S. epidermidis* (IZ: 19 mm, MIC: 125 µg ml-1), stems oil on *S. epidermidis* (IZ: 34 mm, MIC: 125 µg ml-1), *S. aureus* (IZ: 29 mm, MIC: 125 µg ml-1) and B. subtilis (IZ: 22 mm, MIC: 250 µg ml-1), leaves oil on *S. aureus* (IZ: 25 mm, MIC: 125 µg ml-1) and fruits oil on S. paratyphi-A (IZ: 25 mm, MIC: 125 µg ml-1) were greater than positive control, gentamicin (IZ: 21 mm, MIC: 500 µg ml-1 for S. aureus, S. paratyphi-A and B. subtilis and IZ: 18 mm, MIC: 500 µg ml-1 for S. epidermidis). Among the tree tested fungi, *A. brasiliensis* was only found susceptible to flowers, stems, leaves and roots oils (IZ: 11 and 12 mm).

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CHEMICAL COMPOSITION OF THE ESSENTIAL OILS FROM DIFFERENT PARTS OF *FERULAGO TRIFIDA* BOISS.

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Ferulago trifida Boiss. is one of the nine *Ferulago* species represented in flora of Iran [1]. This species is a perennial plant with up to 1.5 m in height which grows as an endemic plant in northwest of Iran [1]. Regarding to the importance of *Ferulago* species as aromatic plants with various medicinal potentials [2] , the present study was designed to investigate chemical composition of the essential oils extracted from the flowers, stems, leaves, fruits and roots of *F. trifida*. This study reports chemical composition of *F. trifida* essential oils for the first time. The flowers, stems, leaves and roots of *Ferulagotrifida*Boiss. were collected in July 2014 and the plant fruits were gathered in August 2014 from around of Ovan Lake located in Alamut region, Ghazvin province, Iran. The shade-dried and comminuted plant samples (200 g each) were individually subjected to hydrodistillation for 3 hours using a Clevenger apparatus. The obtained oils were dried over anhydrous sodium sulfate and keep at 4 °C until analyses [3]. As a result of GC and GC-MS analysis of the essential oils from different parts of *Ferulagotrifida*Boiss., a total of 33 compounds were identified in the flowers (Fl), stems (S), leaves (L) and fruits (Fr) oils, of which (E)-β-ocimene (Fl; 37.3, S; 20.7, L; 25.7, Fr; 30.5%), α-pinene (Fl; 16.3, S; 22.6, L; 19.6, Fr; 18.0%) and bornyl acetate (Fl; 9.4, S; 8.5, L; 16.7, Fr; 11.0 %) were main compounds. Among the 39 compounds identified in the roots oil, suberosin (20.7%), β-barbatene (6.6%) and cuparene (6.1%) were main compounds.

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EFFECT OF *SATUREJA KHUZESTANICA* ESSENTIAL OIL, ULTRASOUND TREATMENT AND ULTRAVIOLET RADIATION ON THE OXIDATION STABILITY OF RAPESEED OIL

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Satureja khuzestanica is a native plant of Iran. Extract and essential oil of this plant have therapeutic and antimicrobial properties. One of major problems in production and storage of vegetable oil is lipid oxidation. They oxidation stability depends on many factors including presence of antioxidant. Although ultrasound and ultraviolet radiation are non-thermal alternative methods used in much food process, oxidation stability of oils can be reduced. The purpose of this study is extraction and identification of *Satureja khuzestanica* essential oil compounds, antioxidant effect and its role in reducing the harmful effects of ultrasound and UV treatments to oxidation stability rapeseed oil.The plant samples were collected from Lorestan and were identified in medicinal plant research department of Beheshti University (MPH-1582). Pure rapeseed oil without any additive was provided from Behshahr Company and chemical materials were obtained from Merck. Essential oil was extracted with newly design ohmic – ultrasound extractor, and then GC-MS analysis was performed to identify essential oil components. Oil samples (control and essential oils at 0.008%) were irradiated using an ultrasonic device for 30 seconds under ultrasonic irradiation (wave length 10 mm), and with UV radiation for 30 minutes (1.8KW).The results showed that essential oil yield is 5.6% (v/w) and the major identified compound is carvacrol (88%). Peroxide value and thiobarbituric acid tests indicate reduction of primary and secondary oxidation in the samples treated with essential oils. Therefore mentioned essential oil could significantly prevent the destructive effects of UV rays and ultrasound.In consequences, *Satureja khuzestanica* essential oil can help prevent for oxidation of vegetable oils as a natural additives used in food. This oil can also be a good alternative to synthetic antioxidants.

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EFFECTS OF DIFFERENT LEVEL OF SALINITY AND IRON FETILLIZER LEVELS ON CHEMICAL COMPONENT ON *LIPPIA CITRIODORA*

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Lemon beebrush (*Lippia citroiodora* Kunth H. B. et K) is a member of Verbenaceae family. The plant contains at least 0.5 volatile essential oil. This study investigated the qualitative and quantitative changes in the plant's oil content under salt stress. The results showed that the salt stress caused meaningful changes in all essential oils' qualitative and quantitative characteristics except α-pinene compound. The content of menthol, Neral, Geranial, Aromadendrene, Linalool, cis-Carveol, Geranyl acetate, sabinen, *p*-Cymene, camphor, cis-carveol β-Caryophyllene were increased. Iron (Fe) had positive effect on the quantity of antioxidant, phenolic compounds and chlorophyll a contents within the plant. In addition, the essential oil activity under salinity condition was improved when compared with the control (without Fe fertilizer application). The highest total essential oil contents in the plant was registered at 4 d/s salinity with 1% Fe fertilization. This study revealed that salt stress could meaningfully increase the secondary metabolites biosynthesis in lemon beebrush.

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EFFECTS OF PLANTING METHODS AND CORM WEIGHT ON YIELD OF SAFFRON (*CROCUS SATIVUS* L.) IN QAENAT REGION

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Saffron as the most valuable agricultural and pharmaceutical product of the world has a specific place in export products of Iran. Due to evaluate the effects of corm size and planting methods on yield of saffron, an experiment was conducted at 2012-2013 in Esfeden on split-plot experiment based on randomized complete block with four replications. Treatments included planting methods in three: mass (traditional) planting, striping planting and furrow cultivation and three corm weight, 6 - 8, 9- 11 and 12- 14 g were used. Results showed that corm size had the greatest effect on yield of saffron in the first year. As increasing corm size from 6 - 8 to 9 - 11 g, yield of flower and stigma and style raised to 161.65 and 176.19 percent respectively. Also increasing corm size from 9-11 to 12-14 g, yield of flower and stigma and style raised 44.74 and 47.40 percent, respectively. In this experiment planting method did not have a significant effect on saffron yield, and stigma length did not impressed by planting method and weight corm. The number and weight of daughter corms by planting methods and corm weight were significantly affected. The maximum number and weight of daughter corms were for furrow planting and the minimum numbers of daughter corms belong to mass planting and minimum weight of daughter corms gained from strip planting method. And also maximum and minimum number and weight of daughter corms resulted in 12-14 and 6-8 g in square meter corm, respectively. Interaction effects of planting method and corm size were not significant on saffron yield, just affected the number of daughter corms. In all planting methods, the maximum and minimum of saffron yield archived from the largest and smallest corms size respectively. Therefore, by ranking and planting of bigger corms in the first year the same product can be obtained as a traditional farmer can achieved in the third year and the year after, consequently this method can save the time and costs for farmers.

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QUANTIFICATION OF COLCHICINE AMONG WILD POPULATIONS OF *COLCHICUM SPECIOSUM* AND *C. KOTSCHYI*

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For successful natural resource conservation, it is important to evaluate its content of pharmaceutical compounds. *Colchicum* species are valuable and endangered natural source of alkaloids, which grow across of Iran.Colchicine (COL) is a toxic natural alkaloid commonly produced by plants like *Colchicum autumnale* and *Gloriosa superba*. It is originally used to treat rheumatic complaints, especially gout and have anti-cancer effects. Here, the variability in concentration of COL in wild growing *C. speciosum* populations (CSPs) and *C. kotschyi* populations (CKPs) was studied. The corms of all samples were collected from eight geographically distinct populations from Mazandaran (SavadKouh, Kiyasar), Semnan (Mehdi Shahr), Kermanshah (Sahne), Tehran (Darake), Khorasan (Torghabe) and Karaj (Baraghan) at full flowering stage and then were analyzed by HPLC. Our results revealed that the concentration (w/w,DW) of COL varied among studied populations. Maximum content of COL (3.4, 2.8, 2.6, 1.9, 1.9, 0.9, 0.7, 0.2 mg/g DW) was obtained from samples of SavadKouh 1, Savadkouh 2, Mehdi Shahr, Kiyasar, Darake, Torghabe, Baraghan and Kermanshah populations, respectively. Variation in the concentrations of COL among *Colchicum* populations may be due to on genetic, ecological or individual variability. The results of the present study show that there is a significant variation among natural CSPs and CKPs which can be considered for conservation and breeding programs to improve production of COL as high valuable anticancer compound.

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EFFECT HARVESTING TIME ON ESSENTIAL OIL FROM *ARTEMISIA CHAMAEMELIFOLIA* COLLECTED FROM GADOK REGION, MAZANDARAN PROVINCE

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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 previuos study indicated that the major constituents of the essential oil obtained from the dried flowering aerial parts of *Artemisia chamaemelifolia* Vill were vulgarone B (38.8%), santolinyl acetate (10.5%) and 14-hydroxy-9-epi-β-caryophyllene (8.4%) [3]. The hydro-distillated essential oil of *Artemisia chamaemelifolia* Vill aerial parts at two phonological stages, including before and 50% flowering collected from Gadok region in Mazandaran province, Northern Iran were analyzed by gas chromatography (GC) and gas chromatography–mass spectrometry (GC–MS). The major constituents of the essential oil of *Artemisia chamaemelifolia* Vill aerial parts at before flowering were chrysanthenone (18.5%), viridiflorol (2%), davanone (7.50%) and *cis*-davanone (8.17%). The main compositions of the essential oil of *Artemisia chamaemelifolia* Vill aerial parts at 50% flowering were chrysanthenone (6.48%), viridiflorol (9.7%), davanone (4.59%) and *cis*-davanone (3.64%).

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IONIC LIQUID ASSISTED EXTRACTION OF DIOSGENIN FROM FENUGREEK (*TRIGONELLA FOENUM-GRAECUM* L.)

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Fenugreek (*Trigonella foenum-graecum* L.) has a long history of medicinal uses in Middle East and Persian medicine. The hypocholesterolaemic and anticancer effects of fenugreek were attributed to its major steroidal sapogenin, diosgenin.Diosgenin is often used as a raw precursor for the production of steroidal drugs and hormones such as testosterone, glucocorticoids and progesterone [1].The most common extraction and preparation method of diosgenin from natural raw materials is hydrolysis with inorganic acid, such as sulfuric and hydrochloric acid. As a kind of novel green solvent, ionic liquids (ILs) have many unique properties, such as, negligible vapor pressure, good thermal stability, and an easily dissolvable and extracting ability. These advantages are highly attractive to the present academic and industrial circles related to the natural functional resources [2]. The traditional hydrolysis process, catalyzed by inorganic acids, always suffers from environmental pollution, energyinefficiency, corrosion hazard, recycling difficulty of acids, as well as, carbonization of the product under high temperature. Considering these occurring disadvantages, the IL is a promising alternative for conventional inorganic acid catalysts. Furthermore, the ultrasonicassisted process could obtain higher extraction and elaborative method which has been greatly popularized in recent years [3]. In this study,1-Butyl-3-methylimidazolium Hydrogen Sulfate ([BMIM]HSO_4) as a catalytic amount, has been used to extract the diosgenin from fenugreek leaves. The efficiency of extraction has been monitored with high performance liquid chromatography (HPLC). The new extraction method was compared with the conventional heat-reflux extraction (HRE) and regular UAE.The higher extraction efficiency (from 1.64 to 6.82 mg diosgenin per 1.0 g of died weight of the plant material) and shorter extraction time (from 120 to 60 min) was obtained with the IL assisted extraction method.

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ROSMARINIC ACID CONTENT IN LEAVES OF *MELISSA OFFICINALIS* L. INCREASED UNDER WOUNDING AND SALICYLIC ACID TREATMENTS

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Medicinal plants of the family Lamiaceae are the important sources of natural antioxidants. *Melissa officinalis* L. known as balm plant, contains hydroxycinnamic acids (up to 6% of rosmarinic acid, p-coumaric and caffeic acids). Up to 0.37% of an essential oil may be composed of more than 40% monoterpenes and 35% sesquiterpenes [1]. Rosmarinic acid is the most important antioxidant compound in balm, and of pharmaceutical interest for its anti-complement, anti-oxidant and anti-inflammatory actions. As RA is supposed to serve as a defense compound against pathogens and herbivores [2], its biosynthesis may be stimulated through wound stress and SA treatments. In this study, rhizomes of lemon balm were cultivated in 17 pots. After growing plants over two months, 6 different treatments, T1 (control), T2 (wounding), T3 (salicylic acid 1 mM), T4 (salicylic acid 1.5 mM), T5 (wounding + salicylic acid 1.5 mM), T6 (pretreatment with salicylic acid 1.5 mM + wounding) were performed for two weeks. Highest amount of rosmarinic acid (2.58 µmol/gDW) was measured in T3 treatment. Results showed that the application of salicylic acid 1.5 mM could increase rosmarinic acid content in both healthy and wounded plants. SA could have stimulated wound tolerance in balm by promoting the interaction between phytohormones, which may be demonstrated by further experiments.

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INTRODUCTION OF A NOVEL BIOSYNTHETIC PATHWAY FOR PRODUCTION OF 11-B,13-DIHYDROCOSTUNOLIDE IN *NICOTIANA BENTHAMIANA*

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Parthenolide is the main active compound of feverfew, *Tanacetum parthenium*, a well-known medicinal plant. Feverfew is a bushy perennial that originates from the Balkan peninsula but can now be found in Japan, China, Australia, America, North Africa and Europe in gardens and on the side of the roads. It has been used since ancient times for multiple afflictions from arthritis to insect bites but mainly, as its common name indicates, against fever and different aches. Feverfew is also sometimes called the 'mediaeval aspirin' [2] . It is now still being used against migraines and its symptoms [4]. Feverfew has been shown to also have a therapeutic working on cancer [1], by inducing apoptotic cell death specifically in cancer cells [3]. Feverfew synthesises many mono and sesquiterpenes but the most promising compounds for medicinal purposes are parthenolide and its precursor costunolide. Parthenolide constitute up to 85% of the total sesquiterpene lactone content of feverfew plants.Parthenolide usage as a medicinal compound is held back by its low water-solubility which can be partially solved by producing a different form of its precursor, 11-β,13-dihydrocostunolide thus making it more soluble while hopefully still retaining the bioactivity. In this study we tried to use a reductase enzyme from *Artemisia annua* to produce 11-β,13-dihydrocostunolide in *Nicotianabenthamiana* as a production platform where all costunolide biosynthesis pathway genes, namely *At*HMGR, *Tp*GAS, *Ci*GAO, *Ci*COS were also expressed. Successful production in the heterologous host, *N. benthamiana*, as a production platform of 11-β,13-dihydrocostunolide was confirmed by LC-Orbitrap-FTMS in a non-targeted metabolomics approach. Isolation and purification of 11-β,13-11-β,13-dihydrocostunolide is in progress to be tested against cancer cell lines.

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THE EFFECT OF SPIRODICLOFEN AND ESSENTIAL OILS (*FERULA ASSAFEOTIDA)* AND*(FERULA PERSICA) ON TETRANYCHUS URTICAE* UNDER LABORATORY CONDITION

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The two-spotted spider mite. is one of the important and polyphaghous pests for agriculture products and using of chemical insecticides will have environmental impact, therefore In present study, We have examined the efficacy the fumigant toxicity of the essential oil from *Ferulla assa foetida* and *Ferulla persica* and acaricide Spirodiclofen SC 240 on *Tetranychus urticae* koch under laboratory conditions. Completely randomized design experiment, with 4 factors in 4 replications was used for the test.The mean of mortality for gastrointestinal toxicity was more than inhalation toxicityin all stages. LD_{50} value in 72 h and LT_{50} value in 20 ppm of *F. persica* essential oil were respectively 1.83 ppm and14.10 h and there were very toxic for larvae compare that other stages. LC_{50} value in 72 h, LT_{50}value in 50 ppm of *F. persica* essential oil for larvicide were respectively LC_{50}= 5.59ppm and LT_{50}12.52=h. Our findings indicated that *F. persica* had reliable mortality on *T. urticae*. Present finding suggested that, using essential oils keep agro -ecosystem away from further pollution. However, more research is necessary to make these compounds applicable.

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AN INVESTIGATION ON THE DISTRIBUTION OF GALBANUM PLANT(*FERULA GUMMOSA*)

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Galbanum with the scientific name *Ferula gummosa* Boiss belongs to Apiaceae or Compositaea family. This genus includes 170 species worldwide. In Iran 23 species distributed all over the country particularly in Zanjan province. This plant extract serve as adhesive in diamond and precious stones industry as well as printing, painting and pharmaceuticals. Likewise, the extract is well known as stabilizer for perfume industry. Given the limited cultivation of this plant, it seems that most need this valuable medicinal and industrial plant, comes from nature. Therefore, high demand not only can cause such damages and excessive utilization from the natural habitats, but also responsive to the pharmaceutical industries, likely due to inappropriate use, its destruction in nature will follow. In order to identify appropriate areas for sowing seeds, mapping the distribution of galbanum in the province was crucial. In this investigatin, based on literature review and plant growth locations four major areas for the province identified and were selected as the main sites of this study. These sites were Kalasar, Shilander, Valis, Aghzavaj. In each region, in addition to the geographical coordinates (including slope, elevation, latitude), 2 to 3 transects in each area (3 to 7 plots per transect), traits associated with these distribution were noted. The traits were: companion species, species percentage, density and covering area. Soil samples were taken from each area as well as common parameters such as soil texture (% clay,% silt,% sand), phosphorus, potassium,% organic carbon, soil chemistry (EC, pH). In Kalasar, (altitude 2500 m) with a mean 1200 plant/ha and 35% live covering, main species are following: *Centura aucheri* (18%), *Ferula gummosa* (14%), *Ferula ovina* (11%), *Alopecurus textilis* (11%), *Prangus ferulaceae* (10%). In Shilander (altitude 2500 m) with a mean 5400 plant/ha and 43% live covering, main species are following: *Tanacetum* (17%), *Ferula gummosa* (11%), *Festuca ovina* (10%), *Silene* (8%). In Valis (altitude 2500 m) with a mean 2000 plant/ha and 28% live covering, main species are following: *Hypericum* (11%), *Ferula gummosa* (15%), *Achillea* (10%), *Silene* (8%), *Prangus ferulaceae* (10%). Eventually, distribution map of this species were developed which can provide the cultivation extension of this plant in suitable rangelands.

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CORRELATIONS BETWEEN HORTICULTURAL CHARACTERISTICS AND CHEMICAL VARIATIONS IN *DRACOCEPHALUM MOLDAVICA* (LAMIACEAE) LANDRACES FROM NORTH WEST OF IRAN

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The Moldavian balm (*Dracocephalum moldavica* L.), is an herbaceous essential oil producing and medicinal plant from *Lamiaceae* family (Dastmalchi *et al.*, 2007). Due to its strong effects on the gastrointestinal system and other parts of the body, *D. moldavica* has traditionally been used for treatment of some diseases e.g. stomach and liver disorders in folk medicine. Recently published reports have buttressed its sedative capacity, tranquilizer remedy (Martinez-Vazquez *et al*, 2012) and anti-Helicobacter pylori activity (Najafi *et al*, 2008). The present study was carried out to assess the genetic diversity in Iranian landraces (cultivated populations) of Moldavian balm based on some horticultural traits and essential oil characteristics and to find the correlations between them. Seeds of seven populations were provided from different areas of NorthWestern Iran, Included: West Azerbaijan province (*Naghadeh*, *Keshtiban*, *Topragh Ghalee*, and *Baghchajogh*) and East Azerbaijan province (*Hokm Abad*, *Jahangir* and *Shiraz valley*) and cultivated in the field conditions of Hamadan province. Sixteen horticultural traits were evaluated. Essential oils were extracted from the aerial parts using Clevenger and were analysed by Gas Chromatography-Mass Spectrometry (GC–MS). Based on the results, the landraces from *Shiraz valley* presented remarkably high mean values for plant height, number of nodes per stem and leaf length. The oil content in landraces varied from 0.03 to 0.12% (w/w). Among the tested *D. moldavica* landraces, *Hokm Abad* showed the highest essential oil content (0.12%). On the whole, 41 compounds were identified in essential oils. The dominant constituent for all landraces was Geranyl acetate (19.8%-45.5%) with an exception of *Naghadeh* (Geranial: 23.82%). The considerable correlations were found among some horticultural and phytochemical traits. According to the Pearson coefficients analysis, branch length was confirmed to be positively correlated (r = 0.559 and 0.594) to Geraniol and Nerol percent. The stem diameter was only horticultural character that had positive correlation with the main economical trait of the essential oil content. The present survey demonstrated a broad variety among horticultural traits and essential oil compositions of Moldavian Balm landraces from NorthWestern Iran. These findings could be a useful tool for indirect selection and breeding programs of *D. moldavica* [1].

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EFFECTS OF MYCORRHIZA ON YIELD COMPONENTS AND ESSENTIAL OIL PRODUCTION IN *PIMPINELLA ANISUM*

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The effects of inoculation with vesicular-arbuscular mycorrhizal (VAM) fungi *Glomus intraradices* and non-inoculation on root colonization, plant growth, agronomic characteristics, essential oil content and essential oil yield in *Pimpinella anisum*, were studied under field conditions. The experiment was carried out in a field conditions, in randomized complete block design with three replications. The VAM inoculation significantly increased the root colonization, number of umbel per plant, number of seeds per umbelet, seed yield, essential oil content and essential oil yield as compared to non-inoculated treatment. The effect of VAM inoculation on the root colonization, growth and seed yield of *Pimpinella anisum* was more pronounced, indicating *Pimpinella anisum* as a highly mycorrhizal dependent genotype. VAM inoculation most markedly increases the uptake of phosphorus. In fact; the VAM inoculation could significantly increase root colonization, growth, and essential oil yield in *Pimpinella anisum* for obtaining economic production under field conditions. Therefore, we conclude that the inoculation of arbuscular mycorrhizal fungi into *Pimpinella anisum* plants is a feasible alternative to increase the essential oil production and reduce the use of fertilizers required to obtain economic production of *Pimpinella anisum* under phosphorus-deficient soil condition [1].

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INFLUENCE OF IRRIGATION DISRUPTION ON AGRONOMIC CHARACTERISTICS AND ACTIVE SUBSTANCE OF ANISE

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Pimpinella anisum (anise) is one of the most important medicinal plants, which is used in drug industries. Drought stress, as a main abiotic stress, has a significant influence on growth and metabolic activities of medicinal plants species. In this study *Pimpinella anisum* was planted for the first time in Hamedan conditions with the aim of the evaluation of the effects of irrigation disruption on growth, essential oil content and essential oil yield of anise. Therefore, three irrigation treatments (irrigated plants till flowering stage, irrigated plants till seed filling stage, and irrigated plants till end of growing season as a control), were evaluated in a randomized complete block design (RCBD) with three replications. Results indicated that irrigation treatments had a significant effect on agronomic characteristics of anise. Irrigation disruption at the flowering stage significantly decreased, number of umbel per plant, number of seeds per umbelet, and seed yield as compared to control (full irrigated plants). Also, results indicated that anise seeds essential oil percentage was affected significantly by irrigation treatments. Anise seeds which were obtained from full irrigated plants (control) had lower essential oil content than from the other two irrigated plants. On the other hands, irrigation disruption in flowering and seed filling stages increased the anise seeds essential oil content. As, means comparisons for essential oils showed that essential oil content which was 4.04 percentage in irrigated plants till flowering stage, was reduced significantly to 3.37 percentage in the irrigated plants till end of growing season (control treatment). However, there was no significant difference between both irrigated plants till seed filling and end of growing season stages for essential oil content [1].

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HISTOMETRICAL CHANGES OF MUSCULATURE OF DUODENUM AND BLOOD GLUCOSE LEVEL IN SURRI MICE FOLLOWING SOY BEAN CONSUMPTION

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The protein of soy bean has been resulted in many therapeutic attributes and during recent yearsresearchers have interested in finding its other specifications. The objective of this study ishistometricalchanges of muscles of duodenum and blood glucose level in the mice fed on soy bean. Forthis study a total of immature 30 femaleSurri mice were used. After adaptation with environment for one week, 20 mice were randomly selected and divided into two groups. The control groupwas fed with a diet without soy bean and the experimental group received a diet containing 20% soy meal. One day after the end of treatment the mice were anesthetized and blood samples for determination of the glucose rate were takenthe heart. After euthanizing, duodenum was removed and the sampleswere fixed in 10% formalin. After histological processing, prepared paraffin blocks were sectioned at 5 microns and stained with H&E. tissue specimens were studied by a photomicroscope and the figures were subjected to histometric study. Inhistometric study, thickness of muscular wall in in the groups consumed soy bean (167.3±18.2) a significant increase compared with the control group (72.8±7.35)was observed($P<0/05$). Also blood glucose level in the experimental group (62.58±6.47) compared with the control group (53.90±5.48) showed a significant decrease ($P<0/05$). The thickness of muscular layers could be a compensatory reaction for increasing mechanical activity against decreasing enzymatic activity induced by soy bean. Also long term consumption of soy bean by decreasing blood glucose, might be useful for diabetics. However individuals with diabetes or with hypo glycosemia should be careful in soy consumption.

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CHANGES OF CHLOROPHYLL, AND CAROTENOID PIGMENTS IN LEMON VERBENA (*LIPPIA CITRIODRA* H.B.K) TO FOLIAR APPLICATION OF BIO-ACTIVE COMPOUNDS AND BIO-REGULATORS

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Lemon verbena (*Lippia citriodora*) is an important medicinal species of Verbenaceae family. This plant has a long history of folk uses in treating asthma, spasms, cold, fever, flatulence, colic, diarrhea, indigestion, insomnia, and anxiety [1]. Plant pigments content can be changed in the leaf lemon verbena by using induction of bio-active compounds and bio-regulators formulation as a new method. In order to investigate the effect of foliar application of bio-active compounds and bio-regulators on content of chlorophyll (*a*, *b*, and *total*), and carotenoid pigments in leaf of lemon verbena, an (three-factor) factorial experiment based on randomized complete blocks design (RCBD) with 16 treatments and 3 replications was conducted at a research greenhouse in 2015. The first factor was bio-regulators application in four levels (control; distillated water, 50 ppm GA_3 + 50 ppm IBA, 50 ppm GA_3 + 100 ppm IBA, and 100 ppm GA_3 + 50 ppm IBA), and the second factor, that is chitosan induction was considered at two levels (control; distillated water, and 400 ppm chitosan), and also, third factor was methanol induction in two levels (control; distillated water, and 5% v/v methanol). The solutions were sprayed four times during growth stages with fifteen day intervals on the aerial parts of the plant. Analysis of variance showed that the foliar application of bio-active compounds and bio-regulators had a significant ($p \leq 0.01$) effect on the content of chlorophyll (*a*, *b*, and total), and carotenoid pigments. The highest amount of chlorophyll *total* (18.04 $mg.g^{-1}$) and chlorophyll *a* (17.35 $mg.g^{-1}$) was obtained at 100 ppm GA_3 + 50 ppm IBA + 5% v/v methanol. The lowest content of chlorophyll *total* (5.54 $mg.g^{-1}$) and chlorophyll *a* (4.49 $mg.g^{-1}$) was observed at 50 ppm GA_3 + 50 ppm IBA. The highest (2.89 $mg.g^{-1}$) and lowest (0.31 $mg.g^{-1}$) value of chlorophyll *b* was related to the treatment of 50 ppm GA_3 + 100 ppm IBA + 5% v/v methanol, and 50 ppm GA_3 + 100 ppm IBA + 400 ppm chitosan + 5% v/v methanol, respectively. Moreover, the highest (6.35 $mg.g^{-1}$) and lowest (3.88 $mg.g^{-1}$) amount of carotenoid was recorded in the treatment of 5% v/v methanol, and 50 ppm GA_3 + 100 ppm IBA + 400 ppm chitosan, respectively. It can be concluded that the above mentioned treatments on the plants leads to the positive changes in biosynthesis of chlorophyll and carotenoid, and it is an effective method in developing plant bio-stimulants.

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THE EFFECT OF OLIVE OIL ON ISCHEMIC DAMAGES INDUCED BY ISCHEMIC STROKE MODEL

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Stroke is a serious neurological disease and a leading cause of death and severe disability in the world [1]. There are two major kinds of stroke: ischemic stroke and hemorrhagic stroke [2]. This event initiates a complex process that includes excitotoxicity,oxidative stress, inflammation, and apoptosis [3]. On the other hand,research on preconditioning, also known as ischemic tolerance, has resulted in promising strategies for the treatment of patients with acute brain injury. One of herbal medicine as ischemic preconditioning factor is Mediterranean diet. The Mediterranean diet is known as powerful antioxidant. A key component of this diet is olive oil, which contains monounsaturated fatty acids and polyphenols, compounds with antioxidant and anti-inflammatory effects. So, the aim of this study was to evaluate the effect of olive oil as a sufficient candidate on cerebral ischemia damages. 35 male Wistar rats were divided into five groups (control, sham, and treatments) (n=7). The control group received distilled water. Treatment groups received different doses (25, 50, and 75 mg/kg) from olive oil that were underwent gastric gavage for 30 days. Two hours after the last gavage, rats were subjected to 60 min MCAO surgery. 24 hours later, the neurologic defects scores and infarct volume totally in total, cortex, amygdala, and striatum of rat brain were evaluated separately. the olive oil 50 and 75 mg/kg-received groups showedsignificant reduction in infarct volume and neurological score in comparison with control group. moreover,this significant difference have observedin infarction volume of cortex. The present results demonstrate that theneuroprotective effect of olive oil couldimproveischemic injuries. It seems that its positive effects is attributed to anti-oxidant and anti-inflammatory properties of olive oil compounds.

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INCREASING OF *PHENYLALANINE AMMONIA-LYASE (PAL)* GENE EXPRESSION AND CHATECHIN PRODUCTION IN CELL SUSPENSION CULTURE OF *SCROPHULARIA STRIATA* BY CHITOSAN

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Scrophularia striata Boiss. (Scrophulariaceae) is one of the native plants in Iran [1]. It is a traditional medicinal plant with the local nameTashneDari and has been reported to have many pharmaceutical effects such anticancer properties [2]. Catechin is a secondary metabolite of polyphenols class that has been ascribed to act as powerful antioxidant compound possessing diverse physiological roles in biological systems. Research data have revealed that chatechin can be used as preventive many diseases related to oxidative stress such as cancer and cardiovascular diseases [3]. In this study, we have verified the time-course of cell growth, cell viability and chatechin production in cells treated with chitosan. To study mechanism of chitosan action, expression of *phenylalanine ammonia-lyase (PAL)* gene was investigated. The cells were treated with 10 mg/L chitosan. Cells were harvested for 3, 5 and 7 days after elicitation. Chatechin quantified by high-performance liquid chromatography (HPLC). Cell samples were used to elucidate the expression level of *PAL* gene by Semi-quantitative RT-PCR. Following treatments with chitosan, the results showed that the cell growth and viability of cells were decreased as compared to control. In addition, Chitosan increased chatechin. Cells elicited with chitosan for 5 days yielded the highest amount of chatechin which was about 2-fold higher than control. The expression of gene by chitosan was increased, reaching a peak at 5 day after treatment (2.4-fold higher than control). Chitosan up-regulate the production of chatechin by effecting on gene expression of this compounds biosynthesis pathway.

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COMPARATIVE EFFECTS OF ROOT POWDER OF *FERULA* (*OVINA*) AND OMEPERAZOLE FOR TREATMENT OF INDOMETHACIN-INDUCED GASTRIC ULCER IN MALE RATS

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Herbal drugs consist of a number active phytoconstituents which has furnished mankind with a number of herbal remedies for wide range of diseases for centuries. The herbal drugs still constitutes a major share of healthcare remedies in developing countries [1]. Ferula assa-foetida grows wildly inthe central and southern mountains of Iran [2]. Ferula spices have been used as one of the most important indig-enous medicinal plant in Iran [3]. It has been reported special feature in traditional medicine as anti spasmodic, digestive, expectorant, laxative, and etc. But its therapeutic effects on gastric ulcer are not yet known in new medicine. So in this study we examined the healing effects of root powder Ferula Ovina against indometacin-induced gastric ulcer in male rats. In this experimental study 56 male rats (280-320gr) were randomly divided to four treatment groups (n=8) and three control groups.72h after fasting indometacin (30mg/kg) administrated orally in all groups (except in normal control).5h later administrated root powder suspension in four dose (125,250,500,1000mg/kg) and In positive control groups administrated omeprazol (20mg/kg) orally and in normal control administrated equal distil water tow time per day for two weeks. and in negative control group Without any intervention. Results were expressed as mean±S.E.M. The statistical difference between the mean ulcer index of thetreated group and that of the control was calculated byusing one way ANOVA and Tukey_/Kramer multiple comparison tests. Histopathological examination showed ulcer in all treatment groups were cured and statistical analysis no significant difference among omeprazol and treatment groups, while as mortality in negative control group compare with treatment groups showed significant difference. The result of this study showed that oral administration of root powder of Ferula Ovina healing effect on gastric ulcer and to compare with omeperazol as an inexpensive and no significant said effects .so it can use for treatment of NSAID-induced ulce.

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EVALUATING THE EFFICACY OF FOUR HERBAL PLANTS ON PERFORMANCE OF BROILER CHICKENS UNDER HEAT STRESS CONDITION

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The purpose of this study was to investigate the effect of feeding of purple coneflowers (*Echinacea purpurea*), dog rose (*Rosa canina*), summer savory (*Satureja khuzistanica*) and sweet marjoram (*Orignum marjorana*) as a feed additive on growth performance of broiler chickens. Two hundred eighty eight, 28-day-old male broiler chickens were randomly allocated into 6 experimental groups (with 4 replicates) as follows: 1) negative control diet without feed additive under normal condition of the Ross 308 broiler management guide recommendations, 2) Positive control diet without feed additive under heat stress condition 3-7) and four experimental diets were supplemented with purple coneflowers extract (1mL/lit), dog rose (1%), summer savory (1%) and sweet marjoram (1%). The birds were raised until 42 days of age. Body weight was not affected in first week of experiment. However, final body weight gain was higher in purple coneflowers and negative control groups (P>0.05) compared to others. Feed intake was not affected by the herbal medicine supplementation, but it was lower in positive control group (P>0.05). Feed conversation ratio was lower in negative control group (P>0.05), but there was no significant difference among the herbals treatments. In heat stress condition, no significant differences were observed between the treatments and negative control. It was concluded that supplementing of herbal medicines in the broiler diet under heat stress condition lead to a positive effect on the growth performance of these birds [1, 2].

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EVALUATION OF *EUCALYPTUS CAMALDULENSIS* AND *SATUREJA RECHINGERI* ESSENTIAL OILS ON GROWTH AND AFLATOXIN B_1 PRODUCTION BY *ASPERGILLUS PARASITICUS NRRL 2999*

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Aflatoxin B_1 (AFB_1) a very toxic and carcinogenic metabolites produced by Aspergillus species [1]. The aim of this study was to examine two essential oils of *Eucalyptus camaldulensis* and *Satureja rechingeri* as antifungal agents against strain of *Aspergillus parasiticus NRRL 2999* (Toxigenic aflatoxin B_1). The essential oil of *Satureja rechingeri* and *Eucalyptus camaldulensis* obtained by Clevenger apparatus. Antifungal activity assay was performed using the disk diffusion method. The minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) was determined essential. Essential oil with gas chromatography (GC) and liquid chromatography/mass spectrometry (GC/MS) analysis was performed. Samples of aflatoxins tested by high performance liquid Chromatography (HPLC) was studied [2, 3]. *Eucalyptus camaldulensis* essential oil blend has been 17 components were identified, the highest rate of 1,8 cineole (55/2%) and the minimum inhibitory concentration (MIC) minimum fungicidal concentration (MFC), respectively, 9000 and 17500 ppm and inhibition zone diameter for 20 ml oil 10^6 spores of *Aspergillus parasiticus NRRL2999*, 12 mm was reported to have little inhibitory power. *Satureja rechingeri*, 7 combined with the highest combination of Carvacrol to the (98/22%), with minimum inhibitory concentration and mortality, 50 and 250 ppm and inhibition zone diameter for a concentration of 20 ml oil in a concentration of 10^6 spores of the fungus *Aspergillus parasiticus NRRL2999*, 62 mm was reported to have super powers are strong and can be used to inhibit the growth and aflatoxin production plant as a genius named B_1.

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ANTIOXIDANT ACTIVITY OF IRANIAN NATIVE BARBERRY FRUITS: *BERBERIS INTEGERRIMA* AND *BERBERIS VULGARIS*

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Barberry is well known and naturally adapted in Iran, and it has been extensively used as a medicinal plant in traditional medicine. The fruit of the barberry is used in medicine to treat liver, neck and stomach cancer, for purification of the blood and for breath freshness [1, 2, 3]. The aim of current study was determination of antioxidant potential of 2 *Barberry vulgaris and Barberry integerrima.* The samples were collected in November 2015 from Birjand ,Khorasan, Iran and identified by the Herbarium of Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University (IAUPS). All the extracts were found to possess some radical-scavenging and antioxidant activities, as determined by scavenging effect on the DPPH free radical. Fruit juice extracted from the fleshy sacs using a hand-operated domestic press. The juice was stored at 4 °C overnight to allow the suspended particles to settle. The fresh juice was then clarified using a spiral ultrafiltration system with a molecular weight-cut off of 40 KD (Osmonic, USA). The antioxidant activity was determined using the procedure that described by Brand-Williams *et al* (1995). Different concentrations of barberry extracts were tested as AOAC methods and absorbance was measured at 517 nm in a UV/VIS spectrophotometer. Results indicated that percentage of RSA is significantly affected by the type of barberry ($p \leq 0.05$). Brberry *integerrima* have more antioxidant activity than barberry *vulgaris*. %RSA in barberry *integerrima* is 47.2% while % RSA in barberry *vulgaris* is 29.3%. The results of this research concluded that both of barberry samples have suitable antioxidant activity and they can use as natural antioxidant in foods and drugs.

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EFFECT OF DIETARY SUPPLEMENTATION OF SAGE EXTRACT, HYSSOP AND HAWTHORN ON BROILER GROWTH PERFORMANCE

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This experiment was investigated to see the effect of feeding sage, hyssop and hawthorn on growth performance of broiler chickens. Two hundred and forty, male broilers (Ross 308) from day 28 until day 42 were divided into 5 groups (with 4 replicates) as follow: 1) positive control (PC) with standard diet without herbal supplementation under heat stress condition, 2) negative control (NC) with normal condition without herbal plants supplementation, 3) 1 mL/L sage extract (SE), 4) 1 % hyssop (HS) of the diet and 5) 1 % hawthorn (HW) of the diet. Final body weight was higher at SE and NC groups ($P > 0.05$). However, final body weight in PC was the lowest compared to others. Feed intake was increased by herbal supplementation ($P > 0.05$). There was a significant difference ($P > 0.05$) in feed conversation ratio (FCR). The best FCR was belonged to NC and SE groups ($P > 0.05$). It was concluded that supplementation of sage extract in the broiler's diet had a positive effect on growth performance of these birds under heat stress condition [1, 2].

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EFFECT OF MAGNETIC FIELDS ON GERMINATION PARAMETERS AND OSMOTIC STRESS TOLERANCE OF CORIANDER (*CORIANDRUM SATIVUM* L.) IN VITRO

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Coriander like other medicinal plants is influenced by many factors, among them deficit water is critical. Osmotic stress limits seed germination, interferes with cell volume, ion homeostasis, may damage cellular macromolecules and impair cell faction. The effects of electromagnetic field (150mT) stimulation on germination parameters of coriander accessions in different levels of polyethylene glycol (PEG) -induced osmotic stress were assessed to determine whether the magnetic field effect on germination parameters was associated with the increase of osmotic tolerance in coriander. A three- factorial trial was set up within completelyrandomized design with three replications. Evaluated facrors were magnetic field and non magnetic field application, 4 osmotic water potential (0, -8, -10 and -12 bar) and three coriander accessions (Isfahan, Bistoon and Hamadan). Results showed no germination observed in any of osmotic stress treatments.Magnetic field exposure did'nt affect germination parameters. Bistoon accession showed the highest germination percentage. Correlation analysis showed the highest correlation between rootlengthand shootlength.

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EFFECTS OF PLANT GROWTH REGULATORS ON BIOCHEMICAL CHARACTERISTICS AND TOTAL SOLUBLE CARBOHYDRATES IN SAFFRON (*CROCUS SATIVUS* L.)

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Saffron (*Crocus sativus* L.) is the most expensive medicinal plant and spice in the world and used as food coloring and seasoning in food industries and also effective compounds of saffron have anti-oxidant properties which cause treatment in many diseases such as cancer [1]. Saffron has a potential source of bioactive compounds that is named as crocin, safranal and picrocrocin [2]. In order to study of saffron quality under effects of exogenous application of plant growth regulators, a greenhouse experiment was conducted in RCBD with four replications in 2015, at College of Aburaihan, University of Tehran, Iran. An endemic Iranian ecotype of saffron was treated by gibberelic acid (GA_3), cytokinin (BA), auxin (IBA) with 250 ppm concentration separately and before cultivation. Content of crocin, safranal and picrocrocin of saffron stigma as active substances were assayed with spectrophotometry method according to ISO protocol [3]. Total soluble carbohydrates of saffron leaves and corms were assayed with anthrone method. Results showed that exogenous application of cytokinin led to increasing of active substances of saffron in comparison with applied IBA and GA_3. Cytokinin hormone had the highest effects on increasing crocin (67.10%), safranal (18.33%) and picrocrocin (46.05%) with increasing about 139.55%, 154.58% and 116.70% respectively compared with control (crocin 28.01%; safranal 7.20% and picrocrocin 21.25%). Cytokinin hormone also had the highest effects on increasing total soluble carbohydrates in leaves (13.18%) and corms (13.44%) with increasing about 3.86% and 3.26% compared with control (12.69% and 12.99%), while applied IBA and GA_3 had not significant differences. As a final result, exogenous application of cytokinin led to increasing of active substances in saffron stigma and it is relevant to increasing of total soluble carbohydrates in leaves and corms as production source of active substances of saffron.

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EFFECT OF BIOFERTILIZERS, CHEMICAL FERTILIZER AND HUMIC ACID ON ESSENTIAL OIL CONTENT, YIELD AND COMPOSITION OF BASIL (*OCIMUM BASILICUM* VAR. THYRSIFLORA)

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Basil is an annual plant, originated from the Northwest India, Northeast Africa and Central Asia [1]. It is a valuable medicinal plant that not only has many applications in food, pharmacy, dentistry, perfumery and cosmetic industries, but also used extensively in traditional and modern medicine [2]. Basil is traditionally consumed as a medicinal herb to treat headaches, coughs, diarrhea, constipation, kidney disorders and parasitic diseases. Management of the fertilizer application is a key factor for cultivation of medicinal plants. In order to reduce the application of chemical fertilizers and investigate the effect of biofertilizers and humic acid on essential oil content, yield and composition of basil (*Ocimum basilicum* var. thyrsiflora), a factorial experiment was conducted based on randomized complete block design with three replications. First factor was included fertilizer treatments in six types as control, Azetobarvar1 (Az1), Phosphatebarvar2 (phos2), combination of Az1+Phos2, chemical, combination of Az1+Phos2+chemical (50%) and second factor included humic acid in two levels (0 and 20 $kg.ha^{-1}$). The essential oil was extracted by hydro-distillation of dried aerial parts and analyzed by GC-MS. The results showed that the highest and lowest of essential oil content was found in Phos2 and control treatments, respectively. The application of Az1+Phos2+chemical (50%) treatment significantly increased essential oil yield while the lowest were observed in control. The main compounds in essential oil of basil were 1,8-cineol, α-bergamoten, β-ocimene, β-pinene, comphore, linalool and methylchavicol. The highest percentages of 1,8-cineole, β-pinene, and linalool were recorded in Az1+Phos2+chemical (50%)+humic treatment whereas the highest percentages of α-bergamoten and methylchavicol were observed in Az1+humic treatment. The highest percentages of β-ocimene and comphore were also obtained in Phos2 and Az1+Phos2, respectively. Overall, according to the results of this study, the use of biofertilizers could be a suitable alternative to chemical fertilizers and reduce their environmental hazards.

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THE EFFECT OF BIOFERTLIZER, CHEMICAL FERTILIZER AND HUMIC ACID ON ESSNTIAL OIL CONTENT, YIELD & COMPOSITION OF CATNIP (*NEPETA CATARIA*)

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Fertilizer management is an important factor in the successful cultivation of medicinal plants. Biofertilizers are micro-organisms that are able to change nutritional elements from useless form to effective and useful compounds. Production expenses of bio-fertilizers are low and it does not cause pollution in the environment. Catnip (*Nepeta cataria*) is the herbaceous, annual or perennial plant that found in the Western Mediterranean, Southeast Asia and China. Essential oil of catnip has many applications in pharmaceutical, cosmetic and food industries [1]. In this research, the effect of biological and chemical fertilizers and humic acid on essential oil content, yield and composition of catnip were studied. A factorial experiment was conducted based on randomized complete block design (RCBD) with ten treatments and three replications. First factor was included fertilizer treatment as control, Azetobarvar1 (Az1), Phosphatbarvar2 (Phos2), Az1+ Phos2 and chemical fertilizer and second factor was humic acid in 2 levels (0 and 20 $kg.ha^{-1}$). Essential oil was extracted by Clevenger apparatus and its components were identified by GC-MS. The highest content of essential oil was found in Phos2 treatment. Az1+ Humic acid had maximum amount essential oil yield. The major components were 4aα,7α,7aβ-nepetalactone, 4aβ,7α,7aβ-nepetalactone, trans caryophyllene, E-E-farnesene and caryophyllene oxide. The maximum amount of 4aα,7α,7aβ-nepetalactone and 4aβ,7α,7aβ-nepetalactone were observed in Az1 and Chemical fertilizer, respectively. Az1+Humic acid had maximum amount of Caryophyllene oxide and trans caryophyllene. Therefore, the application of biofertilizers instead of chemical is recommended.

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KARYOLOGICAL STUDY OF TWO ACCESSIONS IN IRANIAN BORAGE (*ECHIUM AMOENUM* FICH & MEY) SUBJECTED IN ESHKEVARI REGIONS, GUILAN PROVINCE

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Iranian borage (*Echium amoenum*), is one of the most important endemic medicinal plant belonging to boraginaceae family. has not been any reports about the number of chromosomes and karyotype characteristic of this species. With cytogenetic studies revealed that this This is a diploid plant (2n = 2x = 16). The leshkan accessions at altitude of 1700 meters above sea level, have basic chromosome 8, and Somatic chromosome number is 16. on the basis of karyotype, have 12 Metacentric chromosome that the centromere location is the middle area and 4 metacenteric that centromere location is the area near the middle. The average length of the chromosome was 6.3 microns. While in Sajiran accession, height of 770 meters above sea level, on the basis of karyotype, have 12 Metacentric chromosome and the centromere location are the the middle area and 4 metacenteric that centromere location is submetacenteric, The average length of the chromosome was 3 microns. So the two populations differed in terms of the length of chromosome karyotype, But were similar in terms of other characteristics. In the leshkane acceccion the length of chromosomes was 6 micron longer than of the Sajiran acceccion. The results of this study showed that There is variation among populations of low and high altitude. These results also indicate that Altitude and climatic conditions affect the length of the chromosome variations. And length of the chromosome was influenced by the altitude.

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ESSENTIAL OIL COMPOSITION OF *FERULA ASSA-FOETIDA* L. ROOTS IN 2 AGE; COLLECTED FROM KERMAN

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Asafoetida (Heeng) is a well known medicine and condiment of India, Pakistan and Persia (Iran). India consumes about 70 % of the world produce as a culinary and in medicine and supply (re-export) it. It is recorded that only a few species of *Ferula* yield Asafoetida. The perennial Asafoetida plants are native to the region between the Mediterranean and Central Asia, especially, Iran and Afghanistan and most of the world's production of Asafoetida comes from the above two countries. India is the major consumer as well as the supplier (re-exporter) of this condiment.Asafoetida is an oleo-gum-resin obtained from the exudates of the roots of the Iranian endemic medicinal plant, *Ferula assa-foetida*. This species (*Ferula assa-foetida*) is often considered to be the main source of asafetida. It is traditionally used for the treatment of different diseases, such as asthma, epilepsy, stomachache, flatulence, intestinal parasites, weak digestion and influenza . Recent pharmacological and biological studies have also shown several activities, such as antioxidant, antiviral, antifungal, cancer chemopreventive, anti-diabetic, antispasmodic, hypotensive, and molluscicidal from this oleo-gum-resin. In this paper we extract essential oil from roots of *Ferula assa-foetida* that collected from Kerman and It is estimated that the plant is 4 and 8 years old .then we analysis both quantitative and qualitative with GC-MS. Here we saw a decrease pinene compounds and sulfide compounds is increased. During development, the plant has produced more sulfide compounds and monoterpenes reduces.

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GLYCOSYLATED PORPHYRA-334 AND PALYTHINE-THREONINE AND THEIR PLAUSIBLE BIOSYNTHETIC PATHWAYS IN GENOTYPE D OF *NOSTOC COMMUNE*

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Mycosporine-like amino acids (MAAs) are water-soluble pigments that absorb specific UV-B radiation in the range of 280 to 320 nm. They are also thought to be the strongest UVA-absorbing compounds in nature. MAAs are found in various organisms including cyanobacteria and algae from tropical to polar regions and structurally distinct MAAs are known in taxonomically diverse organisms. In this study novel glycosylated MAAs were found in the terrestrial cyanobacterium *Nostoc commune*. An MAA with an absorption maximum at 334 nm was identified as a hexose-bound porphyra-334 derivative with a molecular mass of 508 Da. The other MAAs with an absorption maximum at 322 nm were identified as the palythine-threonine derivatives linked to one or two hexoses with the molecular masses of 450 and 612 Da, respectively. These purified MAAs have radical scavenging activities *in vitro*, which suggests multifunctional roles as sunscreens and antioxidants.According to the structures and fragmentation patterns of these glycosylated MAAs, a MAA biosynthetic pathway is predicted in *N. commune*. The simultaneous occurrence of palythine-threonine and porphyra-334 as scaffolds in *N. commune* suggests that porphyra-334 could be a metabolic precursor of palythine-threonine. Supporting this idea, the glycosylated palythine-threonine accounted for 60% of the total MAAs and was the most abundant one in *N. commune*. In our predicted pathway, porphyra-334 could be generated via the addition of threonine to the core ring of mycosporine-glycine and the glycosylation of porphyra-334 could produce the 508-Da MAA. The 450-Da MAA could be formed via the elimination of a portion of glycine from C3 of the 508-Da MAA. The addition of another hexose to the 450-Da MAA could produce the 612-Da MAA.This biosynthetic pathway for the production of the glycosylated palythine-threonine and porphyra-334 derivatives could occur particularly in genotype D of *N. commune*; however, the enzymes and genes involved in the biosynthesis of these glycosylated MAAs are unknown.

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CHARACTERIZATION OF MYCOSPORINE-LIKE AMINO ACIDS AND THEIR POSSIBLE BIOSYNTHETIC PATHWAYS IN GENOTYPE A OF *NOSTOC COMMUNE*

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Mycosporine-like amino acids (MAAs) are water-soluble pigments that absorb UV radiation of 280–340 nm. There are structurally distinct MAAs found in taxonomically diverse organisms. In cyanobacteria, MAAs protect the cells against solar radiation. The energy absorbed by MAAs is promptly dispersed into the surroundings as heat. Thus, MAAs do not function as accessory pigments in photosynthesis. It is noteworthy that all MAAs identified thus far in the terrestrial cyanobacterium *Nostoc commune* are glycosylated. The glycosylated MAAs in *N. commune* are thought to be localized in the extracellular matrix to allow interaction with other constituents in its complex architecture. These compounds have multiple functions including roles as UV sunscreens and radical scavengers to protect the cells in terrestrial environments where they are exposed to severe UV radiation, extreme temperature and desiccation. In this study, we examined the genotype A of *N. commune* colonies which its water extract showed a UV-absorbing spectrum with an absorption maximum at 335 nm. The water extract contained the following compounds: 7-*O*-(β-rabinopyranosyl)-porphyra-334 (478 Da), pentose-bound shinorine (464 Da), hexose-bound porphyra-334 (508 Da) and porphyra-334 (346 Da).According to the MAA contents and their structures, a MAA biosynthetic pathway is predicted in *N. commune*. In our predicted pathway, porphyra-334 and shinorine could be generated via the addition of threonine and serine, respectively, to the mycosporine–glycine intermediate. The following glycosylation of porphyra-334 and shinorine could produce the 478-Da MAA (as a main MAA), the 508-Da MAA and the 464-Da MAA. In the proposed biosynthetic pathway, the glycosylation used to produce the pentose-bound porphyra-334 and shinorine derivatives is a unique process in genotype A of *N. commune*. Additional molecular genetic studies to identify the genes involved in the glycosylation will elucidate the biosynthesis of the glycosylated MAAs unique in *N. commune*.

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ANTIOXIDANT CAPACITY AND TOTAL PHENOLIC CONTENT OF *SALVIA MACROSIPHON*: THE PRECIOUS PLANT IN IRANIAN TRADITIONAL MEDICINE

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Salvia macrosiphon Boiss. belongs to Lamiaceae family which is widely distributed in the west and center of Iran. This species is used traditionally in treatment of sore throat, cough and infections [1, 2]. The purpose of this study is investigation of antioxidant capacity and total phenolic content (TPC) of total extract and essential oilof *S. macrosiphon.* Notably no study has been done on essential oil of this species. The Aerial parts of*S.macrosiphon*were collected in May 2014 from Fars province, Iran. The plantwere air-dried in the shade, ground intopowder and extracted with hydrodistillation. The obtained essential oil was dried with anhydrous sodium sulphate.Moreover, dried powders of plant were macerated with 80% methanol at room temperature. Antioxidant activity was determined using 2,2-diphenyl-1-picryl hydrazyl (DPPH). Moreover, total phenolic content of the extract and essential oil performed according to the Folin-Ciocalteu method with slight modifications [3]. In DPPH antioxidant method, crude extract and essential oil demonstrated a significant antioxidant activity.The total extract and the essential oil showed more than 90% inhibition of free radicals with 3.33µg/mland 700 µg/ml respectively.Total phenol content of the sample was calculated with a linear equation based on a gallic acid standard curve. It could be concluded that *Salvia macrosiphon*could be considered as a natural source of antioxidants because of the high amount of phenolic compounds. Further studies are being done on the other biological effect of this preciousplant.

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FREE RADICAL SCAVENGING EFFECT OF EXTRACT AND VARIOUS FRACTIONS OF *CYNARA SCOLYMUS* L.

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Free radicals are the reactive chemical species carrying a single electron which can cause many unwanted types of reactions in biological systems and therefore contribute to a wide range of chronic diseases. Powdered leaves of *Cynara scolymus* L. (Asteraceae) collected from Meymand, southern Iran, were successively extracted with n-hexane, chloroform, ethyl acetate and butanol in a soxhlet apparatus and the solvents removed under reduced pressure and the residue from each extract was freeze dried. Free radical scavenging activity of each extract was further evaluated using DPPH (2,2-diphenyl-1-picrylhydrazyl) and NO (Nitric Oxide) assays. The Folin–Ciocalteu method was used to determine the total phenolic content (TPC) and for total flavonoid content (TFC) aluminum chloride method was adopted. Systematic fractionation of butanol extract over SiO_2 afforded an eluate containing two compounds of different polarities as declared by its thin layer chromatogram and showed no resemblance with quercetin and rutin on the chromatogram. DPPH and NO radical scavenging properties of this subfraction were evaluated. Comparisons were again made with quercetin, which is already known for its prominent antioxidant activity. Radical scavenging capacity was found in *Cynara scolymus* butanol subfraction and approached the activity of reference compound, quercetin. This may be attributed mainly to the presence of phenolic compounds, as the above fraction showed total phenolic and flavonoid contents at significant level and the observed activity could be correlated with phenolic and flavonoid contents. Among various classes of compounds, flavanone glycosides and flavonols seem to prevail in various fractions as indicated by thin layer chromatography and color reactions. The results obtained in the present study clearly revealed the significant antioxidant and free radical scavenging effect of butanol extract of *C. scolymus* and thus further studies should be performed in order to verify whether the compounds like cynarin contribute to this activity. Additionally the plant may be considered as a suitable candidate for further detailed studies on the effectiveness of individual chemical components and to understand the presence of synergy between the constituents towards free radical inhibition.

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INVESTIGATION OF SEED BIO-PRIMING WITH *TRICHODERMA HARZIANUM* GERMINATION AND SEEDLING INDICES OF FENNEL (*FOENICULUM VULGARE*L.)

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Bio-priming is a seed pre-treatment that integrates several biological and physiological aspects to enhance growth, improve disease control, and increase yields [1]. Fennel (*Foeniculum vulgare*) is an indigenous herb of Iran, and the plant extract has been used as an antiseptic, palliative and anti-inflammatory [2]. In order to study the impact of seed bio-priming with four strains of *Trichoderma harzianum* on germination and seedling indices ofFennelan experiment was conducted as factorial using randomized completely design with four replications. Experimental factors were priming in five levels including (bio-priming with four strains of T13, T36, T39 and T43of *Trichoderma harzianum* and hydro-priming) and three levels of drought stress (0, -3 and -6 bar imposed by PEG 6000).The results showed that main effects of priming and drought stress was significant on germination percentage, germination rate and weight vigor, also main effect of priming was significant on coefficient velocity germination , mean germination time and interactionof priming and drought stress was significant on length vigor. So that the highest length vigor (13.60) was obtained from priming treatment of T39 and drought stress 0 bar.Among the different levels of drought stress the most germination percentage (83.16), germination rate (3.33) and weight vigor (17.51) was obtained from 0 bar treatment. Also the highest germination rate (3.36) and weight vigor (16.89) from T39 treatment and the most germination percentage (81.66) from treatment of T36. According to the obtained results it can be suggested that seed bio-priming with *Trichodermaharzianum*couldenhance germination and seedling performance under drought stress that considered being the most important limiting factor for Fennel seeds germination.

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PHYTOCHEMICAL ANALYSIS AND FREE RADICAL SCAVENGING ACTIVITY OF AQUEOUS EXTRACT OF *CARDARIA DRABA* L.

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Phytochemical analysis and antioxidant screening of hydroalcoholic extract of *Cardaria draba* L. a plant from Cruciferae family were conducted in the present study. The plant is antiscorbutic. The seeds have been used as a cure for flatulence and fish poison in traditional system of medicine [1]. The aqueous decoction of the powdered aerial parts of the plant was exhaustively extracted with EtOAc in a liquid–liquid extractor. The EtOAc extract was found to be equiactive as the aqueous decoction in demonstration of DPPH inhibition. Antioxidant and free radical scavenging activity of EtOAc fraction of aqueous extract was assessed using DPPH (1,1-diphenyl-2-picrylhydrazyl), NO (nitric oxide), ABTS (2,2'-azinobis (3-ethyl benzothiazoline- 6-sulfonic acid) diammonium salt and FRAP (ferric reducing antioxidant power) assays [2]. Total phenolic and flavonoids contents were determined by Folin-Ciocalteu and aluminum chloride methods respectively, in order to varify their contribution to the antioxidant activity. The ferric reducing antioxidant power of the EtOAc fraction was greater than that of ascorbic acid used as standard antioxidant. The Phytochemical analysis declared the presence of alkaloids, terpenoids, glycosides and saponins. The results clearly showed a positive linear correlation between the phenolic content of the extract and the free radical scavenging activities. Our findings provide evidence that the aqueous ethanolic extract of *C. draba* is a potential source of natural antioxidants and this justifies its uses in folkloric medicine.

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MOLECULAR DOCKING STUDY OF THREE ABIETANE DITERPENOIDS AS TOPOISOMERASE INHIBITOR

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Many abietane-type diterpenoids have been reported from *Salvia* species and most of these compounds showed promising cytotoxic effects on cancer cell lines. Some diterpenoids demonstrated an inhibitory effect on topoisomerase I and II which causes DNA damaging and finally cell death. Molecular docking is a powerful method for exploration of ligand-target interaction and investigation of the behavior and binding mode of molecules in the active site of target proteins. In this project, we evaluated the topo I inhibition of three abietane diterpenoids (taxodione, ferruginol and sahandinone) extracted from the roots of *Saliva lachnocalyx* using molecular docking study. These diterpenoids showed cytotoxic potential in our previous research. The co-crystallized structure of topo I-DNA and camptothecin (PDB: 1T8I) was used as a template structure as well as for validation of the accuracy and performance of docking. In attempt to study the mode of action of three mentioned abietane diterpenoids in a similar way of camptothecin, docking procedure was performed using Autodock 4.2. Virtual binding affinity to topo I-DNA determined by the binding free energies (ΔG_b), were -10.67 for camptothecin and -7.92, -7.80 and -7.77 for sahandinone, ferruginol and taxodione respectively. The binding affinity of diterpenoids to the active center pocket of topo I-DNA exhibited H-bond formation with ARG364, LYS425 and MET428 residues. On the other hand, interactions are also observed with DNA bases viz., C114, C113, E113, D11 and E112. Results indicated a possible description for cytotoxic mechanism of mentioned diterpenoids.

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ASSESSMENT OF MORPHOLOGICAL CHARACTERISTICS OF *ANTHEMIS TRIUMFETTI* L. L AND RACES IN DIFFERENT REGIONS OF ARDABIL PROVINCE

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The genus Anthemis comprises about 100 species distributed in Mediterranean region. *Anthemis triumfetti* L. is a plant of the Asteraceae [2]. Fromthe Roman times up to now, Anthemis taxa have been commonly used as folk remedies, insecticides and dyes [1, 3]. This study examines the morphological performance of *Anthemis triumfetti* L. landraces in different regions of Ardebil province. For this purpose, the native landraces *of Anthemis triumfetti* L. including five regions (Fandoglo, Khalkhal-Asalem, Meshgin-ParsAbad, Sayin and Khiyav) and include two altitude of each region in Ardabil province were collected during 2015 and some morphological traits were measured. The collected data were analysed based on nested design with three replications using SAS v.9.1 software. The results of analysis of variance showed significant difference at 1% probability level based on height of the tallest stem, number of nodes, number of branches, the diameter of the capitol, number of capitol, the total fresh weight, capitol fresh weight, total dry weight and capitol dry weight, between the landraces of the region. But, in terms of stem diameter non-significant differences was observed between the landraces of the regions. The results of cluster analysis grouped the landraces into two groups. The first group which including low and high altitude areas of Khalkhal-Asalem, low and high altitude of Sayin and low altitude is Meshgin-ParsAbad based on all characteristics except capitol diameter, had a greater degree than the average. The second group, which including low and high altitude areas of Fandoglo, high altitude of Khiyav, low altitude of Meshgin-ParsAbad and high altitude of Khiyav, had a capitol diameter greater than the overall average.

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ISOLATION AND CHARACTERIZATION OF THE STRONGEST CYTOTOXICITY AGENT FROM *MARRUBIUM ASTRACANICUM*

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The pharmacological appraisement of constituents from plants is an established technique for the identification of lead compounds which can leads to the development of novel and secure medicinal agents. We selected *Marrubium astracanicum* (Lamiaceae) to explore for its bioactive constituents. The objective of this study was to isolate potential cytotoxicity agent from *M. astracanicum* crude methanol extracts from the flowering shoots, using a bioassay-guided strategy. For this purpose, we used brine shrimp lethality test (BST) that is attractive method and very useful tool for the isolation of bioactive compounds from plant extracts because it is very simple, reliable and low toxin amounts are sufficient to perform the test in the microwell scale and also is confirmed by the National Cancer Institute (NCI). The crude extract has the most effect with LC_{50} values of 31 µg/ml. Then, successively fractionation of this extract was performed by column chromatography with n-hexane, ethyl acetate and methanol solvents, respectively. Ethyl acetate fraction with LC_{50} of 5 µg/ml, was determined the most active component. By using thin layer chromatography (TLC), HPLC-UV analytical method, gradient elution of column chromatography with n-hexane and ethyl acetate (and subjected to sequential fractionation) and BST, ultimately the most effective compound was isolated and purified. This compound displays LC_{50} values of 4 µg/ml and R_f equal to 0.21 in chloroform:methanol (150:1, v/v). The separation efficiency of compound B from total extracts calculated 0.99 percent. The compound B with the scientific name " Bis(1-pentyl) disulfide" completely identified by using spectroscopy techniques of ^{13}C-NMR, ^{1}H-NMR, HCOSY, IR and UV. The present study reveals two results; it is clear that the isolation and purification of plant extracts provides bioactive components that not only eliminate ineffective or even harmful substances, but also increases their effectiveness. On the other hand, we are facing with plant that shows great cytotoxicity. These two factors are critical from the perspective of biological activity and medicinal properties, especially in the field of anticancer [1,2].

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IN VITRO ANTIMICROBIAL EFFECT OF EXTRACTS OF *DIONYSIA REVOLUTA* L.

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Many plant species have so far demonstrated anti infectious and antimicrobial properties and therefore the continuous search for bioactive agents of plant origin could be very well justified. The present study deals with the inspection of antimicrobial activity of polar and non polar extracts of *D.revoluta* of Primulaceae family against some selected bacterial and fungal pathogens. n-Hexane and ethyl acetate extracts of aerial parts of the plant were prepared through separate soxhlet extraction. The solvents removed on a rotary evaporator and the resulting extracts dried prior to microbial analysis. Antimicrobial screening was carried out using disc diffusion assay against a gram negative bacteria (*Pseudomonas aeruginosa*), a gram positive bacteria (*Staphylococcus aureus*) and a fungi (*Candida albicans*). Minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) of the extracts determined through micro broth dilution method. The results obtained showed that the extracts have inhibitory effects on clinical isolates and a standard strain of *C.albicans* in lower concentrations than Nystatin. The inhibition zones diameter for Nystatin was between 16 to 20 mm while this was found to be 21 to 24 mm for the extracts against the clinical isolates and standard strain and of *C.albicans*, respectively. Based on the results the best MIC of extract against clinical isolates and standard strain of *C.albicans* were 25 and 2.5 mg/ml, respectively. Ethyl acetate extract surpassed n-hexane in the manifestation of fungistatic activity against *C. albicans* (IZ 30, MIC 0.039, MFC 0.039, respectively). *C.albicans* was therefore found to be the most susceptible organism followed by *S. aureus* and *P. aeruginosa*. Results of the present study revealed that extracts of aerial parts of *D. revoluta* showing efficient antimicrobial potential against the tested microorganisms. Further screening with four pure isolated compounds disclosed strong fungicidal effect for one of the tested compounds which may be considered as a lead for detailed and thorough screening against a wider range of microbial strains.

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COMPARISON OF THE EFFECT OF *LAVANDULA* AND *CITRUS AURANTIUM* (BITTER ORANGE) ON DEPRESSION IN MENOPAUSALWOMEN: A RANDOMIZED CONTROLLED TRIAL

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Menopause is an inevitable milestone and an important stage in the period of every woman's life. Due to its association with changes and complications, menopause is considered a critical period with common psychological changes. This study aimed to compare the effects of lavandula and bitter orange on depression in menopausal women. This triple-blind randomized controlled clinical trial was conducted on 156 menopausal women. Eligible subjects were allocated to two intervention groups and one control group with a ratio of 1:1:1 through the randomized block design. Intervention groups received 500 mg capsules containing bitter orange or lavandula flower's powder and control group received 500 mg starch capsules, all groups used capsules twice daily after breakfast and dinner for 8 weeks. Capsules were in the same color and shape. Beck Depression Inventory was completed by the participants before and after the intervention. The one-way ANOVA analysis showed no significant difference in mean depression scores in the three groups before the intervention (P= 0.262); however, the general linear model test adjusted for baseline and confounding factors showed significant differences between the groups in the mean depression score after 8 weeks of treatment (P< 0.001). Bitter orange significantly reduced the mean depression scores compared with the control group [Adjusted Mean Difference (aMD): -2.88 (95% Confidence Interval, -4.26 to -1.51)]. Lavandula significantly reduced the mean depression scores compared with the control group as well [aMD: -3.01 (95% CI -4.40 to -1.63)]. There was no significant between lavandula and bitter orange groups (P= 0.850).Considering the positive effect of bitter orange and lavandula in reducing depression in menopausal women, they can be used as a complementary medicine in depressed patients.

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COMPARE THE EFFECT OF ALCOHOLIC EXTRACT OF AERIAL PARTS OF *SWERTIA LONGIFOLIA* BOISS. AND *SALVIA HYDRANGEA* ON TESTING KIDNEY FUNCTION IN DIABETIC RATS

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Diabetes is a multifactorial syndrome with high prevalence and is also a global challenge, Still ways to treat the disease and side effects are limited. In this regard, the aim of this study was to compare the effect of alcoholic extract of aerial parts of swertialongifoliaBoiss and Salvia Hydrangea on renal function in diabetic rats is. analysis method:In this study, 48 male Wistar rats into six groups: control, diabetic, and diabetes were divided into 4 groups. Normal daily water and food control, diabetic control group solvent and four experimental groups, respectively: *swertia longifolia* Boiss alcoholic extract at a dose of 100 and 200, *Salvia Hydrangea* alcoholic extract at a dose of 100 and 200 in the form of gavage. For induction of diabetes, Streptozotocin drug to the amount of 60 mg / kg intraperitoneally injected. At the end of measuring creatinine and blood urea nitrogen, blood samples were taken and they were analyzed. Creatinine and blood urea nitrogen levels in diabetic control group was significantly increased compared to control group but Statistics of these factors in all experimental groups receiving at least (100mg / kg) and maximum (200mg / kg) alcoholic extract of Salvia Hydrangea and *swertia longifolia* Boiss than the control group ($P < 0.05$). alcoholic extract of aerial parts of *swertia longifolia* Boiss and *Salvia Hydrangea* has beneficial effects on symptoms of diabetic kidney.

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IN VITRO CYTOTOXIC ACTIVITY OF ABIETANE DITERPENOIDS FROM *SALVIA LACHNOCALYX*

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There are 61 *Salvia* species growing naturally in Iran, 17 of them are endemic. Abietane diterpenoids are more commonly found in the roots of *Salvia* species and they can be suggested as their metabolite fingerprints. Phytochemical investigation of dichloromethane extract from the roots of *Saliva lachnocalyx* led to the isolation of four abietane diterpenes (taxodione, ferruginol, sahandinone, 4-Dehydrosalvilimbinol).The structures of the compounds were elucidated on the basis of 1 and 2D NMR spectroscopic data (^{1}H and ^{13}C, ^{1}H-^{1}H COSY, HSQC and HMBC), electron ionization mass spectrometric analysis (EIMS) as well as comparison of the above spectrums with data from literature [1, 3]. The purified compounds were evaluated for their cytotoxic activity on human leukaemia (MOLT-4) and colon (HT-29) tumor cell lines using the MTT colorimetric bioassay. All of isolated abietane diterpenes had significant cytotoxic effects on both cell lines.

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PHYTOCHEMICAL AND WOUND HEALING EFFECTS OF METHANOLIC EXTRACT OF *SALVIA MULTICAULIS* VAHL. IN RAT

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Wounds are unavoidable events of life which result in damage to the structure and function of skin. Plants and their phytochemicals have immense potential for the management of different types of wound. *Salvia multicaulis* Vahl. is an evergreen shrub species, which traditionally used as a wound healing agent. The aim of the present study is to evaluate phytochemicals and wound healing activity of *S. multicaulis* in an excision wound model. Preliminary phytochemical screening tests were performed on the methanol (80%) extract. Total phenolic content was measured using Folin-Ciocalteu reagent. Antioxidant activity of the extract was assessed by (DPPH) free radical scavenging test. *In vitro* antimicrobial activity against *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Candida albicans* were tested using macrodilution method. 2x2 excision wounds were induced in the dorsal area of 30 Wistar rats. Animals were received topical eucerine, 1% phenytoin as well as 5%, 10% and 20% ointments of the plant extract in eucerine base. Wound areas were photographed and wound contraction was calculated as the reduction percentage of wound size compared with zero days. Last day skin samples of wounded area were used for histological evaluations.Collagen deposition for positive control group and A20% were low fibrils and A10% high fibrils and A5% highest fibrils. Total phenolic content was 262.083±47.15 mg GAE/g extract. IC50 was 54.02 µg /mL. All concentrations of the extract ointments were significantly effective in the animal model of excision wound ($p<0.05$) which was also confirmed in histological study. It is concluded that *S. multicaulis* extract could act as a wound healing agent. This activity is possibly due the high concentrations of phenolic compounds with antioxidant.

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STUDY OF ANTIMICROBIAL ACTIVITY OF LEAVES EXTRACTION OF *ADIANTUM CAPILLUS-VENERIS* FROM SOUTH EAST OF MARIVAN

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Adiantum capillus-veneris is a medicinally essential plant used for the treatment of diverse infectious diseases.We collected this plant in November 2015 from southeast of marivan. Extractions methanolic were performed with a Soxhlet apparatus.To evaluate the antimicrobial activities of extract of leaves were examined against a set of twelve microorganisms. The methanolic leaves extracts ofAdiantumcapillus-veneris investigated for antimicrobial activity by disc diffusion method. These were investigated against selected species of Escherichia coli (ATCC 10536), Bacillus subtilis (ATCC 6633), *Klebsiella pneumonia* (ATCC 10031), *Staphylococcus aureus* (ATCC 29737), *pseudomonas aeruginosa* (ATCC 27853), *Staphylococcus epidermidis* (ATCC 12228), *Shigelladysenteriae* (PTCC 1188), *Proteus vulgaris* (PTCC 1182), *Salmonella paratyphi-A serotype* (ATCC 5702),*Candida albicans* (ATCC 10231), *Aspergillusniger* (ATCC 16404),*Aspergillus brasiliensis (PTCC 5011)*, to find the inhibitory activities of the microorganisms.The methanolic leaves extracts of Adiantumcapillus-veneris showed activity against *pseudomonas aeruginosa*, *Staphylococcus aureus*, Bacillussubtilis. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values for plant were determined by microdilution method. The samples showed low antimicrobial activities with inhibition zone diameter from 10 to 12 mm in these tests. Extract with inhibition zone diameter of 12, 10, and 10 mm for *pseudomonas aeruginosa* (ATCC 27853), *Bacillus subtilis* (ATCC 6633) and *Staphylococcus aureus* (ATCC 29737), exhibited the best results in these tests, respectively.

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QUANTIFICATION OF PENTACYCLIC TRITERPENOIDS IN SOME *THYMUS* SPECIES FROM IRAN

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Lamiaceae, one of the most important family among the medicinal plants, has been reported as a wide-ranging source for isolation of free BA, OA and UA besides other compounds [1]. In the present study, quantitative determination of highly valuable pentacyclic triterpenoids (PTs) betulinic acid (BA), oleanolic acid (OA) and ursolic acid (UA) was simultaneously carried out in some *Thymus* species *i.e.T. daenensis*, *T. pubescens*, *T. persicus*, *T. caramanicus* from Iran [2]. Optimum separation of the three compounds was achieved by reverse-phase high-performance liquid chromatography (HPLC) on a C_{18} column with 87:0.05:12.95 (v/v/v, isocratically) methanol-phosphoric acid-water as mobile phase [3]. With this route, maximum content (mg $100g^{-1}$ DW) of BA (856.89± 10.15), OA (480.64 ± 10.93) and UA (941.66 ± 16.14) was determined in the aerial parts of *T. persicus*. Calibration curves for all the three standards showed good linearity at tested concentrations (2 to 1000 mg L^{-1}), with correlation coefficients (R^2) of 0.9991, 0.9994, and 0.9994 for BA, OA, and UA, respectively. The method was accurate, sensitive and has a good reproducibility. The modified method led to satisfactory separation, acceptable resolution and high symmetric peak shapes. It can be also used for identification and fingerprinting of thyme pharmaceutical products.

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EFFECT OF CORM SIZE AND PLANT DENSITY ON SOME COMPONENTS OF SAFFRON (*CROSUS SATIVUS* L.)

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Saffron is one of the valuable medicinal plants whose stigma is the most important part of it, and its medicinal value is due to the existence of three metabolite of primary, secondary, and its derivations. Nowadays the extract of the stigma and petal of saffron is used as a reducer of inflammation, anti-pain and anti-depressant, antispasmodic, helper to natural digestionof food, soother of gumsirritations, tranquilizer, carminative,mucus, sweat increaser, stomach tonic, stimulating sexual desire, making early menstruation [1].The main usage of saffron is using as flavoring and food odorant [2]. Also it is used for dyeing expensive fabrics in textile industry, potential usage in medicinal applications, especially for its anti-cancer and anti-tumor specifications [3]. In order to investigate the effect of different levels of corm size and corm spacing between rows and corm spacing within rows on the different yield components of experimental saffron the experiments based on factorial design with three replications in complete randomized blocks have been done at East Azarbaijan Agriculture Research Center, Khosrowshah.Experimental factors consisted of different corm sizes based on diameter of corms in two levels (2, 4 cm and 4, 6 cm), corm spacing between rows in three levels (10-20-30 cm), and corm spacing within rows in two levels (7 and 14 cm). Results show that flower filament length, length of stigma, fresh and dry weight of stigma were affected by our experimental factors.The larger corms due to their higher physiological power begin their flowering sooner than the smaller corms so that give long and weighty stigmas.Planting saffron corms with lower spacing or planting with high density increases the total yield of stigma that is because of increasing the number of plant and the numbers flower per unit area. Also planting saffron corms in 5-7 centimeter depth increases their yield and components yield, while increasing planting depth reduces growing possibility and germination and consequently reducing yield and their components yield.

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ASSESSMENT THE EFFECTS OF GARLIC AQUEOUS EXTRACT ON WOUND HEALING INFECTED WITH *PSEUDOMONAS AERUGINOSA* IN RAT

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Burn is kind of damage to the skin or muscle that facilitates the microorganism colonization and infection." *Staphylococcus Areous" and "Pseudomonas Aeruginosa*" are the most common bacteria that cause burn infection. Nowadays the plant compounds with antibacterial activity are known [1, 2, 3]. One of them is *Allium Sativum*. This study aimed to determine the effect of garlic extract on burn wound healing in rat was infected with *Pseudomonas Aeruginosa*. In this study, male Wistar rats (8-weekold, weighting 200-250 g) were anesthetized by intraperitoneal injections of ketamine and Xylazine. Dorsal hairs were shaved and second-degree skin burns were created on the back of the animals by using a red-hot pin (2x2 cm^2).24 hours after burn induction, bacteria were injected subcutaneously in the margins of the wound. After confirmation of wound infection, 30 rats were divided into five groups of equal numbers. Three groups treated with different concentrations of garlic extract (%0.2, %0.4, and % 0.8). The positive and negative control groups were recieved silver sulfadiazine and base cream, respectively .The rats were followed for 21 days and the diameter of the wound areas was measured on days 0,3,6,9,12,15,18,21. Data was analyzed by SPSS16. The clinical findings of the present study were showed wound surfaces in the experiment group (%0.4 garlic extract) were significantly decreased in comparison to the control wounds ($p<0.01$). Microbiological evaluation was showed that total bacterial count of wound surfaces in garlic-treated group was lesser than this variable in the control wounds ($p<0.01$). With attention to these results, extract of garlic can be considered as a topical agent for accelerating and enhancement burn wound healing in infected rat.

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INVESTIGATION OF QUALITATIVE TRAITS AND EVALUATION OF FLOWER YIELD OF POT MARIGOLD (*CALENDULA OFFICINALIS* L.) DURING ITS GROWTH PERIOD UNDER DROUGHT STRESS

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Considering the importance of the medicinal plant pot marigold (*Calendula officinalis* L.) in some industries such as pharmaceutical Industry [1], the effect of drought stress on quantity and quality of harvested flowers of pot marigold was studied, using a complete block design as split plot with four replications in faculty of agriculture, Birjnand University, in 2015. Two factors including drought stress with three levels consisting of watering as 75, 50 and 25 percent of the soil field capacity (non-stressed, moderate and severe stress respectively) and plant type (medicinal and ornamental type) were considered. Evaluation of flower yield during the growth period (22 harvests) revealed that this trait was significantly reduced by drought stress. The highest and lowest cumulative flower yield were recorded in non-stressed (6.57 $g.plant^{-1}$) and severe stress (3.37 $g.plant^{-1}$) treatments, respectively. In addition, two marigold types were not significantly different in terms of flower production during the whole growth period.Measured flavonoid content of flowers [2] was primarily increased with increasing drought stress intensity from non-stressed(25.14mg rutin equivalent.g^{-1} extract) to moderate stress (38.97 mg rutin equivalent.g^{-1} extract) level, however it was considerably decreased afterwards and reached the lowest amount (22.96 mg rutin equivalent.g^{-1} extract) at severe stress level. Medicinal type of pot marigold showed a higher potential of flavonoid production. Flavonoid content of medicinal type of pot marigold was approximately 28% higher than ornamental type. Increasing drought stress also decreased the essential oil of flowers, so that the essential oil percent from 0.0120% in non-stressed level was reduced to 0.0062% in severe stress level. However flowers of two marigold types had the same content of essential oil.

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QUANTIFICATION OF ROSMARINIC ACID IN CALLUS AND *IN VITRO* REGENERATED PLANTLETS OF *ZATARIA MULTIFLORA* BOISS.

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Zataria multiflora Boiss. is a valuable medicinal plant in traditional Iranian medicine. Rosmarinic acid (RA) has been found in the plant species of Lamiaceae [1]. Rosmarinic acid is one of the major active components of this plant for its antioxidant properties [2]. This compound has been reported to have various biological activitie such as antimicrobial, anti-inflammatory, antiviral, antimutagenicity and cytotoxicity, which make it an important agent for health promoting effects [3]. In this study,shoot formation occurred from explants of *in vitro* germinated seedlings cultured on Murashige and Skoog (MS) medium. Maximum callusing (96.7±0.3%) was obtained from leaf segments grown on B5 medium supplemented with 1.0 mg L^{-1} 2,4-D plus 0.5 mg L^{-1} BAP and greatest fresh weight of callus (1.91 and 1.2 g per explants). Callus induction from seedling shoot and production of RA in callus culture of *Zataria multiflora* was obtained on Gamborg (B5) media supplemented with 0.75 mgL^{-1} BAP. Maximum growth index (4.94±0.96) was obtained from the callus cultured on B5 medium supplemented with 0.75 mg L^{-1} BAP. The RA content was determined for the selected callus culture and*in vitro* regenerated plantlets using HPLC method. Determination and quantification of RA in cultured calli and plantlet were performed by HPLC analysis. Our results revealed that the content of RA *in vitro* germinated seedlings and callus culture of the plant were 12.67±0.00 and 23.32±0.08 mg per 1g dry weight (DW), respectively.

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INVESTIGATION THE EFFECT OF EXTRACTION SOLVENTS ON THE PHENOLIC COMPOUNDS OF PISTACHOI (*PISTACIA VERA* L.) FROM SARAKHS REGION IN IRAN BY USING ULTRASOUND WAVES

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In this study, we evaluated the effect of methanol, hexane (50%, 90% and 100% v/v) and distilled water on the extractability of some of the phenolic compounds (total phenols, flavonoids and proanthocyanidin) of *pistaciavera* from Sarakh region of Khorasan- Razaviprovince in Iran by using ultrasound waves at a frequency of 20 kHz and without ultrasound. Our examination carried as a complete randomized design with four replications.The obtained results revealed that, 90%methanol ultrasound extract showed the highest amount of total phenols, total flavonoids and total proanthocyanidin (823.49 mg GAE/100 g, 2026mg QE/100 g and 1731 mg CE/100g respectively). The extraction factors which investigatedwere significantly increased by 30 min and above this time they were decreased.So the efficiency of methanolic extract (90% v/v) sonicatedwas the highest in all of the solvents employed [1, 2].

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CYTOTOXIC ACTIVITY OF *CROCUS SATIVUS* L. (SAFFRON PETALS) AGAINST ARTEMIA SALINA LARVAE

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In many studies the effects of anti-inflammatory, antinociceptive and antidepressant saffron stigma and petal extractshave been demonstrated in animal models. *Crocus sativus* is a native plant of Iran. In present study we evaluate cytotoxic activity of *C. sativus* (saffron petals) alcoholic extract using brine shrimp toxicity assay, that with the cooperation DekaTejarat Ati company in Tehran University of Medical Sciences was conducted. The powdered aerial parts of the plant were extracted with ethanol 80%by maceration technique at room temperature (3×2 days). The resulting extract was then concentrated using a rotary evaporate or and dried using freeze dryer. For brine shrimp lethality test, brine shrimp eggs were incubated in 500mL of 3% sea salt water solution for 24 hours in 25-27°C. After 24 hours, the larvae were hatched. Subsequently, 500µL of 3% sea salt solution (pH=7.4), containing different concentrations of extract (31.25, 62.5, 125 and 250µg/mL) was added to 500µL of 3% sea salt solution containing about 15-20 active larvae. The results for the lethality were noted in term of deaths of larvae, compared to proper negative control after 24 hours. The mortality rate of introduced larvae were42, 58, 85 and 86% at concentrations of 31.25, 62.5, 125 and 250µg/ml, respectively. The results showed a dose-related cytotoxic activity for the extract with the LD_{50} value of 49.91µg/mL.It has been concluded that *C.sativus*petalscould be consider asa new candidate for investigation of potent natural anti-cancer compounds in the future.

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CYTOGENETICAL STUDY OF DIFFERENT ECOTYPES OF *NIGELLA SATIVA* L.

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Black Cumin (*Nigella sativa* L.) belongs to the family Ranunculaceae, is an annual flowering plant, native to south and southwest Asia. Nigella has many properties including the treatment of cancer, gastric ulcer, anti-bacterial, laxative and increase milk secretion, elimination of toxins in the liver and adjust the body's digestive system. Cytogenetical and karyotype studies can be used for many purposes such as, the study of chromosomal characteristics, identifying diploid and polyploidy species and hybridization process, the study of genetic diversity and finding taxonomic relationships, and to gather information about past evolutionary events.Inthis study, 3 accessions of *Nigella sativa* L. Included Tehran, Ayask Mashhad andShahreza investigated using cytogenetic characteristics.Results showed that all three studied accessions had the basic chromosome number X=6 and diploid(2n=2x=12), but the length of chromosomes was verydiverse (from 0.83 to 3.96 µm for the short arm andfrom 1.84 to 4.18 µm for the long arm). Tehran accession has 1 satellite on chromosome 2, Ayask Mashhad accession has 1 satellite on chromosome 2, Shahreza accession has two satellites in the chromosomes 2 and 4. Karyotypic formula of Tehran, Ayask Mashhad and Shahreza was determined based on table Levan et al. as 10m+8sm and 6m+12m respectively.

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RESISTANCE TO SOIL PENETRATION IN SAFFRON FIELD AS EFFECTED BY DIFFERENT LEVELS OF IRRAGATION, ANIMAL MANURE AND UREA FERTILIZER

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Saffron (*Crocus sativus* L.) is one of the most important perennial plants in Iran. The importance of this precious plant becomes more apparent and nowadays saffron is considered as one of the plants with pharmological value. Due to the limited water resources, saffron irrigation management for efficient use of water is necessary. In arid and semi-arid areas, due to the extreme lack of organic matter, nitrogen is the most important nutrient for crop growth. In this study, the interaction of two forms of nitrogen (animal manure and urea) and different levels of irrigation water, using randomized complete block design with 4 replications was studied over a two–year period. Animal manure as much as 20 tons per hec and urea as much as 100 kg per hec were applied. In all irrigation treatments the use of urea fertilizer decreased soil penetration. According to the results of this study, the use of urea makes soil harder and increases soil resistance that causes the delay in flowering while use of animal manure improves the soil structure and reduses soil resistance. The highest resistance to penetration was for the 50% water requirement and urea treatment that was 3 kg.s/cm^2. The lowest resistance to penetration was for the 100% water requirement and animal manure treatment that was 0.7 kg.s/cm^2.

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IN VITRO REGENERATION OF *THYMUS DAENENSIS* SUPSP. DAENENSIS CELAK. COLLECTED FROM WEST OF IRAN, ILAM

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The genus *Thymus* belongs to the family Lamiaceae and includes about 300 species in the world. This species belongs to a genus withwide distribution in the Mediterranean area and can befound in dry open areas and scrubs [1]. *Thymus*, with the common Persian name of 'Avishan' consist of 14 species which are found wild in many regions of Iran, some of which are endemic [2]. *Thymus daenensis* supsb *daenensis Celak.*, as a rich source of phenolic and flavonoid compounds, is a valuable medicinal plant which grows as an endemic species in Iran [3]. The explants cultured on MS medium supplemented with different cytokinins at different concentrations showed variation in the regeneration percentage and number of shoots formed. The induction of multiple shoots from nodal segments was the highest (100% regeneration rate, with 9.9 ± 0.1 shoots produced per explant) in MS medium supplemented with 6.6 µM BAP+0.49 µM IBA. After successful shoot multiplication, the microshoots were excised and transferred to different concentration rooting media for induction of roots. Rooting was promoted after three weeks on half-strength MS media containing PGRs or auxin-free. High frequency rooting (86.0%) and mean root number (3.3 ± 0.6 adventitious roots per shoot) with a length of 1.7 ± 0.05 cm were obtained on the medium containing 5.7 µMIAA. The rooted plantlets were hardened initially in culture room conditions and then transferred to greenhouse.

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EFFECTS OF 5-AMINOLEVULENIC ACID ON GROWTH AND ANTIOXIDANT CAPACITY OF *MENTHA PIPERITA* UNDER NORMAL CONDITION AND DROUGHT STRESS

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Recent research has found that a key precursor in the biosynthesis of chlorophyll and hemes, 5-aminolevulinic acid (ALA), is promoting plant growth under normal environments and stressful conditions when applied at low concentrations [1,2]. Peppermint (*Mentha piperita* L.) is one of the most important plants producing essential oil. This experiment was conducted to determine the effect of ALA on growth parameters and antioxidant capacity of peppermint under drought stress. Plants, were subject to 4 levels of water deficit stress (100, 75, 50, 25 % field capacity), and were sprayed with various concentration (5, 10, 20, 40 mg/L) of ALA. Results indicated that drought stress reduced the growth parameters and antioxidant capacity of peppermint. ALA application increased growth and antioxidant capacity of peppermint under both normal condition and drought stress compared to control. Results suggested that ALA could be a promising material used to reduce the harmful effect of drought stress on the growth and antioxidant capacity of medicinal plants.

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EFFECTS OF SILICON ON GROWTH AND ANTIOXIDANT CAPACITY OF *STEVIA REBAUDIANA* UNDER NORMAL CONDITION AND SALINITY STRESS

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Although, silicon is non-essential element for plant growth, however, various studies have demonstrated that Si application significantly increased plant growth not only in normal environments but also under biotic and abiotic stresses such as salt stress (Agurie et al.,1992). *Stevia rebaudiana*, a herbaceous perennial shrub contains steviol glycosides, as an alternative source of sugar for diabetic patients. Hence the objective of this work was to evaluate the effect of silicon on growth parameters and antioxidant capacity of Stevia plants under salinity stress. Potted plants of Stevia were subjected to different levels of NaCl (0, 50, 100 mg/l) and were treated with various concentration (5, 10, 20, 40 mg/L) of silicon. Results exhibited that salt stress reduced the growth parameters but mild salinity increased antioxidant capacity of Stevia. Si application increased growth and antioxidant capacity of Stevia under both normal condition and salt stress compared to control. Results suggested that silicon could be a promising material used to reduce the harmful effect of drought stress on the growth and antioxidant capacity of medicinal plants. Water being an integral part plays a vital role in the main- tenance of plant life. Availability of water is one of the limiting factors determining plant distribu- tion and survival in natural ecosystem. The objective of this study was to investigate the ability of tolerance of Stevia plants to water stress. Potted plants of Stevia were subjected to different levels of water regimes (100 ml, 200 ml, 300 ml) per day, whereas control plants were watered daily with about 400 ml water. Plant height, leaf area, electrolyte leakage and antioxidant enzyme activ- ity (peroxidase and catalase) were assayed during the experimental period. All these parameters were severely affected under water stress condition. Stress treatment caused an increase in elec- trolyte leakage compared to control. Plant height decreased under severe stress condition whe- reas a sharp increase in antioxidant enzyme activity was observed in stressed plants as compared to untreated control plants. Our experiment emphasizes the importance of proper watering sche- dule for the cultivation of Stevia as an agricultural crop to meet the challenges for sugar and ener gy crisis. Stevia rebaudiana, a non-caloric sweetener (family—Asteraceae) is cultivated for its sweetening compounds (the steviol glycosides). The two main glycosides of Stevia are stevioside (5% - 10% of dry leaves) and rebau- dioside-A (2% - 4%). Due to the non-caloric and sweetening properties, stevioside has gained attention with the rise in demand for low-carbohydrate, and low-sugar food alternatives (Kalpana et al., [5]). Srivastava and Srivas- tava [6] reported marked alterations in physiology and biochemistry of Stevia plants grown under water stress. Hence the objective of this work was to evaluate the influence of variable regimes of water on growth per- formance and antioxidant activity of *Stevia*.

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ULTRASONIC EMULSIFICATION OF METHYL JASMONATE NANOEMULSION FORMULATION AND EVALUATION OF ITS CYTOTOXICITY ACTIVITY

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Methyl jasmonate (MJ), a plant stress hormone, has been studied because of its application as an antitumor drug compound. However, as MJ is a poorly water-soluble compound, a suitable oil-in-water nanoemulsion (NE) has been studied in order to provide its solubilization in an aqueous media and to allow its administration by the parenteral route. MJNE was formulated using non-ionic surfactant Tween 80 and water by ultrasonic emulsification method. Effect of various process and formulation parameters on development and stability of NEs were investigated. Droplet characteristics, stability studies, in-vitro cellular studies were examined. The optimum NE had an oil droplet diameter of 64.33±4.04 nm, and a polydispersity index of 0.076. The NE was stable after centrifugation at 5000 rpm. In-vitro cytotoxicity studies on MCF7 breast cancer cell line revealed that MJNE was more potent and efficacious than MJ solution ($p<0.05$). Altogether, study showed that the NE described here may be considered a suitable vehicle for parenteral administration of MJ [1, 2].

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CALLUS INDUCTION AND ORGANOGENESIS CHICORY PLANT (*CICHORIUM INTYBUS* L.) IN LIQUID MEDIUM

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Cichorium intybus L. is belonging to the family of Asteraceae [1]. Chicory is a medicinal plant that is effective in the treatment of liver diseases. Population growth and the reduction of sources of plant products in the world is a serious problem that scientists have at least the past decade encouraged to think, to use new methods to protect the environment, the production plant more and better products say, one of the modern methods used in plant cell and tissue culture technology. In this study, the best types of explant and hormonal treatments were examined on callusing and organogenes of this plant in MS liquid medium containing single hormonal treatments. So, sterile root, stem and leaf explants were prepared from healthy seedling and were placed in MS liquid medium containing different hormonal treatments, including 2,4-D (Chlorophenoxy acetic acid), BAP (benzyl-amino-purine) and Kin (kinetin) with different doses, separately. Consequently, the best type of explant and hormone treatment were evaluated for callusing and organogenesis. Conditions cultivation room was inclusive 23±2 °C temperature and 16-hour lighting period. The results showed that the color of callus obtained from leaf explants, stems and roots in different concentrations of 2,4-D often were brown to dark brown, in different concentrations of BAP hormonal treatment, yellowish-green to bright green and in different concentrations of Kin were yellowish-green to light green. Callus tissue derived stem and leaf explants in different concentrations of 2,4-D often were soft but for the root explants were soft and loose and formless. In different concentrations of BAP hormone treatment, the callus often were soft to firm but for root explants were soft and loose. Also, The callus from explants of stem and leaf explants in various concentrations of Kin hormonal treatments often were stiff but for root explants were soft, loose and amorphous. The results showed, the most of percent of callogenese (76/22%) was allocated to the leaf explants in hormonal treatments of 2,4-D but the least of percent of callogenese (1/76%) was allocated with control samples. Also, the highest callus fresh weight (7/3 g) and callus dry weight (0/077 g) of leaf explants treated with hormone kinetin (0/75 mg/L), respectively. The most of rooting (2) was related to stem and leaf explants treated with 2,4-D(1mg/L). In the end result, a single application of hormones in the tissue culture fluid can lead to callus induction the chicory plant but the hormones of cytokinin such as Kin and BAP prevented from rooting of explants and callus.

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NEUROPROTECTIVE EFFECT OF HONEY ON ACRYLAMIDE-INDUCED CYTOTOXICITY IN PC12 CELLS

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Acrylamide (ACR), an α, β unsaturated carbonyl compound that is used extensively to manufacture polyacrylamides. Polymers are used in different industries including: water and wastewater management, soil coagulation, dye synthesis and in laboratories for gel electrophrosis[1]. Neurotoxicity of ACR has been shown in human and animals[2]. Exposure to ACR elevated reactive oxygen spices (ROS) generation and induced apoptosis in PC12 cells[3]. Honey contains polyphenols, which are powerful antioxidants that are thought to reduce oxidative stress. The present study was designed to determine the possible protective effect of honey on acrylamide-induced cytotoxicity in vitro model (PC12 cells). PC12 cells were cultured 2500 cell/well in a 96-well Cell Culture Plates and exposed to Honey (40, 100, 200 and 400 µg/ml) for 8, 12 and 24 h. Then, ACR at certain concentration of 6 mM was added to each well, then after 24h Cell viability was measured indirectly by MTT assay**.** The exposure of PC12 cells to ACR reduced cell viability, The pretreatment of cells with 40, 100, 200, 400 µg/ml honey before ACR treatment significantly attenuated ACR cytotoxicity in a dose-dependent manner. In fact, Honey can reduced cytotoxic effect of ACR in PC12 cells.

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STUDY ON ANTIOXIDANT ACTIVITY OF ZIZIPHORA T AND STEVIA R EXTRACTS FROM KHORASAN AND THEIR EFFECT ON THE SYNTHESIS OF GOLD NANOPARTICLES

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Ziziphora T ,*Stevia* is one of the 240 species in the sunflower family. This two plants are native to tropical and subtropical regions of western North America to South America. Stevia species are commonly known as sweet leaf, sugar leaf, or simply are known as Stevia leaves and they widely planted beacause of their use as sweet leaves. Stevia due to its sweetness 300 times more than sucrose, Being calorie-free, low impact on blood sugar, possible impact on reducing obesity and high blood pressure, lack of carcinogenic effects in comparison with other sweeteners, types of plants are non-poisonous, has been much attention . The primary role of herbal essences is to protect plant against phytophagous and pathogens, absorbing pollinators, dispersing seeds and other useful microorganisms and acting as signals in reciprocal plant-plant reactions. Participation of essences in reproduction successes and success of plant in ntural ecosystems and the effect on agricultural and economical characteristics including performance and quality of food brings this idea to mind that change in Ai of each plant is different, and through genetic engineering there is possibility of potential improvement for specimen of agricultural plants. Ziziphora is a wilding plant. Various methods invented and developed for the synthesis of gold nanoparticles that increases daily consumed.According to this method, including potential environmental pollution problems and the complexity of the synthesis, In this study, the feasibility of using the extracts of *Stevia* and *Ziziphora T* for the reduction of gold ions to nanoparticles form have been studied. The aim of this study was to investigate the antioxidant properties of these plants and their ability to synthesize gold nanoparticles. *Stevia* and *Ziziphora T* leaves were used to prepare the aqueous extract for this study. The extraction was extracted by using Soxhlet apparatus.in the investigation of The antioxidant activity of these plants with 2, 2-diphenyl-1 - Pykryl phenols and flavonoids were determined and show that these plants have good antioxidant activity. Fourier analysis and spectroscopic child as well as the visible - UV confirmed the formation of gold nanoparticles, Transmission electron microscopy images show that the nanoparticles are spherical and uniformly distributed, and its size is from 10 to 15 nm. The scanning electron microscopy and X-ray diffraction spectra imply the right of forming gold nanoparticles.

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IN SILICO MOLECULAR DOCKING STUDIES OF ANTHOCYANINS COMPOUNDS IN BILBERRY (*VACCINIUM MYRTILLUS* L.) AS ANGIOTENSIN CONVERTING ENZYME INHIBITORS IN HYPERTENSION

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Hypertension is the common modern lifestyle risk factor for many diseases such as stroke, kidney disease and several cardiovascular disorders. The renin-angiotensin system (RAS) activation plays a key role in hypertension. Inhibition of RAS with Angiotensin converting enzyme (ACE) inhibitors by blocking the enzyme that catalyses the conversion of angiotensin I to angiotensin II can lead to reduce blood pressure by blood vessels dilation [1, 2].Bilberry (*Vaccinium myrtillus L.*) is one of the richest natural sources of anthocyanins. Anthocyanins are involved in a wide range of biologicalactivities[3].The aim of this study is to analyse the potential ACE inhibitory action of naturalanthocyanins inbilberry by computational docking studies.Molecular docking study of benazepril (FDA approved ACE inhibitor drug) and the main anthocyanins found in bilberry, including, cyanidin-3-O-glucoside, delphinidin-3-O-glucoside, petunidin-3-O-glucoside, malvidin-3-O-glucoside with ACE (PDB ID:1O86) has been done using Autodock 4.2.6.The results have indicated that among these four anthocyanins compounds in bilberry, cyanidin-3-O-glucoside showed higher binding affinity compared to others with the lowest binding energy (-8.48kcal/mol) and the high potential effect for hypertension treatment. While, the lowest binding energy was observed in delphinidin-3-O-glucoside (-6.14kcal/mol). The binding energy of benazepril to ACE (-8.75kcal/mol) wasalmost equal to thecyanidin-3-O-glucoside.Our findings clearly demonstrate thepotency of anthocyanins compound for discoveryand developmentof new ACE inhibitors with less toxicity and more selectivity than chemical inhibitor and prove that dietary anthocyanins like bilberry can be effective for treatment of hypertension and other cardiovascular disorders.

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EFFECT OF CULTURE MEDIUM ON THE PRODUCTION OF BETULINIC ACID IN CONTINIOUS CELL CULTURES OF *THYMUS PERSICUS*

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Thymus persicus (*Ronniger ex Rech.* f.)Jalas, as a rich source of triterpenoids, is a valuable and endangered medicinal plant which grows as an endemic species in the North West of Iran [1, 2]. Betulinic acid is a naturally occurring pentacyclictriterpenoid which has hepatoprotective, antimalarial, and anti-inflammatory properties [3].The aim of present study was initiated to evaluate production of betulinic acid (BA) in *T. persicus* via continuous cell suspension culture. Several factors may influence triterpenoids accumulation *in vitro* including growth regulators, carbon source, and Elicitor. In continuous culture system, nutrient depletion does not occur due to continuous flow of nutrient medium and the cells always remain in the steady state of active growth phase. It has been reported that are production of triterpenoids in high concentration and short periods of time using *in vitro* cell cultures by changing nutritional conditions. *In vitro* cultures would afford a good system model for studying the accumulation of the triterpenoids under controlled conditions. The extraction procedure of the cells and HPLC method adopted for determining the compounds is efficient and reproducible. In the present study we report the results of studies on the production of BA found in extracts from *T. persicus* continuous suspended cells developed under nutritional conditions.Cell suspension culture of the plant was exposed to 2.5 mgL^{-1} BAP and 0.5 mgL^{-1} α-naphthalene acetic acid (NAA). BA yield was lower at the start to one week (3µg/g dry weight). After this, there were a linear increase in cell suspension growth and BA yield (2-4 weeksafterinoculation) of culture (171, 165 and 158 µg/g dry weight respectively).The data presented in this study demonstratecontinuous culture system can be useful for production of BAand growth in cell suspension cultures of *T. persicus.*

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A PHYLOGENETIC STUDY OF *TEUCRIUM* L. (LAMIACEAE) BASED ON NRDNA ITS IN IRAN

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*Teucrium*L.belongs to the tribe *Ajugeae* (Lamiaceae) that has more than 260 species in worldwide. The *Teucrium* L. is mainly distributed in Mediterranean regions [2, 3]. This genus includes 12 species and 6 sections with 4 endemics species in Iran. Plants of this genus have medicinal and therapeutic properties. A total of 63 accessions representing 56 species belonging of *Teucrium* and 7 species of *Ajuga* as outgroups were included in a phylogenetic analysis by using nrDNA ITS sequences.Phylogenetic analyses were performed using Maximum Parsimony, Maximum Likelihood and Bayesian methods. The results of the analyses have shown that all *Teucrium* species formed a strongly supported monophyletic group. Also sections *Teucris* and *Scordium* are monophyletic. Section *Scordium* placed along with the members ofsection *Chamaedrys* in a well-supported clade. With the exception of *T.persicum*, a taxon considered to be a member of section *Isotriodon*,monophyly of section *Polium* was strongly corroborated.The treetopology represents twomain cladesthat section *Teucris* clade is a sister group with the other clade comprising the rest sections of *Teucrium.* Phylogenetic relationships among members of section *Polium* remained unresolved.

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DETERMINATION OF CHLOROGENIC ACID, ARCTIIN AND ARCTIGENIN CONTENTS IN THE SEEDS OF *ARCTIUM LAPPA L.* BY UPLC-PDA METHOD

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An ultra performance liquid chromatographic method performed for simultaneous determination of trace lignans (arctiin and arctigenin), and chlorogenic acid contents in the seeds of *Arctium lappa L.* from Dehful, Nahavand located in western part of Iran. Chromatographic separation achieved by using UPLC system, consisting of a Knauer Platinblue UPLC with photodiode-array detector (PDA), and BlueOrchid C18 column (100×2 mm, 1.8 µm,). The mobile phase consisted of MeOH and 0.1% formic acid. Detection wavelengths were 280 and 325 nm. The speed of flow was 0.2 mL/min. The arctiin's linear range was 30-300 µg/mL (r=0.9988). The arctigenin's linear range was 1.84-92 µg/mL (r=1.0000). The chlorogenic acid's linear range was 5.1-20.4 µg/mL (r=0.9994). The contents of arctiin, arctigenin, and chlorogenic acid were 11.18%, 0.086%, and 0.65% (w/w) respectively.

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MOLECULAR PHYLOGENY OF *DRACOCEPHALUM* L. (LAMIACEAE) BASED ON NRDNA ITS IN IRAN

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Dracocephalum L. belongs to the tribe Nepeteae (Lamiaceae) is mainly distributed in temperate regions of the Northern Hemisphere [5]. This genus includes 70 species in worldwide (with most species in China) and represented by 11 species with 5 endemics in Iran [1,3]. Plants of this genus have medicinal and therapeutic properties [2]. A total of 41 accessions representing 37 species belonging of *Dracocephalum* and 4 species of *Lallemantia* as outgroups were included in a phylogenetic analysis by using nrDNA ITS sequences. Phylogenetic analyses were performed using Maximum Parsimony, Maximum Likelihood and Bayesian methods.The results of the analysis have shown that *Dracocephalum* is monophyletic, in a basal grade of the tree, *D.grandiflorum* (from China) followed by a small clade (*D. parviflorum* and *D. argunense*). It is then joined by the other small clade including *D. bullatum* and *D.grandiflorum*, which being sister to a large clade including three subclades diverging in a polytomy. Iranian species are mostly nested in the largest subclade and their phylogenetic relationships remained unresolved.

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PHYLOGENETIC UTILITY OF EXTERNAL TRANS CRIBED SPACER OF NR DNA (ETS) IN TRIBE ASTREAE

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Tribe Astereae with an estimated 222 genera and ca. 3100 species is the second largest tribe of family Compositae [3]. Astereae comprises 15 genera with 38 species in Iran [1, 2] . The genus *Psychrogeton* with 11 species is the largest genus of tribe in Iran that distributed in Irano-Touranian region. The external transcribed spacer (ETS) of the 18S-26S nrDNA repeat has shown promise for intrageneric phylogenetic reconstruction in this tribe. A total of 158 accessions representing 121 species from 24 genera of Astereae plus *Calendula officinalis* and *Cryzantemum indicum* as outgroups were included in the analyses. Phylogenetic analyses were performed using Bayesian and Maximum likelihood methods. The analyses showed that *Aster*, *Crinitina*, *Erigeron*, *Galatella* and *Psychrogeton* appear to be non-monophyletic, whereas, *Bellis*, *Chamaegeron*, *Lachnophyllum*,and *Myriactis* are monophyletic. The topology of the tree represented several main clades, mostly including *Aster*, *Erigeron* and *Psychrogeton* clades. *Chamaegeron* species constitute a strongly -supported clade. *Heteropappus altaicus*, *sheareia nana*, *Rhinactinidia eremophyla* are nested in the *Aster* clade. *Aster bachtiaricus* is distinct from other *Aster* species. *Erigeron* species plus some members of *Conyza* formed a well-supported clade.The main Psychrogeton clade excluding *Ps. obovatus* formed three distinct subclades.

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CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS OF *MENTHA PULEGIUM* IN KASHAN REGION, IRAN

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Todays, there is an increasedtendencyto useessential oilsasnatural remedies. Identificationand investigation of antimicrobial activityofessential oilcompoundsto achievenatural antibioticsis increasing [1].This study was conducted to investigate the effect of essential oil of *Mentha pulegium* (Puneh in Persian) on *Bacillus cereus*, *Staphylococcus aureus*, *Salmonella*, *Klebsiella* and *Candida albicans.* Puneh has been used as sedative for central nervous system and antispasmodic. It can alleviate gastrointestinal pain and use as carminative agent [2]. Puneh was purchased from local shops and the essential oil was extracted using Clevenger apparatus, chemical compounds were described by GC/MS. The most important components of the essential oils were Pulegone (32.75%), β-Pinene (8.9%), Trans-isolimonene (3.78%), 3-Terpinolenone (3.23%), α-Pinene (2.97%), Trans-caryophyllene (2.77%), Caryophyllene oxide (2.72%). In addition, several dilutions of oil at a concentration of 1- 1/2 - 1 /4- 1/ 8- 1/ 16- 1/32 ppm were prepared. Then, the survival rate of *Bacillus cereus*, *Staphylococcus aureus*, *Salmonella*, *Klebsiella* and *Candida albicans* under various concentrations of essential oil of *Mentha pulegium* were investigated by disk diffusion. All *in vitro* testes were triplicated. No bacterial growth diameters were measured after using 1 ppm concentration of Puneh essential oil. The diameters for *Candida albicans*, *Klebsiella*, *Salmonella*, *Bacillus cereus* and *Staphylococcus aureus*, were 15, 12, 11, 11, and 10 mm, respectively. Based on the results, it is concluded that Puneh essential oil may play as anti candidaalbicans and anti bacterial agent.

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EVALUATION OF THE EFFECT OF *THYMUS VULGA* AND *ROSMARIUS OFFICINALIS* EXTRACTS ON MECHANICAL TRANSMISSION OF CUCUMBER MOSAIC VIRUS AND COMPARISON OF THEIR EFFECTS WITH SALICYLIC ACID

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The cucumber mosaic virus belong to Cucumovirus that is one of the most important viruses infectscucurbit plants in Iran and around the world .This study accomplished in a completely randomized design by 6 repeat to survey spraying herbal extracts, salicylic acid and distilled water as control on resisting cucumber plants against CMV mechanical infection in a greenhouse at Islamic Azad University of JahromBranch in 2015. It was planted 4 seeds of cucumber in each pot, and at the time of inoculation 2 plants were reminded.After treatments, (including spraying of 3% thyme and Rosemaryextracts,0.02% salicylic acid and distilled water) the plants were inoculated mechanical by sap of an infected plant. After that, pots were checked for a month. The infection of plants examined by ELISA test. Data analysis was done using MSTAT-C.Results showed that the herbal extracts significantly were prevented on infection rate of CMV. According to the resultsin salicylic acid, thyme extract, rosemary extract and distillated water treatments inoculation rate were 33.3%, 58.3%, 66.6% and 88.3%, respectively. There wasn't statistically significant difference between treatments of salicylic acid and Thyme extract, as well as, spraying with Thyme and Rosemary extracts. Considering to the result of this study,it can be concluded that by application of salicylic acid and then Thyme extract,the CMV can be controlled significantly.

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CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS OF *AROMATICUS CARYOPHILLIUM*

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Aromaticus caryophillium (Mikhak in Persian) is native to the islands of Indonesia and Central Asia and because of its special beauty are used as ornamental trees in most of the world. Eugenolis the main component of *aromaticuscaryophillium* extract which is used in dentistry as quiet as dental pain. In traditional medicine *aromaticuscaryophillium* has many propertiessuch as antimicrobial, antipyretic, antioxidant, antithrombotic, anaesthetic and anticancerous activities [1, 2]. This study was conducted to investigate the effect of essential oil of *Aromaticus caryophiliumon Bacillus cereus, Staphylococcus aureus, Salmonella, Klebsiella* and *Candida albicans* (2).*Aromaticus caryophilium* was purchased from local shops and the essential oil was extracted usingClevenger apparatus, chemicalcompounds were described byGC/MS.The most important components of the essential oilswere Eugenol(53.24%),trans-Caryophyllene(30.4%),Eugenol acetate (6.80%). In addition, several dilutions of oil at a concentration of 1- 1/2 - 1 /4- 1/ 8- 1/ 16- 1/32 ppm were prepared. Then, the survival rate of *Bacillus cereus, Staphylococcus aureus, Salmonella, Klebsiella* and *Candida albicans* under various concentrations of essential oil of *Aromaticus caryophilium* were investigated by disk diffusion. All *in vitro* testes were triplicated. No bacterial growth diameters were measured after using 1 ppm concentration of *Aromaticus Caryophilium* essential oil. The diameters for *Bacillus cereus, Staphylococcus aureus, Salmonella, Klebsiella* and *Candida albicans* were 40, 23, 17, 15, and 20 mm, respectively. Based on the results, it is concluded that *Aromaticus caryophilium* essential oil may play as anti *candida albicans* and anti bacterial agent.

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EVALUATION OF THE EFFECT OF SALICYLIC ACID, HARMAL AND TEA EXTRACTS ON MECHANICAL TRANSMISSION OF CUCUMBER MOSAIC VIRUS

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The cucumber mosaic virus (CMV) belong to Cucumovirus Family Bromoviridae. CMV is one of the most important viruses that infects cucurbit plants in Iran and around the world .This study arranged in a completely randomized design by 6 repeats. Treatments were 0.02% salicylic acid, 3% harmal Extract, 3% black tea extract, 3% green tea and distilled water as control. Plants were inoculated mechanically by sap of infected plant after spraying of treatments. This study was performed in a greenhouse at Islamic Azad University of Jahrom Branch in 2015. It was planted 4 seeds of cucumber in each pot, and at the time of inoculation 2 plants were kept.Plantswere checked for a month after treatment and finally the infection of plants examined by ELISA test. Data analysis was done using MSTAT-C. Results showed that the herbal extracts significantly were prevented on infection rate of CMV transmission. According to the results in salicylic acid, harmal extract, black tea extract, green tea extract and distillated water treatments inoculation rate were 33.3%, 25%, 58.3%, 66.7% and 100%, respectively. Considering to the result of this study, it can be concluded that by application of medicinal plants extract can control plant viruses significantly.

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INVESTIGATION OF *IN-VITRO* EFFICACY OF *FERULA PSEUDALLIACEA* ESSENTIAL OIL AND EXTRACTSA GAINST *TRICHOMONAS VAGINALIS*

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Trichomonas vaginalis which is flagellated unicellular organism is the causative agent of vaginitis. Medications used to treat trichomoniasis often have unpleasant side effects or are not effective. Given the prevalence of this disease, the production of safe, effective and affordable medicines is necessary(1). Various species of *Ferula* have an antibacterial, anti-fungal and anti- protozoan activities(2). So far, no study has been done on the effect of *Ferula pseudalliacea* on trophozoite of *Trichomonas vaginalis.* After collecting *Ferula pseudalliacea* from its natural, the leaves and the stems of them were dried and subjected to extraction; methanol, ethyl acetate, hexane extract and essential oil. *In vitro* antiprotozoal susceptibility testing of the herbal essential oil and extracts was performed by five *T. vaginalis* isolates at concentrations of 4000, 2000, 1000, 500, 250, 125 and 62.5 µg/ml, compared with control and metronidazole. Each extract was tested three times, in duplicate. Data analysis was done by one-way ANOVA and SPSS statistical software, version 16. After 24 hours of incubation, the mean of minimum inhibitory concentrations (MICs) and standard deviation of different types of *F. pseudalliacea* derivatives were essential oil; 375 with Sd ± 170, hexanic extract; 491 with Sd ± 202, ethyl acetate extract; 700 with Sd ± 249, methanolic extract 1600 with Sd ± 498 µg/ml ($P<0.001$). The mean of metronidazole MIC was 21.8 with Sd ± 26.3 µg/ml. This study is shown that the extract and essential oil derived from *F. pseudalliacea* have pharmacological effect on *T. vaginalis* and they can inhibit growth of the parasite in different concentration ranges from 375 to 1600 µg/ml, although essential oil of *F. pseudalliacea* was more effective than methanolic extract.

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EFFECTS OF LIPECSAN® ON BLOOD LIPIDS PROFILE, IN COMPARISON TO PLACEBO IN PRESENCE OF GEMFIBROZIL

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Hyperlipidemia effected by many factors such as diet, weight, physical exercise, drug usage and genetic.There are various kind of drugs in traditional medicine that can reduce blood lipids levels such as *Allium sativum* [1], Anethumgraveolens, Rhuscoriaria and Morusalba. In this study effect of compound drug containing above mentioned herbson blood lipids was investigated. In this study double-blind clinical trial on patients aged 18-75 years, cholesterol level was 250 mg/dl and triglycerides level was 200-499 mg/dl was carried out. If there are no exclusion criteria, patient filled satisfaction letter and then divided in to two groups randomly: The first group contain of patients who received twoherbal drug capsules (750 mg), three times daily for six weeks. The second group received Placebo capsule with the same dose as herbal capsule. Both groups were received capsule of 300 mg Gemfibrozil once daily. Drugs were made in booali daroo pharmaceutical company with Lipecsan and Placebo brand names.For investigation of effects of each group Paired T-test was used and for comparison of two groups effects Independent T-test was used. There were 74 patients in this study, 29 patients received placebo and 45 patients received drug. Number of men in drug group 21 patients (%47.6) and 14 patients (%48.3) in placebo group (p=0.892). Average and Standard deviation of age in lipexangroup (48.7±10.1) and in (41.1±10.5) in placebo group (p=0.003). According to all demographic variables there is no statistical significance between two groups (p>0.05). Average of blood triglycerides levels in drug group before of treatment was 425.2 mg/dl that after treatment reached to 250.1 mg/dl(p<0.001). These values in placebo group were 359.7 mg/dl and 270.2 mg/dl respectively (p=0.001).Colestrol average in lipexangroup from 224.9 reached 203.4 (p=0.002) and in placebo group from 222.7 reached 211.8 (p=0.145). HDL and TG levels in lipexan group were significant decrease in comparison to placebo group(p<0.005), but changes in cholesterol and LDL leves not statistically significant (p>0.5). Due to anti-triglycerides and anti-HDL effects of compound drug, this drug can be administered to the patients who are having high blood lipids. More studies should carry out about this drug with synthetic drugs.

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STABILITY DETERMINATION OF ANNAB SYRUP, A NEW DRUG INSPIRED FROM IRANIAN TRADITIONAL MEDICINE

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Annab (*Ziziphus jujuba* Mill.) is a well-known medicinal plant with traditional indications on cardiovascular system. In traditional medical texts, a decoction consists of Annab and thyme (*Zataria multiflora* Boiss.) is frequently mentioned as a blood diluent and purifier [1, 2]. The traditional term "blood diluents" is referred to anti-hyperviscosity drugs. Hyperviscosity is one of the most important causes of cardiovascular diseases. Today, there are few drugs targeted blood viscosity; therefore, introducing new medicines with this indication is preferable. The decoction of Annab and thyme (DAT) would be a good candidate for this indication but because all decoctions have a short shelf-life, improving and stabilizing the dosage form of this medicine is the aim of this study. Based on traditional manuscript, DAT is prepared via boiling Annab fruit and thyme aerial part in plenty of water. This watery extract with the viscosity of about 1 cP (at 25°C) is susceptible for oxidation and fungi contamination. To resolve this problem, the extract was concentrated by vacuum and heat (60°C) to reach the viscosity of 150 cP. This concentrated extract was then pasteurized and filled in a well-closed 120 ml syrup bottle for accelerated stability testing (40°C temp. and 70% moisture). Physicochemical properties as well as microbial count of the product were determined in the month 0, 1, 3, and 6. The results showed that organoleptic properties of the product are the same in all testing times. The pH showed little changes from 4.77 at the beginning to 4.60 at the end of month 6. Total phenolic content was 9.4 mg/ml at the beginning and was 9 mg/ml at the end. Microbial count was in acceptable range (total bacteria <100 cfu/ml, total fungi and yeast <10 cfu/ml, no *Salmonella sp.*, *E. coli*, *S. aureus*, and *P. aeruginosa*) at all testing times. Based on the results, the concentrated extract of Annab and thyme is stable and can be produced in a form of syrup in pharmaceutical industries.

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STUDYING THE EFFECT OF AROMATHERAPY WITH LAVENDER ESSENCE ON ANXIETY, PAIN SEVERITY AND LABOR SATISFACTION IN CENTERS AFFILIATED TO HAMEDAN MEDICAL SCIENCE UNIVERSITY

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Childbirth is an event which is experienced by many women. The most common mental reaction of women to labor is anxiety and fear. Then she experiences cycle of anxiety, pain and muscular spasm that affect considerably the labor. Non-pharmacological methods used mostly in some societies are less expensive and easy with acceptable efficiency and less complications. Aromatherapy is one of complement non-medicinal treatments. The present study is aimed to investigate effect of lavender aroma on anxiety, pain, and satisfaction of pregnant woman this is a clinical trial done on 60 primiparous women referred to labor ward of Tuyserkan hospital. Samples were placed randomly in control and intervention groups. Intervention group was received routine cares. In addition, they inhaled 1.5% lavender essence for 20 minutes (two drops of the essence were dropped on a napkin). Control group was received routine cares as well. Instead of the essence, they inhaled almond oil. Anxiety was measured by Spielberger and pain severity was measured by visual analog scale before, immediately and 60 minutes after intervention. Satisfaction of mothers was evaluated by the inventory after labor. average state-trait anxiety scores immediately and 60 minutes after intervention have no significant difference between controls and intervention group. Within intervention group, average pain severity decreased from 8.53 before intervention to 7.77 and statistically there was a significant difference between two groups (p=0.009). There was no significant difference between two groups after intervention regarding the first and second stages of labor. Satisfaction of intervention group was higher than that of control group (p=0.000) aromatherapy with lavender can result in reduction of labor pain. Therefore, satisfaction from natural labor is increased.

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INVESTIGATION OF *IN-VITRO* EFFICACY OF *MARRUBIUM VULGARE* ESSENTIAL OILS AND EXTRACTS AGAINST *TRICHOMONAS VAGINALIS*

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Trichomonas vaginalis (T. vaginalis) is a protozoan parasite causing trichomoniasis ortrichomonal vaginitis. The infection is considered as non-viral sexually transmitted disease (STD) [1]. Metronidazole and Tinidazole are now the drugs of choice for the treatment of this infection. However, resistant to these drugs has also been reported. So it is necessary to search for effective alternative drugs with fewer side effects [2]. Various species of, *Marrubium vulgare* a large number of essential oils and their constituents have been investigated for their biological activity, notably antibacterial, antifungal, and antioxidant properties [3]. Therefore, in this study the effects of different extracts of this plant on *T. vaginalis*in culture media have been investigated. After collecting *Ferula pseudalliacea* fromits natural, the leaves and the stems of them were dried and subjected to extraction; methanol, ethyl acetate, hexane extract and essential oil. *In vitro* antiprotozoal susceptibility testing of the herbal essential oil and extracts was performed by five *T. vaginalis* isolates at concentrations of 4000, 2000, 1000, 500, 250, 125 and 62.5 µg/ml, compared with control and metronidazole. Each extract was tested three times, in duplicate. Data analysis was done by one-way ANOVA and SPSS statistical software, version 16. After 24 hours of incubation, the mean of minimum inhibitory concentrations (MICs) and standard deviation of different types of *M. vulgare* derivativeswere essential oil; 350 with Sd ± 124, ethyl acetate extract; 1000 with Sd ± 0.0, methanolic extract; 2266 with Sd ± 691, hexanic extract; 2533 with Sd ± 899 µg/ml ($P<0.001$). The mean of metronidazole MIC was 21.8 with Sd ± 26.3 µg/ml. This study is shown that the extract and essential oil derived from *M. vulgare* have pharmacological effect on *T. vaginalis* and they can inhibit growth of the parasite in different concentration ranges from 350 to 2533 µg/ml, although essential oil of *M. vulgare* was more effective than hexanic extract.

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EFFECTS OF DIFFERENT ORGANIC SUBSTRATES ON THE GROWTH OF *PHYSALIS PERUVIANA* SEEDLING

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Gooseberry (*Physalis peruviana* L., Solanaceae) is a tropical plantnative to South America with high nutritional and medicinalvalue. In order to study the effect of organic inputs (vermicompost, cow manure and municipal solid waste compost in 0, 10, 20, 30, 40 and 50% V) integrated with two types of substrate (coco peat and coco peat-perlite (50:50 V:V)), on growth and development of gooseberry seedling, an experiment was conducted based on completely randomized design with four replications in Research Greenhouse of Department of Horticultural Science, University of Tehran in 2015. Criteria such as root length, seedling height, crown diameter, leaf number, internode length, fresh and dry weight of aerial part and root were evaluated. Results revealed that treatments significantly affected all measured criteria in which application of vermicompost in 30%V performed better than the other treatments in most criteria and also using 10% V cow manure and 10 & 20% V municipal solid waste compost, improved most criteria compared to control (coco peat and coco peat-perlite media). Based on the results,it seems using organic inputs in coco peat and coco peat-perlite media, can improve the quality of growth media for better seedling growth and development of *P. peruviana.*

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EFFECT OF IRON OXIDE NANOPARTICLES ON GROWTH AND ANTIOXIDANT ACTIVITY OF GENETICALLY TRANSFORMED ROOTS CULTURE OF *HYOSCYAMUS RETICULATUS*

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Hyoscyamus reticulatus L. is a rich source of tropane alkaloids. Recently, there has been considerable interest in the production of important secondary metabolites such as tropane alkaloids by genetically transformed roots culture because of their stable production which is often comparable to, or even greater than, plant roots [1- 3]. Elicitation of secondary metabolites biosynthetic pathways by different kind of elicitors is an effective strategy to increase secondary metabolites productivity. In this research, effect of various concentrations of iron oxide nano particles (FeNPs) (0, 450, 900, 1800, and 3600 mg/l) at different exposure times (24, 48 and 72 h) on growth and antioxidant activity of *H. reticulatus* hairy roots were investigated. ANOVA results declared, elicitation with FeNPs has not negative effects on hairy roots growth and there were no significant differences among fresh and dry weights of treated hairy roots and control. ANOVA results showed that antioxidant activity of hairy roots significantly affected by different concentrations of FeNPs and exposure time ($P<0.01$). The highest antioxidant activity was observed in cultures exposed to 450 mg l^{-1}FeNPs for 24 and 48 h, while the lowest activity was related to the control. Activity of antioxidant enzymes including catalase, guaiacol peroxidase and ascorbate peroxidase was also increased in treated hairy roots rather than of the control (none transformed roots). Based on the results, it can be concluded that elicitation with FeNPs lead to induce an oxidative stress. Iron nano oxide is a novel effective elicitor and to the best of our knowledge, present study is the first report of its elicitation effects in hairy root cultures of medicinal plants.

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MOLECULAR PHYLOGENY OF *ASTRAGALUS* SECTION *INCANI* (FABACEAE) BASED ON ITS IN IRAN

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Incani DC. is one of the most important and species richest section of *Astragalus*. Its synonyms are: *Proselius* Bunge, *Podochreati* W.D.J. Koch, *Chondrocarpus* Steven and *Apatellobium* Pomel [1, 2]. Sect. *Incani* includes about 135 species distributed from Southern Europe, North Africa, Turkey and Near East to all boreal Asia [2]. In Flora of Iran, the section has 90 species of which 60 are endemic [2]. In Turkey, 27 species, in Armenia 19 species, in Azerbaijan 16 species and in Iraq 7 species were reported. A few species of section are in east and the most of species are in west of Iran. Phylogenetic analyses based on nrDNA ITS region was performed using Bayesian and Likelihood methods. 109 accessions representing 80 species of section *Incani* plus *A. citrinus* and *A. curvipes* (section *Caprini*) as outgroups. This section is monophyletic except of *A. platyphyllus*. Phylogenetic and taxonomic relationships is corresponded with the geographic distribution of species. The eastern most of the section (except *A. ackerbengensis*) form the basal branches of the clade. The most species of the section distributed in the westward form the largest assemblage of the clade. Phylogenetic relationships within this assemblage due to the low number of nucleotide substitution were weakly resolved. Albeit some smaller clades can be found. The main clade includes western species and Anatolia species. Close evolutionary relationships observed between species of Iran West and Turkey.

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ALLELOPATIC EFFECTS OF *ACHILLEA MILLEFOLIUM* AREAL PART EXTRACTS ON SORGHUMBICOLOR (VAR. KIMIA)

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Achillea millefolium is a medicinal plant belongs to Asteraceae. It has been for treatment of hemorrhage, pneumonia, rheumatic pain and wounds healing in Persian traditional literature and as, anti- inflammatory, anti-spasmodic, diuretic and emmenagogic agents. In recent years, use of allelopathic effects on weed management has attracted many researcher, herbal extracts by positive and negative interactions on living organisms have good potential in this field. Flower and leaves of *A. millefolium* were collected from Plour in Iran and then yarrow extracts were obtained by fractiation in *n*-hexane, ethanol and distilled water with sonication (15min) and fallow the latest maceration (24 h) method. The extracts were used at concentrations of 0.75%, 1.25%, 2.5%, 5% and 7.5%in basal MS media, after that sorghum seeds were sterile and cultured on that. All treatments have shown significant allelopathic effects. Flower extracts at lower concentrations had strongereffect thanleaf extracts. After 21 days, reduced in the plantgrowthrate, negative geotropism of the roots, limited rhizogenesis and decrease in Internode length and leaf area were observed. Treatment with high concentration of the extracts caused to necrosis in the sorghum root at early stage and black root exudates was appeared around roots.The greatest allelopatic effect of *n*-hexane extract was done by 7.5% concentration but aqueous leaf and flower extract had same effect, respectively, at 2.5% and 1.25% concentrations. The results showed that different extract of the yarrow can be used for herbicides purposes.

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GENETC DIVERSITY OF *THYMUS DAENESIS* CELAK. ACCESSIONS IN COLD REGIONS OF BOYER AHMAD BASED ON MORPHOLOGICAL CHARACTERISTICS

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Thymus is one of the largest and the most famous genus of Lamiaceae due to having the thymol and carvacrol compounds using as antimicrobial, antibacterial and antiflatulence agents. *Thymus daenesis* Celak. is an endemic species grown in Iran, which has high morphological diversity due probably to hybridization within and between species. In this study, 82 genotypes of *T. daenesis* Celak. Collected from 6 different regions of BoyerAhmad (Sepidar, Vezg, Lodab, Kakan and the western and the eastern of Dena). Plant height, leaf length, leaf width, leaf area,leaf length to width ratio, dry and wet weight were recorded. The result showed a significant positive correlation between the most of traits except theplant height with leaf length, leaf width and leaf area, leaf width and leaf length to width ratio.Mean comparison by t-test was done and the results showed that there was a significant difference between traits in different genotypes. Also, the result of means comparsion using Duncan test showed that the highest dry and wet weight, leaf length, leaf area andleaf length to width ratiobelonged tothe Sepidar population, the highest plant height belonged to the western of Denapopulation and the highest leaf width belonged to the Vezg population. The lowest dry weight, leaf length, leaf width and leaf area belonged to the Lodab population and the lowest plant height, wet weight and leaf length to width ratio belonged to the Vezg population. Leaf area and leaf length to width ratio had the highest and the lowest genotypic and phenotypic coefficient of variation, respectively. Collected populations classified in 2 groups based on cluster.In this type of clustering, Sepidar and Vezg populations placed in first group and Lodab, the western Dena, Kakan, the eastern Denapopulations were in the second group.

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MORPHOLOGICAL AND PHYSIOLOGICAL RESPONSES OF HULL-LESS OIL SEED PUMPKIN (*CUCURBITA PEPPO* L.) TO DROUGHT STRESS

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Hull-less oil seed pumpkin (*Cucurbita peppo* L.) is one of important medicinal plant cultivated for valuable medicinal properties as well as oil contents. Environmental factors impact on crop production globally. Among those factors, drought stress is one of the most crucial element reduces plant growth. This study was carried out to investigate the effect of drought stress on some morphological and physiological traits of medicinal pumpkin under drought stress condition. A field experiment was conducted in a factorial based on completely randomized block designed with five water deficit levels (100% FC (S1), 75% FC (S2), 50% FC (S3), 25% FC (S4) and without irrigation (S5)), four variety which collected from different point of Iran namely Khoy (V1), Isfahan (V2), Arak as styrica (V3), and Zanjan (V4)) with three replication in the crop research station for Agricultural and Natural Resources Research& Education Centre of Zanjan. Drought stress treatments were imposed at 6-7 true leaf stage after seedling. The results of variance analysis showed that yield and yield component significantly are being affected by drought stress ($p<.01$) but varieties were not exposed any significant differences. The comparison of average traits showed that S1 had the highest fruit weight (38.56 kg), dry weight of seed (42.67 g) and wet weight of seed (111.76 g). Analysis of variance showed that drought stress significantly affected on number of flowers, fruits and leaves and plant size during 9 weeks after beginning of stress treatments. Drought stress progressively decreases CO_2 assimilation rates due to reduced stomatal conductance and reduced transpiration and photosynthesis rates. Nevertheless, results exhibited an increase of stomatal CO_2.

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PALYNOLOGICAL STUDY OF THE NYCTAGINACEAE IN IRAN

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Nyctaginaceae family commonly known as o'clock family. It comprises about 30 genera and 400 species in the world. It is distributed in tropical and subtropical parts of both the hemispheres. In Iran, they are grow in south and south east of the country. This family is represented by 4 genera and 6 species which *Mirabilis* L. and *Bougainvillea* L. are ornamental plants. *Boerhavia diffusa* one of the renowned medicinal plants used to treat large number of human. *Boerhavia diffusa* been used for its anti-diabetic and diuretic properties. Also *Boerhavia elegans* is a medicinal plant used for the treatment of kidney disorders, urinary tract disorders and blood purification in Baluch tribe. The pollen morphology of the 6 species belong to 4 genera, i.e. *Mirabilis, Boerhavia, Commicarpus* Standl. and *Bougainvillea* was studied by light microscope and scanning electron microscope. Pollen morphology of the taxa has extremely variation in the shape and sculpturing. The pollen shape in Nyctaginaceae family is spheroidal with round poles, three colpates or pantoporate and with spinose or reticulate exine. In this study 14 characters of pollen grains have investigated. Pollen grains of herbaceous genera like *Boerhavia, Commicarpus* and *Mirabilis* have similar shape an sculpturing. Pollen grains are spheroidal and pantoporate, and spinulose exine. The shrubby taxa like *Bougainvillea* ex Juss. are characterized by spheroidal to oblate – spheroidal, 3-colpate and reticulate type of pollen grains with 28.01 micrometers in diameter. The largest pollen grains belongs to *Mirabilis* with 150.996 micrometers diameter and the smallest one to *Boerhavia elegans* with 56.196 micrometers in diameter. The thinnest exine belongs to *Mirabilis* with 8.408 micrometer thickness and the thinnest one belongs to *Commicarpus stnocarpus* with 3.073 micrometers thickness. The largest length of spinules belongs to *Boerhavia diffusa* with 3.146 micrometers and the smallest one *to Mirabilis* with 0.813 micrometers. Size variation of the pollen grains and exine thickness and ornamentation exine can be used to distinguish between the genera of family Nyctaginaceae. But to distinguish between the individual species of *Boerhavia* and *Commicarous* is unreliable due to the extensive similarity in size ranges.

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INVESTIGATION ON THE EFFECT OF HUMIC ACID SPRAYING AND PLANTING DENSITY ON SOME QUANTITATIVE TRAITS OF BALANGU MEDICINAL HERB (*LALLEMANTIAROYLEANA* B.)

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Application of organic fertilizers is one of the most important plant nutritional alternatives in comparison with chemical fertilizers especially in organic management of herbal plants. In order to study the effects of humic acid and plant density on yield, yield components and quality characteristics of the medicinal herb called Balangu (*Lallemantia royleana* B.), a factorial experiment on the basis of randomized complete block design with nine treatments and three replications was conducted in the farms of agricultural faculty of Ferdowsi University of Mashhad in 1390-91 crop years. The first factor was considered as plant density at three levels (20, 30 and 40 plants per square meter) and the second factor was three different concentrations of humic acid (0, 5 and 10 liters per hectare). The results showed that planting density has significant effects on the plant height, number of branches, flowering shoot, seed yield, biological yield and harvest index of Balangu. So that by increasing plant density from 20 to 40 plants per square meter, all of the mentioned traits showed significant increase except the number of branches and flowers that decreased. For example, the maximum height of 32.48 centimeter and the maximum yield and biological yield also observed at a rate of 38 and 357 grams per square meter respectively all in 40 planting density of the Balangu. A positive impact was observed on the plant height,flowering shoot, seed and biological yields of the plant when different concentrations of humic acid had been supplied. Using of 5 and 10 liter per hectare of Humic acid (32 and 37 grams per square meter respectively) caused 27 and 45 percent increasing in the seed yield compared to the control treatment. The most biological yield obtained at a rate of 349 grams per square meter when 10 liter per hectare of humic acid had been used in comparison with 275 grams per square meter performance in the control treatment which showed the least yield.

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EFFECT OF DROUGHT STRESS AND USE OF *PSEUDOMONAS PUTIDA* BACTERIA ON FATTY ACID COMPOSITIONS OF FLAX (*LINUM USITATISSIMUM* L.)

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Flax (*Linum usitatissimum*) is an economically important oilseed crop. Flax oil is the richest source of linoleic (Omega-6) and linolenic (Omega-3) polyunsaturated fatty acids (PUFA), which are essential for humans. Also this oil is qualitatively different from the more common vegetable oils with high PUFA proportions.Water stress is considered one of the most important factors limiting plant performance and yield in world and impact on oil of flaxseed. Sustainable systems require the understanding of interactions between plants and microorganisms (such as phosphate solubilizing bacteria), an additional mechanism that helps them to tolerate stress, which consists of an association with soil rhizospheric micro-organisms that can help them to survive and ameliorate their productivity. A field experiment was performed at the research field of Urmia University in 2014. Factors, including irrigation regimes (irrigation after 60 and 180 mm of evaporation from Pan Class A, as normal and stress condition respectively), and bacteria strain (non-inoculated and *Pseudomonas putida* P13). After harvesting the seeds and oil extraction, oil components were identified with Gas Chromatography-Mass Spectrometry (GC/MS). The results were shown in the Table 1.

Table 1. The components of flaxseed oil.

Irrigation regime	bacterium	Lignoceric	Behenic acid	Arachidonic acid	**Linolenic acid**	**Linoleic acid**	Oleic acid	Stearic acid	Margaric acid	Palmitoleic acid	Palmitic acid	Myristic acid	Lauric acid
60	Non-bacteria	0.17	0.19	0.41	45.05	17.2	20.56	2.4	0.19	1.21	8.08	1.17	0.72
60	*P. putida*	0.19	0.28	0.31	46.19	17.87	19.81	2.79	0.27	0.93	7.74	1.1	0.46
180	Non-bacteria	0.33	0.35	0.37	50.45	15.23	16.82	3.65	0.33	0.67	6.28	0.79	0.45
180	*P. putida*	0.29	0.19	0.2	54.83	14.17	15.59	3.88	0.26	0.5	5.25	0.63	0.58

Unsaturated fatty acids was decreased under stress condition (irrigation after 180 mm of evaporation), but inoculation with bacteria increased this amount to 85.09% even than normal irrigation, and mutually lowest percentage of saturated fatty acids was obtained. The highest level of two essential fatty acids (Linoleic and Linolenic) in both irrigation regimes were observed in plants inoculated with bacteria. Because that our body can to make its necessary derivatives from omega-3 and omega-6, needs to get balanced ratio of these two fatty acids. The ideal ratio of omega-6 to omega-3 should be 1:1 and a maximum of 4:1, that the best balance was obtained in the irrigation after 60 mm of evaporation and bacteria inocolation.

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THE EFFECT OF ETHANOL EXTRACT OF THE LEAVES OF *ARTEMISIA AUCHERI* BOISS ON GRAM NEGATIVE BACTERIA CAUSE URINARY TRACT INFECTIONS RESISTANT TO MULTIPLE ANTIBIOTICS

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One of the big problems that despite the medical profession modern brought advantages compared with traditional medicine with the use of chemical drugs is increasing. This problem becomes more acute with the passage of time takes shape. Today, by developing science and technology should be used medicinal plants. In this context, the effects of antimicrobial can be a way to get antibiotics pave new plant. The antimicrobial activity of plant extracts and chemical composition by exposing resistant microorganisms evaluated [1]. Today, due to the side effects of antibiotics and resistance to pathogenic microorganisms have won against them in the medical use of extracts and compounds with biological properties of plant species is common. In this research, the use and effects of the plant *Artemisia aucheri Boiss*. on the bacteria that cause urinary tract infection has been investigated. The most important shrubs in grasslands, plants are *Artemisia* species. The genus, 34 species in Iran that has been scattered across the country. For a variety of *Artemisia*, many biological activities such as germicidal, antifungal, anti-virus, anti-parasitic, anti-malarial, anti-tumor, antipyretic, anti-bleeding, hepatitis, wound healing, antispasmodic and nerve pain. The study included 24 samples of the most common Gram-negative bacilli that cause urinary tract infections include *Escherichia coli* and *Klebsiella pneumoniae* resistant to more antibiotics than any of the 12 isolates was performed. Isolates were collected from a number of medical laboratory and then to help them identify biochemical tests were performed. To assess their sensitivity to leaf extract of *Artemisia* Broth macrodilution laboratory methods were used. All experiments were performed in triplicate for statistical data analysis software SPSS/ 16 was used. In accordance with the microdilution method, the MIC for *E.coli* methanol extract of *Artemisia* and *Klebsiella pneumoniae*, respectively, equal to 35/81 and 44/35 mg / ml respectively. Sefidkon and colleagues acknowledged that in 1392, *Artemisia* antimicrobial effects on gram-negative bacteria compared with less is probably due to Gram-positive bacteria cell wall of Gram-negative bacteria are lipopolysaccharides. Findings from this study also demonstrated that ethanol extracts of these medicinal plant has little effect on two of bacteria, *Klebsiella pneumoniae* and *Escherichia coli*, MDR was responsible for urinary tract infections.

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TO INVESTIGATION OF MONTHLY VARIATIONS IN ESSENTIAL OIL OF ARABIAN LILAC (*VITEX TRIFOLIA* VAR. PURPUREA) FROM AHWAZ OF IRAN

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Arabian Lilac (*Vitex trifolia* L.) is a tropical shrub that widely distributed in tropical countries, such as India, China, Indonesia, and North Australia. It is used as an anti-tumor, anti-pyretic, anti-inflammatory, nematicidal agent and increases body weight [1]. In order to investigation its monthly fluctuations in essential oil content, plants were collected in the middle of each month. Half of the plants were immediately used to extract essential oils and the essential oils of other half of the plants were extracted after drying in laboratory temperature (30 °C) .The results were analyzed based on completely randomized design and showed that essential oil content was significantly changed during different months. The lowest of essential oil content of fresh plants were recorded in August and then gradually increased, reaching a maximum in April. Essential oil content of dried plants was increased gradually from October, reached its maximum value in April.

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PHYTOCHEMICAL STUDY OF *HYOSCIAMUS SENECIONIS* WILLD. AND EVALUATION OF SOME OF IT'S ALKALOIDS

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Hyoscyamus senecionis Willd. of Solanaceae family is endemic species of Iran. In Iranian traditional medicine *Hyoscyamus sp*. have been used as analgesic and sedative for improving respiratory disorders such as convulsive coughs, bronchitis and parkinsonism. There isn't any phytochemical report about this plant. In this investigation the aerial parts of plant was collected from Khabr of Baft of Kerman province of IRAN. Primary phytochemical studies showed the presence of tropane alkaloids, tannins, flavonoid (rutin) and chlorogenic acid but were not saponins.in the plant. Quantitiative measurement with UV/Vis spectrophotometer indicated that the tropan alkaloids is about 0.05 percent of dry weight of the plant In other *Hyoscyamus* species the tropane alkaloids percent is 0.04-0.17 and rutin flavonoid and chlorogenic acid were exist. The flavonoid also exist in *H. Niger* [1, 2].

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EVALUATION OF TOXICITY, ANTIOXIANT AND HEPATOPROTECTIVE POTENTIAL OF *STACHYS LAVANDULIFOLIA* AND ISOLATION OF ITS CONSTITUENTS

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Stachys lavandulifolia Vahl. (Lamiaceae) is an herbaceous plant that its aerial parts are used in traditional medicine for the treatment of fever and gastrointestinal conditions and also as sedative, gastrotonic, liver tonic, spasmolytic and emmenagogue agent [1, 2]. The present study was designed to evaluate antioxidant, toxicity and hepatoprotective potentials of S. lavandulifolia and isolation of its constituents. The air-dried and comminuted plant (1.2 kg) was macerated with methanol-water (8:2) (5× 15 L) at the room temperature. The dried total hydroalcoholic extract (280 g) was eluted successively with petroleum ether, chloroform and methanol-water (8:2) (5 L each) to get the three main fractions. Antioxidant activity was determined using DPPH and FRAPS methods and brine shrimp lethality test (BSLT) was applied for general toxicity assay. Hydroalcoholic fraction with considerable antioxidant activity in both DPPH (IC_{50}: 9.3 ±0.8 µg/ml) and FRAP (53.9 ±4.1 mmol FSE/g) assays, without toxicity at the highest tested dose (1000 µg/ml) in BSLT, was selected to hepatoprotective activity assay. Hepatoprotective activity was evaluated in rat acute liver injury induced by acetaminophen. The results showed that post-treatment of rats with hydroalcoholic fraction at the dose of 100 mg/kg, significantly reduced liver injury by preventing elevation in levels of serum hepatic enzymes (ALT, AST and ALP), protection of liver GSH content, inhibition of MDA production ($P<0.001$) and moderation of liver histopathological changes, similar to those observed in the silymarin-treated group. Phytochemical analyses of this fraction using various chromatographic and spectroscopic methods led to the isolation of verbascoside [1], apigenin-7-O-β-D-glucopyranoside [2] and luteolin-7-*O*-β-D-glucopyranoside which their hepato-protective activity have been reported previously in the literature. Phytochemical investigation of the chloroform fraction, as the most toxic fraction (LD_{50}; 121.8 ± 5.6 µg/ml^{-1}), resulted to the isolation of seven methoxylated flavonoids, penduletin, chrysosplenetin , kumatakenin, velutin, viscosine, chrysoeriol, 7-O-methlether luteolin , together with apigenin).

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EFFECT OF *MENTHA PIPERITA* ESSENTIAL OIL ON RUMINAL ISOLATED LACTOBACILLUS

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In order to evaluate the effect of *Mentha piperita* essential oil on isolated Lactobacillus involve with rumen acidosis, rumen fluid sample was collected from the rumen of a caw equiped with permanent fistula. The cow according to was fed by a diet containing 65% Concentrate and 35% forage. Bacterial isolation was done on standard methods. Bacterial culture was done on the special media of MRS and colonies were selected and distinguished hased on their size and morphology as well as catalase, oxidase and Gram staining tests. Thirty-six colonies of lactobacilluse genus were identified according these characteristics. It was confirmed that heterofermentative Lactobacillus with a propertion of 58% were more than the homofermentative lactobacillus (42%) following running purification and biochemial tests of arginine hydrolysis and fermentation of carbohydrates and co_2 production from glucose. Based on simillarity biochemical and growth characteristics the 36 isolated lactobacillus were classified into 15 groups and 3 stories.The *Mentha piperita* essential oil was extracted by the Clevenger apparatus. The effect of *M. piperita* essential oils was done using the agar cup test. All the 15 isolated groups of lactobacillus and *Lactobacillus plantarum* were sensitive to peppermint essential oil based on the characteristics of colonies. More in vivo experiments are required for reaching to the practical application of *M.piperita* essential oil utilization against the involved lactobacillus with rumen acidosis.

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EXTRACTION OF CURCUMINOIDS FROM TURMERIC (*CURCUMA LONGA* L.)

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Turmeric comes from the root of the *Curcuma longa* plant and has a tough brown skin and a deep orange flesh. Turmeric has long been used as a powerful anti-inflammatory in both the Chinese and Indian systems of medicine. Extraction of curcumin from turmeric could be done in several different ways. The curcuminoids are not water-soluble and therefore extractions have to be made in nonpolar solvents. In previous studies hexane, acetone, ethylene dichloride and different alcohols have been used to extract the curcumin analogues. It has been shown that the best yield has been obtained from the attempts where the extraction is made by acetone. Fresh rhizomes were cleaned, washed with deionsed water, sliced and dried in the sun for one week and again. Dried at 50˚c in a hot air oven for six hours. Dried rhizomes were cut in small pieces, powdered by electronic mill. A large filter paper was used instead of a paper thimble. The paper was folded so that it could contain 20 g of turmeric powder and was then placed in the soxhlet apparatus. 200 mL acetone was heated and refluxed for extraction of the "filter paper thimble". The procedure was monitored until the yellow colour of the extractions faded after 5 h. Extraction was purified by column chromatography to separate curcumin and its analogues. The column was packed by 100 mL of silica gel in dichloromethane. A suitable mobile phase to elute the compounds was chosen by determination of the Rf values on TLC plates with UV-detection This method was relatively simple procedures and no complications occurred. An advantage with soxhlet extraction was that no further filtration was needed before it was concentrated. The obtained extract gave a crude yield of 2,6 g, which was purified by column chromatography. To get a good result from the extraction, it is important to find a solvent that have the ability to extract curcumin together with the other two curcuminoids. As they are analogues, the polarity of the compounds is very similar and reaches from nonpolar to half polar, and therefore a half polar solvent was the most appropriate choice for the extraction procedure. The solvent of choice was acetone for all experiments.

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ASSESSING POTENTIAL OF *CHICORY INDIGENOUS* POPULATIONS AND FORIGN CULTIVARS FOR INDUSTERIAL APPLICATION

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Chicory (*Cichorium intybus* L.), along with Jerusalem artichoke (*Helianthus tuberosus* L.) is an important industrial crop which is used for inulin production. Inulin is indigestible by human enzymes and its fermentation in the colon causes health promoting properties. Root yield and inulin percentage are two major components of inulin yield. For the first time we have investigated thirteen indigenous chicory genotypes along with some important foreign industrial (root) chicory and endive varietiesthat were cultivated in CRBD with 3 replications to compare their fresh root yield, inulin percentage and inulin yield. Inulin percentage was measured by subtracting the reducing sugar that was recorded in 575 nm using dinitrosalicylicacid reagentfrom total sugar which was determined in 490 nm after acid hydrolysis [1]. The highest fresh root yield per area unit was obtained from Orchies (4.45 kg/m^2), Tilda (3.56 kg/m^2), Schepens (3.34 kg/m^2) and Hera (2.96 kg/m^2) and the most inulin percentage of fresh roots was also observed in Schepens, Hera, Orchies and Tilda, respectively.Indigenous genotypes showed the lowest root yield and inulin percentage because they generated flower stalk at the first year of their cultivation [2]. Accordingly, intensive selection and breeding of indigenous genotypes for bolting resistance is the priority work before applying them to create root chicory varieties.

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IN VITRO PROPAGATION OF PEROVSKIA ABROTANOIDES KAREL

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Perovskia abrotanoides Karel (Lamiaceae) with the common Persian name of "Brazambel"is an Iranian folk medicinal herb. Plant containsa large amount of tanshinones which have been shown different biological activities including effects on cardiac function, antioxidant, leishmanicidal, andantiplasmodial. The aim of present study was to identify a suitable system for regenerating *P. abrotanoides* via direct organogenesis. *In vitro*-grown shoot tips were exposed on MS medium supplemnted with different concentration (1.0, 2.0 and 3.0 mg/L) of cytokinins 6-benzylaminopurine (BAP), thidiazuron (TDZ) and kinetin (KIN) alone or in combination with different concentration (0.5or 1.0 mg/L) of auxins α-naphthalene acetic acid (NAA),2,4-dichlorophenoxyacetic (2,4-D), and indole-3-butyric acid (IBA). The highest multiple shoot formation (8.64±0.62) occurred from explants of *in vitro*shoot tips cultured on medium fortified with 2 mg/L BAP plus 1.0 mg/L IBA. Rooting of elongated shoots was performed on half-strength MS medium supplemented with different concentrations (0.1, 0.5 and 1.0 mg/L) of IBA, 2,4-D and NAA. Regenerated shoots were easily rooted on the different tested media, with the most abundant (9±2.3) and strongest roots obtained on half-strength MS medium withoutplant growth regulators.

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THE EFFECT OF FRACTIONS EXTRACT OF SUMAC (*RHUS CORIARIA L.*) ON THE ACTIVITY OF PARAOXONASE-1 *IN VITRO*

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In this study, fruit of the sumac powder and soxhlet for 5 hours with solvent petroleum ether the solventwas removed, and sumac dried powder with methanol was extracted by soaking. In order to separate the components of theextract sumac using gel filtration chromatography Sephadex LH -20. Was injected methanol extract of sumac on column and with continuous washing column Collected fractions obtained from extracts. To determine the total phenolic compounds extract and selected fractions of sumac using the Folin-Ciocalteu and the amount of anthocyanin extract composition and selected fractions of sumac is determined by changing the pH and the amount of total flavonoid extract and selected fractions of sumac using the was measured by colorimetric method of aluminum chloride, the amount of tannin extract and selected fractions of sumac using the was measured by colorimetric method of Folin–Dnys, and to evaluate the effect of extract and selected fractions on the activity of paraoxonase-1, measured Paraoxona seactivity and activity phenyl acetateparaoxonase-1. Based on the results, It seems that the fruit extract sumac and selected fractions that containing significant amounts of phenolic compounds, flavonoids, anthocyanin's and tannins, as significantly increase the Paraoxonaseactivityandactivityphenyl acetateparaoxonase-1 [1, 2].

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VARIATION THE YIELD OF PEPPERMINT (*MENTHA PIPERITA* L.) IN RESPONSE TO DIFFERENT LEVELS OF VERMICOMPOST AND WATER DEFICIT STRESS

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Effect of vermicompost and water deficit stress on the yield of peppermint (*Mentha piperita* L.) was investigated in Kermanshah, in 2010. Treatments were 3 levels (0, 5 and 10 ton/ha) of vermicompost and water deficit at 3 levels (100%FC, 75%FC and 50%FC). This experiment was conducted by use factor as randomized complete block design with 3 replications. The results showed that there was a significant difference between the yields and leaf and stem dry weight. Mean comparisons showed that the highest yield (8ton/ha) and leaf dry weight (13.2 g/p) belong to 10 ton/ha vermicompost at the first time harvest and 4 ton/ha of yield and 8.1 g/p of leaf dry weight at the second harvest in this level of vermicompost. The highest yield (8kg/ha) and leaf dry weight (13.4 g/p) was belonging to 100% FC. Mean comparisons between deficit stress * vermicompost showed that the highest yield with 9 ton/ha and leaf dry weight with 14.9 g/p achieved in 100% FC and use of 10 tons vermicompost per hectare. The maximum dry weight of stem was in these treatments too about 18g/p. Mean comparisons of the treatments showed the highest yield in all treatments between two times of harvest was in the first time harvest. The results showed that peppermint is a hydrophyte plant and it needs to use enough of food and water to increase the yield.

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THE EXTRACTION OF MICROBIOLOGICAL GRADE AGAR FROM SEAWEED *GRACILARIA CORTICATA*

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The coasts of the Bushehr province are rich in macroscopic algae which include red algae *Gracilaria*. This alga is a world-known source of agar. Concerning the importance and economic value of agar in the food industry, pharmaceutical, medical, laboratory fields, studying different species of agar from ecological aspects and considering the different quantitative and qualitative content of the extracted agar has received a lot of attention among researchers [1, 2]. In this study, a meticulous review of the local and international studies was done in order to obtain an optimized method for the extraction and preparation of agar from red algae. We conducted tests to determine the best methods to extract agar from seaweed *Gracilaria corticata* collected from the shores of the Bushehr province. According to the gained results, the extracted agar had the gel strength of 867 g/cm^2 which was greater than that of similar studies. Considering some features including the moisture content of 13% and ash 4.7%, this agar with commercial, food, and microbiological grade has been known to have the high capacity of investment and mass production. Regarding the high inherent quality of agar extracted from *Gracilaria corticata* alga which could have biological uses and its capability of growth compatible with the weather conditions of the southern coast, it is suggested that due to low cost of extraction in this method and economic value, a safe and good investment could be made for massive production.

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THE EXTRACTION AND PURIFICATION OF PHYCOCYANIN FROM FRESH CYANOBACTERIA *SPIRULINA PLATENSIS*

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Algal pigments have massive commercial value as natural colorants in nutraceutical, cosmetics, and pharmaceutical industries, besides their health benefits [1]. Phycocyanin could be extracted from photosynthetic cyanobacteria, cryptophytes, and red algae, which has been widely used in commercial applications in the food and cosmetic industry as a natural blue dye. The cyanobacteria Spirulina platensis is an excellent source of phycocyanin. The protein fraction may contain up to 20% of phycocyanin [2]. In this research the extraction and purification of phycocyanin from the fresh concentered of *Spirulina platensis* was studied. The extraction was carried out by biomass vortexes in sodium phosphate buffer (pH 7.0), in the presence of glass pearls. The biomass was subjected to freezing and thawing for 24 hours. Then carbon active was used for purification of phycocyanin pigment. Combined solvent extraction, freezing-thawing and purification method treatments led to approach high yield 1.14 mg mL^{-1} phycocyanin with the purity ratio (OD_{615}/OD_{280}) 1.6.

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TOTAL PHENOLIC CONTENT IN LEAVES OF *SALIX ACMOPHYLLA* AND THEIR ANTIOXIDANT ACTIVITY

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Phenolics are one of the main group of secondary metabolites occurring in significant amounts in the plants of the family Salicaceae. The willow species contain specie's specific composition of phenolics, including flavonoids, tannins and phenolic acids. These compounds have important roles either as food-selecting clues for their resident insects or as antifeeding or replant agents for the invading insects and other predators. *Plagiodera versicolora* is a willow beetle found on different willows and we report this insect for the first time feeding on *Salix acmophylla* Boiss. (Salicaceae) in the Fars province in Iran. The feeding behaviour of *P. versicolora* on different *Salix* species are stimulated by phenolic compounds such as salicin, populin and luteolin-7-glucoside or some time deterred by some other phenolic acids like caffeoyl qunic and chlorogenic acids [1]. Therefore, the total phenolic contents of the plant's leaves are suggested to play an important role on the feeding preferences of the leaf beetle; *P. versicolora*. We found that, the larvae of *P. versicolora* prefer to feed on the younger leaves, but the adults select the older ones. We have determined the correlation between the herbivore-feeding effect on the phenolic contents and the radical scavenging activity of intact, adults and larval consumed leaves of the host plant, *S. acmophylla.* The antioxidant activity and total phenolic contents of 80% aqueous methanol extracts of the plant's fresh leaves were determined by DPPH radical scavenging assays and Folin-Ciocalteus colorimetric methods, respectively. The phenolic contents were measured of 2.37±0.26, 2.30±0.27 and 2.55±0.29 mg of gallic acid equivalents/ g of fresh leaves, for the above mentioned treatments, respectively. On the other hand, the IC_{50} values of radical scavenging activity of the extracts were determined to be 9.68±0.83, 7.62±0.67 and 9.95±0.59 mg/ ml DPPH 10^{-4} M, respectively. The statistically identical (p values . 0.05; n=5) values, showed that feeding of the insects on the leaves of the host plant do not increase the total phenolics or the total antioxidants, which is usually expected to be, after feeding of insects on a plants.

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IN-VITRO ANTI FUNGAL ACTIVITY OF TURPENTINE OIL ON *PENICELLIUM CITRINIUM*

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The use of herbs and herbal drugs has increased dramatically in recent years. Herbal drugs for many years have been used for antifungal activity. Despite the availability of clinically useful antifungal drugs,a continuing search for new antifungal agents still remains because some of the antifungal agents have serious side effects.The aim of this study was to investigate antifungal activity of turpentine oil on *penicellium citrinium*. The effect of Turpentine oil *on penicellium citrinium* fungi was investigated by poisoned food (contact) method, using 150, 300, 450, 600 mg/ml concentration of turpentine oil.And the diameter of inhibition zone was measured using a ruler [1, 2].To determine minimum inhibitory concentration (MIC) and minimum fungicide concentration (MFC) dilution serieswas prepared. We observed that the all concentration of Turpentine oil has anti-fungal effects compared to control group.That this inhibitory effect was dose-dependent pattern and increased with increasing concentration.Based on the results, between the minimum inhibitory concentration (MIC) and the minimum fungicide concentration (MFC) there is a significant differences.And turpentine oil at a concentration of 267/27 ±12/3 mg/ml can eliminate all Penicillium citrinum fungi (MFC). According to the results of the present study Turpentine Oil hasan antifungal activity on penicelliumcitrinium.And more studies might result to find a new antifungal compound with low side effects.

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EXTRACTION AND DETERMINATION OF FATTY ACID COMPOSITIONS IN AERIAL PART AND ROOTSTOCK OF *OROBANCHE CERNUA*

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Primary metabolites such as carbohydrates, amino acids, fatty acids, chlorophylls and etc. were found in all plants. Unlike primary compounds, secondary metabolites are present in some plants only. Secondary metabolites are not directly involved in the normal growth, development or reproduction of an organism [1]. Fatty acids, especially unsaturated fatty acids, are important as nutritional substances and metabolites in living organisms. Many kinds of fatty acids play an important role in the regulation of a variety of physiological and biological functions There is currently scientic interest in studying polyunsaturated fatty acid sources due to correlation between these fatty acids (omega-3 and omega-9) and the prevention of cardiovascular disease and the reduction of LDL cholesterol levels among other benefits [2]. *Orobanche cernua* is a parasite loss chlorophyll and leaves, from Orobanchaceae family. Orobanchaceae comprises about 170 species, mostly distributed in the temperate and semi-arid regions of the world [3]. The genus *Orobanche* has 39 species in Iran of which nine taxa are endemic to Flora Iranica area. In this study, plant material was collected on April 2015 in Birjand area, in Iran. The aerial part and rootstock of plant was air- dried at ambient temperature in the shade and the extract was obtained by n-hexane as solvent, using a Soxhlet apparatus for 12h. The lipids were esterified with 2% methanolic NaOH-25% BF3/methanol reagent. The fatty acid methyl esters were extracted with hexane/saturated NaCl and analyzed by gas chromatography–MS Spectroscopy (GC-MS).

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THE STUDY OF FENUGREEK SEEDS WATER EXTRACT EFFECTS ON TREATING DIABETES INDUCED BY ALLOXAN MONOHYDRATE IN RATS

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Diabetes is one of the most common diseases in the world and despite of various chemical drugs, treatment and control of its complication still considered as a public health problem [1]. In this study we investigated the effect of fenugreek seeds water extract on treatment and control of diabetes complications. For this purpose 36 male rats were divided into three groups of healthy control, diabetic control, and diabetic rats group which treated by fenugreek seeds water extract. In the second and third groups diabetes induced by intra peritoneum injection of alloxan monohydrate at a dose of 120 mg/kg [2]. We fed treatment group by fenugreek seeds water extract at a dose of 870 mg/kg as gavage for 28 days. Blood samples were taken from cardiac puncture of rats [3] and levels of serum glucose, MDA (malondialdehyde), and A1C hemoglobin was measured as indicators of blood sugar control and activity of free radicals in diabetic rats. The results showed a significant decrease in glucose level, MDA and A1C hemoglobin levels in fenugreek treatment group in contrast with diabetic control group, which represents the effect of fenugreek seeds extract on reduction of glucose serum and diabetes complications.

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ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES AND CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF THE MEDICINAL PLANT: *ARUM MACULATUM*

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Arum maculatum is a common woodland plant species of the Araceae family. [1]. It is known by an abundance of common names including snakeshead, adder's root, arum, wild arum, arum lily, lords-and-ladies, devils and angels, cows and bulls, cuckoo-pint, Adam and Eve, bobbins, naked boys, starch-root, wake robin, friar's cowl and jack in the pulpit. Its Persian name is “Kardeh” and in the south of Iran, different preparations of this plant *e.g.*, decoctions or powders, are used as a soup with the same name [2]. In this study, the essential oil of *A. maculatum* obtained by hydrodistillation method in room temperature and were analyzed by GC-MS. The major identified components were Palmitic acid (23.31%), Phytol (13.02 %), Methyl 9, 12, 15-octadecatrienoate (10.34 %) and Methyl linolenate (8.64 %). Then antimicrobial activity of essential oils extracted from *A. maculatum* was conducted by minimum inhibitory concentration (MIC). Best activities can be seen against *Staphylococcus aureus* with MIC=32 mg/ml, *Staphylococcus epidermis* with MIC=4 mg/ml and *Escherichia coli* with MIC=4 mg/ml. The antioxidant activities of the essential oils of *A. maculatum* were also evaluated using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assays. IC50 values in the DPPH assay was reported: 24.86 ± 21.4 mg/mL.

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PHYLOGENY OF HEDYSARUM (FABACEAE) INFERRED FROM SEQUENCE DATA OF NRDNAITS

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The genus *Hedysarum* (Hedysareae, Fabaceae) with ca. 140–180 species is the largest genus of the tribe in the world and with 35 species is the second large genus of tribe In Iran [1, 2]. It is distributed in temperate to arctic regions of Northern Hemisphere, widely centered in Central and West Asia, Himalaya and North America. Species of the genus occur in variant habitats such as alpine and arctic meadow, stony grasslands, deserts or seashores [3]. *Hedysarum* is mainly characterized by its lomented, indehiscent pods [4]. To contribute to fill some of the gaps in resolving and supporting properly relationships due to insufficient taxon sampling within genus *Hedysarum*(Fabaceae), we have initiated a phylogeny work on *Hedysarum* in Iran, Turkey and Afghanistan with emphasis on Iran. Based on the Bayesian tree resulted from nrDNAITS sequences of 77 species (135 accessions), the relationships and monophyly of *Hedysarum* were assessed.The results showed that *Hedysarum* as delimited here is not monophyletic group and consists of three well-supported main clades: the first clade corresponds to *H.* sect. *Hedysarum*; the second clade is the re-defined *H.* sect. *Multicaulia*, consisting of the core group of *H.* subsect. *Multicaulia*and plus H. subsect.*crinifera*; and the third clade includes the monospecific H. sect. *Stracheya* (with *H. tibeticum*) and three species previously placed in H. sect. *Multicaulia* (*H. kumaonense*, *H. Lehmannianum* and *H. minjanense*).

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BIOLOGICAL INVESTIGATIONS ON AN ENDANGERED SPECIES, *DOREMA AUCHERI* FROM KOHGILUYEH AND BOYER-AHMAD

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Dorema aucheri belongs to Apiaceae family. The young tops of plant were used as pickle in Kohgiluyeh and Boyer-Ahmad province. In this study the cytotoxicity and antioxidant activities of total extract and different fractions of young tops of *D. aucheri* and total extract of its pickles were investigated and their total phenols were determined. The young tops of *D. aucheri* were collected in March 2015 from Yasouj, Iran. The plant was identified and a voucher specimen of plant is deposited in Herbarium of The school of biology, University of Tehran (No. 46056 TUH). Dried powders of plant were macerated with 80% methanol at room temperature. The crude extracts were concentrated and fractionated with Petroleum ether (PE), chloroform (CL), Ethyl acetate (EA) and methanol (ME), separately. The pickles of plant was dried and extracted with 80% methanol, too. Brine shrimp test was used for toxicity investigation of pickle extract, crude extract and different fractions (10-200 µg/ml). Mortality percentages were determined following Abbot's formula, p = pi- C/1- C; where pi means the observed mortality rate and C represents the natural larvae mortality of negative control [1]. For investigation of radical scavengering activity of fractions, the DPPH method was used with some modifications [2]. The determination of phenol content of samples was performed according to the Folin-Ciocalteu method with slight modifications [3]. The mortality percentage of crude extract in BST method was more than other fractions and pickles extract (LC_{50} =119.5 µg/ml). In DPPH antioxidant method, the inhibition percent of free radicals of 83.33 µg/ml of different fractions were comparable with 40 µg/ml vitamin E and 100 µg/ml BHA in 30 min period. Total phenol content of the fractions was calculated with a linear equation based on a gallic acid standard curve. The ME and EA fractions had the highest phenol content. *Dorema aucheri* could be a source of natural antioxidants with phenolic structures.

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COMPARISON OF ANTIOXIDANT ACTIVITY OF CURCUMIN AND ITS DERIVATIVES BASED ON CALCULATE RADICAL STABILIZATION ENERGY (RSE)

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Natural phenolic compounds from medicinal herbs and edible plants have been attracted great interest as potential therapeutic agents for various diseases in humans [1]. Scavenging free radicals is the main role of phenolic compounds as antioxidant in protection against lipid peroxidation [2]. Turmeric, the Indian spice, has been used as a traditional medicine for centuries [3]. It is a source of phenolic compounds called curcuminoids which include curcumin, demethoxycurcumin and bis-demethoxy curcumin that showed significant therapeutic potential. The major component of turmeric is curcumin. It has showed different biological activities including anti-cancer, anti-bacterial, anti-inflammatory and the properties which have effect on Alzheimer's disease. Since the stability of curcumin radical is the main factor of its radical scavenging and antioxidant benefits, we have examined several active sites of curcumin to react with radicals to investigate the radical scavenging ability of curcumin and other related derivatives. Radical stabilization energies (RSE) and bond dissociation enthalpies (BDE) are useful for the prediction or interpretation of reactions in free radical chemistry. It is revealed that the RSE of curcumin is high and comparable with vitamin C. The phenolic hydroxyl group is discovered as the principle site for antioxidant properties of curcumin.

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EFFECT OF *MENTHA PIPERITA* EXTRACT CONCENTRATION, REACTION TIME AND TEMPERATUREON THE YIELD AND SIZE OF GREEN SYNTHESIZED IRON NANOPARTICLES

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High antioxidant activity of *Mentha piperita* and presence of many active antioxidant components in this valuable food, make this plant a valuablenatural reducing agent [1]. In this study, green synthesis of monodisperse nanozero-valent iron (nZVI) particles in the presence of water extract of *Mentha piperita* is investigated. Effect of different parameters, including volume ratio of iron salt to the extract solution, temperature and reaction time, were studied. The size of nZVI particles was characterized using scanning electron microscope (SEM). Results confirmed that among these three parameters, temperature is the most efficient factor which makes more than 10 nm difference in the average size of the nanoparticles whereas the effect of reaction timewas not so high.

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EXTRACTION OF GALANTHAMINE FROM THE BULBS OF *NARCISSUS TAZETA* L.

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*Narcissus tazeta*is a bulbous plant with extended and thin leaves and fragrant umbrella_like inflorescences. It is form amarillidceae family and its flowers have narcotic and its bulbs have vomiting effect. Its bulbs also contain anti Alzheimer drug galanthamine [1]. The natural habitat of narcissus in Iran is Shiraz and Khuzestan, but it's grown in other areas of the country because of its beautiful and fragrant flowers. The bulbs were collected in autumn from Bam area, and after separating stems, leaves and petals, they were transferred to the laboratory for separation of galanthamine alkaloid. The plant alkaloids were first extracted in *n*-pentane in neutral alkaline form. Galanthamine was detected in the *n*-pentane extract using TLC and HPLC methods.

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ISOLATION AND CHARACTERIZATION OF ENDOPHYTIC GALANTAMINE- PRODUCING BACTERIA FROM *NARCISSUS TAZETTA* GROWING WILD IN IRAN

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Galantamine (GAL), a morphine like alkaloid, is an important Acetylcholinesterase (AChE) inhibitor that is obtained naturally from Amaryllidaceae family members such as *Narcissus* sp., *Galanthus* sp., *Leucojom aestivum*, and *Lycoris* sp. [1]. AChE, a key enzyme in the nervous system of animals, hedrolyses the neurotransmitter Acetylcholine (ACh) at the cholinergic synapses, thus leading to loss of stimulatory activity and causing Alzheimer's disease (AD) and the alkaloid GAL is known aspreventative drug of AD.During the official records in the United States, deaths from other major causes have decreased significantly, but deaths from AD have increased significantly. Between 2000 and 2013, deaths attributed to AD increased 71 percent, while those attributed to the number one cause of death (heart disease) decreased 14 percent [2]. This problems stimulates us for exploration of new way for production of natural compounds. In the meantime, medicinal plants and their endophytes are interesting resources for discovery of natural products [3]. Endophyte mimic the production of specific plant associated secondary metabolites (e.g. taxol, camptothecin and rohitukine) in culture, independent of the host tissue [4]. In this study 10 endophytic bacteria isolated from the bulbs of *Narcissus tazetta* L. collected from behbahan in the southwest of Iran. According to the HPLC analysis, two of 10 isolated endophytic bacteria producedGAL. Two endophytic isolated bacteria were identified as *Burkholderia graminis* and *Bacillus thuringiensis* according to the internal transcribed spacer nuclear rDNA gene sequence analysis. *Burkholderia graminis* and *Bacillus thuringiensis* produced 37.8 and 61.0 µg/L GAL, respectively. Interestingly, these two endophytic bacteria, are the first endophytic GAL-producing bacteria isolated from *N. tazetta* L. bulbs.

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INFLUENCE OF DRYING METHODS ON DRYING TIME, TOTAL PHENOLICS AND FLAVONOIDS OF GOLDENROD (*SOLIDAGO VIRGAUREA* L.)

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Goldenrod (*Solidago virgaurea* L.) is an interesting medicinal herb of the Astraceae family which possesses anti-inflammatory and diuretic activities. Drying is one of the most important processes of herbs post harvesting which affect the quality of their active ingredients.The presentexperiment was carried out,during 2015, to determine the effect of different dryingmethods and conditions (sun, shade, oven [40, 50°C] and microwave [550, 1000w] drying) on drying time, total phenolic and flavonoids of *S. virgaurea* herbal drugs. The experimental design was a completely randomized design with three replications. The drying process was continued to reach to a moisture content of about 10%. For each treatment, time of drying was recorded, as drying in shade (60h) took highest time while drying in microwave 1000w (7min) showed highest drying speed. Total phenolic and flavonoids of the dried herbs were significantly influenced by different drying methods.

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INVESTIGATION OF ANTI-ALZHEIMER PHYTOCHEMICALS FOCUSING ON IN SILICO STUDIES

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Alzheimer's disease (AD) is a neurodegenerative disease which devastates quality of life and represents one of the main primary causes of death. It has multifactorial aetiology and complex pathophysiology, so there are many theories try to explain it. The chemistry and pharmacology of some natural products, especially Phytochemicals, which have potential for drug development have been studied extensively in last decade and some of them reach clinical trials. Since, *in silico* molecular modeling approaches play an important role in discovery of novel lead compounds having pharmacological activity, in this study several related researches were highlighted. Also the multi-target-directed ligand (MTDL) investigations, which connected to molecular modeling and structure activity relationship (SAR) studies, were discussed.

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IDENTIFICATION OF THE FATTY ACID COMPONENTS OF THE HEART OF PALM TREE FROM BAM AREA

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Phoenix dactylifera L. is a well-known tree belonging to the palm family (palmaceae) [1]. Geographical distribution of the plant in Iran is mainly in Khozestan, Bushehr, south of Fars, Kerman, Hormozgan, Sistan and Baluchestan and Isfahan. The heart of palm is a white, edible and sweet material located in the crown of tree. It mainly constituted of the stem cells of the trunk and leaves of the plant before changing into wood [2]. In summer 2014, it was collected from Bam palm gardens and its total extract was obtained in methanol. After removal of the solvent, a*n*-hexane fraction of the extract was prepared and injected into a GC/Mass system. Twenty-six compounds were identified in *n*-hexane extract and the main compounds were recorded as follow: 5-nonadecene (5.01%), nonadecane (23.71%), hexadecanoic acid (14.11%), heneicosane (12.66%) and 9,12-octadecadienoic acid (26.56%). These compounds are all from long chain fatty acid family.

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COMPARISON OF INACTIVATION OF *ESHERICHIA COLI* ON MINCED MEAT SURFACES BY MEDICINAL PLANTS AND ATMOSPHERIC COLD PLASMA JETS

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Hurdle technology usually works by combining more than one approach. Each hurdle aims to eliminate, inactivate or at least inhibit unwanted microorganisms. The purpose of this study was to investigate the antibacterial effects of extracts of Rosmarinus officinalis and atmospheric cold plasma jets on the growth curve of E.coli O157. The dried Leaves of Rosemary were used for preparing various concentrations (0.2, 0.3 and 0.4 gr/ml) of alcoholic extracts. He, N2 (both 7 L/min), and mixtures of each were used to produce the plasma jets. After treatment for 1 min with ACP jets of, the numbers of E.coli on minced meat were reduced by 0.87, 4.19, and 7.59 log units, respectively. Extracts reduced the E.coli by 1.37, 4.73 and 6.52 log units, respectively. Based on the findings of this study, Rosemary extract and ACP jets had a stronger antimicrobial effect on E.coli bacterial and for prolonging the shelf-life of such foods. In future studies can be combined with rosemary extract and ACP to inactivate pathogenic bacteria. [1, 2].

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COMPARISON OF ESSENTIAL OIL COMPOSITIONS AND ANTIMICROBIAL ACTIVITY OF CULTIVATED AND WILD TYPES OF *BUNIUM PERSICUM* (BOISS.) B. FEDTSCH.

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Bunium persicum (Boiss.) B. Fedtsch is one of the invaluable medicinal plants belonging to Umbelliferae, which its fruit has been used as flavor in food and as carminative and antiseptic [1]. This precious plant faced with extinction risk in recent years because of over exploitation and natural and manmade hazards. Cultivation of such a plant could preserve its wild resources and yet meet the market demand. In the present study we examined essential oils composition and antimicrobial activity of a wild and a cultivated type of *B. persicum*. The essential oils were isolated by hydrodistillation of dried powdered fruits (100g) within 2 hours. The yield of extraction was calculated as 2.5% and 2.25% (w/w) for the wild and cultivated types, respectively. Essential oil analysis was performed by GC and GC-MS. The components were identified by using GC retention indices and comparison of their mass spectra with authenticated ones in Wiley library and literatures. The minimum inhibitory concentrations (MIC) were determined by agar diffusion method against *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans*. About thirty components were identified in each sample which accounted for 95.8% and 93.8% of wild and cultivated oils respectively. Predominant constituents of wild and cultivated oils were γ-terpinene (30.8% and 27.6%), cuminaldehyde (20.5% and 21.1%) and *p*-cymene (20.1% and 18.3%), respectively. The MICs of oils against *S. aureus*, *E. coli* and *C. albicans* were calculated as 1.5, 1.5 and 0.375 mg/ml for wild type, and 6.25, 6.25 and 0.75 mg/ml for cultivated type respectively. Despite the similarities in major constituents of both oils and especially similar high content of cuminaldehyde, which is responsible for specific scent of *B. persicum*, antibacterial potential of wild oil was significantly higher than cultivated one. This may be due to combinatorial effects between major and minor components of essential oil such as synergism, addition or antagonism. Further studies on different combination of the components may reveal the exact cause of these findings.

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ANTIIMICROBIAL ACTIVITY OF *DIOSPYROS LOTUS L.* LEAVES AND FRUITS FROM NORTH OF IRAN

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Antimicrobial activity is one of the most important properties of plant products. *Diospyros Lotus L*. is a deciduous tree with broad or ovate-oblong leaves, dark brown and small fruits. The leaves and fruits of *Diospyros Lotus* L. have been used as folk remedies for some medical treatments. It has antipyretic, sedative and disinfection effects and because of that is effective in treatment of microbial diseases [1]. Earlier, Tannins and oligosaccharides from *Diospyros Kaki* determined as antibacterial agents in this plant [2]. In this study, the fruits and leaves of*Diospyros Lotus L.*were collected from the cities of Sari and Gorganin the north of Iran and dried completely at room temperature and far from light for a week and cut into small pieces. Plant extracts were prepared via maceration technique with methanol as solvent and antimicrobial activity of methanol extract of fruits and leaves of *diospyros lotus* L. was evaluated against Escherichia coli, Staphylococcus aureus and Bacillus cereus microorganism [3] via Disk diffusion method followed by Micro plate method. In Disk diffusion, Kirby-Bauer method was applied for determination of susceptibility of microorganism. The final results were indicated by minimum bactericidal concentration (MBC) and minimum inhibitory concentration (MIC). The fruit extract of Sari province showed the significant effect against *Staphylococcus aureus*. The MIC value of this extract was 40 mg/ml. Moreover, the experiments showed that the increasement in the amount of extract may result in the increasement of antimicrobial activity.

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IN SILICO MOLECULAR DOCKING STUDIES OF COMPOUNDS IN GREEN TEA AS AN ANTI-INFLAMMATORY AGENTS

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Inflammation is a vital part of the body's immune response. Cyclooxygenase-2 (COX-2) is an enzyme that causing pain and inflammation by catalysis the conversion of arachidonic acid to prostaglandin in inflammatory response. COX-2 inhibitors can reduce inflammation and painsare used for treatment of arthritis, or other chronic inflammatorydisorders. Celebrex and Vioxx are chemical drugs that used for the treatment of chronic pain conditions related to inflammation by targeting COX-2 [1]. Natural herbal products that have been used traditionally as nutrition or medicine may also act as COX-2 inhibitor.Green tea (*Camellia sinensis)* is an ancient beverage with many pharmacological effects on several diseases and disorders by it's more than 200 bioactive compounds. The most important green tea ingredients aretheanine, caffeineand catechins like (-) epigallocatechin-3-gallate (EGCG) and kaempferol [2]. The purpose of this study is to analyse the potentialinhibitory action of green tea compounds on COX-2 inhibition by computational docking studies. Molecular docking study of Celebrex and Vioxx (FDA approved drug) and EGCG and kaempferol with COX-2 (PDB ID:6COX) has been done using Autodock 4.2.6.Our analysis indicated thatamong these natural compounds,EGCGshowed higher binding affinity compared to others with the lowest binding energy (-9.6kcal/mol) and the high potential anti-inflammatory activity. The binding energy of Vioxx to COX-2 (-9.44kcal/mol) was higher than EGCG.The binding energy of kaempferolis -7.98kcal/mol. Celebrexhas the lowest binding energy(-10.13kcal/mol) among these four compounds. Green tea major polyphenolic constituent EGCG and kaempferol can be an anti-inflammatory agents by COX-2 inhibiton. Current data show the potency of green tea as traditional medicin to be effective inpain relievingby less toxicity and more selectivity than chemical inhibitory drugs and discovery and development of novel inhibitors in clinical.

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THE SEPARATION AND IDENTIFICATION OF LOPEUL &APIGENIN FROM *ANTHEMIS HUSSKNECHTII*

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Anthemis is the second largest genus in Asteraceae. *Anthemis*genus is known to contain sesquiterpen lactones and flavonoids,acetylene and essential oils [1].The flowers of *Anthemis hussknechtii* were collected on the mountain Sanandaj in Iran.The flowers of *Anthemis hussknechtii* extracted with EtoAc, 3 times, each time for about 60 hour by percolation method. Two main components were separated and isolated by means of chromatographic methods mainly column chromatoghraphy checked by TLC. These component were identified by spectroscopic methods,including H-NMR, COSY,DEPT-135 and MS spectroscopy. The structures of the isolated compounds were stablished as Lopeul and Apigenin. Lopeul is categorized in saponin group, it has disinfection, anticonvulsants and anti-inflammatory activities, effect on hypo-cholesterolemic diseases, contraceptives, hemolysis of red blood cells, reduced egg production, reducing the germination of seeds, insecticides property Tap, antifungal, and the allelopathic activities [2, 3]. The molecular weight of Lopeul is 426 g/mol and it has $C_{30}H_{50}O$ formula. 6, 7, 4' trihydroxi flavoneis known as Apigenin which is a potent inhibitor of CYP_2C_9, an enzyme responsible for the metabolism of many pharmaceutical drugs in the body. The molecular weight of Apigenin is 270 g/mol and it has $C_{15}H_{10}O_5$ formula.

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THE COMPARISON OF THE QUANTITIES OF SOME FLAVONOIDS IN FRUITS & LEAVES OF *DIOSPYROS LOTUS* L. IN GORGAN & SARI

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Flavonoids have many biological effects like anti-inflammatory, antiallergic and antivirus properties [1]. Quercetin is one of the most abundant flavonoids which exists in the form of Aglycone in foods. Quercetin and kaempferol flavonoids are antiproliftration and can be effective in anticancer drugs [2]. In this research the amount of three flavonoids (Myricetin, Quercetin, kaempferol) in fruits and leaves of *Diospyros lotus L*. in Gorgan& Sariin the north of Iran was analyzed by HPLC and compared before and after hydrolysis. The extracts were prepared with 70% methanol using ultrasonic waves for half an hour and maceration for 24 hours.The determination of total phenol content was carried out by Folin-Ciocalteu reagent [3] and then the absorption was read at 415 nanometer. The leaves of Gorgan's forest contained most of the flavonoids with almost 0.542 g/100 g Gorgan's leaves after hydrolysis. Also Myricetin was the major flavonoid of plant extracts. The amount of Myricetin after hydrolysis was 5162.239 ppm. In comparision, Gorgan's fruits contains 9.71 ppm, Sari's leaves 3773.96 ppm and Sari's fruits 19.25 ppm Myricetin flavonoids. Moreover, it was carried out that the proportion of Myricetin flavonoid in glycoside form is 5 times more than Aglycone form. For this statistical comparison we used SPSS software.Scheffe and Games-Howell exams were done in order to analyze the results and variances.

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ALLELOPATHIC EFFECTS OF *ACHILLEA MILLEFOLIUM* ETHANOLIC EXTRACT ON SOME COMMON WEEDS

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Allelopathy offers potential tool for selective biological weed management whole the production and release of allelochemicals from the plant materials (Weston, 1996). In recent years weed resistance to herbicides have more advertence to the biological control methods. In this content there is a growing interest for use of plant extracts and essential oils as safe natural substances (Lopez et al, 2008; Fiorentino et al, 2008). For this objective the allelopathic effects of *A. millefolium* ethanolic extracts were considered at pre-emergence stage on three common weed species including *Amaranthus retroflexus*, *Nigella sativa* and *Lactuca serriola*. Present study was conducted in a factorial base experiment with completely randomized design during 2015 in laboratories of Horticulture department of Urmia University. The ethanolic extracts of shoot plant were obtained from plant grown in natural habitat and were used with different concentration (0, 20, 33.3, 50% extract) with three replications. Finally, germination percentage was evaluated during seed germination among different species. Our results indicated that *A. millefolium* extracts decreased germination in all concentration and in all species in compare whit control. *A. millefolium* herbaceous extract of plant gathered from natural habitat had a great inhibitory effect, so that with absolute concentration made a 100% inhibition on *A. retroflexus* seed germination, but in *N. sativa* and *L. scariola* the seed germination percentage was 28 and 3.5 respectively. Our results indicate that the highest percentage of germination of all three species occurred in the control treatments 93.7 to 98.7. *A. retroflexus* seeds were more sensitive than other seeds in different concentrations. Our experiment have shown that ethanolic extracts of *A .millefolium* can be used as a useful natural herbicides, however future studies are necessary to fully understand the reasons by which medicinal plant extract may affect as herbicide in order to commercial application.

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COMPARISON OF GROWTH AND YIELD OF ROSELLE IN TRANSPLANTING AND DIRECT-SOWING METHODS

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Roselle (*Hibiscus sabdariffa* L.), is an annual herbaceous medicinal plant belonging to the family of Malvaceae. This plant is native to Africa and grows in tropical and sub-tropical regions [1]. In Iran, roselle is mainly cultivated in Sistan & Balouchestan province, considering to its sub-tropical climate, but its cultivation in many parts of country is prevented by late spring and early fall cold stress. Therefore, transplanting can be an appropriate method for roselle production in areas affected by cold stress. This study was conducted based on a Randomized Complete Block Design with two planting methods (transplanting and direct sowing of roselle) and three replications at Research Field of Sarayan Faculty of Agriculture (33ºN, 58ºE and 1450 masl) in South Khorasan province. Planting methods had a significent effect on most of the morphological indices, yield and yield components of roselle. The amounts of plant height, number of lateral branches, number of ftuit per plant and mean fresh weight of fruit in transplanting method were 15, 80, 80 and 25% more than direct-sowing method, respectively. The amount of sepals yield per plant in treansplanting was 1.42 $g.plant^{-1}$, while this index was 0.60 $g.plant^{-1}$ in direct sowing. In addition, the values of leaf area, leaf weight and plant dry weight in transplantig were 48, 60 and 67% higher than direct sowing method. As the same way, sepals yield of roselle in transplanting method was 110 $kg.ha^{-1}$, while this criteria was 62 $kg.ha^{-1}$ in direct-sowing method. Our osbservations revealed that early autumnal chilling stress is the most important obstacle for roselle production in Southern Khorasan province. Therefore, the transplanting of this plant can accelerate its growth rate and thus reduce the damage of late season cold. Moreover, considering roselle is a sub-tropical plant [1], its transplanting is a suitable method to avoid from late spring cold stress which is an inhibitor factor for on-time roselle sowing. In similar study Rezvani-moghaddam *et al*., [2] recommended that cultivation of roselle in Mashhad climate condition must be done only through its greenhouse cultivation and then transfer of seedlings to the field condition.

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MOLECULAR PHYLOGENY OF SECTION HELIOBRYCHIS (ONOBRYCHIS-FABACEAE) INFERRED FROM SEQUENCE DATA OF NRDNAITS

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The section *Heliobrychis* (subgenus *Sisyrosema*), is the most species-rich section of genus *Onobrychis* in Iran with about 27 species [1]. Širjaev (1926) divided section *Heliobrychis* into three subsections *Boissierianae*, *Szovitsianae* and *Persicae* [2]. A total of 63 accessions representing 23 species belonging of *Heliobrychis* and 10 species from the other related sections as outgroups were included in a phylogenetic analysis by using nrDNA ITS sequences. Phylogenetic analyses were performed by maximum parsimony approach as implemented in PAUP*, Maximum Likelihood analysis using RaxmlGUI software and Bayesian method using MrBayes program. In the analyses, members of *Heliobrychis* sensu Rechinger (1984) were clearly separated from other sections of *Onobrychis* as forming a highly supported monophyletic group. The subsections mentioned sensu Širjaev (1926) are not monophyletic. In the basal position of phylogenetic tree, populations of *O.aucheri* in a well-supported clade is sister to the remaining members of *Heliobrychis* comprising some populations of *O. aregyrea*, *O. subacaulis*, *O.heliocarpa* and *O.heterophylla* plus a large clade. The basal branches of this large clade occupied with two species of *O.gaubae* and *O.mozafariani*. The rest species of the section mostly diverge in unresolved branches.

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EVALUATION OF ANTIBACTERIAL ACTIVITIES OF *BERBERIS VULGARIS ASPERMA* ROOT EXTRACTS ON *ESCHERCHIA COLI* AND *SALMONELLA ENTERITIDIS* STANDARD STRAINS

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Although synthetic drugs and chemicals may treat illnesses to some extent, they give rise to some side effects e.g. drug resistance. Suitable alternatives are herbal medicines. The aim of this study was to evaluate the antibacterial properties of chloroform and ethanol extracts of *Berberis vulgaris asperma* root against *Escherichia coli* and *Salmonella enteritidis* standard strains. In this study, extraction was done by using ethanol and chloroform solvents. The antibacterial properties were determined by tube double serial dilution method, and then minimum inhibitory concentration (MIC) was obtained. The present study showed that the examined species were susceptible to ethanol and chloroform extracts of the root of this medicinal plant. 25 mg/ml and 75 mg/ml of the ethanol extract and 6.25 mg/ml and 3.125 mg/ml of the choloroform extract were recorded as MICs agains *E Coli* and *Salmonella enteritidis* standard strains respectively. Further studies on active ingeridents of root ethanol and chloroform extracts of *Berberis vulgaris asperma* is suggested. [1- 3]

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VARIATION THE MORPHOLOGICAL TRAITS OF PEPPERMINT (*MENTHA PIPERITA* L.) IN RESPONSE TO DIFFERENT LEVELS OF VERMICOMPOST AND WATER DEFICIT STRESS

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In order to investigate the effect of water deficit stress on the morphological traits of peppermint (*Mentha piperita* L.), an experiment was conducted under field conditions in 2010, at Kermanshah. Treatments were 3 levels (0, 5 and 10 ton/ha) of vermicompost and water deficit at 3 levels (100%FC, 75%FC and 50%FC). This experiment was conducted by use factor as randomized complete block design with 3 replications. The results showed that there was a significant difference between the plant height, the number of nodes in stem, the number of lateral branches, the number of leaves and leaf length and width. Mean comparisons showed that the highest plant height (53.57 cm), the number of lateral branches (12.16 n/p) and the number of leaves (74.23 n/p) belong to 5 ton/ha vermicompost at the first time harvest. Mean comparison of vermicompost indicated the maximum of the number of nodes (18.23 n/s), leaf length (4.12 cm) and leaf width (1.63 cm) were achieved in the 10 ton /ha. Plant height (56.39 cm), leaf width (1.64cm), leaf length (4.14cm), the number of lateral branches (12.87 n/p), leaves (73.52n/p) and nodes in stem (19.29 n/s) were all the highest in 100% FC. Result showed that we can have the best peppermint with high quantity of morphological traits when we use suitable amount of vermicompost and Proper irrigation.

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ANTIBACTERIAL EVALUATION OF SUCCESSIVE EXTRACTS OF MAIRNE BROWN ALGAE-*DICTYOTA DICTOMA*

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Algae and consequently their extracts can be the invaluable sources of biologically active compounds which are studied for the development of new biotechnological products [1, 3]. Due to the limited research work on the bioactive metabolites from Iranian algae, the dried and grinded brown algae, *Dictyota dictoma*, gathered from intertidal southern coasts of Qeshm Island was subjected to successive extraction with solvents of different polarities (hexane, dichloromethane, ethyl acetate, ethanol) and solely with methanol in the optimized extraction conditions. The antibacterial activities of extracts were studied against two gram negative and two gram positive bacteria (three gram positive in the case of methanolic extract) including *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterococcus faecium* and *Staphylococcus aureus*, respectively. The results showed the remarkable antibacterial activity of the algal extract with the MIC of 0.0625-0.125 mg/ml against *Staphylococcus aureus*, 4-32 mg/ml against *Enterococcus faecium*, 1-8 mg/ml against *Escherichia coli* and 8-16 mg/ml against *Pseudomonas aeruginosa*. It seems that this alga could be considered as a new source of potential bioactive components that could attribute to its moderate to high antibacterial activity.

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EFFECT OF DROUGHT STRESS ON ESSENTIAL OIL PERCENTAGE AND THE ESSENTIAL OIL COMPOUNDS OF *THYMUS DAENENSIS* CELAK

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Lamiacea plants have long been used as medicinal plants. Thyme essential oil is one of the ten world famous essential oils, more ever It has anti-bacterial, anti-fungal and antioxidant effect. This research was performed in randomized complete block design with 3 replications and 5 treatments. Treatments include drought stress of 100% of field capacity (control), 80% of field capacity (enough irrigation), 60% of field capacity (mild stress), 40% of field capacity (slightly severe stress) and 20 % of field capacity (severe stress), respectively. The methods of treatments applied were weightily and TDR, the essential oil extraction was water distillation for 2 hours, determination of essential oil compounds and identified through by gas chromatography and mass chromatography. Analysis of variance on traits of *Thymus daenensis* showed that between treatment on yield and percentage of essential oil, 1.8-Cineole Borneol, Thymol, Carvacrol and E-Caryophyllene there was a significant difference in the level of 1%. There was a significant positive correlation between Linalool and 1,8-Cineole. a significant negative correlation was observed between Linalool with Borneol and E-Caryophyllene. A significant positive correlation was abserved between Thymol and Carvacrol. There was a significant negative correlation between Thymol and E-CaryophylleneThe highest essential oil yield with 17.53 kg per hectare belongs to 60% field capacity treatment. The highest essential oil percentage with 2.4% belongs to 20% field capacity treatment. The highest Thymol with 66.3% belongs to 80% field capacity treatment. According to the results, for production plants with high quality and quantity, use of drought stress 60%FC (*Thymus daenensis*Celak) is suitable.

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EFFECT OF DROUGHT STRESS ON ESSENTIAL OIL PERCENTAGE AND THE ESSENTIAL OIL COMPOUNDS OF *THYMUS VULGARIS* L.

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Iran's average annual precipitation is about 250 mm, and having less than 150 mm rainfall in about 65% of its area, is among the world's arid regions.Experiment on *Thymus vulgaris* was conducted in the field and laboratory conditions in 2010-2011.This research was performed by use in randomized complete block design with 3 replications and 5 treatments.Treatments include drought stress of 100 % of field capacity (control), 80% of field capacity (enough irrigation), 60% of field capacity (mild stress), 40% of field capacity (slightly severe stress) and 20 % of field capacity (severe stress), respectively. The methods of treatments applied were weightily and TDR, the essential oil extraction was water distillation for 2 hours, determination of essential oil compounds and identified through by gas chromatography and mass chromatography. Analysis of variance on traits indicated that between treatment on yield and percentage of essential oil p-Cymene, 1.8-Cineol, γ-Terpinene, Thymol, Carvacrol and E-Caryophyllene. There was a significant difference in the level of 1%.The highest essential oil yield with 19.26 kg per hectare belongs to 40% field capacity treatment. The highest essential oil percentage with 2.22% belongs to 100% field capacity treatment.The highest 1.8-Cineole with 31.6% belongs to 60% field capacity treatment. The highest Thymol with 40.5% belongs to 100% field capacity treatment. According to the results, the tolerance of *Thymus vulgaris* is high and for production plants with high quality and quantity, use of drought stress 40%FC is good.

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STEROIDS WITH CYTOTOXIC ACTIVITY FROM THE PERSIAN GULF SPONGE, *IRCINIA MUTANS*

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The wide diversity of marine organisms offers a rich source of natural products. Among marine organisms, sponges are wealthy sources of diverse bioactive metabolite with various biological activities [1]. Herein we have reported the isolation and structure elucidation of steroids with cytotoxic activity from the Persian Gulf sponge, *Ircinia mutans* by using flash column chromatography, thin layer chromatography (TLC), GC-Mass spectroscopy and nuclear magnetic resonance (NMR) [2, 3]. Investigation on Methanol and dichloromethane extracts of *I. mutans* led to isolation of three steroids. Analysis of a nonpolar fraction from the silica gel open column chromatography revealed that this sponge is a rich source of C_{27} and C_{28} sterols. The sterols containing fraction consisted of at least 5 components belonging to Δ^5- series among which three compounds were identified. Cholest-5-en-3ß-ol, cholesta-5, 7-dien-3ß-ol and ergosta-5, 7, 22-trien-3-ol (3ß, 22 E). The sterols containing fraction were evaluated for anti-cancer activity against Molt-4 and MCF-7 cell lines. The results showed that this fraction is a moderate anticancer agent with the IC_{50} values of 13.0 and 11.1 µg/ml respectively. These compounds are reported for the first time from the sponge, *I.mutans* of the Persian Gulf.

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INVESTIGATION ADAPTABILITY AND YIELD OF EXTERNAL AND INTERNAL CULTIVARS OF CANNABIS (*CANNABIS SATIVA* L.)

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In order to comparison of different cannabis genotypes, this research was conducted at research institute of forests and rangelands, Alborz research complex station in 2012-2013. The experiment was conducted in the form of a randomized complete block design with three replications. The treatments were Futura 75 from Germania genotype and two populations of Isfahan and Yazd. Analysis of variance in frest year showed that plant height, stem diameter, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant and total yield had significantly difference between two genotypes. Analysis of variance in scecond year showed that plant height, stem diameter, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant and total yield had significantly difference between two genotypes. Analysis of variance in years showed that plant height, stem diameter, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant and total yield had significantly difference between two years at $P \leq 0.01$. So there was significantly difference between genotypes on plant height, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant at $P \leq 0.01$. The results of mean comparisons between years indicated that the highest plant height (155.3cm), stem diameter (2.6 cm), the number of lateral stem (39.13 number/main stem), lateral stems weight (39.34g), main stem weight (65.34g), leaf weight (39.71g), total weight of plant (144.15g) and total yield (7682.4 kg/ha)belong to ferst year. The results of mean comparisons between genotyps indicated that), stem diameter (3.14 cm) and the number of lateral stem (38.44 number/main stem) belong to Futura 75 from Germania. the highest lateral stems weight (41.17g), leaf weight (44.58g), total weight of plant (142.65g), the highest main stem weight (69.13g), and total yield (4492.6 kg/ha) achieved from populations of Isfahan.

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PROTECTIVE ROLE OF NITRIC OXIDE IN ALLEVIATING DROUGHT STRESS DAMAGE IN *OCIMUM BASILICUM* L.

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Nitric oxide (NO) is a highly reactive free radical with a wide variety of physiological implications in plants. In this research, we investigated the protective effects of exogenous Sodium Nitroprusside (SNP) as a NO donor, against the damage caused by drought stress in sweet basil (*Ocimum basilicum* L.). Plants grown in the field were treated with SNP at 0 (control) and 150 µM (three times; early flowering, mid flowering and late flowering) and different irrigation (70, 120 and 170 mm evaporation pan class A) significantly induced accumulation of hydrogen peroxide (H_2O_2) significantly increase in serious lipid peroxidation, electrolyte leakage (EL) and decreased the growth and the biomass of basil. Application of SNP before drought stress resulted in alleviated drought-induced electrolyte leakage and malondiadehyde (MDA) content and increased proline in shoots of sweet basil, compared with the control.

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INVESTIGATION EFFECT OF PLANT DISTANCES ON MORPHOLOGICAL TRAITS AND YIELD OF CANNABIS (*CANNABIS SATIVA* L.)

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In order to comparison of different cannabis genotypes, this research was conducted at research institute of forests and rangelands, Alborz research complex station in 2012-2013. The experiment was conducted in the form of a randomized complete block design with three replications. The treatments were plant distances were 50*50, 40*40, 30*35 and 20*25 cm. Analysis of variance in frest and scend year showed that effect of plant distances on plant height, stem diameter, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant and total yield had significantly difference. Analysis of variance in years showed that plant height, stem diameter, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant and total yield had significantly difference between two years at $P \leq 0.01$. The result of analysis of variance of plant distance showed that plant height, stem diameter, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant and total yield had significantly difference at $P \leq 0.01$. So analysis of variance intraction years * plant distance indicated that plant height, stem diameter, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant and total yield had significantly difference between two years at $P \leq 0.01$. The results of mean comparisons between of plant distance indicated that the highest stem diameter (3.34 cm), the number of lateral stem (39.05 number/main stem), lateral stems weight (41.02g), main stem weight (70.41g), leaf weight (46.59g), total weight of plant (157.8g) achieved from cultivated 3.6 plant/m^2. mean comparisons between of plant distance indicated that the highest total yield (5957.7 kg/ha) achieved from cultivated 20 plants/m^2. The results of mean comparisons between years * plant distance indicated that the highest total yield (17856 kg/ha) achieved from cultivated first year* 20 plants/m^2.

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EVALUATION OF ANTIBACTERIAL ACTIVITIES OF *BERBERIS VULGARIS ASPERMA* BARK EXTRACTS ON *ESCHERCHIA COLI* AND *SALMONELLA ENTERITIDIS* STANDARD STRAINS

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Although synthetic drugs and chemicals may treat illnesses to some extent, they give rise to some side effects e.g. drug resistance. Suitable alternatives are herbal medicines. The aim of this study was to evaluate the antibacterial properties of chloroform and ethanol extracts of *Berberis vulgaris asperma* bark against *Escherichia coli* and *Salmonella enteritidis* standard strains. In this study, extraction was done by using ethanol and chloroform solvents. The antibacterial properties were determined by tube double serial dilution method, and then minimum inhibitory concentration (MIC) was obtained. The present study showed that the examined species were susceptible to ethanol and chloroform extracts of the bark of this medicinal plant. 25 mg/ml and 37.5 mg/ml of the ethanol extract and 7.81 mg/ml and 3.9 mg/ml of the choloroform extract were recorded as MICs agains *E Coli* and *Salmonella enteritidis* standard strains respectively. Further studies on active ingeridents of bark ethanol and chloroform extracts of *Berberis vulgaris asperma* is suggested.[1- 3]

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COMPARISON AND THE EFFECT OF BIOLOGICAL AND CHEMICAL FERTILIZERS ON GROWTH PARAMETERS OF FENUGREEK (*TRIGONELLA FOENOM-GRAECUM*L.)

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Fenugreek is an annualherbal plant and belongs to the Fabaceaefamily. This plant is known for its use as a medicinal herb and vegetable. The seed and vegetative parts are useful in the treatment of various diseases. It also has the ability to live in symbiosis with nitrogen-fixing bacteria.Thus this plant can adsorb its nitrogenby fixing of the air nitrogen.To investigate the effects of biological and chemical fertilizers on some morphological traits and the yield of fenugreek, a field study was conducted in a randomized complete block design with five treatments and in triplicates. The treatments included Rhizobium (isolated from the root node of Fenugreek), fertile PotaBarvar-2, fertile PotaBarvar-2+rhizobium, chemical fertilizers (based on soil analysis) and the control (without fertilizer and inoculation), whose effects was assessed on the number of nodes, internode length, plant height, number of pods andthe length of the first pod. Results showed that the effect of treatments was significant on internode length, plant height, number of pods and the length of the first pod, while it was not significant on the number of nodes, at the 5% level. Applyingfertile PotaBarvar-2resulted in the maximum plant height as well as length of internodes (62.63 and 3.52 cm, respectively).The lowest height was resulted byfertile rhizobium+PotaBarvar-2 (57.04 cm) and the lowest internode length caused by the control group (2.96 cm). The largest number of pods was obtained by complete fertilizer.However, rhizobium treatment had also positively influenced the increase inthe number of pods. The maximum length of the first pod caused by thefertile rhizobium+PotaBarvar-2 (12.62 cm) and minimum length was obtainedby the control (10.52 cm). The results indicate that biological fertilizers, especially fertile PotaBarvar-2, positivelyeffectedincrease inthe growth parameters. Given that rhizobium is avoluntary coexist of Fenugreek, theresults suggested that the use of rhizobium also created desirable results. In subsequent experiments under more suitable conditions, we will probably get muchbetter results using these bio-fertilizers.

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EFFECT OF FOLIAR APPLICATION OF CHITOSAN ON GROWTH AND YIELD IN MARIGOLD (*CALENDULA OFFICINALIS* L.)

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This experiments were conducted at the field of Islamic Azad University, Shahr-e-Rey Branch, during May to August 2015, to investigate the effect of foliar application of chitosan, a growth promoter, on morphological, growth and yield attributes of marigold. The experiment comprised of four levels of chitosan concentrations viz., 0 (control), 100, 150 and 200 ppm. The chitosan was sprayed once at 40 days after sowing and twice at 40 and 60 days after sowing. The field experiment was laid out in a factorial experiment based on randomized complete block design, with three replicates. Results revealed that most of the morphological (plant height, leaf number plant), growth (total dry mass plant, absolute growth rate, relative growth rate), and yield attributes (number of flower and flower weight) were increased with increasing concentration of chitosan until 150 ppm, resulted the highest flower yield in marigold. However, the increment of plant parameters as well as flower yield was not significant from 200 ppm of chitosan. Therefore, foliar application of chitosan at 150 ppm may be used at 40 days after sowing to achieve a maximum flower yield in marigold [1, 2].

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EFFECTS OF DROUGHT STRESS ON SEED GERMINATION AND SEEDLING ANTIOXIDANT ACTIVITY OF DEGEN & DOERFLER (*SECURIGERA SECURIDACA*.L)

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In order to assessment the effect of drought stress on seed germination and antioxidant activity of Degen & Doerfler an experiment was conducted with three replications using seven osmotic potential including (0 as control), 0.2, 0.4, 0.8 1.2, 1.4, 1.6 MPa which induced by PEG 6000.The results showed that drought stress had significant effect on germination percentage, shoot length, root length, seedling length and phenol content. Phenol increased as drought stress increment. The seeds germinated well up to 1.6 MPa. The results showed that under drought stress condition, Degen & Doerfler seed has tolerance up to 1.6 MPa osmotic potential.

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DIFFERENT LOADS OF EXERCISE AND *NIGELLA SATIVA* AFFECTS RAT SEROLOGICAL AND HEMATOLOGICAL PARAMETERS

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A scientific and standard method for diagnosis and management of overtraining in athletes has not been introduced. There are many recommendations for prophylactic usage of Nigella sativa (N. sativa) for healing fatigue and body strengthening [1,2]. Therefore the effect of different loads of exercise and N. sativa treatment on serologic and hematologic parameters in rat was examined. Male Wistar rats were divided into control sedentary (C), moderate trained (MT), overtrained (OT), overtrained recovered (OR), control sedentary + N. sativa (NC), moderate trained + N. sativa (NM) and overtrained + N. sativa (NO) treatment. Animals' performances were evaluated before and during the study. Immediately, 24 h and 2 weeks (in OR) after the last bout of exercise serum concentration of corticosterone and lactate as well as total and differential WBC, RBC, Hb, Hct, corpuscular indices and platelets were also measured. Increasing training load caused a significant performance decline in OT and OR groups ($p<0.01$-$p<0.001$). Compared to control group, serum corticosterone and lactate concentrations were significantly increased after moderate exercise and overtraining ($p<0.05$ to $p<0.001$), total WBC count ($p<0.001$), lymphocytes ($p<0.01$) and monocytes ($p<0.01$) were decreased in overtraining animal. N. sativa treatment caused a significant decrease in lactate concentration in overtraining ($p<0.01$) and serum corticosterone in all exercised ($p<0.05$) compared to untreated groups. Overtraining induced chronic inflammatory like changes, performance decline, stress hormone elevation, and WBC count decrement. N. sativa administration improved corticosterone elevation and metabolic state.

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STUDY ON CHEMICAL CONSTITUENTS OF ESSENTIAL OIL OF TARRAGON CULTIVATED IN "RAY" REGION

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French Tarragon (*Artemisia dracunculus* L.) is a perennial herb in the Asteraceae family that is widely cultivated throughout the world. The herbaceous parts of this plant use as spices, seasonings, flavorings and vegetables. Flowering stems were collected. Then air-dried flowering stems of the plant were submitted to hydrodistillation using a Clevenger-type apparatus according to the method recommendation in British Pharmacopoeia. The essential oil was analyzed by combination of GC-FID and GC-MS. Nineteen compounds were identified, which represented about 99.9% of the total detected constituents. The main constituents of the essential oil were Estragole (80%), Spathulenol (4.58%), Methyleugenol (2.87%), Trans-anethole (1.66%), Caryophyllene oxide (1.54%) and Ledene oxide (1.04%) [1-3].

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EFFECT OF BACOPA MONNIERI EXTRACT ON INFLAMMATORY PAIN IN MICE

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Bacopa monniera (Brahmi), a traditional Ayurvedic medicine has been used for centuries as a memory enhancing, anti-inflammatory, analgesic, antipyretic, sedative, and anti-epileptic agent. More recently, preclinical studies have reported therapeutic effects with various extracts of B. monniera [1].The crude ethanolic leaf extract of Bacopa monnieri (L) Penn. (family: Scrophulariaceae) was evaluated for its possible analgesic activity growing in indoor aquarium. The Analgesic activity of the extract of B. monnieri was studied using injection of formalin into the hind paw in mice.The ethanolic extract of B. monnieri has effect on formalin induced pain in mice. At the dose of 500 mg/kg of body weight administered orally, the extract produced pain inhibition in test animals respectively. The results were statistically significant and was comparable to the standard drug Diclofenac Na, at a dose of 25 mg/kg weight. Bacopa monnieri, has a strong significant antinociceptive effect, which is comparable to the effect of morphine via adenosinergic, opioidergic, and adrenergic mechanisms. BM has been also reported to be effective in neuropathic pains. Additionally, it has a strong anti-inflammatory effect mediated via COX-2 inhibitory mechanism. Apart from its effect of augmenting morphine analgesia, BM also inhibits opioid-withdrawal induced hyperalgesia, and acquisition and expression of morphine tolerance [2, 3].

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INVESTIGATION OF ESSENTIAL OIL COMPOSITION OF POT MARIGOLD (*CALENDULA OFFICINALIS* L.) AT DIFFERENT CONCENTRATIONS OF CHITOSAN PRETREATMENT

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Marigold (*Calendula officinalis* L.) is a medicinal herb whose dried flower heads are used to heal wounds. In order to study the effects of different concentrations of chitosan on essential oil composition of marigold, an experiment was conducted at field of Islamic Azad University, Shahr-e-Rey Branch in 2015. Application of four chitosan concentration level (0, 100, 150 and 200 ppm) once at 40 days after sowing and twice at 40 and 60 days after sowing were compared in a factorial experiment based on a randomized complete block design with 3 replications. The results showed ($p \leq 0.05$) significant different between 12 essential oil composition of marigold (α-Cubene, Copane, Cubehen, Curyophllene, Germacreneb, AlfaAmorphene, Larixone, Grindelicacide, Fenretinlde, α-cadinol, Opi-α-muurolol and α-cadinene) [1, 2].

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ANTIBACTERIAL ACTIVITY OF LAVANDER ESSENTIAL OILS IN AMOL REGION, IRAN

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Nowadays, there is an increased interest to use essential oil of medicinal plants instead of chemicals and antibiotics to control bacterial pathogens. On the other hand, it is recommended to use herb as a supplementary medicine for medical care to reduce harmful and side effects of chemical drug. The present study was conducted to investigate antibacterial effects of lavender essential oil on *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus* and *Salmonella* in laboratory condition. Lavender, as a kind of medicinal herb, are generally known for their pharmacological effects such as anticonvulsant, sedative, antispasmodic, antifungal, analgesic and antioxidant activity. Lavander was collected from Amol region and the essential oil of its flower was extracted using Clevenger apparatus. Chemical compounds were identified by GC-MS. The major components found in flower of Lavander essential oils were 1.8-cineole, linalyl, Camphene, Linalool, α-pinene, borneol, β-pinene. Several dilutions of 1/2, 1/4, 1/8, 1/16, 1/32, 1/64 and 1/128 were prepared. Then, antibacterial activity of Lavander essential oils on Escherichia coli, *Staphylococcus aureus*, *Bacillus cereus* and *Salmonella* was determined using disk diffusion method. All in vitro testes were done triplicate. The maximum zone of growth inhibition of Escherichia coli, Staphylococcus aureus, Bacillus cereus and *Salmonella* was 28, 27, 26 and 16 mm which were achieved at dilution of 1/2, respectively. The achieved results depicted that essential oils extracted from flower of lavender have the most effects on *Escherichia coli*. It is also concluded that Lavander essential oils can be used as natural antibacterial agents against pathogenic bacteria [1,2].

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EFFECT OF CHITOSAN ON PLANT GROWTH, FLOWERING AND YIELD OF MARIGOLD

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The research was aimed at determining the influence of chitosan with different concentrations on the growth and yield of flowers of marigold cultivated in field. The plants were cultivated at the field of Islamic Azad University, Shahr-e-Rey Branch. The research results obtained have shown that chitosan is used as a biostimulator in the cultivation of marigold. Regardless of the concentration of the compound, the chitosan-treated plants had more leaves and shoots, flowered earlier and formed more flowers. The application of 100 and 150 ppm chitosan resulted highest plant growth. The highest increase in the flower yield was observed as a result of treating plants with 150 ppm chitosan [1, 2].

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EFFECT OF CULTURE MEDIUM TYPE ON SHOOT REGENERATION OF (*HYOSCYAMUS RETICULATUS* L.) FROM SHOOT-TIP EXPLANTS

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Hyoscyamus species such as *Hyoscyamus reticulatus* L. are rich sources of tropane alkaloids, mainly Hyoscyamine and scopolamine, which are used widely in medicine for their anticholinergic properties. In vitro regeneration has high potential for the production of medicinal plants with high quality of secondary metabolites. In this study, the effect of various basal culture media including, MS, 1/2MS, Modified MS and B5 supplemented with 2mg/l BA and 0.1 mg/l IAA on shoot regeneration of shoot tip explants were surveyed. All treatments were subcultured after each 3 weeks and data n percentage of explant forming shoots, shoot number per explant were collected after 9 weeks. Well-developed shoots (5 cm long) were excised from all shooted explants and maintained in the presence of cytokinin (2mg/l benzyl adenine) for 3 weeks to habituate before transferring to the rooting media comprising half or full MS salt strength free of hormone or containing 1.1 and 2.2 µM of indole-3-butyric acid (IBA) or IAA. Each of 5 shoot regenerated explants was cultured in per 7cm × 9cm-vials. Regenerated shoots were subcultured every 2 weeks on to the similar fresh rooting media for a period of 5 weeks, at the end of 5th weeks rooting rate of the regenerated shoots was recorded. ANOVA results revealed that high and low rate of shoot germination percentage (88.33 and 48.33%) was obtained in B5 and MS media respectively. although results showed that maximum shoot regeneration average (17.06 shoot per explants) were observed in B5 media fortified with 2mg/l BA and 0.1 mg/l IAA and minimum shoot regeneration average (4.28 shoot per explants) were obtained in 1/2 MS media containing 2mg/l BA and 0.1 mg/l IAA. The significant difference between rooting rate on MS and 1/2 MS media (Fig. 2), indicate that the composition of root induction medium is important in the regeneration process through organogenesis, as we observed higher rooting frequency with the same PGRs on 1/2 MS, compared to full strength MS medium. All the whole regenerated plants acclimatized well in the greenhouse and then under outdoor conditions with 90% survival rate.

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MEDICINAL AND AROMATIC PLANTS INDUSTRY IN IRAN, A SECTORIAL INNOVATION ANALYSIS

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Although main stream approach in innovation and technology management was the linear approach for decades, national innovation system changed this approach to a systemic view. Innovation was not just research, madding a prototype and the marketing line, and many other factors (social, economical, political etc) was important in NIS. Sectorial innovation system beside NIS, focus on a special sector of innovation in a country. In this article we first will identify and compare this two approaches and then will analyse the sectorial innovation system of Iran in medicinal and aromatic sector, which is one of the most important industries in the country. Finally we will give some recommendations for empowering policy making in this special sector [1-3].

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EFFECT OF FOLIAR APPLICATION OF CHITOSAN AND CHITOSAN NANOPARTICLES ON GROWTH AND FLOWER YIELD OF MARIGOLD (*CALENDULA OFFICINALIS* L.)

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The production of medicinal plants as raw material for industry must associate quality with biomass formation and, with this purpose, the application of chitosan has been studied in marigold. The objective of this study was to compare the effect of chitosan and chitosan nanoparticles on essential oil composition in marigold. The experiment was conducted in a field and the treatments consisted of doses of the chitosan (0, 100, 150 and 200 ppm) and chitosan nanoparticles (0.001 and 0.002 Eq) applied by foliar spraying once at 40 days after sowing and twice at 40 and 60 days after sowing. The experiment was arranged in a factorial based on completely randomized design, with three repetitions. The number of leaves and flower heads increased by chitosan nanoparticles at 0.002 Eq. The total dry mass and shoot dry mass showed maximum values by chitosan nanoparticles at 0.002 Eq. Plant height reached the highest values by chitosan nanoparticles at 0.002 Eq. The chitosan promoted the development of marigold. Among the tested doses, the application of 150 ppm of the chitosan is recommended for more efficient large-scale production of marigold [1,2].

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CHANGE IN ESSENTIAL OIL CONTENT AND COMPOSITION OF DIPLOID AND AUTOTERTAPLOID GENOTYPES OF *MENTHA MOZAFFARIANII*

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Mentha mozaffarianii Jamzad, is an endemic mint species from Iran. Six species and several subspecies of this genus are found in Iran, among which just M. mozaffarianii is endemic. In this research essential oil content and composition of diploid and autotetraploid (Induced by colchicine) genotypes of this species were studied. At full flowering stage, the plant samples of two genotypes with four replication were harvested and after drying, essential oil content (by Clevenger) and components (consist of 34 combinations with GC-MS apparatus) were measured. The results showed significant differences among treatments on some factors measured. Essential oil content significantly differ between diploid and tetraploid genotypes, such that oil content in diploid genotype 1.44% W/V and in tetraploid genotype 2.60% were determined (80.61% in oil content was occurred because autertraploidy). Ploidy level had significant effect on some major constituents of M. mozaffarianii. The most essential oil content that affected by ploidy including Menthone (2.48% and 5.74% in diploid and tetraploid genotypes respectively), Pulegone (12.7% and 17.6% in 2x and 4x genotypes respectively), trans-Piperitone epoxide (7.97% and 14.47% in 2x and 4x genotypes respectively) and Piperitenone (36.93% and 21.61% in 2x and 4x genotypes respectively). Also, some other content changed because autetraploidy [1, 2].

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FOLIAR APPLICATION OF CHITOSAN IMPROVES GROWTH AND YIELD IN MARIGOLD

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A field experiment were conducted in 2015 under semi-arid condition (35°30' N and 51°17' E) during the period from May to August, to investigate the effect of foliar application of chitosan (a growth promoter), on morphological, growth and yield attributes of marigold plants. The experiment comprised four levels of chitosan concentrations viz., 0 (control), 100, 150 and200 ppm. The chitosan was sprayed once at 40 days after sowing and twice at 40 and 60 days after sowing. Results revealed that foliar application of chitosan at 40 days after sowing improved the morphological (plant height, leaf number plant, leaf length and breadth, leaf area plant), physiological (total dry mass plant, absolute growth rate and harvest index) parameters and yield components thereby increased flower yield of marigold. The highest flower yield was recorded in 100 and 150 ppm of chitosan in marigold. Therefore, foliar application of chitosan at 150 ppm may be used at 40 days after sowing for getting maximum flower yield in marigold [1,2].

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TOTAL PHENOLIC, FLAVONOID CONTENT, AND ANTIOXIDANT ACTIVITY OF *CENTELLA ASIATICA* (L) URB. EXTRACTS AT DIFFERENT GROWTH STAGES

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Centella asiatica (L) Urb. (Apiaceae) is a tropical edible plant growing naturally in Southeast Asian countries and has been used in ayurvedic medicine since centuries. The preparations of the plant have been used in wound healing and memory enhancement and recorded for its proven biological effects in the monographs of European Pharmacopeia and World Health Organization. In this study, the antioxidant activity, total phenolic and flavonoid content of ethanol and aqueous ethanol extracts of Centella asiatica aerial parts in different stages of growth (pre-flowering, flowering and after-flowering) were evaluated. Antioxidant activities of the samples were determined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) method. In the DPPH test, %75 ethanol extract of Centella asiatica at the pre-flowering stage showed the highest radical scavenging activity with an IC50 value of 109.79±1.63 µg/mL, about 58% of the potency of synthetic standard butylated hydroxyanizole (BHA) as positive control (IC50 = 63.83±0.59 µg/mL). The total phenolic content of the Centella asiatica extracts was determined using the Folin-Ciocalteu reagent. Among the extracts, %75 ethanol extract at the pre-flowering stage was containing the highest amount of phenolic compounds (57.48±1.02 mg gallic acid /g dry extract). There was a significant linear correlation between antioxidant activity and total phenolic content for ethanol and aqueous ethanol extracts (R^2=0.7667 and 0.9994, respectively). Large differences in the amount of flavonoids of Centella asiatica in ethanol and aqueous ethanol extracts were detected. Ethanol extract has been found to be rich in flavonoids with a value of 75.84±0.79 (pre-flowering), 67.62±0.91 (flowering) and 86.08±0.65 (after-flowering) mg quercetin/g dry extract. The results suggest that the potent antioxidant activities are justified by the high concentration of phenolic constituents present in the extracts [1,2].

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RESPONSE OF *CALENDULA OFFICINALIS* L. PLANTS TO CHITOSAN NANOPARTICLES

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This experiment was conducted at field of Faculty of Agriculture, Islamic Azad University, Shahr-e-Rey Branch, Iran, during cropping seasons of 2015 to study the effect of foliar application of chitosan nanoparticles; (0, 0.001, and 0.002 Eq), once at 40 days after sowing and twice at 40 and 60 days after sowing on the vegetative, floral and chemical constituents of Calendula officinalis plant. The results indicated that chitosan increased most of vegetative and floral characters. However, using the different concentrations and time, significantly increased all the studied characters. Foliar application of 0.002 Eq chitosan nanoparticles at the 40 days after sowing was superior in its significant effect [1, 2].

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PROXIMATE COMPOSITION AND ANTIOXIDANT ACTIVITY OF IRANIAN BROWN ALGAE-*DICTYOTA DICTOMA*

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Marine macroalgae (seaweeds) are rich in bioactive compounds that could potentially be exploited as functional ingredients for both human and animal health applications [1-2]. For example, it has been proven that the inclusion of small amounts of algae in fish feed results in positive effects in growth performance and feed utilization efficiency [3]. This study was carried out to assess proximate and fatty acid composition of the brown macroalgae - *Dictyota dichtoma* gathered from southern coasts of Qeshm Island and antioxidant properties of its polar and nonpolar extracts. The studied algae showed high carbohydrate content (28.20±1.88% DW), protein content of 6.12±0.33% DW and low lipid composition (0.52±0.05 % DW). The ash content was 23.49±0.76 % DW and the amount of moisture was 2.37±0.13 % DW. It also has a low energy of 1489 Kcal/Kg. Palmitic acid and Stearic acid were recorded as the most abundant saturated fatty acids (SFA). Palmitoleic acid and oleic acid were the major monounsaturated fatty acids (MUFA). Linoleic acid (polyunsaturated omega-6 fatty acid) and arachidonic acid were found to be the predominant polyunsaturated fatty acids (PUFA). The hexane extract of this algae showed the highest antioxidant activity of 247.74 µg/ml in DPPH assay compared to the dichloromethane, ethyl acetate and ethanolic extracts.

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EFFECT OF IRON OXIDE NANOPARTICLES ON GROWTH AND ANTIOXIDANT ACTIVITY OF GENETICALLY TRANSFORMED ROOTS CULTURE OF *HYOSCYAMUS RETICULATUS*

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Hyoscyamus reticulatus L. is a rich source of tropane alkaloids. Recently, there has been considerable interest in the production of important secondary metabolites such as tropane alkaloids by genetically transformed roots culture because of their stable production which is often comparable to, or even greater than, plant roots [1-3]. Elicitation of secondary metabolites biosynthetic pathways by different kind of elicitors is an effective strategy to increase secondary metabolites productivity. In this research, effect of various concentrations of iron oxide nano particles (FeNPs) (0, 450, 900, 1800, and 3600 mg/l) at different exposure times (24, 48 and 72 h) on growth and antioxidant activity of H. reticulatus hairy roots were investigated. ANOVA results declared, elicitation with FeNPs has not negative effects on hairy roots growth and there were no significant differences among fresh and dry weights of treated hairy roots and control. ANOVA results showed that antioxidant activity of hairy roots significantly affected by different concentrations of FeNPs and exposure time ($P<0.01$). The highest antioxidant activity was observed in cultures exposed to 450 mg l^{-1}FeNPs for 24 and 48 h, while the lowest activity was related to the control. Activity of antioxidant enzymes including catalase, guaiacol peroxidase and ascorbate peroxidase was also increased in treated hairy roots rather than of the control (none transformed roots). Based on the results, it can be concluded that elicitation with FeNPs lead to induce an oxidative stress. Iron nano oxide is a novel effective elicitor and to the best of our knowledge, present study is the first report of its elicitation effects in hairy root cultures of medicinal plants.

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A COMPARATIVE STUDY ON ANTI- LIPIDPEROXIDATION EFFECTS OF GREEN TEA INFUSION IN CONTRAST TO VIT-E

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Lipid peroxidation (LPO) is considered as one of the most biologically an event which is relevant to free radicals chains reactions. In Fact the increase of end products of LPO resulting in free radicals formation and finally a series of fatal diseases such as malignant neoplasia of breast and rectum in human body will be developed [1]. In this regard, any free radical scavenging compound can hinder the formation of free radicals is of importance in prevention of LPO induced diseases. Vitamin E or α- Tocopherol is accounted as most potent scavenger in human and can cross the electrophilic reactions involved in free radical sequential reactions [2]. The aim of this study is to compare the potential of anti lipidperoxidation of a very known free radical scavenger namely; Vit- E, against a natural product made from green tea which is reported to have a lot of antioxidant effects. Lipid peroxidation was induced by using appropriate amounts of the herbicide papraquat (PQ) in egg yolk homogenate. Then the LPO induced by PQ was measured in accordance with Dorman `s method and using thiobarbituric acid (TBA) and also by plotting Malondialdehyde (MDA) calibration curve [3]. Afterwards, the samples of green tea infusion at concentrations ranged from 500 to 5000 µg/ml and or Vit E (3 – 17 µg/ml) were applied to egg homogenates and LPO inhibition levels were measured and compared to control. The most LPO induced by PQ was obtained at 50 ppm concentration and found to be 225. 75 µM of MDA. Green tea infusion (GTI), at concentration of 5000 µg/ml, reduced the LPO level; so that its level reached 15.95±1.45 µM of MDA. Vit- E could significantly ($P <0.001$) reduced LPO induced levels in egg yolk homogenates and reduced it to 3.73 µM of MDA. Based on this study, we can conclude that the infusion made from green tea at high concentration (5000 µg/ml) is equipotent with Vit –E in reducing the lipid peroxidation level in egg homogenates and may act the same as biologic antioxidant and have antiliperoxidation property.

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ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS OF ROSEMARY IN AMOL REGION, IRAN

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In recent years, natural products have acquired a special attention due to increasing the fact of antibiotic resistance by different bacterial species [1]. Medicinal plants can be used as a safe and effective supplementary medicine to treat persistent bacterial infections. Among the plants known for medicinal value, Rosemary plants are significantly considered for their therapeutic potentials. Rosemary essential oils demonstrate to have antibacterial, antifungal and antioxidant properties as biologically active constituents. It has long been used to treat colds, asthma, fever, cough, sinusitis and rheumatism [2]. The aim of this work was to investigate antibacterial effects of Rosmary essential oil on Escherichia coli, Staphylococcus aureus, Bacillus cereus and Salmonella. Rosemary was collected from Amol region and its essential oil was extracted using Clevenger apparatus. Chemical compounds were identified by GC-MS. Several dilutions of 1/2, 1/4, 1/8, 1/16, 1/32, 1/64 and 1/128 were prepared. Antibacterial activity of Rosemary essential oils against Escherichia coli, Staphylococcus aureus, Bacillus cereus and Salmonella were evaluated using disk diffusion method. All in vitro testes were done triplicate. The maximum zone of growth inhibition of Escherichia coli, Staphylococcus aureus, Bacillus cereus and Salmonella was 19, 22, 23 and 14 mm which were achieved at dilution of 1/2, respectively. The achieved results depicted that essential oils extracted from Rosemary have significant effects against Escherichia coli, Staphylococcus aureus and Bacillus cereus. It is also concluded that Rosemary essential oils collected from Amol region can be used as natural antibacterial agents against pathogenic bacteria.

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EXTRACT BIOCHEMICAL VARIATION AMONG 14 MENTHA LONGIFOLIA

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The genus *Mentha* consists of more than 25 species and are well known for monoterpenes like menthol, menthone, carvone and pulegone. A pot experiment was conducted to evaluate the biochemical variations among 14 *M. longifolia* ecotypes from different parts of Iran. The experiment was a Randomized complete design (RCD) with 14 treatments (ecotypes) and three replications. In this purpose, three rhizomes with 5 cm length were selected and planted in each pot. All pots were kept out side. At full flowering stage, the plant samples of all treatments were harvested and the most important extract biochemical factors such as total flavonoide, total phenolic compound, antioxidant activity (IC_{50}), and carbohydrate content were measured. Moreover, all characteristics of studied ecotypes were subjected to cluster analysis and correlation between factors was determined. The results showed significant differences among ecotypes in relation to factors measured. The highest and lowest total flavonoide (39.28 and 21.50 mg quercetin/g DW) belonged to Golmakan 1 and Esfahan-Dastjerd ecotypes, respectively. The highest phenolic compound (14.31 and 13.68 mg Gallic acid/g DW) were determined in Gorgan-Ziarat and Esfahan 3 Treatments respectively while the lowest content (6.67 mg Gallic acid/g DW) in Yasouj 2 ecotype was determined. The maximum and minimum antioxidant activity in Gorgan-Ziarat and Yasouj 2 ecotypes were measured, respectively. Also as relation to total carbohydrate, significant different were observed between ecotypes [1, 2].

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GENETICALLY EVALUATION OF JOJOBA SHRUBS (*SIMMONDSIA CHINENSIS*, CV: ARIZONA) IN KERMAN, IRAN BY MOLECULAR MARKERS

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Jojoba [*Simmondsia chinensis* (Link) *Schneider*] multipurpose plant (miracle tree) is diocious shrub, evergreen, cross pollination, native to Sonoran desert and comes from Simmondiacea family that its seed contains 50% waxy oil. In this investigation genetic diversity of 25 jojoba shrubs were studied using 5 Primer of molecular markers, RAPD in Kerman. DNA was extracted according to modified CTAB method and its quality was tested by agarose gel electrophoresis and spectropotometry.The resutls of molecular investigation by using RAPD markerwere analysed by Gene Tools, Excel and NTsys softwares and indicated a high efficncy for genetic diversity between 25 jojoba genotypes. Jojoba genotypes classified in defferent groups by clustering using Jaccard similarity coefficient that indicated high genetic diversity between studied genotypes [1-3].

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MEDICINAL HERBAL EXTRACTS USED FOR EYEBROW RECONSTRUCTION AND ITS HAIR LOSS INHIBITION

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Eyebrow is one of the most important members of the body, not to mention its health and beauty is momentous and its loss is catastrophe for people, especially youths and females Due to this anxiety, lots of efforts have been done to inhibit eyebrow's hair loss and effort to reconstruct the lost hair [1]. As topical chemical medications for treatment may cause side effects, sufferer desire to apply medicinal herbal extracts to enhance eyebrows hair growth and prevent losing and thinning. To assess the efficacy of medicinal herbal extracts -Rosmarinus officinalis, Urtica dioica, Matricaria chamomilla, Mentha Piperita and Salvia officinalis- combined Dexpanthenol (vitamins B5) and Pyridoxine (vitamin B6) in the form of cream, applied to the eyebrows in a randomized study. Subjects (n= 20) suffering from eyebrow hair loss, enrolled in the study. As the combination was in form of cream, glycolic herbal extracts with vitamins B5 and B6 was applied to each eyebrow 2 times daily for 3 months and the result was consequently examined. The primary end point was eyebrow appearance; while the other was subject-reported outcomes. Assessment showed improvement in 4 people during first month, 11 people with hair loss inhibition eyebrow treatment in 8 weeks and in remained participants significant outcomes were revealed after 3 months. All subjects were fully satisfied with eyebrow fullness, thickness, and hair loss inhibition. Results confirms hair loss inhibition by 5-α-reductase due to Urtica dioica contains β-sitosterol and ursolic acid. On the other hand, TGF-β1 and TGF-β2 transcription (these genes are involved in hair miniaturization) are decreased by Rosemarinic acid, in Rosemarinus officinalis, while Carnosic and carnosol are stimulating hair growth by blood vessel vasolidatation for more blood flow and follicle nourishment. Interestingly, azulene and coumarin in Matricaria chamomilla inhibits histamine release as an anti-inflammations and apigenin in Salvia officinalis promotes hair strengthen and thickness. Surprisingly, to conclude, mentioned Eyebrow Cream with appropriate viscosity, is a fully vitamin enriched nourishment, highly effective for eyebrow reconstruction with great moisturizing and cell metabolism increase [1].

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EFFECTS OF CHEMICAL AND BIO FERTILIZERS OF POTASSIUM ON BIOCHEMICAL TRAITS AND TOTAL SOLUBLE SUGARS IN SAFFRON

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Saffron (*Crocus sativus* L.) is traditionally used as a coloring or flavoring agent, but recent research has shown its potential to promote health. The constituents of interest include crocin, crocetin, picrocrocin, and safranal which have all demonstrated health promoting properties [1]. The application of bio-fertilizers in order to raising the quantity and quality of saffron is a positive step towards sustainable agriculture [2]. One of the problems saffron is lack of proper growth and low quality product in small corms, thus in order to study of effects of potassium fertilizer on improvement of quantitative and qualitative traits of small corm of saffron; a field experiment was conducted using factorial arrangement in RCBD with three replications in 2015, at College of Aburaihan, University of Tehran, Iran. Two corm sizes of saffron (large, 10 gr and small, 5 gr) were treated with bio-fertilizer potassium (Pota-barvar 2) with two levels 0 and 100 gr/ha and chemical fertilizer potassium sulfate at two levels 0 and 200 kg/ha before cultivation. Content of crocin, safranal and picrocrocin of saffron stigma as active substances were assayed with spectrophotometry method according to ISO protocol [3]. Total soluble sugars of saffron leaves and corms were assayed with anthrone method. Results showed that chemical fertilizer potassium had greatest impact on the percentage of sugar in leaves of small corm (13.41%) and then bio-fertilizer (13.19%) and latest integrated treatments (13.22%), in comparison with control (12.2%), respectively. But the amount of total sugar content of corm integrated treatments with (12.79%), which had not significant different with chemical fertilizer, that compared to the control treatment (12.12) showed significant differences. Results indicated that application of combined chemical and bio fertilizers led to increasing of crocin, picrocrocin and saffranal content in both corm sizes in comparison with control and applied alone treatment. Finally, this study revealed that application of combined chemical and bio fertilizers of potassium on small corms could had greatest effect on increasing quality of crocin, picrocrocin and saffranal and produce sugars in saffron leaves through improvement of photosynthesis.

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SAFFRON (*CORCUS SUTIVUS* L.) YIELD AS AFFECTED BY CHEMICAL, ORGANIC AND BIOLOGICAL FERTILIZERS

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Saffron (*Crocus sativus*) is one of the most expensive spices in the world. The aim of this study was to evaluate the economic performance of saffron in response to application of different fertilizer. The research was conducted in the field with latitude 35 degrees 55 minutes north and longitude 51 degrees 38 minutes east, and with a height of 1062 m above sea level, was conducted. The first factor consisted of different amounts of fertilizer at three levels of NPK (0, 50 and 100 percent of the recommended amount of fertilizer based on soil analysis) Second factor: the different types of non-chemical fertilizer at four levels (without fertilizer, vermicompost, bio-fertilizer PGPR containing Pseudomonas and Bacillus, Pseudomonas and Bacillus bacteria combined with vermicompost), respectively. This experiment 5 years after applying fertilizer treatments was performed. In mid-November was the first appearance of flowers and flower harvesting operations and measure performance characteristics such as wet weight, dry weight of flower and stigma and stigma. The results showed that the best economic performance-enhancing treatment was 50% chemical fertilizer + vermicompost, Treatment 100% chemical fertilizer and integrated application of 100 %chemical fertilizer with other fertilizers had low yield as the lowest yield of saffron achieved in PGPR + 100% chemical fertilizer treatment.

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ROSA DAMASCENA MILL OF IRAN, A MARKET ANALYSIS AND COMPARATIVE STUDY BETWEEN IRAN AND TURKEY

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Rosa damascene mill is one of the mail medicinal and aromatic plants of Iran. Although the mother land of this plant is Iran, there is a few studies on the market analysis and industrial uses of this strategic plant in the country. Turkey, Bulgaria, Morocco and India are other areas which this plant is cultivated. In this article we will focus on the market and industrial analysis of this plant and it's derivatives. Then we are going to present a comprehensive comparative analysis of this plant and it's derivatives between Iran and Turkey. Finally we will be able to give some industrial policy recommendations toward private and public sector of Iran for further steps of enhancing the situation [1, 2].

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PLANT GROWTH PROMOTING RHIZOBACTERIA AND *ARBUSCULAR MYCORRHIZAL* FUNGI MODULATE SECONDARY METABOLISM OF *STEVIA REBAUDIANA* THROUGH TRIGGERING OF PLANT DEFENSE REACTION

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The leaves of Stevia rebaudianaBertoni could be used not only as a source of non-caloric sweeteners but also naturally occurring antioxidants [1,2]. A green house nursery study was conducted to assess effect of interaction between arbuscularmycorrhizal (AM) fungus, Glomusintraradices and some plant growth-promoting rhizobacteria (Bacillus polymixa, Pseudomonas putida and Azotobacter chroococcum), singly and in combinationon AMF colonization, biomass, steviosideas well as total phenolic and flavonoids contents of *Stevia rebaudiana*.The highest, mycorrhizal colonization,aerial biomass and stevioside content were recorded in dual inoculated plants especially in microbial consortium consisting of Glomus + Azotobacter. Triple treatments exhibited less biomass and stevioside when compared to dual inoculations. In contrast, total phenolic and flavonoids contents of leaves as well as SA and NO content and PAL and CHS enzyme activities were enhanced further in triple treatments than single or dual inoculations. Our results at least partly suggesting, that the enhanced production of phenolic compounds in *Stevia rebaudiana* may be a result of induced systemic resistance through NO and SA signalling and promoting plant defensive reaction to fungal or bacterial colonization.

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THE STUDY OF THE EFFECT OF REPEATED HEAT STRESSES IN IN VITRO CONDITION FOR DETERMINATION OF VIABILITY ON MICROPROPAGATED *ZATARIA MULTIFLORA* BOISS

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The primary heat stress often cause the increase of plant tolerance against successive heat stresses. In this study, the intact explants of stressed plants were compared with unstressed plants to verify the effect of heat pretreatment on viability of *Z.multiflora* against successive heat stresses in in vitro condition.To measure the effect of successive heat treatment on micropropagated *Z. multiflora* shoots, one primary heat treatment at 35, 40 or 45ºC for 1h was applied to to these shoots in in vitro condition and 47 days after subculture in fresh MS medium, the second treatment was applied. The appearance, shoot generating and morphological features were verified to determine the viability rate. The results showed that the viability of samples which which unstressed primarily was the lowest and in samples that pretreated at at 45ºC was upper than the others, but the difference wasṅt significant between unpretreated and pretreated shoots at 35ºC and between pretreated shoots at 40 and 45ºC. However the shoots that pretreated at 40 and 45ºC were different from other groups significantly.The results indicated that pretreatment of heat was effective on viability and tolerance of *Z.multiflora* shoots against the successive heat stresses [1, 2].

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GENETIC VARIATION STUDY OF DIFFERENT POPULATIONS OF *ROSA DAMASCENA* IN ZANJAN PROVINCE USING RAPD MARKERS

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Damask rose (*Rosa damascena* Mill.) isbelongs to Rosaceae family and one of the most crucial medicinal plants in Iran.Genetic variation of different populations of *Rosa damascena* in Zanjan province were analysed using random amplified polymorphic DNA (RAPD) markers. This method was used to characterize the geneticdiversity among 8 Damask rose landraces of Zanjan. The 22 primers used in this study amplified 264 scorable RAPD loci among which 185 were polymorphic (69.6%). Genetic similarity calculated from the RAPD data ranged from 0.261 to 0.995 with an average of 0.63. A dendrogram was prepared on the basis of a similarity matrixusing the UPGMA algorithm and separated the 8 landraces into two groups. There was a good correspondence between genetic divergence and climate condition. The results suggested a possible application of RAPD markers in assessment of genetic diversity in *Rosa damascene* populations.

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EVALUATION SUPPLY SITUATION OF THE MEDICINAL PLANTS IN FARS PROVINCE (CASE STUDY FIROZABAD CITY)

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This research was done in order to supply situation of medicinal plants in Firozabad city. For this purpose, questionnaires related to 14 important groceries in this city were designed and completed. In this research, was examined educational status sellers, employment history, the most utilization and most low utilization medicinal plants, packaging items, place of supply medicinal plants, the percentage of collected medicinal plants from nature or cultivated plants and selling and supplying problems. A summary of the results is as follows: In terms of education, 57.16% of the sellers had university education. The most expensive medicinal plants supplied, included Saffron, Ginseng and Palm dry pollen, while Licorice (*Glycyrrhiza glabra*) and Yarrow (*Achillea wilhelmsii*) were the cheapest plants supplied. Borage (*Borago officinalis*), Chamomile (*Matricaria recutita*), Turmeric (*Curcuma longa*), Thyme (*Thymus vulgaris*) and Lavender (*Lavandula officinalis*) were the most consumed plants supplied and Ginseng and root Burdock (*Arctium*) were the lowest consumption plants. Most types of maintenance in groceries (62.5%) were plastic bowls and the lowest type of maintenance (5.35%) were wooden Containers. 92.86 percent of the sellers, had storeroom in order to maintenance their supplementary medicinal plants. All of sellers purchased needed medicinal plants from nature resource. Thyme, Chamomile, Marshmallow (*Althea* sp.) were the most important plants gathered from nature resource while Borage, Saffron and Lemon beebrush (*Lippia citriodara*) were prepared from cultivated areas.

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COMPARISON OF PHENOLIC COMPOUNDS, REDUCTANT ACTIVITY AND DPPH RADICAL ELIMINATION OF POMEGRANATE AND GRAPE SEEDS

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Many chronic diseases such as coronary heartdisease, diabetesand cancer are in direct contact with high production of free radicals in the body.Harmful effects of free radicals can be reduced by eating a diet rich in antioxidants. Plants are the most important sources of antioxidant [1]. In this study, after collecting of pomegranate and grape seeds and then drying in the shade, 90% methanol extracts were prepared by maceration.To determine antioxidant activity, Total phenolic compounds using the Folin-Ciocalteu reagent (FCR) [2], Reductant activityof seeds extractswith reduce Fe (III) to Fe (II) with use of Yen and Chen methods[3] and DPPH free radical trapping in *In Vitro*with the method has been used Yamaguchi et al. Based on the results of the tests,Total phenolic compounds of grape seeds (94.36±5.86 mg quercetin on gr extracted) is more of pomegranate seeds (10.41±0.608). Reductant activity of extracts in comparison to Vit-C standard in 800µg/ml concentration for Vit-C (1.375) and grape seeds (0.767) is more of pomegranate seeds (0.130). In concentration of 20µg/ml of extracts, percent activity of DPPH free radical trapping for pomegranate and grape seedswere evaluated 56.20±3.70 and 96.91±0.56, respectively. The findings show thatmethanol extracts of grape seeds have beenantioxidant activity stronger than pomegranate seeds and action in order to remove andtrappingof DPPH free radical is stronger by 58%.

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EFFECT OF HYDROALCOHOLIC EXTRACT OF *BERBERIS INTEGERRIMA* FRUIT ON FUNCTION AND LIVER TISSUE IN ADULT MALE RAT'S TREATMENT WITH ETHANOL

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Bereberis integerrima was identified along time ago and its medicinal properties had been expressed in different books. This plant has different chemical compounds, here is some of them : Alkaloids, antocyanidin ,various flavonides and compound like Ascorbic,α-tocopherol and β- karotene. Also nowadays consuming alcohol as a social problem had caused diseases and different disorders in human body ,specially liver disorder.The purpose of this survey is to study the effect of berberisintegerrima's fruit on serum levels in liver enzymes (ALT, AST, ALP,GGT), albumin and total protein and changes in liver tissue caused by consuming alcohol. In this study ethanol was used to induce liver damage. In this study, ethanol was used to apply liver damage.50 male Wistar rats(160-220 gr) were randomly divided into 5 groups as follows:1)Control group without any treatment,2)Positive sham group receiving 2 ml of 20% ethanol daily by gavage ,3)Negative sham group receiving berberisintegerrima dose(200 mg/kg bw) and experimental groups1 and 2 receiving 20% ethanol respectively for 21 days and in the second 28days,100mg/ kg and 200 mg/ kg doses of berberisintegerrima were prescripted ,Then blood samples,were taken to measure,liver enzyme ,Albumin and the Total protein levels. Histological section for histopathological studies of liver were provided. The results showed that changes in body and liver weight in sham groups were not significant in comparison to control groups. In enzymes like AST, ALP, GGT,ALT, Albumin and total protein in exprimental groups receiving Berberisintegerrima were significant at p≤ ./5 level in compare to positive sham group that was treated with ethanol.Histological studies shows that in the positive sham group that was treated with ethanol large areas of empty hepatocyte cells were seen, and the recovery processes were observed in the experimental groups receiving berberisintegerrima's extract. Because of having anti-oxidative compounds and more flavonord Consuming berberisintegerrima extract in (200 mg/kg) dose protects liver cell against oxidative stress caused by ethanol.

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PROTECTIVE EFFECT OF HYDROALCOHOLIC EXTRACT OF BERBERIS INTEGERRIMA FRUIT ON TESTIS FUNCTION AND TISSUE IN ADULT RAT'S TREATED WITH ETHANOL

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This herb has properties such as antioxidant,anti-inflammatory effect, reducing blood pressure, hypoglycemia, and reducing fat.Therefore, since berberis extract has antioxidant effect and acts as a reducer in metabolites of active compounds and free radicals, present study was to determine protective effect of berberis integerrima's extract on testis tissue and its functions while consuming alcohol.In this study ethanol was used to induce testis damage. 50 male Wistar rats were randomly divided into 5groups as follows:Control group without any treatment, Positive sham group which had received 2 ml of 20% ethanol daily by gavage ,Negative sham group which received berberis integerrima(200 mg/kg bw dose) and experimental groups 1 and 2 received 20% ethanol for 21 days and after28 days they received 100mg/ kg and 200 mg / kg doses of berberis integerrima ,then blood samples was taken and their testis was removed and histological studies were performed. The results of this study showed that the concentration of testosterone in the positive sham group and experimental group1 have decreased. FSH and LH hormones are also increased in the positive sham group which LH levels had significant changes. The results showed that in compare to control group, number of primary spermatocytes and spermatids in the positive sham group and experimental group1 were significantly decreased and the number of spermatogonia cell in experimental group 2 had significant increase. High concentration of testosterone has effects in division of spermatogonia. In this study alcohol has decreased testosterone levels,but by consuming berberis integerrima, testosterone had increased and this leads to a significant increase in thenumber of primary spermatocytes cells and also excessive alcohol consumption, prevent the development and maturation of sperm.This led to reduction of spermatids cells in groups consuming alcohol. Cutting out alcohol and consuming berberis integerrima can protect testis tissue.

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EFFECT OF GINGER- JUICE *ZINGIBER OFFICINALE* ON BIOCHEMICAL PARAMETERS OF BLOOD LIPIDSON RATS

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A Ginger is one of the most important and oldest spices, consisting of the prepared and sun-dried rhizomes ofZingiberofficinale (Zingiberaceae). It is cultivated in many tropical countries. It has a good commercial value and is claimed to have many medicinal uses. Because of differences in cultivation pattern, harvesting technique and climatic conditions it's commercial value differs and so also the medicinal actions and uses. It is referred by different names in the languages of different regions andcountries.Investigation of hypolipidimic effects of ginger-juice (*zingiber officinale*) in rat. Methods: Albino rats (n=10) were administered G.J at single dose (6ml/rat, p.o) as a chronic treatment over period of 30days. Effect of ginger-juice treatment was studied in rats on the following Lipid profile parameters: A.Total cholesterol B. Triglycerides C. HDL cholesterol D.LDL-cholesterol. The rats were divided into control and testgroups, each group consisting of 10 rats. Results: Thirtydays' treatment with ginger-juice in rats significantly reduced the total serum cholesterol level (143.38 ± 2.06mg/dl of control group to 104.12 ± 2.18mg/dl, $P<0.001$) and significantly increased the serum HDL-cholesterol (40.45 ± 1.39mgldl of control group to 68.23 ± 1.50mg/dl, $P<0.001$). LDL-cholesterol and triglycerides remained unaltered. It is found that ginger-juice act as hypolipidaemic agent. Conclusion: Ginger-juice reduced the serum total cholesterol which was observed rise in normal rats administered ginger-juice over period of twenty-one days.

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ANTI- INFLAMMATORY EFFECT OF METHANOLIC EXTRACT OF BEE POLLEN IN THE RAT AIR POUCH MODEL OF INFLAMMATION

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Synthetic anti-inflammatory drugs have numerous side effects [1] which give rise to research involved in identification of cheaper and safer alternatives from the natural resources. Bee pollen comes from the pollen that collects on the bodies of bees. Bee pollens are rich in flavonoid and phenolic compounds [2]. The aim of the present study was to investigate the effect of methanolic extract of bee pollen on the inflammatory parameters in a rat model for rheumatoid arthritis, namely air pouch model of inflammation. To induce air pouches, sterile air (20 ml and 10 ml) was injected subcutaneously on the back of anesthetized rats on day 0 and day 3 respectively. On day 6, inflammation was induced by injection of carrageenan into pouches. Methanolic extract of bee pollen (50, and 100 mg) were administered intra pouch at the same time as the carrageenan and then for 2 consecutive days. After 72h, the rats were sacrificed and pouch fluid was collected in order to determine exudates volume and leukocyte numbers. Pouches were dissected out and the weight determined. Bee pollen extract (100 mg/rat) reduced significantly the leukocyte accumulation in the pouch fluid ($p<0.01$), granulation tissue weight ($p<0.001$) and without any significant differences in the the volume of exudates versus the control group. The extract which was administered at a dose of 50 mg/rat did not change the inflammatory parameters except the granulation tissue weight ($p<0.01$). The study confirms that the methanol extract of bee pollen has an anti-inflammatory effect in the air pouch model of inflammation which may be related its flavonoid and phenolic compounds.

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THE EFFECT OF GOLEGHAND MAJUN® AND PSYLLIUM ON CHRONIC CONSTIPATION

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Chronic constipation is a significant condition with a prevalence rate estimated between 12% and 19% in North America [1] Chronic constipation symptom severity and quality of life are negatively correlated, Impact of Chronic constipation on the quality of some patients' lives is similar in magnitude to that of diabetes, hypertension, depression, and heart disease. The aim of this study was to compare the effects of Goleghand Majun with psyllium on chronic constipation. This study was performed on 122 patients with constipation , 33 patients in Goleghand with sugar group, 34 patients in Goleghand with honey group,30 cases in psyllium group and 25 patients in Goleghand's reproduct group and then constipation symptoms and severity after 4 and 8 weeks of treatment in both groups were measured and then collected data were compared between two groups using chi-square and Fisher exact tests. 98 patients (80.3%) were female and 24 patients (19.7%) were male with an average age of 40.9 ± 3.7 years. The results of the study showed that Goleghand with sugar 43.3% , Goleghand with honey 60.6%, psyllium 46.7% and Goleghand's reproduct 32%have beneficial effects in improving constipation severity ($P=0.06$). The Average of constipation severity decreased in Goleghand with sugar group from 16.2 to 10.7 ($p=0.007$), Goleghand with honey group from 16.6 to 9.5 ($p<0.001$), psyllium group from 13.96 to 12.43 ($p=0.843$) and in Goleghand's reproduct from 15.24 to 9.12 ($p=0.001$). The results of the study showed that Goleghand Majun have beneficial effects in improving constipation severity, but the results didn't show significant differences in constipation symptoms between the groups receiving Goleghand Majun and psyllium. Thus, Goleghand Majun is effective home remedy constipation in patients with chronic constipation.

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EFFECT OF DROUGHT STRESS ON SOME MORPHOLOGICAL, PHYSIOLOGICAL AND BIOCHEMICAL TRAITS OF MEDICINAL CANNABIS

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Notwithstanding agricultural crops that lose their quality and quantity under drought stress, medicinal plants in this condition maybe obtain higher biochemical production as better economical yield. *Cannabis sativa* L. is one of the most important medicinal plants has been cultivated throughout human history as a source of fiber, oil and food, and for its medicinal and intoxicating properties [1]. Cannabinoids were only found in Cannabis as original source of Marinol® and Sativex® to cure and improve the multiple sclerosis and cancers. Samples were collected in three replicates at early, mid and late tension under three irrigation regimes included 100% field capacity (no drought stress), 50% field capacity (moderate stress) and 30% field capacity (severe stress). The change of some morphological, physiological and biochemical traits were measured. Results showed a significant changed in all attributes measured. The highest value of THC and CBD was seen in late and early stage of stress respectively. Total antioxidant capacity, higher CAT and APX activity, maximum level of total phenol and PPO was seen in 30% FC and in late stress. The highest RWC, Chlorophyl a, Chlorophyl b and Carotenoids was seen in FC and mid stress. Plant height, stem diameter, number of leaves, leaf area and LMA was higher in FC and at late stress.

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ANTIOXIDANT AND PHYSIO-CHEMICAL PROPERTIES IN JUICES OF POMEGRANATE FRUITS

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Pomegranate (*ponica granatum* L.), a species of punicaceae, has recently become of great interest to the scientists who engage themselves in pharmaceutical, nutriogical and pharmacological research, and new drug development, due to its distinctive multiple officinal parts and multiple bioactivities such as hypolipidemic, antioxidant, antiviral, anti-neoplastic, antibacterial, anti-diabetic, anti-diarrheal, and helminthic effects [1]. The objective of this present study was to investigate the antioxidant and chemical properties of 100 various pomegranate, grown in Yazd collection. Claster analysis using 5 traits showed that genotypes divided to four main groups. Secondary metabolite such as total phenols (TPs), antioxidant capacity (AA), total anthocyanin rate (TAs), total solution solids (TSS) Percentage and also total acidity (TA). The total antocyanins content was observed in pomegranate cultivars between 15.48 mg/g and 416.60 mg/g based on Cyaniding-glucosid. The level of total phenolics was varied from 17.44 mg/g to 36.24 mg/g based on Gallic acid. The antioxidant activity of pomegranate cultivars was found between 27.54 and 63.59%. Total soluble solids ranged from 15.16 to 24.77 (°Brix) and titratable acidity ranged between 45% and 1.60% in pomegranate juices, respectively.

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FABRICATON AND CHARACTERIZATION OF *SATUREJA KHUZESTANICA* ESSENTIAL OIL NANOEMULSION CONTAINING TOCOPHERYL SUCCINATE

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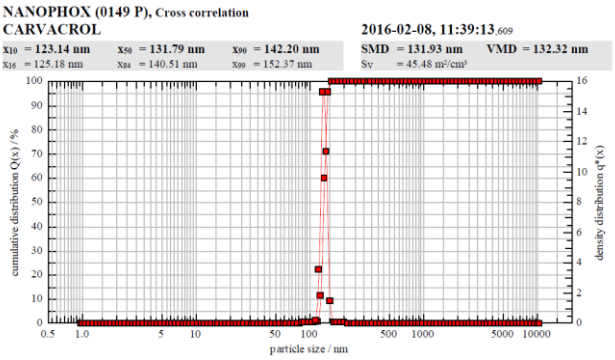
Novel therapeutic approaches have been recently developed for cancer treatment, due to the poor bioavailability of chemotherapeutic agents, like paclitaxel. Nanotechnology has offered novel delivery systems to carry bioactive compounds with low solubility to the target tissues. Nanocarriers like nanoemulsions not only improve the drug solubility, but also could play an effective role in reducing toxic side effects [1]. Among novel anticancer agents under investigation, α-tocopheryl succinate (an esterified vitamin E analogue) lacks the antioxidant activity of α-tocopherol but induced apoptosis in various human cancerous cells without any toxicity on normal cells [2]. In a recent study, α-tocopheryl succinate in addition to the pharmacological action against cancer cells could develop a drug delivery system representing cytotoxicity against melanoma cancer cells. In this study we utilized *Satureja khuzestanica* essential oil containing 80% carvacrol as a cytotoxic monoterpenoid for delivering one or more anticancer agents. Oil in water nanoemulsion containing α-tocopheryl succinate were prepared by homogenization and ultrasonication methods and then characterized by particle size analysis (Nanophox, DLS). Prepared nanoemulsion had a mean particle diameter of 133.22±3.26 nm with a narrow size distribution (PDI=0.05±0.01). The cytotoxicity of the above mentioned formulation will be examined.



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EFFECTIVE HERBS TO STOP HAIR LOSS

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Baldness refers to losing hair in all parts of the head and body or some parts of head and body. baldness could be due to many different reasons and it can manifest differently. this problem could be innate and or it can happen due to heavy attack on the immune system of the body, different types of infections,diabet , labor and disorders inTiroeed and stress. nowadays, many people are suffereing from this disease and spend much money to resolve it. to recognize the effective herbs for treating this disease in the traditional and local medicine, the following books were examined:Alabniyat an Haghayeghaladviyeh (MovafaghaldinAbou Mansour Ali Alhervi), Ferdousalhekmat , (Ali ebnTabari), Ghanun fi Teb (Aveccina), AlaghrazaltabeeatvaalMabahes al Alanaiee, Zakhire Kharazmshahi, Khafi Alayee (Seid Esmaeel Jorjani), Gharabadin Salehi (salehebn Mohammad ebn Mohammad Saleh Ghaeni Harvi), Mojarabat Farangi (Hakim Mettissaheb), EksirAzam (Hakim Mohammad Azam Khan) [1-3]. In these collections a number of herbs were proposed as the remedy for hair loss of which the following could be mentioned: True myrtle (*Myrtus communis*), Common olive (Oleaeuropea), Ailweed (*Cuscuta epithymum*), Eastern blacknut (*Juglan nigera*), Garden fennel-flower (*Nigella sativa*), Southern maidenhair (*Adiantum capillus veneris*), Rock rose (*Cistus villosus*), Lentiskpistache (*Pistacia lentiscus*), Poppy windflower (*Anemon coronaria*), Garden celery (*Apium graveolens*), ris(*Iris* SPP), Asparagus (*Asparagus officinalis*), Beet (*Beta vulgaris*).

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EFFECTIVE HERBS TO INCREASE AND DECREASE MILK

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A number of herbs could affect the milking via stimulating milking glands and either decrease or increase milk in women. also, some of the fragrant herbs could have anti-bloatproperty and when they enter into mother's milk , it can stop the baby's stomachache. to know these effective herbs in generating milk, a number of most important books in traditional medicine of Iran including:Alabniyat an Haghayeghaladviyeh (MovafaghaldinAbou Mansour Ali Alhervi), Ferdousalhekmat (Ali ebnTabari), Ghanun fi Teb (Aveccina), AlaghrazaltabeeatvaalMabahes al Alanaiee, Zakhire Kharazmshahi and Khafi Alayee (Seid Esmaeel Jorjani) [1-3]. Alhavi fi Teb (Razi), Mojarabat Farangi (Hakim Mettissaheb), remooz Azam (Hakim Mohammad AzamKhan) were studied. Theherbs that could increase milk were the following items, they were translated into their scientific names: Chaste tree (*Vitex agnus castus*), Cucumber (*Cucumis sativus*), Chichen pea (*Cicerari etinum*), Common dill (*Anethum graveolens*), Sweet basil (*Ocimum basilicum*). The herbs that could decrease excreation of milk were the following items: Common lenti (*Lens esculinaris*), Gardenlettuca (*Lactuca sativa*), Common rue (*Ruta graveolens*), Yellow sweet clover (*Melilotus officinalis*), Cumin (*Cuminum* SPP), Flaxseed plantain (*Plantago psyllium*).

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USING GARLIC (*ALIUM SATIVUM*) AS FILLETS SHELFLIFE ENHANCER IN COMMON CARP (*CYPRINUS CARPIO*)

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This study was conducted to investigate effects of dietary garlic extract on shelflife of common carp fillets. 180 fish in 6 experimental groups were fed with diets supplemented by 5 and 10% of garlic powder and 0.5, 1 and 2 % of garlic extract (in triplicates) for 56 days. After this period, the fish were captured and filleted and fish fillets were examined for shelflife at 4OC. After 12 days, the maximum psychrophile bacterial count was recorded for control group (without any garlic supplementation) ($p<0.05$). Also, total bacterial count on day 12 on control group and 5% of garlic powder was more than other groups ($p<0.05$). On day 6, maximum pH was seen in control group ($p<0.05$). Based on the results, using from 1% garlic extract is recommended for supplementation of common carp diet for increasing of fillet shellife beside of other garlic benefits. The minimum TVBN and TBA were seen on day 3 in experimental group which were fed by 1% garlic extract ($p<0.05$). Antibacterial effects of garlic extract may lead to decrease of bacterial spoilage and decreasing TBA and TVBN [1,2].

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AUTO- FLOCCULATION OF SPIRULINA PLATENSIS UNDER LIGHT STRESS FOR BIOMASS PRODUCTION

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Blue- green algae use solar energy, carbon dioxide, and minerals within the water to grow, and their growth rate is very high. *Spirulina platensis*, one of the blue-green algae among microalgae, is larger than other species of microalgae and is easily digested and absorbed in the human body. Microalgae can be separated from aqueous solution by settling after treatment with flocculants, coagulants. At the pilot or laboratory scale, this can be performed using a graduated cylinder and measuring the settling speed and final clarification of the aqueous medium. Flocculation-sedimentation is assumed to be more effective than centrifugation and gravity sealing, since it allows treating large culture volumes and does not consume much energy [1, 2]. Microalgae auto- flocculation using dissolved oxygen which is produced photosynthetically has also been studied. The auto-flocculation mechanism was described by Sukenik and Shelef who concluded that it occurs when the pH of the culture is raised [3]. In this research the light induced microalgae flocculation was studied. Microalgae concentration decreased with increasing light levels and thus the auto-flocculation was occurred. for three days culturing spirulina platensis, it was prolonged cultivation for two days under sunlight without CO_2 or air supply assists auto- flocculation of algal cells. The culture was disrupted again and coagulated particles formed. Subjected biomass production for very easy harvesting. Laboratory experiments also revealed that auto-flocculation can be simulated by increasing temperature and pH to achieve certain pH values.

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A THERMODYNAMIC MODEL FOR SUPERCRITICAL EXTRACTION OF PHARMACEUTICAL PLANT ASTABRAQ

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Fluids with temperature and pressure upper than their critical points are known as supercritical fluids. This special fluid has unique properties such as permeability similar to gases and density similar to liquids. The solubility increases with tuning of temperature and pressure. So supercritical fluids are very applicable in chemical industries for efficient extraction. In this research solubility modeling of phytol and thymol that are the main components of the pharmaceutical ingredient milkweed plant in supercritical carbon dioxide at temperature in the range of 313.15 and 318.15 and 323.15 k and pressure of 100 – 145 and 190bar were investigated and then compared with existing experimental data phytol and thymol. Thermodynamic equation of the Soave-Redlich-Kwong , Peng -Robinson looked for the first time has been evaluated . The modeling in compare with the experimental data shows that the use of supercritical carbon dioxide could be an effective method for the extraction of plant components called "Astabraq" . Peng -Robinson equation of state tertiary and Soave-Redlich-Kwong well have the abililty to model the phytol because the range of 2% to 6% AARD for phytol which is highly desirable but for the thymol this value range is between 8% to 30% of the utility model for thymol not phytol [1-3].

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HISTOPATHOLOGICAL STUDY OF PROTECTIVE EFFECT OF *CAMELLIA SINENSIS* ON NEPHROTOXICITY OF CARBON TETRACHLORIDE IN RAT

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Carbon tetrachloride is a colorless and highly toxic substance which causes liver and kidney necrosis in man and animals.*Camellia sinensis*(Teaceae)has been reported to have antioxidant properties because of its compounds [1]. Inthis study the protective effect of green tea hydro alcoholic extract on CCL_4-inducedhistopathological changes has been evaluated. The powdered arial parts of *Camellia sinensis* was macerated with methanol 80% in perculator at room temperature for 3×48 hours. Rotary evaporator was used to remove methanol 80% from the extract. The crude extract was collected in Small vials and stored in deep freeze until used in the test. Thirty male wistar rats were randomly divided into3 groups of 10 members.The first group (negative Control) received distilled water for eight weeks. Second group (positive control) received 5 ml/kg of carbon tetrachloride dissolved in olive oil(1:1).Third group (therapeutic) received 5 ml/kg of carbon tetrachloride dissolved in olive oil(1:1) and green tea extract 1.5% for eight weeks. After Of treatment period, the rats were killed and their kidneys were removed in 10% formalin solutionfor histopathology testes [2].Treatment with green tea extract significantly ($p<0.01$) reduces renal damages compared with positive control group.The results of this study indicate that *Camellia sinensis* extract has antioxidant properties that could significantly reduce damages caused byCCL_4in rat.

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AMELIORATION OF HIGH GLUCOSE-MEDIATED OXIDATIVE DAMAGE IN HEK293 CELLS BY AQUEOUS EXTRACT FRACTIONS OF *CORIANDRUM SATIVUM*

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A plethora of studies have indicated that chronic highglucose (HG) condition leads to renal cell oxidative damage. Coriandrum sativum L. has been shown to have antioxidant properties. In this study we investigated the protective effect of aqueous extract fractions of coriandrumsativumagainst high glucose (HG)-elicited oxidative damage in HEK (human embryonic kidney) cells as an in vitro model for diabetic nephropathy. The aqueous extract was fractionated with n-butanol to give n-butanol and water residue fractions. The water residue fraction was then applied to silicagel column chromatography to obtain five fractions. The water residue fraction was also fractionated with sephadex LH-20 as a stationary phase. Consequently, the water fraction isolated with sephadex LH-20 was applied to TLC and three fractions were obtained.The activity of superoxide dismutase (SOD), catalase (CAT) as well as the levelsof malondialdehyde (MDA), glutathione (GSH), intracellular reactive oxygen species (ROS), cell viability and DNA fragmentation were measured in HG-treated HEK293 cells with and without herbal extractsco-treatment.Pretreatment of HEK293 cells with the fraction (a) isolated by TLC procedure, prior to HGexposure, was associated with a marked diminution in DNA fragmentation, intracellular ROS and MDA levels. Additionally, the cell viability, GSH level, SOD andCAT activity were increased by this fraction.The results suggest that aqueous extract of coriandrumsativumhas possibly protective effects on HG-induced cytotoxicity in HEK293 cells.

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IMPROVING GAS CHROMATOGRAPHY–MASS SPECTROMETRY ANALYSIS BY MULTIVARIATE CURVE RESOLUTION: FULL IDENTIFICATION OF CO-ELUTING COMPOUNDS OF DRACOCEPHALUM MOLDAVICA

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Dracocephalum moldavica (D. moldavica), which is known as ‘‘baderashbo’’ in Persian, is an annual, a perennial herb, aromatic plant belonging to the Lamiaceae (Labiatae) family [1, 2]. Tincture of the dry herb has been used for ages in Uyghur folk medicine to treat heart disease, blood pressure, angina, tracheitis, atherosclerosis, neuralgia, migraine, and headache and toothache. Several techniques have been used to extract EOs from different parts of the aromatic plants. Also, the high sensitivity, the low limit of detection, the possibility of analyzing a great number of analytes, and identifying these using mass spectra, makes gas chromatography-mass spectrometery (GC–MS) one of the most widespread analytical techniques for nalysing the essential oils. In this study, the essential oil of D. moldavica after extraction by soxhlet, was anylized by GC-MS. Complete separation of the components of essential oils which contain tens of chemical components, are difficult to achieve even if rigorous conditions are imposed on the chromatographic separation process. This is due to the existence of some overlapping/embedded peaks even under good separation conditions. To our experience and some literatures [3], GC–MS combined with the chemometric resolution techniques is the best tool for the characterization of the components of essential oils. This study focuses on characterization of the components of Iranian D. moldavica essential oil using GC–MS. Multivariate curve resolution (MCR) approach was used to overcome the problem of background, baseline offset and overlapping/embedded peaks in GC–MS. The analysis of GC–MS data revealed that forty components exist in the D. moldavica essential oil. However, with the help of MCR this number was extended to more than forty components with concentrations higher than 0.01%, which accounts for 99.23% of the total relative content of the D. moldavica essential oil. The most important constituents of the Iranian D. moldavica are geranyl acetate (32.58%), *E*-citral (32.39%), *Z*-citral (23.54%) and neryl acetate (2.91%).

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THE ESSENTIAL OIL ANALYSIS OF *ARUM CONOPHALLOIDES* BY GC/MS

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The leaves of *Arum conophalloides* (Araceae) were used in some west areas of Iran as a desert. Composition of the essential oil , which was obtained and collected from Sahneh city (Kermanshah). After identifying, plant converted into powder and essential oil was extracted by distillation with water and then determined by GC/MS. Totally, 18 component (92% of essential oil) were identified. The results show that the essential oil contains mainly *T*-Muralol (25.4%), β-Ionone (12.6%), Nonanal (17.7%), *T*-Cadinol (8.9%), Fitone (7.9%), Methyl palmitate (7%).It should be mentioned that the chemical composition of essential oil from the herb is being reported for the first time in this research [1].

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SELECTIVE CYTOTOXIC EFFECT OF GINGER EXTRACTONCCRF-CEM TUMOR CELL LINE IN COMPARISON WITH NORMAL PERIPHERAL BLOOD MONONUCLEAR CELLS

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Acute lymphoblastic leukemia (ALL), the most common cancer diagnosed in children [1], has an overall 5-year event-free survival rate of more than 80%[2]. Nevertheless,drug resistance and side effects are known as disadvantages while using of conventional chemotherapeutic agents [2,3]. Therefore, so traditional medicine has been emerged as a safe, inexpensive, readily acceptable and accessible approach to cancer treatment. Ginger (*Zingiber officinale*) is one of the most widely used natural products consumed as a spice and medicine. Evidence of anticancer activity of ginger components in different types of cancer including breast, pancreatic, gastric, colon, colorectal, and myeloid leukemia is increasingly reported. Tumor cell selectivity is a highly desirable trait of any chemopreventive or chemotherapeutic regimen. The effects of ginger extract on CCRF-CEM tumor cell lines were previously examined. To assessthe cytotoxicity effect of ginger extract on normal cells we treated normal peripheral blood mononuclear cells (PBMNCs) with 1/8, 1/4, 1/2.85, 1/2.35,and1/2 serial dilutions of the ginger extract stock solution, which was prepared by dissolving 1µl ginger in 1ml water. After treating normal PBMNCs with the aforementioned dilutions of the ginger extract, during 72 hours, results showed that a significantly higher IC50 ($p<0.01$) is required for ginger to inhibit normal cell survival compared to the tumor cell line.

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THE EFFECT OF DIFFERENT EXTRACT ON ACTIVE SUBSTANCE DELIVERATION OF *EUCALYPTUS GLOBULUS*

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In this research, usage of different extract were studied. For this purpose, an experiment on Randomized Complete Design (RCD) with five treatments and three replication was conducted. Treatments includes different extract, T_1: water extract, T_2: Hydro-methanolic extract (30-70%), T_3: Hydro-ethanolic extract (30-70%), T_4: Hydro-hexanolic (30-70%) and T_5: Hydro acetone extract (30-70%). Some active substance on extract consist of flavone and flavenol, total flavonoide and total phenolic compound were determined. The results showed significant effect of treatment on factors measured. The maximum Flavone and Flavonols (1.54 mg quercetin/g dry weight) was determined on Hydro-acetone extract treatment while the minimum (0.07 mg quercetin/g dry weight) content was measured in Hydro-ethanolic extract treatment. The highest and lowest content of total flavonoide (4.71 and 0.18 mg quercetin/g dry weight) relation to Hydro-ethanolic and Hydro-acetone extract treatments, respectively. The highest value of total phenolic compound (9.65 mg gallic acid/ g dry weight) was observed in Hydro-acetone extract treatment whereas the lowest content (0.72 mg gallic acid/ g dry weight) belongs to Hydro-ethanolic extract treatment.

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DETERMINATION THE BEST EXTRACT FOR ACTIVE SUBSTANCE EXTRACTION OF *LIPPIA CITRIODORA*

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Genus *Lippia* belongs to Verbenaceae family that contains about 200 species from the tropics of Africa and America. Selection the extract type can be play important role on quantity and quality of secondary metabolite of medicinal plants. For this purpose, an experiment on Randomized Complete Design (RCD) with five treatments and three replication was conducted. Treatments includes different extract, T_1: water extract, T_2: Hydro-methanolic extract (30-70%), T_3: Hydro-ethanolic extract (30-70%), T_4: Hydro-hexanolic (30-70%) and T_5: Hydro acetone extract (30-70%). Some active substance on extract consist of flavone and flavenol, total flavonoide and total phenolic compound were determined. The results showed significant effect of treatment on factors measured. The maximum Flavone and Flavonols (1.62 mg quercetin/g dry weight) was determined on Hydro-hexanolic extract treatment while the minimum (0.20 mg quercetin/g dry weight) content was measured in Hydro-methanolic extract treatment. The highest and lowest content of total flavonoide (3.96 and 0.96 mg quercetin/g dry weight) relation to Hydro-hexanolic and Hydro-methanolic extract treatments, respectively. The highest value of total phenolic compound (1.51 mg gallic acid/ g dry weight) was observed in Hydro-methanolic extract treatment while the lowest content (0.89 mg gallic acid/ g dry weight) was determined to Hydro-ethanolic extract treatment.

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CYTOTOXIC ACTIVITIES OF THE ESSENTIAL OIL AND EXTRACTS OF *CUSCUTA EPITHYMUM* AND *PYRETHRUM ROSEUM*

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Cuscuta epithymum is a parasitic plant assigned to the Cuscutaceae or *Convolvulaceae* family, depending on the taxonomy. It is red-pigmented, not being photosynthetically active. It has a filiform habit, like a group of yarns. Its leaves are very small, like flakes. Its flowers, disposed in little glomerules, have a white corolla, with the androecium welded to the corolla. *Cuscuta epithymum* is a rootless, wholly parasitic plant that occurs most commonly on heather (Calluna vulgaris), gorse (Ulex europaeus) and clover (Trifolium) species. Clover dodder is native to Europe, but occurs almost worldwide. It is a member of the *Convolvulaceae* family, which includes Ipomoea and Convolvulus species, many of which are commonly known as bindweed and morning glory. Clover dodder is normally insect-pollinated, but can also self-pollinate. Clover dodder is used in traditional medicine as a purgative and to treat disorders of the liver, spleen and urinary tract. However, there has been little scientific investigation into the actual effectiveness of its use. *Cuscuta epithymum* is used to treat cancer and neurological and psychiatric diseases. *Cuscuta epithymum* plant used in traditional medicine *pyrethrum roseum* plant. This plant were collected from of Iran [1].
Cytotoxic activities of essential oil ,and 80% methanol extracts and 100% n-hexan extracts of these plants were assessed on one human cancer Molt4 cell line with the MTT assay [2]. The test results obtained, essential oil and extraction of 80% methanol and *Cuscuta epithymum* and mixing *Cuscuta epithymum* and *pyrethrum roseum* plants has been active, and can certainly were more active reported mixed, but both hexane extraction plants has been completely disabled.

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EFFECT OF NITROGEN AND PHOSPHOROUS FERTILIZERS ON GROWTH AND OIL CONTENT OF PEPPERMINT (*MENTHA PIPPERITA*)

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Peppermint (*Mentha piperita* L.) from Lamiaceae family is one of the most important Medicinal plants [1]. It used in food, sanitary and cosmetic industries [2]. A field experiment was undertaken in Sari Agricultural sciences and Natural Resources University during 2012-2013. A factorial experiment was performed based on randomized complete block design (RCBD) with four replications. Treatments were nitrogen fertilizers at four levels [0% (As control), 100,200 and 300 kg/ha Uren] and four levels of phosphorus fertilizer (0, 50,100 and 150 kg/ha p2o5). Results indicated that fresh biomass yield, plant height, dry biomass yield and fresh leaf weight, increased significantly by increasing in nitrogen levels up to 200 kg/ha. The value of fresh and biomass and essential oil yield of peppermint were significantly ($p< 0.01$) increased by increasing of phosphorous fertilizer levels till 100 kg/ha. Therefore 200 kg/ha nitrogen fertilizer and 100 kg/ha phosphorus fertilizer recommended for maximum oil and biomass production in peppermint

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IN SILICO INVESTIGATION OF HERBAL COMPOUNDSIN *PEGANUM HARMALA* AS NOVEL MAO INHIBITORS FOR NEURODEGENERATIVE DISEASES TREATMENT

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Monoamine oxidases (MAOs, EC 1.4.3.4) are a family of enzymes that catalyze the oxidative deamination of important neurotransmitters in both the central and the peripheral nervous system play a significant role in several neurodegenerative diseases like Huntington's disease, Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis and depression. MAOs contain two isoforms MAO-A and MA0-B [1].MAO inhibitors (MAOIs) like natural and traditional herbal inhibitors in botanical extracts are used for the treatment of depression and neurodegenerative syndromes.Secondary metabolitesespecially alkaloids have been investigated for their inhibition effect on MAO-A and -B. In this computational study, we investigate the inhibitory effect of harmala alkaloids in *Peganum harmala*extract by molecular docking analysis. *Peganum harmala*is well-known in Iran with several pharmacological and therapeutic effects particularly psychotropic properties because of its active alkaloids [2]. Molecular docking study ofthe most important constituents of *P. harmala*such as harmalol, harmaline, harmine, harmane, tetrahydroharmine, harmol and MOA-A (PDB ID:2Z5X) has been done using Autodock 4.2.6. The results have indicated that among these six compounds, harmine showed higher binding affinity compared to others with the lowest binding energy (-5.98kcal/mol) and the high potential effect for neuro-degenerative diseases treatment. These herbal compounds can act as MAOIs and need further experimental studies to prove this. Our findings clearly demonstrate thepotency of these herbal compounds for discovery and development of new MAO inhibitors with less toxicity and more selectivity than chemical inhibitors and prove that natural herbal compounds like *Peganum harmala*canbe effective for treatment of neurodegenerative diseases.

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IDENTIFICATION OF VOLATILE COMPONENTS FROM THE ROOT OF *ARCTIUM LAPPA*BY GC/MS

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Composition of the essential oil from the leaves of *Artium lappa* (Asterceae), which was collected from Mashhad (Farms of Agricultural School), was determined by GC/MS. Totally, 24 components (87% of essential oil) were identified. The oil contains mainly1,3-cyclooctadiene (%53.5), *E*-caryophyllene (% 7.3), β-selinene (% 6.0), 9,10-dehydro-isolongifolene (% 5.9), 7-methyl-3,4-octadiene (% 3.6) and levomenol (% 3.4). Identification of the components was based on comparison of their mass spectra with standards. The chemical composition of essential oils from the herbs is being reported for the first time in Iran. Antioxidant activity of the methanol extract of *A. lappa* root was investigated by DPPH method and was compared with rutin. It has a suitable antioxidant activity.

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ANALYSIS OF GARLIC CORM AND OLIVE LEAVES BY GC/MS

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In this project hexane extract of *Allium satium* corm, and leaf of *Olea europea* was prepared and analyzed by GC/MS. 39 components of *Allium sativum* extract were identified (75.7 % of whole components). Also 28 components of olive leaf extract were identified (74.2 % of whole components). 1,2-Benzene dicarboxylic acid, bis (2-ethyl hexyl) ester (12.1%), triacontane (5.3%), octacosane (6.6%), nonacosone (4.0%), heptacosane (4.9%), hexacosane (5.4%), tetracosane (4.3%), eicosane (6.4%), octadecadienoic acid, methyl ester (4.2%), heptadecane (6.1%) and hexadecane (4.1%) were identified as major components in *A. sativum* extract. In olive leaf, eicosane (9.0%), hentriacontane (11.9%), tritriacontane (15.3%), dotriacontane (5.0%), nonacosane (4.3%) and bis (2-ethyl hexyl) phthalate (4.0%) were major.

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

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In order to study the effect of salinity on germination stage in *Nigella sativa*, this experiment was conducted in the University of Nahavand, using a completely randomized design with three replications. Treatments included 4 levels of salinity (control, 3 dS/m, 5 dS/m, 7 dS/m), The source of salinity was prepared from Persian Gulf water. The results showed that salinity levels did not affect on germination percentage, radical and plumule length. The increase of salinity did not reduce the germination percentage and radical and plumule length significantly. Since the classification of saline soils begins from 4 dS/m, so *Nigella sativa* can be known as a tolerant plant to salinity in the germination stage.

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CURCUMIN LOADED 1,8-CINEOLE NANOEMULSIONS; PREPARATION, CHARACTERISATION AND ANTIBACTERIAL ACTIVITY

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Curcumin is a polyphenolic natural compound, extracted from the rhizomes of *Curcuma longa*. Curcuminhas attracted considerable attention due to its wide range of biological activities including anti-cancer, anti-inflammatory [1] and anti-microbial [2] effects. However, therapeutic efficacy of curcumin is limited by poor aqueous solubility,chemical instability in alkaline media,rapid metabolism and poor absorption from gastrointestinal tract.1,8-cineole also is a monoterpenoid compound with similar biological activities as curcumin which amy also act as a carrier liquid [3]. The goal of this study was to prepare a nanocarrier system for curcumin and investigate the possible sinergistic effect between 1,8-cineole and curcumin *in vitro*.Therefore, oil in water nanoemulsionsof 1,8-cineole (asoil phase) with or without curcumin were prepared using non ionic surfactants andultrasonicationtechnique.Then, the Physicochemical characteristics, stability profile and anti-bacterial activityof the above mentioned nanoemulsionswere studied.The prepared nanoemulsions had mean particle diameter ranging from 150.37 nm to ??? nm with PDI =0.05-???.The optimum preparations were stableafter centrifugation and heating–cooling cycle test without any significantchange in mean particle size. Antibacterial studiesindicated thatnanoemulsions containing curcumin - 1,8-cineole had lower MIC value compared to the blank nanoemulsion.MIC values on *staphylococcus aureus* bacterium are shown in the following table:

Nanoemulsion	MIC(1,8-cineole)	MIC(curcumin)
Blank*	>32 mg/ml	-
Curcumin – 1,8-cineole	8 mg/ml	4µg/ml

* nanoemulsion without curcumin

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FORMULATING OF CINNAMON ESSENTIAL OIL IN THE FORM OF NANOEMULSION IN ORDER TO ENHANCE ITS ANTI *H. PYLORI* ACTIVITY

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Helicobacter pylori infection is among the widespread contaminations, especially in developing countries H. pylori transmits via oral-oral and oral-fecal routes. Consequently, there is a direct correlation between society's cultural and economic class with the infection rate. There are 2 main problems in tackling H. pylori infection: 1-antibiotics degradation in stomach's low pH, and 2- bacterial resistance to antibiotics [1]. This study can be classified into three steps: 1- Isolation and purification of clinical H. pylori isolates from patients suffering from gastrointestinal disorders. 2-Generating oil in water nanoemulsion formulations containing *Cinnamomum zeylanicum* essential oil as active agent. Optimizing conditions such as HLB, surfactant concentration and type, to achieve highly stable monodispersed nanoemulsions [2]. 3-Evaluating antibacterial effect of formulated nanoemulsions against clinical strains of Helicobacter pylori and a standard E. coli strain. Our result showed that a high percentage of Iranian people are infected to antibiotic resistant H. pylori strains. However, in the case of nonresistant bacteria, cinnamon essential oil was able to inhibit H. pylori and E. coli growth. Furthermore, MIC evaluations showed that nanoemulsion formulations could decrease cinnamon essential oil's MIC value, up to 4 and 32 times in cases of H. pylori and E.coli respectively.

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WATER STRESS EFFECTS ON GROWTH AND COMPATIBLE OSMOLYTES CONTENTS OF *THYMUS VULGERIS* L. SEEDLINGS UNDER IN VITRO

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Production of medicinal plants are strongly influenced by climatic limitations such as, drought, salinity in arid and semiarid regions. Water deficit is the major abiotic factor limiting plant growth and crop productivity around the world. The present study aims to determine the effects of sorbitol and mannitol as osmotic agents on the growth parameters and compatible osmolytes contents of seedlings of *Thymus vulgeris* L**.,** an important medicinal plant in perfume and medical industry, when subjected to different levels of drought stress under *in vitro* conditions. Seedlings of *Thymus vulgeris* L. were cultured in MS medium containing 0, 2 and 4% sorbitol and mannitol, separately. After 2 weeks, the effects of drought treatments were studied on growth and proline, carbohydrate and protein contents. Growth parameters of seedlings were significantly reduced under water deficit. Nevertheless, the reduction of growth caused by mannitol was more severe. Proline and carbohydrate contents were increased under sorbitol and mannitol treatments. The highest amounts of proline and carbohydrates were observed at 6% stress level of both treatments. Overall, although water deficit stress reduced seedling growth of *Thymus vulgeris* L**.**, this was offset by an increase in proline and carbohydrate contents. Also, the amount of protein content varied in the different treatments. It seems that a part of acquisition of drought tolerance of *Thymus vulgeris* L**.** is related to the accumulation of organic osmolites such as proline, carbohydrate and changes in protein concentration [1-3].

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MEASUREMENTS OF ANTHOCYANIN, VITAMIN C AND CAROTENOIDIN PLANT EXTRACT OF SPATHE *PHOENIX DACTYLIFERA* L. (TAROONEH)

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Phoenix Dactylifera A collection of flowers in each inflorescence branches grownon a diet of dates in the series are drawn oval wooden sheath [1]. Spathe of date palm (which is called Tarooneh by Persian folk) and its aroma water is widelyused in Persian traditional medicine but according to the best of our knowledge lack is done on its chemicalcomposition or standardization of the herb for its quality control in herbal market [2]. For this purpose, this plant was collected from shoshtar North of Khuzestan.The amount of anthocyanin and carotenoidof plant extracts was measured using UV-Vis spectrophotometer [3]. Vitamin C were obtained by the AOAC's official titrimetric method (AOAC, 1990). For this purpose,the plant parts were dried at room temperatureand ground mechanically. Each part was extractedin n-hexane (Merck) for 8 h in a Soxhlet apparatusin the presence of anhydrous Na_2SO_4. The results showed that the total oil content of the plant was 6.04%, the amount of anthocyanin was 0.27μm per gr dry, and the amount of carotenoids was 0.024 mgr per gr fresh plant.Volatile constituents and preliminary pharmacognostic evaluation of Tarooneh can give some useful data for further phytochemical analysis, quality control and standardization of Tarooneh.

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EXTRACTION OF GLYCYRRHIZIC ACID FROM LICORICE ROOTS AND ITS SPONTANEOUS HYDROLYSIS TO GLYCYRRHETINIC ACID BY THE USE OF ULTRASONIC WAVES

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Nowadays, *Glycyrrhiza glabra* is widely used traditionally for its antiviral, anti-inflammatory and anti-allergic properties [1]. Two main compounds in *Glycyrrhizaglabra* are *Glycyrrhizic acid* and *Glycyrrhetinic acid* (Aglycone) [2]. Although *Glycyrrhetinic acid* is physiologically very active, a trace amount of it is present in *Glycyrrhiza glabra* [3]. We proposed a new method for extraction of *Glycyrrhizic acid* from Licorice roots and its spontaneous hydrolysis to *Glycyrrhetinic acid* by the use of ultrasonic waves. In the first step, *Glycyrrhizicacid* was extracted from licorice root. In the next step, certain amount of *Glycyrrhizic acid* was dissolved in Phosphat buffer as the aqueous phase, and chloroform was added to it as the organic phase. Both steps were performed by the help of ultrasonics. These two phases were separated by centrifuge. After evaporating both solvents, we have dissolved the sediment in methanol and performed HPLC analysis in order to evaluate our procedure yield.

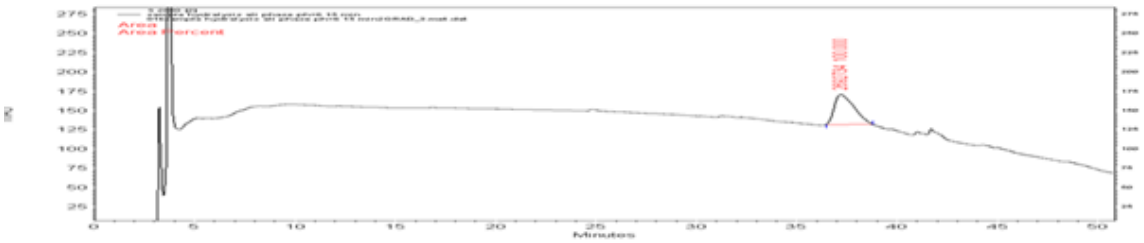

Fig 1. Chromatogram of Glycyrrhetinic acid

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THE EFFECTS OF AQUEOUS EXTRACT OF *FICUS CARICA* (FIG TREE) LEAVES ON BLOOD GLUCOSE LEVELS IN STREPTOZOTOCIN –INDUCED DIABETIC RATS

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Diabetes is the world's largest endocrine disease as the fourth leading cause of death in world associated with long term complications including retinopathy, nephropathy, neuropathy and angiopathy and several others. Given the prevalence rate of diabetes in the world and the insufficiency of adequate blood glucose-lowering drugs in the prevention and control of disease complications and side effects and decrease the effectiveness of appropriate over time, the necessity of using medicinal herbs for traditional medicine has a long history can be seen. 24 male Wistar rat randomly allocated in 4 groups. One group assigned as control and diabetes was induced by interperitoneal adminstration of Streptozocin (45-50mg/kg).One of the diabetic group assigned as diabetic control and the two others received 500 and 1000 mg/kg of aqueous extract of ficus Carcia leaves. Blood glucose was significantly reduced in two group which received different dose of aqueous extract of *ficus Carcia* leaves ($p \leq 0.05$) in comparison of the diabetic control. The treatment of diabetic rats with 1000mg/kg improved the glycemia level in comparison with 500 mg/kg. Body weight values of diabetic rat treated with mentioned dosage of aqueous extract of *ficus Carcia* leaves were similar ($p \geq 0.05$). The results have shown that aqueous extract of *ficus Carcia* leaves has anti-hyperglycemic effect may use as complementary drug in diabetic patients.

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THE EFFECTS OF AQUEOUS EXTRACT OF *FICUS CARICA* (FIG TREE) LEAVES ON LIVER ENZYMES IN STREPTOZOTOCIN INDUCED DIABETIC RATS

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Medicinal plant extracts are being increasingly utilized to treat a wide variety of clinical diseases including liver disease ischemia, reperfusion injury, atherosclerosis, acute hypertension, haemorrhagic shock, diabetes mellitus, and cancers. Various species of figs are used in traditional medicine that have been used for their medicinal benefits. Diabetes is one of the most common endocrine disorders in the world. This chronic disease is the most important source of health and socio-economic problems in the world. Medicinal herbs because of their nature are more compatible with the body and do not have chemical side effects, so long consumption of drugs and chronic diseases, seem appropriate. 24 male Wistar rat randomly allocated in 3 groups. One group assigned as normal control and diabetes was induced by interperitoneal adminstration of Streptozocin (45-50mg/kg). After 14 days the blood glucose was measured to document as diabetic groups. One of the diabetic groups assigned as diabetic control and the other received oral administration of 1000 mg/kg of aqueous extract of ficus Carcia leaves during 18 days. Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were determined by Pars-Azmoon Photometric Diagnostics kits . AST and ALT were determined as IFCC Method without adding of pyridoxal-5-phosphate. The sensitivity of the kits was 2 and 4 U/L respectively. Alkalain Phosphatase (ALP) was evaluated by DGKC method in base of P-Nitrophenol production of P-NitrophenolPhosphate by ALP. The sensitivity of the kits was 3 U/L. TruLab N and TruLab P Serum controls provided with Pars Azmoon Photometric Kit. Serum AST, ALT and ALP levels were slightly altered in sterptozocine-induced diabetic rats in comparison to normal control. However, no significant change was observed in aqueous extract of ficus Carcia leaves –treated rat in comparison to normal control but showing the protective effects of *F. carica* leave extract against changes induced in liver enzymes in diabetic rats. The present study suggests that the administration of F. carica leave extract may be useful to revert the liver enzyme activities near to normal status.

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INTRODUCTION OF MEDICINAL PLANTS OF LAMIACEAE FAMILY IN ARDABIL PROVINCE

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Ardabil province with an area of 17950 ha, is located in North West of Iran, between 37° 45´to 39° 42 ´ north latitude and 47° 30´ to 48° 55´ east longitude. The altitude range is from 16 to 4811 m above the mean sea level. The range of temperature is between -7/9 to 15/2 C°. Results showed that medicinal plants of Lamiaceae in Ardabil include 26 genera and 70 species. The important genera are *Salvia* with 14 species, *Nepeta* with 7 species and *Thymus* with 6 species. Biological forms of species include: Hemichryptophytes 62 %, Chamaephytes 20 %, Therophytes 17 % and Geophytes 1 %. From the view point of regional elements plants of This region include:: 46 % Irano-Touranian, 39 % Irano-Touranian and Europe-Siberian, 7 % Irano-Touranian and Europe-Siberian and Mediterranean, 7 % Irano-Touranian and Mediterranean, and 1% Europe-Siberian and Mediterranean.

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FIELD STUDY OF MEDICINAL PLANTS IN DEZFUL

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In Iranian traditional medicine, many herbal drugs have been used for medicinal plants. These plants have one or some of the organs that contains drug matter [2]. Since ancient times medicinal plants have been used as a source of remedies and healthcare preparations. Recently a renewed interest in medicinal plants re-emerged for restoring and maintaining health [1,3]. Medicinal plants have different groups of secondary metabolites including, Alkaloids, Flavonoids, lignin and Terpens. Medicinal herbs in Dezful region as follows: *Artemisia, Euphorbia, Astragalus, Cedrus, Linum, Foeniculum, Cichorium, Lawsonia, Plantago psyllium, lavender, Aloevera, Chamomile, Cirsium, Setaria, Peganum, Gunera* and *Salix*. To investigate the use of medicinal plants in Dezful city groceries for human consumption was conducted with more than 40 medicinal plants. Result showed that most use of medicinal plants in the city of Dezful including: *lavender* (21.42%), *Aloevera* (16.66%), *Cedrus* leaves (14.28%), *Cichorium* (9.52%), *Foeniculum* (9.52%), *Plantago psyllium* (2.38%), *Lawsonia* (2.38%), *Peganum* (2.38%), *Cirsium* (2.38%) and *Linum* (2.38%). The *lavender* was used to treat colds and respiratory infections. The composition of this plant is P-Cymene, E-Caryophyllene, α-Pinene, Sabinene, β-Pinene, Delta-3-Carene, α-Terpinene, Limonene, 1,8-Cineole, Cis-Sabinene hydrate, Terpinene-4-ol and Delta-Cadinol. *Aloevera* have effect on the wound and wound healing phenomena and reconstruction of defects created especially after surgical injury in order to prevent infections after it and rapid return to physiological function of damaged tissue. The results of this study showed that people of Dezful city little interest in the use of medicinal plants.

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THE EFFECTS OF AQUEOUS EXTRACT OF HUSK OF PLANTAGO OVATA SEED ON LIPID PROFILE IN STREPTOZOTOCIN –INDUCED DIABETIC RATS

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Hyperglycemia and hyperlipidemia are two important characters of diabetes mellitus, an endocrine disorder based disease. The researches were conducted in last few decades on plants mentioned in ancient literature or used traditionally as anti-diabetic and hypolipidemic agents. *Plantago ovata* (Psyllium) has been used traditionally for constipation, diarrhea, hemorrhoids, irritable bowel syndrome, weight loss, obesity, high cholesterol and diabetes. In this study we investigated hypolipidemic effect of aqueous extract of Plantago Ovata in streptozocine-induced diabetic rats. 30 male Wistar rat randomly allocated in 4 groups. One group assigned as normal control and diabetes was induced by interperitoneal adminstration of Streptozocin (45-50mg/kg).After 14 days the blood glucose was measured to document as diabetic groups. One of the diabetic groups assigned as diabetic control and the others received oral administration of 0.5 and 12.5 mg/kg of aqueous extract of Plantago Ovata seed during 21 days. Total cholesterol (TC) was assayed by use of cholesterol esterase in serum sample followed by cholesterol oxidase and peroxidase enzyme to developed color form choromgenic substrate .(the cholesterol oxidase-phenol+aminophenazone (CHOD PAP) kit produced by Pars Azmoon -Iran). Triglyceride (TG) was measured by use of Enzymatic Method (the glycerol-3-phosphate oxidase-phenol+aminophenazone (GPO PAP) Kit Manufactured by Pars Azmoon- Iran) in base of Lipoprotein Lipase and peroxidase activity in sample to develop colored product which assayed by photometric assay. HDL cholesterol was analyzed by sedimentary method by use of phosphotangetenic acid and magnesium for chylomicron ,LDL-C and VLDL sedimentation to exclusion. HDL-C was measured in supernatant by (CHOP-PAP Kit-Pars Azmoon- Iran). Through this method TG was measured with a sensitivity of 5 mg/dl and accuracy of 1.6%, TC with a sensitivity of 5 mg/dl and accuracy of 1%, HDL sensitivity of 1 mg/dl and accuracy of 0.81% .LDL cholesterol was calculated by the Friedewald formula. Planatgo Ovata seed extract administration significantly decreased total cholesterol, triglyceride ($p \leq 0.05$) and increased HDL in comparison to normal controls. Administration of 12.5 mg/kg of P.ovata significantly lowered lipid profile in diabetic rats in comparison to 0.5 mg/kg and diabetic controls. The results suggest that the oral administration of Plantago Ovata seed extract may induce hypolipidemic effects.

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INVESTIGATION AND IDENTIFICATION OF MEDICINAL PLANTS OF BAGHMALEK CITY IN KHUZESTAN PROVINCE

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Khuzestan Province is located in the South West of Iran. A mountainous land and flat frequency range in which they are growing medicinal plants. Medicinal plants have been increasingly used for the production of herbal drugs as a reliable alternative or supplement to the conventional medicines. Medicinal plants are rich resource of secondary metabolites which are commercially important both in traditional and modern medicine systems and there is increasingly a high demand for metabolites such as terpenoids, alkaloids, flavonoids and cannabinoids as essential ingredient of various drugs [1]. The most important medicinal herbs in Baghmalek region as follows: *Thymus pubescens*, *Melissa officinalis*, *Teucrium polium*, *Achillea millefolium*, *Ziziphora tenuior*, *Matricaria chamomilla*, *Teucrium polium*, *Peganum harmala*, *Alhagi mannifera*, *Physalis alkekengi*, *Hyssopus officinalis*, *Descurainia sophia*, *Cichorium intybus*, *Cinnamomum verum*, *Foeniculum vulgare*, *Mentha piperata*, *Althaea officinalis* and *Allium ascalonicum.* In this study, we have investigated the use of medicinal plants in Baghmalek city groceries for human consumption with more than 45 medicinal plants. Result showed that most use of medicinal plants in the city of Baghmalek including: *Thymus pubescens* (25%), *Teucrium polium* (13.63%), *Achillea millefolium* (11.36%), *Matricaria chamomilla* (9.09%), *Peganum harmala* (6.81%), *Alhagi mannifera* (6.75%), *Descurainia sophia* (4.54%), *Cinnamomum verum* (4.54%), *Mentha piperata* (2.27%), *Foeniculum vulgare* (2.25%) and *Althaea officinalis* (2.27%). The *Thymus pubescens* was used to treat colds and respiratory infections. *Thymus pubescens* is using as an anti-flatulence, digesting food, anti-spasmodic, anti-tussive, phlegm, and anti-bacteria. Thymol and carvacrolare main ingredient of essential oil of this plant. *Teucrium polium* have been used for treatmentofmany pathophysiological conditions, such as gastrointestinal disorders, inflammations, diabetes and rheumatism. *Achillea* is one of the most important genera of the Asteraceae family and different medicinal functions of *Achillea* such as spasmolytic, choleretic, treatment of wounds and anti-inflammatory activities make it as an important medicinal plant. Generally, the continuation of this process gradually leads to the development of medicinal plants in Khuzestan Province.

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THE EFFECTS OF AQUEOUS EXTRACT OF HUSK OF *PLANTAGO OVATA* SEED ON LIVER ENZYMES IN STEREPTOZOTOCIN-INDUCED DIABETES RATS

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Diabetes mellitus is a major endocrine disorder and growing health problem in most countries [1].This disease is characterized by abnormalities in the metabolism of carbohydrates, protein and fat, which leads to an increase in blood sugar. The liver and kidney failure as complications of diabetes are major cause of death in diabetic patients. Circulating concentrations of the liver transaminases: alanine aminotransferase (ALT), aspartate aminotransferase (AST) and to less extent gamma-glutamyltransferase (GGT) are commonly used as markers of liver damage. Recent findings indicate that serum levels of these enzymes are associated with multiple components of the metabolic syndrome. *Plantago ovata* (Psyllium) has been used traditionally for irritable bowel syndrome, weight loss, obesity, high cholesterol and diabetes. The study designed to investigate the effect of *Plantago Ovata* seed extract in in liver enzyme in diabetic rats diabetic rats. 28 male Wistar rat randomly allocated in 4 groups. One group assigned as normal control and diabetes was induced by interperitoneal administration of Streptozocin (45-50mg/kg). After 14 days the blood glucose was measured to document as diabetic groups. One of the diabetic groups assigned as diabetic control and the others received oral administration of 0.5 and 12.5 mg/kg of aqueous extract of Plantago Ovata seed during 21 days. Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were determined by Pars-Azmoon Photometric Diagnostics kits. AST and ALT were determined as IFCC Method without adding of pyridoxal-5-phosphate. The sensitivity of the kits was 2 and 4 U/L respectively. Alkalain Phosphatase (ALP) was evaluated by DGKC method in base of P-Nitrophenol production of P-NitrophenolPhosphate by ALP. The sensitivity of the kits was 3 U/L. TruLab N and TruLab P Serum controls provided with Pars Azmoon Photometric Kit. Plantago Ovata (25 mg/kg) slightly reduced the serum alanine aminotransferase (ALT), aspartate aminotransferase (AST) and Alkalain Phosphatase (ALP) levels in diabetic rats during 21 days when compared with diabetic and normal controls ($p \geq 0.05$). The findings suggest that the treatment with Plantago ovata seed extract in dose 25 mg/kg enhanced liver protection in diabetic rats induced by sterptozocin**.**

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THE ABILITY OF SOME MEDICINAL PLANTS EXTRACTS TO DEGRADE ZEARALENONE (AN ESTROGENIC MYCOTOXIN)

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Zearalenone (ZON) is an estrogenic mycotoxin which produced by Fusariumspecies specially *Fusarium graminearum* on some cereals crops.ZONpresents a similar structure to estrogen and therefore resulting inproblems in fertility and reproduction in human and animal [3]. ZONalso exhibits hepatotoxic, hematotoxic, immunotoxic, and genotoxic properties [1,2]. Today, to solve this problem,some natural resources such as microbial and plants metabolites areinterestinglyconsidered. For this purpose,the destructive effect of three extracts (ethanol, methanol and ethyl-acetate) from10medicinal plants(at the final concentration 2.0ng.mL^{-1}),on ZON structure (20.0 ng.mL^{-1}) was studiedincomplete randomized design with three replications. The ZON-detoxification activities were determined after 24 h incubation on an incubator shaker at 39°C and400 rpm in darkness. The ZON-content analyzed by High Performance Thin Layer Chromatography (HPTLC).The Result showed that the extracts from *Satureja khuzistanica, S. hortensis, Thymus daenensis, T. vulgar, Oreganum vulgare, Mentha piperita, Foeniculum vulgare, Lavandula angustifolia* and *Cuminum cyminum*couldn't significantly degrade ZON. However, three extracts from *Pulicaria gnaphalodes*could significantly degrade ZON by 50,46 and 34% respectively.By considering the positive effects of medicinal plants,further investigations to purify and identifyactive compounds are necessary.

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EFFECT OF DIFFERENT DOSES OF NAA (0,125, 250 AND 500 PPM) ON LAVENDER (*LAVANDULA ANGUSTIFOLIA* MILLER) ROOTING

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Lavender (*Lavandula angustifolia* Miller), as an evergreen and perennial plant, may be propagated via generative from seeds or via vegetative from soft and hard wood cuttings, or through tissue culture. In recent years, new hybrids of lavender which have been bred, do not produce seeds; so vegetative propagation from cuttings as stem is unavoidable. Propagation with stem cuttings is more rapid, simple, and cheaper than other vegetative methods. Greater uniformity (clones) and reaching maturity at an earlier age are another advantages. Even in easily rooted species, it is important to enhance rooting because small gains in rooting percentage may be of considerable economic value when the species is propagated on a commercial scale. The aim of the study was to determine the effect of NAA on rooting of lavender cuttings. The trial was established as a randomized block design with 3 replications during 2015, in greenhouse of the Agronomy Department, Faculty of Agriculture of Urmia University, Iran. At first, one stock plant was selected from a field in Urmia University Campus. Stem cuttings were taken from the stock plant. Before placing in the media the cuttings were treated with NAA (0,125, 250 and 500 ppm). According to the results the average stem height ranged 10.31-16.87 (cm); number of leaves ranged 15.7-33.9 (pcs); number of roots ranged 6.3-12.7 (pcs); the highest root height ranged 2.21-6.02 (cm); leaf fresh weight ranged 5.82-9.06 (g); stem fresh weight ranged 4.87-5.93 (g); root fresh weight ranged 0.31-0.39 (g); leaf dry weight ranged 1.65-2.75 (g); stem dry weight ranged 1.53-1.72 (g); root dry weight ranged 0.101-0.162 (g). In terms of highest root height, root weight and number of roots NAA 500 ppm; in terms of number of leaves, stem height, leaf weight and stem weight, NAA 250 ppm were the best.

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EVALUATION OF GENE EXPRESSION OF CHAVICOL - O - METHYL TRANSFERASE AND PHENYLPROPANOID COMPONENTS OF ESSENTIAL OILS IN VIOLET LANDRACE OF BASIL (*OCIMUM BASILICUM*) AT DIFFERENT TREATMENT OF CHITOSAN

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Basil (*Ocimum basilicum),* a member of a Lamiaceae family, is used in traditional Iranian medicine. Essential oils of basil leaves are composed of phenylpropanoids which are important in treatment of headaches, diarrhea, coughs, warts, worms and kidney malfunctions [1,2]. Chavicol- O- methyl transferase (CVOMT) is a key enzyme in phenylpropanoid pathway. It catalyzes the methylation of chavicol, to produce methylchavicol, which is as phenylpropanoid compound in basil. In this research, the level of phenylpropanoid compounds and the expression level of CVOMT gene was investigated at different treatment of chitosan. Three levels Chitosan were at the rates of 0.0 (CH_0) as a control, 0.2 (CH_1) and 0.4 (CH_2) gr/litr. The plants cultivated and harvested by hand at flowering stage. Phenylpropanoid compounds were identified by Gas chromatography/Mass spectrometry (GC/MS) [3] and the level of gene expression was monitored by Semi quantitative RT-PCR. Our results showed that different concentration of chitosan especially 0.4 gr/litr affecte on CVOMT gene experession and phenylpropanoid compounds contents**.** The changes observed in phenylpropanoids compound can be as a result of different levels of CVOMT gene expression at different treatment of chitosan.

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EFFECT OF JASMONIC ACID ELICITOR ON PHYSIOLOGICAL CHARACTERISTICS AND BIOLOGICAL ACTIVITY PURPLE IRANIAN BASIL UNDER DROUGHT STRESS

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Basil (*Ocimum basilicum*), a medicinal and aromatic plant of the Lamiaceae family, is used in treatment of headaches, diarrhea, coughs, warts, worms and kidney malfunctions. Drought is of the most important factors limiting the production of plants and has a significant impact on growth and development of medicinal plants. Jasmonic acid (JA) is a plant-signaling molecule that shows a wide range of plant responses, with effects at the morphological and physiological levels. The aim of this study, it was to evaluate the effects elicitor jasmonic acid on physiology properties and antioxidant activity of the extracts of purple basil under drought stress. Experimental treatments were arranged as factorial in a complete randomized design with three replications. For this purpose, the basil plants under different irrigation regimes (100, 60 and 30% field capacity) were treated with 0, 200 and 400 µL jasmonic acid. Results analysis of variance showed that different levels drought stress, jasmonic acid and interactions had significant effects on some of physiology characteristics and antioxidant activity of the extracts. Analysis of variance indicated that Chl a, b and cartenoides significantly decreased and proline and soluble sugars and antioxidant activity of the extracts increased under water deficit and elicitor jasmonic acid in concentration 400 µl. Since drought is a distinguishing feature of Iran and there is no escape from this natural and unchangeable phenomenon and on the other hands, consumption of energy resources (water and food) are increasingly in society increases, therefore, in order to combat and reduce damage water shortage, the use of elicitors such as jasmonic acid as a material reducing stress in basil, is important.

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EFFECT OF CHITOSAN ON MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERISTICS GREEN BASIL (*OCIMUM BASILICUM*) UNDER REDUCED IRRIGATION

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Plants show morphological and physiological responses to microbial, physical or chemical factors which are known as elicitors. Chitosan is a natural biopolymer modified from chitin, which is the main structural component of squid pens, cell walls of some fungi and crab shells. Water deficit stress is one of the most important abiotic stresses that affects plant physiological and morphological traits. To evaluate the effect of chitosan on morphology and physiology characteristics of green basil under different irrigation regimes, an experiment was conducted at Shahrekord, southwestern Iran. Treatments comprised control, 0.0, 0.2, and 0.4 g l^{-1} chitosan applied to plants under normal irrigation, and slight and mild drought stress. Drought stress decreased the content of photosynthetic pigments and growth parameters. Foliar-applied chitosan, in particular 0.4 g l^{-1} increased plant growth under stressed or non-stressed conditions compared with untreated plants. In conclusion, it is suggested that chitosan could be used to reduce the harmful effect of water deficit on the growth of basil plants [1-3].

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ANTIBACTERIAL EFFECTS OF *MYRTUS COMMUNIS* EXTRACTS AGAINST ACINTOBACTER BAUMANII ISOLATED FROM PATIENTS IN ICU

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Due to an increase in UTI bacterial infections rate, it requires an urgent need for the cure. Also today, enhancing resistance to antibiotics (which is a serious problem) needs new resources to eliminate the cause of this disease. Although antibiotics are the first line treatment for *Acintobacter baumanii* infections, the long-term use of antibiotics may have many various side effects. Therefore, an alternative treatment based on natural products is required. *Myrtus communis*is a useful herb with an antibacterial effect that has synergistic effect with many antibiotics. The aim of this survey was to investigate *in-vitro* antibacterial activity of *M. communis* methanol, ethyl acetate and chloroform extracts against *A. baumanii* isolated from hospitalized patients in ICU. Antibacterial effects of ethyl acetate, chloroform and methanol extracts were determined by micro-broth dilution method. The results of Ethyl acetate extract of *M. communis* exhibited that out of 40 isolates investigated 25 isolates (62.5%) were inhibited in MIC=400mg and 5 isolates (12.5%) were inhibited in MIC=200 mg, 5 isolates (12.5%) were inhibited in MIC=100 mg and 5 isolates (12.5 %) were inhibited in MIC=50mg. The results of methanol extract of *M. communis* exhibited that out of 40 isolates investigated 20 isolates (50%) were inhibited in MIC=400mg and 11 isolates (27.5%) were inhibited in MIC=200mg, 5 isolates (12.5%) were inhibited in MIC=100mg and 4 isolates (10%) were inhibited in MIC=50 mg. The results of chloroform extract of *M. communis* exhibited that out of 40 isolates investigated 25 isolates (62.5%) were inhibited in MIC=400mg and 6 isolates (15%) were inhibited in MIC=200 mg, 5 isolates (12.5%) were inhibited in MIC=100 mg and 4 isolates (10%) were inhibited in MIC=50 mg.

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THE EFFECT OF *MENTHA LONGIFOLIA* ON BLOOD LIPIDS

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One of usual medical procedure for prevention of cardiovascular diseases is using lipid lowering agents. Despite the side effects of these drugs, finding the plants with the same effect will be useful. The purpose of this study was to compare the effect of alcoholic extract of *Mentha longifolia* with lavostatin on blood lipid profile. In this experimental study, 36 adult male Wistar rats (170-185 gr) were used. The rats were randomly divided into 6 groups of 6. Group one, two, three, four, five and six were fed with normal diet, high cholesterol diet (%5 cholesterol+0.5% olive oil), high-cholesterol diet with lovastatin (10 mg/kg), high-cholesterol diet with alcoholic extract of *M. longifolia* (50mg/kg), high-cholesterol diet with alcoholic extract of *M. longifolia* (100mg/kg) and high-cholesterol diet plus alcoholic extract of *M. longifolia* (250mg/kg) respectively for one month by gavage method. Cholesterol serum concentration, LDL, TG, HDL and CHO/HDL, LDL/HDL were measured and compared for each animal to determine the blood lipid profile. The results of this study showed that using alcoholic extract of *M. longifolia* (100 mg/kg) in compared to group two (73.65±1.33 vs. 88.36±1.00) caused a significant decrease in the serum level of cholesterol ($p<0.05$), TG (71.63±1.47 vs. 86.91±1.9) ($p<0.05$), LDL (20.76±1.86 vs. 43.55±1.29) ($p<0.05$), CHO/HDL (2.07±0.05 vs. 2.97±0.12) ($p<0.05$) and LDL/HDL (0.58±0.05 vs. 1.46±0.03) ($p<0.05$) while there was a significant increase in HDL level (35.43±0.90 vs. 29.75±1.44) ($p<0.05$). According to the results of this study, alcoholic extract of *M. longifolia* not only improved lipid profile but also like lovastatin could lower blood lipids level.

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THE ANALYSIS OF ESSENTIAL OIL OF *ADIANTUM CAPILLUS-VENERIS* AND THE ANTIBACTERIAL EFFECT OF ITS EXTRACT ON MRSA

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Effect of chemical antimicrobial compounds has encouraged researches to focus on alternative drugs. Investigation about plant originated compounds with antibiotic properties has been high lighted the present study was to investigate the antibacterial effects of total extract and different fractions of the *A. capillus-veneris* against methicillin resistance *Staphylococus aureus*. The global increasing of drug resistance of factious agent as well as serious sides *Adiantum capillus-veneris* was purchased from grocery in Tehran. It was scientifically authenticated and total extract and chloroform, methanol and etheric fractions were prepared using maceration method. Standard agar diffusion method was used to evaluate the antimicrobial activity of the extract and fractions against bacterial strains. Antibacterial activity was not defined as the diameter varage of inhibition zone following incubation time. In this study, chemical composition of essential oil of *A. capillus-veneris* was analyzed quantitively and qualitivly for the first time. The essential oil was analyzed by GC/MS. 13 compounds were identified. The major components in essential oil were Phytol (59.9%), *p*-menth-4(8)-en-3-one (8%) and nonanal (8%). This study was done for the first time.

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EFFECTS OF ORGANIC MANURE AND NITROGEN FERTILIZER ON SOME GROWTH TRAITS OF MEDICAL PLANTS OF BALANGU SHIRAZI (*LLALEMANTIA ROYLEANA*)

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Due to lack of efficient use of medicinal plants cultivation and medical care in recent years has provided an opportunity to use valuable medicinal plant as Balangu. However, chemical fertilizers and manure by increasing the nitrogen content increases the chlorophyll has been followed by greenness, ability to absorb sunlight, photosynthesis and the production of plant growth and yield will increase The trial was an opportunity to evaluate the effects of different rates of manure and chemical fertilizers on chlorophyll content of medicinal plants Balangu Shirazi trial randomized complete block design with three replications in research farm control of both fertilizer livestock at four levels (0, 10, 20 and 30 tons per hectare) and nitrogen fertilizer (0, 60, 120 and 180 kg per hectare) to be implemented in the spring of 1391. The results of data analysis showed that the organic fertilizers for fresh weight and dry root weight to 5% for other traits was a significant percentage.The effect of nitrogen fertilizer for all traits was a significant at 1% percentage. Most of the fresh weight of root, root, leaf dry weight, respectively, with an average of 0/25, 0/27, 0/7, 0/13, 22/5,22/5,21/8, 3/6 and 3/9 gram of 180 and 120 kg per hectare to 30 tonnes per hectare of fertilizer and manure, and in order to the highest number of branches, number of flowers per branch and the number of flowers per plant with an average of 7/58, 8/63, 9/386, 406/461, 96/06 and 102/86 belongs to organic fertilizers 30 tons per hectare and 180 kg of fertilizer per hectare and the lowest values in all traits was given control [1, 2].

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ANTIBACTERIAL EFFECTS OF *ZATARIA MULTIFLORA* EXTRACTS AGAINST *ACINTOBACTER BAUMANII ISOLATED* FROM PATIENTS IN ICU

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Due to an increase in UTI bacterial infections rate, it requires an urgent need for the cure. Also today, enhancing resistance to antibiotics (which is a serious problem) needs new resources to eliminate the cause of this disease. Although antibiotics are the first line treatment for *Acintobacter baumanii* infections, the long-term use of antibiotics may have many various side effects. Therefore, an alternative treatment based on natural products is required. *Zataria multiflora* is a useful herb with an antibacterial effect that has synergistic effect with many antibiotics. The aim of this survey was to investigate *in-vitro* antibacterial activity of *Z. multiflora* methanol, ethyl acetate and chloroform extracts against *A. baumanii* isolated from hospitalized patients in ICU. Antibacterial effects of extracts were determined by micro-broth dilution method. The results of ethyl acetate extract of *Z. multiflora* exhibited that out of 40 isolates investigated 3 isolates (7.5%) were inhibited in MIC=400 mg and 20 isolates (50%) were inhibited in MIC=200mg, 10 isolates (25%) were inhibited in MIC=100mg and 7 isolates (17.5%) were inhibited in MIC=50mg. The results of methanol extract of *Z. multiflora* exhibited that out of 40 isolates investigated 14 isolates (35%) were inhibited in MIC=400mg and 15 isolates (37.5%) were inhibited in MIC=200mg,7 isolates (17.5%) were inhibited in MIC=100 mg and 4 isolates (10%) were inhibited in MIC=50 mg and the results of chloroform extract of *Z. multiflora* exhibited that out of 40 isolates investigated 6 isolates (15%) were inhibited in MIC=400mg and 9 isolates (22.5%) were inhibited in MIC=200mg, 18 isolates (45%) were inhibited in MIC=100 mg and 7 isolates (17.5%) were inhibited in MIC=50mg.
After all, we totally conclude that extract of *Z. multiflora* have good antibacterial effects on *A. baumanii* and we can use it instead of antibiotics and produce the production of *Z. multiflora* and use it as a drug in market.

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ISOLATION AND IDENTIFICATION OF VOLATILE COMPONENTS FROM THE LEAVES (MALE AND FEMALE) AND SEEDS OF *CANNABIS SATIVA* BY GC/MS

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Leaves and seeds of *Cannabis sativa* (Cannabinaceae) were collected from farms of Agricultural School (Ferdowsi University), Mashhad, Iran, in September 2015. Composition of the essential oils were identified by GC/MS Totally 17, 56 and 60 components (99.3%, 97.4% and 97% of oils) were identified in seeds, leaves (Female) and leaves (Male), respectively. Identification of components were based on comparison of mass spectra with stansards. *E*-caryophyllene was as major component in seed (24.9%), female leaves (15.5%) and male leaves (19.8%). Other major components of seed oil were α-humulene (8.2%), α-bisabolol (7.2%) and *E*-β-farnesene (6.4%). The major components in female leaves were α-bisabolol (9.0%), Phytol (5.7%) and α-humulene (5.1%) and in male leaves were α-bisabolol (9.3%), α-humulene (6.3%) and *E*-β-farnesene (4.8%).

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EVALUATION OF ANTI-SEIZURE, ANTI-ANXIETY, HYPNOTIC AND AMNESTIC EFFECTS OF *THYMUS KOTSCHYANUS* HYDROALCOHOLIC EXTRACT USING EXPERIMENTAL MODELS

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Psychiatric and neurologic disorders are growing problems of living in urban and industrialized societies. The prevalence of these disorders have a direct effect on the quality of people's lives and have multiple undesirable effects on society. Problems such as anxiety disorders, sleep problems, memory impairment and seizures are examples of such disorders. Although there are several medicines to treat these disorders, unfortunately they have limited efficacy and show adverse drug unwanted effects. In these study we evaluated the hypnotic, anti-epileptic anti-anxiety and amnestic effect of hydro-alcoholic extracts of *Thymus kotschyanus* using pentobarbital induced sleeping tes, PTZ, MES, Elevated plus maze (EPM), open field and passive avoidance tests. Hydroalcoholic extract of the plant was administered IP into the maleNMRI mice. In each experiment, the effects of different doses (50, 200, 400 and 600 mg/kg) of the extract were compared to the control groups. The extract at a dose of 200 mg/kg showed significant anti-anxiety effects in EPM test and at a dose of 400 and 600 mg/kg it showed hypnotic and anti-seizure effects. In the passive avoidance test the extract at doses 200-600mg/kg showed no significant effects on learning and memory. Results of this study indicate that the extract has anti-anxiety, anti-siezure and hypnotic effects, the active component and toxicity of the hydro-alcoholic extract of *T. kotschyanus*.

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EFFECT OF GARLIC CORM AND OLIVE LEAVES EXTRACTS AND THEIR COMBINED ON β-LACTAMASE-PRODUCED *ESCHERISCHIA COLI* AND *KLEBSIELLA PEUNOMONIAE*

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The control measure of infection disease have been affected largely by high prevalence if antibiotic resistance throughout the world and it treats the human living. Medicinal plants have been concered as the useful alternatives since they are partially without side effects. That is why they have been focused by researchers during recent decades. In the present project, the analyze of garlic and olive leaf extracts and antibacterial effects of them against β-lactamase-producing *Eschrishia coli* and *Klebsiella pheumoniae* have been tested. Clinical samples containing strains of *E. coli* and *K. pneumonia* that cultured in plate were prepared and kept in fridge until microbial tests. Different concentrations of each plants extracts was prepared with DMSO and their MIC & MBC results was obtained with the method of both micro dilution also antimicrobial effect of them was tested with 2 method of disk diffusion and well diffiusion. MIC and MBC results of both extracts was obtained separately and mixed by studying them can conclude that olive leaf extracts expresses stronger inhibitory effect than garlic that with mean MIC of 56.25 mg/ml can inhibite groth of ESBL *E. coli* and with mean MIC of 73.21 mg/ml can inhibite growth ESBL Kleb. Also mixture of garlic and olive leaf extracts have synergism effect that inhibit growth of ESBL *E. coli* and *K. pneumoniane* stronger than 2 previous conditions with mean MIC of 26.8 and 33.4 mg/mL. By analyzing antimicrobial effect of extracts with disk diffusion methodcan resulted that methanol extracts of olive leaf express stronger inhibition effect that can inhibite growth of ESBL *E. coli* with concentration of 200 mg/ml and mean inhibition zone of 13 mm. This extract also have stronger inhibition effect on ESBL *K. pneumonia* with concentration of 400 mg/ml. Mixture of both plants extracts have synergism effect that inhibit growth of ESBL *E. coli* and *K. pneumoniae* stronger than 2 previous conditions with concentration of 100 and 200 mg/ml and mean inhibition zone of 13.6 and 15.4 mm. Mixture of both plants extracts have synergism effect that inhibit growth of ESBL *E. coli* and *K. pneumonia* stronger than 2 previous conditions with concentration of 100 and 200 mg/ml and mean inhibition zone of 15.1 and 16.5 mm.
Finally we resulted that there is possible to control some antibiotic resistance species with herbal extracts. Furthermore it was found that mixture of both extracts have synergism effect and antimicrobial effect is intensified.

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THE STUDY OF EFFECT OF SALICYLIC ACID AND DROUGHT STRESS ON THE GROWTH AND SOME PHYSIOLOGICAL TRAITS OF (*CORIANDRUM SATIVUM* L.) MEDICINAL PLANTS

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In order to investigate effect of drought stress and salicylic acid on growth and some of the physiological traits of (*Coriandrum sativum* L.) medical plants a pot study was conducted. A randomized complete design with four replications was used. Treatment consist of three levels of irrigation [FC (control), 2/3 FC (mild drought stress) and 1/3 FC (severe drought stress)] and three levels salicylic acid (0, 1 and 2 Mm) was sprayed on the leaves. During vegetative growth, stem and root length, leaf area, plant dry and fresh weight, relative water content (RWC), electrolyte leakage, proline, total chlorophyll, photosynthesis, and stomatal conductance were measured. Rsults showed that drought stress reduced stem length, leaf area, plant dry and fresh weight, relative water content, total chlorophyll, photosynthesis and stomatal conductance but increased root length, leaf electrolyte leakage and proline. salicylic acid increased stem and root length, leaf area, plant dry and fresh weight, relative water content, proline, total chlorophyll, photosynthesis, and stomatal conductance but decreased electrolyte leakage in (*Coriandrum sativum* L.) medical plants. Interaction effect of drought stress and salicylic acid has a significant effect on plant fresh weight, relative water content, proline, total chlorophyll and photosynthesis [1,2].

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THE EFFECT OF PLANTING DATE AND GENOTYPE ON GROWTH PARAMETERS, YIELD CHARACTERISTICS, ANTHOCYANIN AND MUCILAGE CONTENTS *MALVA SYLVESTRIS*

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Malva sylvestris L., known as common mallow, is native to Europe, North Africa and Asia. In the Mediterranean region, this species has a long history of use as food, and due to its therapeutic relevance, some parts of this plant have been employed in traditional and ethnoveterinary medicines. To study the effect of planting date and genotype on growth, yield and some quality parameters like anthocyanins and mucilage contents, a factorial experiment besed on Randomized Complete Block Design with three replications was used in two years of 2013-2014 and 2014-2015. Factors included of seven planting dates (4 fall planting : 11 September, 23 September, 7 October, 23 October and 3 spring planting :6 March, 4 April and 5 May) and two genotypes (*Malva sylvestris* L. and *Malva sylvestris var mauritania*). The highest fresh weight and dry of flower, number flowers and number of flowering branches per plant was observed in planting date of 11 September in Iranian Mallow and the highest fresh and dry weight of flower, number flowers and number of flowering branches per plant was observed in planting date of 7 October in *Malva sylvestris var mauritania*. The highest percentage of mucilage obtained in planting date on 11 September for two genotypes of *Malva sylvestisis* and *Malva sylvestris var mauritania* and the highest amounts of anthocyanins were obatained for *Malva sylvestris* in planting date in 6 March and for *Malva sylvestris var mauritania* in planting date on 5 May respectivly [1].

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STUDY ON SUITABLE SEED MOISTURE, STORAGE TEMPERATURE AND PACKAGING MATERIALS OF CHAMOMILE (*MATRICARIA CHAMOMILL*A.)

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Chamomile *(Matricaria Chamomilla.)* is annual plant of the composita family, which is grown in many parts of Iran. In order to determine the best storage condition to maintain maximum viability of the chamomile seeds and best seed packaging material, this factorial experiment in a completely randomized design was carried out and six levels of time storage (30, 60, 90,120,150 and 180 days) five level of seed moisture (5, 7, 9, 11, 13%), four level of temperature (10, 15, 20 and 25ºC) and 2 packaging material (aluminum and nano) were studied. The results showed that with increasing duration of storage with high temperatures and humidity seed germination was reduced but reduction was lower in nano packaging than aluminum. Generally at most levels of temperature and moisture nano was better than aluminium. At 25º C germination in both 5 and 7 precent of humidity was 95% in first months of storage and after 6 months reduced only one precent. It seems that a low level of humidity is to neutralize the negative impact of rising temperatures. At 25º C and 9 precent of humidity germination in both packaging material (aluminum and nano) were 84 in first months of storage and after 6 months reduced to 55% in nano and 51% in aluminum. At 25º C and 13 precent of humidity germination in both packaging material (aluminum and nano) were 80% in first months of storage and after 6 months reduced to 42% in nano and 30% in aluminum [1-3].

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YIELD AND YIELD COMPONENTS VARIATION BETWEEN DIFFERENT LANDRACES OF BLACK CUMIN (*NIGELLA SATIVA* L.) IN IRAN

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Black cumin (*Nigella sativa* L.) is an annual medicinal plant belonging to the buttercup family (Ranunculaceae). It is native to Europe, Middle East and Western Asia and growing prolifically in hot and dry climates. This plant is cultivated by farmers in local farms in different regions of Iran. A lot of medicinal properties of this plant like anthelmintic, antiviral, antibacterial, antipyretic, galactogogue, carminative and blood sugar lowering effects is reported. To study the variation in yield and yield components of this plant, different landraces are collected from different parts of the country, and cultivated in a Randomized Complete Block Design at the research field of Seed and Plant Certification and Registrantion Institute in three replications in year of 2014-2015. Yield and yield components were monitored and recorded. It was a significance different in seed yield (g/m^2), biological yield (g/m^2), dry matter (g/pl), seed weight (g/pl), capsule number and capsule weight between diferent landraces. The results showed that the highest yield components like length and diameter of capsules (mm), capsule weight (g), seed number in capsules, capsule number per plant, seed weight (g/pl) , dry weight (g/pl), biological yield, weight of 1000 seeds and seed yield was recorded for the landrace of Hamedan [1,2].

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PHENOLICS AND CAROTENOIDS OF *CROCUS SATIVUS* LEAVES, TREATED WITH MAGNETIC WATER

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Crocus sativus L., commonly known as saffron, is a perennial stemless herb of the Iridaceae. Saffron has been used as a very important medicine plant around the world because of its anticancer properties, mainly attributed to stigma pigments. A few studies however have been dedicated to the pharmaceutical importance and application of vegetative plant organs. Beside carotenoids, phenolic compounds are of major components of leaves which have not been studied widely [1, 2]. The content of phenolic compounds in plants seems to be conditional, being affected by the physic-chemical characteristics of the soil. The present research was conducted in order to study the effects of magnetically-treated water on the contents of leaf phenolic compounds of saffron. The plants in their vegetative growth phase were irrigated with either magnetically-treated or tap water (as control). The activity of phenylalanine ammonialyase (PAL), the key enzyme in phenyl propanoides metabolism, and the contents of phenolic acids and flavonoids, and picrocrocin were evaluated by HPLC [3]. Based on the results irrigation of saffron plants with magnetically-treated water remarkably increased the activity of PAL (ca. two folds of the control). The contents of caffeic acid and cinnamic acid however, significantly decreased by magnetically-treated water. The treatment had no significant effect on rutin, quercetin, ferulic acid, gallic acid, and benzoic acid. The content of picrocrocin however, significantly increased by magnetically-treated water, compared with the control group. Regard to the fact that saffron leaves are used for feeding of domestic animals, these changes might be important in animal food chain.

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A STUDY ON THE ADAPTATION AND EFFECT OF DIFFERENT SULFUR CONCENTRATIONS ON YIELD AND MORPHOLOGICAL CHARACTERISTICS OF CHAMISSO ARNICA (*ARNICA CHAMISSONIS* Less. ssp. *filiosa*)

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Chamisso Arnica (*Arnica chamissonis* Less., Asteraceae) is a rhizomatous herbaceous perennial native to north America and Canada which also grows naturally in parts of Europe. Presence of sesquiterpene lactones such as helenalin and 11-alpha 13 dihydroxyhelenalin in this plant is responsible for its anti-inflammatory properties and it has a long history of use in cosmetic products. This plant prefers a soil pH level of 5.8 to 6.7. Since the genus *Arnica* is not reported in the Flora of Iran, the aim of this study was to study the adaptability of *A. chamissonis* in Iran for commercial cultivation in near future. In order to study the effect of Sulfur levels in soil on adaptability and flower yield *of A. chamissonis*, the plant was cultivated as a complete random block design with 3 replications and 4 concentrations of Sulfur (0, 250,500 and 750 kg/ha). For every 50 kilograms of Sulfur, one kilogram of BioSulfur biological fertilizer, containing *Thiobacillus* bacteria was used to improve the oxidation of this element and induce better absorption of Phosphorus, Iron and Zinc. Parameters such as plant height and width, lateral branching, capitula diameter with and without ray florets, flower number on single plant, ray floret length, width and count, single flower weight and wet and dry yield were measured. The results approve the adaptability of *A. chamissoni*s in Iran. Flower number showed a steady increase throughout the cultivation time with a peak in early to mid August. In addition, the 250 kg/ha treatment of Sulfur resulted to the highest increase in flower yield (10.07 g/plant) and all morphological characteristics compared to the control treatment in 5% level of significance.

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MORPHOLOGICAL DIVERSITY OF FIELD HORSETAIL (*EQUISETUM ARVENSE* L.) POPULATIONS IN IRAN

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Field or common horsetail (*Equisetum arvense* L., Equisetaceae) is a rhizomatous herbaceous perennial plant native to Europe, America, North Africa and Asia. It has many different medicinal uses such as analgesic, anti inflammatory, anti diabetic, diuretic and scar healing. In order to study the morphological diversity of this plant, populations from Mazandaran, Ardabil and Azarbayjan-e-Sharghi provinces were collected and morphological characteristics such as dry weight, plant height, plant width, number of segment, intersegment length and stem thickness were measured. The results showed that most of these characteristics were affected by growth region. The population from Irdimousa (Ardabil province) had the highest weight (0.68 g), intersegment length (28.17 mm), plant height (34.42 cm), stem thickness (1.82 mm) while Abbasabad population from Mazandaran province showed the lowest dry weight (0.38 g), segment joints (11.4) and height (22 cm) [1, 2].

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THE EFFECTS OF *MENTHA PIPERITA* CRUDE LEAF EXTRACTS ON THE TOXICITY OF RED FLOUR BEETLE (*TRIBOLIUM CASTANEUM*)

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The red flour beetle (*Tribolium castaneum*) is a worldwide pest of stored products, particularly food grains, and food products including flour, cereals, pasta, biscuits, beans, and nuts, causing loss and damage. The toxicity effects of an important medicinal plant, peppermint (*Mentha piperita*) was studied under controlled conditions (16:8 h L:D at 25 ± 1 C and 65 ± 5% RH). The acetonic, methanolic extracts of peppermint were prepared. Five concentrations (0.625%, 1.25%, 2.5%, 5%, and 10%) were used for toxicity and to evaluate LC50 values with the control, which was treated with acetone, or methanol. Each bioassay was performed with 25 adult of *T.castaneum* per concentration for all the experiments in three replicates. LC_{50} values were calculated using probit MsChart software by recording the mortality at 36 h. The LC_{50} value were 61.777% for methanolic extract and 4.19% for, respectively. These results indicate that this medicinal plant might possess potential secondary metabolites that may be useful for controlling potential insect pests [1-3].

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952
ESSENTIAL OIL YIELD AND VARIATION ON PHYTOCHEMICAL CHARACTERISTICS OF DIFFERENT POPULATIONS OF *TANACETUM PARTHENIUM* CULTIVATED AT SHAHREKORD CLIMATIC

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Tanacetum parthenium L. as a medicinal plant, is herbaceous perennial belonging to the Asteraceae family. Feverfew in traditional medicine is used as an analgesic, housing, fever-lowering, anti-rheumatism and migraines. The most important active ingredient of the herb is essential oil. Variation on genetic and environmental conditions play major role in the growth, development, quality and quantity of active ingredients of medicinal plants, so this study was to evaluate the effect of diversity of phytochemical characteristics of eight different populations of *Tanacetum parthenium* at 2014 in Shahrekord region, southwestern Iran.In this study, seeds of *Tanacetum parthenium* were collected from eight regions of Iran. After preparing the seedlings in greenhouses at Research Center, Islamic Azad University of Shahrekord, the plantlets in early April 2014 were transferred to the filed Islamic Azad University of Shahrekord. Aerial part of the plants were harvested at stage of 100% flowering. Hydro-distillated essential oils were analyzed by GC and GC/MS.The highest essential oil yield was obtained from the Safashahr population and the lowest essential oil yield was obtained from the Gilan population. The results showed that the major compounds were camphor and bornyl acetate that the highest percentage of camphor was identified in the Safashahr population with 46.86% and the highest percentage of bornyl acetate was identified in the Gilan population with 13.56%.Results of this study indicated that two populations of Safashahr and Gilan are suitable to cultivate at Shahrekord climate.

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SCREENING OF SOME IRANIAN PLANT EXTRACTS FOR ANTIBIOFILM ACTIVITY AGAINST *PSEUDOMONAS AERUGINOSA* PAO1

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Pseudomonas aeruginosa is a multidrug resistant opportunistic pathogen responsible for nosocomial infections. Quorum-sensing (QS), is a bacterial cell-to-cell communication system that controls the expression of many virulence factors such as the ability to form biofilm. Therefore, it is necessary to seek anti-QS compounds which are capable of attenuating bacterial colonization. The purpose of this study was to screen some Iranian plants with the ability to inhibit biofilm formation by *P. aeruginosa*. Thirty plants were selected from *Lamiaceae, Apiaceae, Anacardiaceae* and Rhamnaceae families. The aerial parts of the selected plants were extracted with methanol by the maceration method. The dried extracts were then dissolved in dimethyl sulfoxide (DMSO) at 200 mg/ml final concentration and pH 7.4. The biofilm inhibitory effect of the extracts was determined against *P. aeruginosa* PAO1 using the microtiter plate assay. The results showed that *Salvia syriaca, Heracleum persicum, Pistacia atlantica, Ziziphus jujube* and *Salvia multicaulis* extracts had antibiofilm activity and reduced biofilm formation at 1.0 and 2.0 mg/ml concentrations in 1.0 % DMSO. The highest biofilm inhibition occurred by *Salvia syriaca, Heracleum persicum* and *Pistacia atlantica* extracts where at 2.0 mg/ml, 75.5%, 75.0% and 70.0% inhibition and at 1.0 mg/ml concentration, 48.5%, 61.5% and 81.3% inhibitory effects were observed, respectively. The results of this study show that plant extracts contain natural compounds with anti-quorum sensing potential and could be considered as anti-infective drugs against multidrug resistant pathogens

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BIOASSAY-GUIDED ISOLATION OF CHEMICAL CONSTITUENTS FROM *DAPHNE MUCRONATA*

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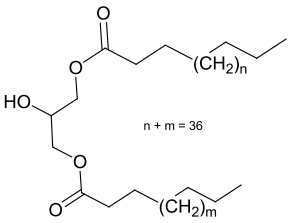
Daphne mucronata Royle is a shrub well known as a medicinal plant in different regions of Asia. Ethnobotanical, phytochemical and pharmacological studies have revealed strong anti-cancer potential of the plant [1]. In Iranian folk medicine, ethanolic extract of the aerial parts of *Daphne mucronata* have been used to treat breast tumors and various cancer [2]. In this study, methanolic extract of the plant was prepeard and then subfractioned to n-hexane, ethyl acetate, and n-butanol extracts. Each sub extract was tested against breast cancer cells (MCF-7). The highest activity was determind for the n-hexane extract. Further chromatographic separation of n-hexane extract led to the isolation of active components. Their structures were identified as 1-triacontanol, montanic acid, 1-octacosanol, Lupeol, Daucosterol, a long-chain alcohol, a β-Sitosterol derivative, and a diglyceride drivative. Their structures were established by high-field NMR techinues (^{1}H & ^{13}C NMR, ^{1}H-^{1}H COSY, HMQC, HMBC). Cytotoxicity of the isolated compounds were evaluated by MTT assay. Among these structures, the diglyceride drivative (**1**) revealed significant Cytotoxicity against MCF-7 cell line with IC_{50} = 49.3 µg/mL. Furthermore the apoptosis-inducing effect of this compound against MCF-7 cells by using Flow Cytometry, DAPI Staining, Western Blotting, DNA Fragmentation techniques as well as imaging by fluorescent microscopy were confirmed.



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ISOLATION AND STRUCTURE ELUCIDATION OF CHEMICAL CONSTITUENTS FROM ETHYL ACETATE EXTRACT OF *SALVIA HYDRANGEA*

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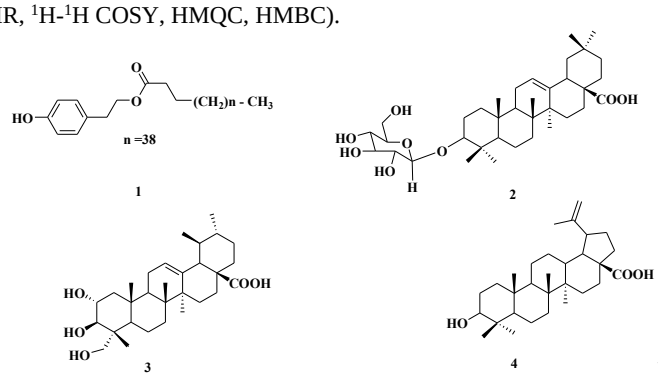
The genus *Salvia* is a rich source of structurally diverse terpenoids. One of the most distinguishing features of *Salvia* species is their ability to synthetize isoprenoids with unusual scaffolds. In a project directed at structurally interesting bioactive metabolites from Iranian Lamiaceae, we studied *Salvia hydrangea*. This species is popularly known in Persian as "Gol-e Arooneh". It grows widely in Iran, Anatolia and Transcaucasia, and its flowers are used in popular Iranian medicine as an anthelmintic and antileishmanial. We recently identified Hydrangenone, pervoskone B and salvadione C, three new antiplasmodial triterpenoids from this plant [1]. In this study, The stems and flowers Of *S. hydrangea* was extracted with ethyl acetat. The extract was separated using repeated column chromatography to afford one new phenylethanoid compound (**1**), together with seven known compounds which identified as oleanolic acid 3-O-β- glucopyranoside (**2**), 2α,3β,23-trihydroxyurs-12-en-28-oic acid (**3**), betulinic acid (**4**), apigenin 7-O- β-glucopyranoside, rosmarinic acid, ursolic acid, and daucosterol. Their structures were established by high –field NMR techinues (^{1}H-NMR, ^{1}H-^{1}H COSY, HMQC, HMBC).



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SIMULTANEOUS DETERMINATION OF NEONICOTINOID INSECTICIDES AND THEIR METABOLITES IN PISTACHIO USING A MODIFIED QUICK, EASY, CHEAP, EFFECTIVE, RUGGED, AND SAFE (QUECHERS) METHOD

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Among all the edible nuts, peanuts, almonds, hazelnuts, pecans, pine nuts, macadamias, pistachios, and walnuts are the most popular and commercially valuable. They have been an important source of nutrients since ancient times, and it has been proved that they play a relevant role in the human diet and moreover that they are of great benefit to consumers' health and food safety. Pistachio is a strategic product of Iran [1]. Two decades of increasing use of neonicotinoids have established their important role in protecting crops and pets from pest insect attack. The two major commercial neonicotinoids consist of Imidacloprid and acetamiprid. They are widely applied throghout pistachio fields. These neonicotinoid insecticides have important metabolites that screening of them is important for Codex Alimentarious. However, concerns are now being raised about their potential adverse impact on pistachio. In this study, for the first time the Quick, Easy, Cheap, Effective, Rugged, and Safe method (QuEChERS) optimized for the extraction of neonicotinoid insecticides from pistachio and then coupled by High Performance Liquid Chromatography (HPLC) analyses with UV detector. In this approach the role of different salts and graphen oxide for improving the recovery of extraction are evaluated [2]. The goal of this research is present a valid extraction and analysis method as an introductory step to define the statuse neonicotinoid insecticide and metabolites residue in pistachio that are harvested according to Good Agricurtural Practice (GAP) for proposed international Maximum Residue Limit (MRL) to Codex Alimentarious.

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A NEW SESQUITERPENOID WITH AN UNPRECEDENTED SKELETON FROM *PROVSKIA ABROTANOIDES*

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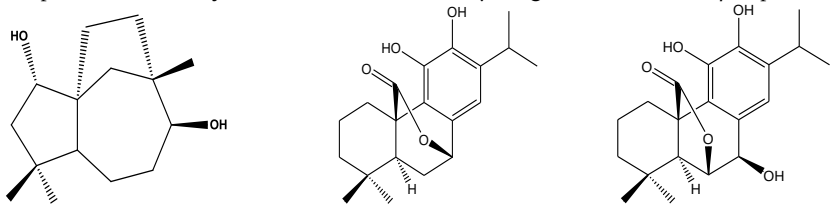
Perovskia is a small genus in the family Lamiaceae and represent in an area from northeast Iran to northwest Indian. This genus represented in Iran by only three species [1]. *Perovskia abrotanoides* Karel. is an aromatic erect herb which is used in Iranian folk medicine as an analgesic in rheumatic pains,as cooling medicine, as anti feaver, and as treatment of fleishmasaniasis. In recent years, other biological properties, including antibacterial [2], anticanser and antiparasitic of this plant is reported to be highly regarded. In the present work, a phytochemichal investigation on n-hexane extract of the aerial parts of *P. abrotanoides* led to the isolation and identification of six compounds, including: one new sesquiterpenoid (**1**), two abietane diterpenoides (carnosol **2** and epi- rosmanol **3**), one ursane triterpenoid (ursolic acid), one glucosidal steroid (daucostrol) and one flavonoid (salvigenin). Their structures were established by extensive spectroscopic methods, including: 1D (^{1}H NMR & ^{13}C NMR) and 2D-NMR (^{1}H-^{1}H COSY, HMQC, HMBC, NOESY). Compound **1** is a sesquiterpenoid with an unprecedented 5/7/5 membered carbon ring skeleton. It showed in vitro antiplasmodial activity, with an IC_{50} value of 1.4 µM against *Plasmodium falciparum*.



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ANTIFUNGAL ACTIVITY OF SOME PLANT EXTRACTS AGAINST A PLANT PATHOGEN *MACROPHOMINA PHASEOLINA* (TASSI) GOID.

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Macrophomina phaseolina (Tassi) Goid causes charcoal rot disease on a wide spectrum range of plants such as legumes, vegetables, fruits and fiber crops. In order to find a natural fungicide against this plant pathogen, a screen platform of medicinal plants for evaluation of their antifungal activity has been applied to find the individual active component with the bioassay guided fractionation procedure. Several extracts of different plant including, *Moringa peregrina, Kelussia odoratissima, Artemisia herba-alba, Teucrium polium, crataegus pentagyna* were applied in this bioassay. The ethyl acetate fraction from the ethanol extract of *Moringa peragrina* and *Kelussia odoratissima* also ware significantly suppressed mycelial growth of the pathogen. *Artemisia herba-alba* crude extract was the most effective on the microsclerotia, and *Teucrium polium* crude extract had a significant effect on microsclerotia while the *crataegus pentagyna* showed low effect on the studied fungus [1].

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ISOLATION, STRUCTURE ELUCIDATION AND BIOLOGICAL ACTIVITY OF CHEMICAL CONSTITUENTS FROM THE ROOTS OF *SALVIA LERIIFOLIA*

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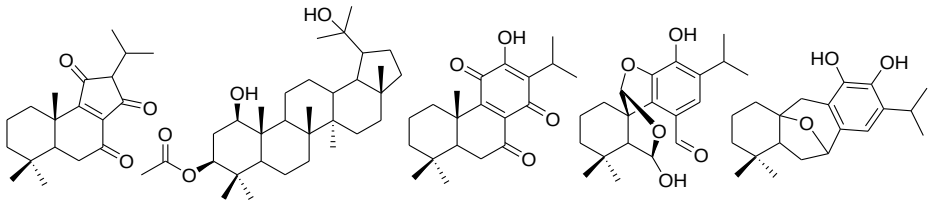
Salvia is the largest genus in the family *Lamiaceae*. *Salvia* species are important medicinal and culinary plants, and they have been the subject of numerous chemical and biological study [1]. 61 *Salvia* species are found in Iran, 17 of which are endemic. *Salvia leriifolia* is one of them that grows in Khorasan and Semnan provinces .In recent years, different properties of this plant such as anticancer, antibacterial activities, anticonvulsant, antischemia, anticonvulsion, anti-inflammatory, antioxidation, hypoglycemic and attenuation morphin dependence have been reported. Despite the many studies on pharmacological effects of the plant, Its phytochemical investigation is limited to a few reports [2]. In the present study, a phytochemical investigation on hexane extract of the root of *S. leriifolia* led to the isolation and identification five compounds including one new abietane diterpenoid (**1**), one new lupane triterpenoid (**2**), as well as three known abietane and icetexane diterpenoids (**3-5**). Their stractures were stabilished on the basis of extensive spectroscopic data, including ^{1}H-NMR, ^{13}C-NMR, ^{1}H-^{1}H COSY, HMQC, HMBC and APT. Compound **1** is a nor-abitane diterpenoid with an unprecedented 6/6/5 membered carbon ring skeleton. In vitro activity of compound (**1**) against *Trypanosoma brucei rhodensiense, Trypanosoma cruzi*, *Leishmania donovani* and *Plasmodium falciparum* were determined. It showed promising activities with IC_{50} values 0.99, 4.62, 0.99, and 3.64 µM against *T. b. rhod*, *T. cruzi*, *L. don*., and *P. falc*. respectively.



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THE FIRST STEPS TOWARDS DOMESTICATION AND UTILIZATION OF *ERYNGIUM* SPECIES: GERMINATION APPROACH

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Eryngium is a genus in the family Apiaceae that is native to Iran and the Caucasus. At least 10 species of this genus can be found in Iran; however, there are about 250 species in the world. These plants are used in Iranian traditional medicine for hypoglycemic agent and nowadays, its herbal distillates sold in high volumes in the market. Unfortunately, indiscriminate harvesting of landraces caused shortages and extinction risk in the rangelands. According to importance of domestication and sustainable production of this genus with desired quality and quantity of active substances, germination tests and transplant production of four species (*E. billardieri, E. thyrsoideum, E. noeanum* and *E. bongei*) were conducted in research laboratory and greenhouse. The results showed that seed sterilization with sodium hypochlorite had negative effects on germination percentage in all of four species. *E. billardieri* had high potential for agricultural production in drought conditions and its root growth was more than shoot.

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A SIMPLE AND RAPID METHOD TO QUANTIFY THE HERBICIDE GLYPHOSATE AND ITS METABOLITES IN RICE

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Glyphosate, N-(phosphonomethyl) glycine, is a post emergence nonselective broad spectrum herbicide used in agriculture for the control of many annual and perennial weeds. Glyphosate is widely used even though their effects on non-target species are still not entirely known [1]. Extensive worldwide use of these compounds in agriculture is required very sensitive method for determination of pesticide residue due to their effects on aquatic ecosystems, carcinogenic potential and environmental problems. In this study we have developed a chromatographic base method in order to determine glyphosate and its metabolite residue in rice plant. Seed of shiroodi variety was obtained from rice research institute of iran and was grown in an open field. Rice plants were cultivated in the same field to avoid the influence of growing location. Glyphosate concentration was based on the recommended permitted dose from plant protection organization. Rice plants were subjected to glyphosate treatment with 41% glyphosate powder during heading and flowing time. Untreated plants were planted under the same experimental condition. Rice leaves were taken one day before treatment as control and twenty times after treatment. In this study a technique was developed to improve the speed sensibility to amino-acid analysis such as glyphosate with phenyl isothiocyanate for the rapid detection of very small amounts of glyphosate residue in rice plants. The herbicide residue was extracted based on water extraction in acidic conditions and detected with High Performance Liquid Chromatography (HPLC) method with UV detector and the trace amounts of glyphosate metabolite was detected according to this method.

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COMPARISON THE CHEMICAL COMPOSITION OF ESSENTIAL OIL FROM FRESH AND DRIED *PLECTRANTHUS AMBOINICUS* L.

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Plectranthus amboinicus L. is a tender fleshy perennial and highly aromatic plant in the family Lamiaceae with an oregano-like flavor and odor. It is native to southern and eastern Africa which has been recently cultivated in Iran. It has numerous applications in pharmaceutical, food and spice in the many countries of the world. According to its fleshy leaves as the main source of aromatic part, the plant mostly has been extracting freshly to obtain the essential oil. In this study, three different drying method including drying in the shade and oven and in the air flow along with the fresh extraction of the leaves have been used to obtain the essential oil of *P. amboinicus.* Oils were obtained by hydrodistillation and analyzed by gas chromatography–mass spectrometry (GC–MS) and GC–flame ionization detector (GC–FID). The drying in the shade is a time consuming method for this plant while the other methods are faster. The yield of essential oil extracted in shade, oven, air flow and fresh leaves were 1.1, 1.0, 1.2, and 0.1 v/w%, respectively. The main component of essential oil in this plant were thymol (45-60%), γ-terpinene (10-18%), β-caryophylene (6-11%) and *p*-cymene (6-9%). The essential oil of this plant is rich in thymol in different drying preparation and freshly application. In conclusion, *P. amboinicus* can be suggested as a natural antibacterial and antioxidant in the food and pharmaceutical industries in Iran [1, 2].

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EFFECTS OF *CRATAEGUS PENTAGYNA* ON THE ELECTROPHYSIOLOGICAL PROPERTIES OF CARDIOMYOCYTES DERIVED FROM LQTS3-IPSC

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LQTS3 is the third common form of congenital Long QT syndrome. This disease is characterized by QT interval prolongation in the electrocardiogram due to mutation in SCN5A gene. This causes defects in Cardiac Na^+ channel, NaV1.5 [1]. This life-threatening abnormality leads to sudden death due to ventricular fibrillation. Mexiletine is the most common drug used for LQT3 patients. However, it is not completely effective. Other antiarrhythmic drugs have also some side effects that limit their usage [2]. Nowadays traditional remedies and natural products have been considered as alternative treatments. *Crataegus* species are one of the common medicinal plants used for cardiovascular diseases. Their cardiac effects have been proved in many *in vitro* and *in vivo* experiments [3]. In this study we aimed to evaluate effects of *crataegus pentagyna* extract on the electrophysiological properties of cardiomyocytes which have been obtained from the LQTS3 patients- derived induced pluripotent stem cells (iPSC). The evaluation of the extract and then the effective fraction based on the bioassay guided fractionation has been set up to find the antiarrhythmic drug for LQTS3 patients. The results showed that the *Crataegus* extract has a biphasic effect on cardiomyocytes beating rate. Our data have shown that LQTS3- derived Cardiomyocytes provides suitable model for electrophysiological studies *in vitro* and possible drug discovery.

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IONIC LIQUID ASSISTED EXTRACTION OF TRIGONELLINE FROM FENUGREEK (*TRIGONELLA FOENUM-GRAECUM* L.)

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Fenugreek seeds are considered as a potential commercial source of trigonelline which is important in the pharmaceutical industry. Trigonelline, the main alkaloid of *Trigonella foenum-graecum* belongs to the pyridine alkaloids class. It has been reported to have anti-diabetic, anticancer, anti-microbial, anti-parasitic and anti-alzheimer properties. Trigonelline as a specialized metabolites have important functions in interactions between plants and the environment (e.g. as drought, salinity and UV stress. Quantitative analysis of trace level of trigonelline alkaloids is still a significant challenge demanding a rapid and effective sample preparation procedure. Zhang and Ashihara have given an explicit procedure for trigonelline extraction with traditional volatile organic solvents and it is relatively low efficiency and time-consuming. In this study a new simple, selective and environmental friendly method with higher efficiency for trigonelline extraction has been developed. Ionic liquids (ILs), as a kind of novel green solvent, have many unique properties, such as, negligible vapor pressure, good thermal stability, and an easily dissolvable and extracting ability. Apart from this properties, the ability of ILs to swell or dissolve biomass can lead to a better access to the valuable ingredient embedded in biopolymer matrices. Comparison of organic solvents and ILs for the extraction of the pharmaceutically trigonelline from seed of *T. foenum graecum*, significantly improved extraction yield for a range of ILs. Several ionic liquids composed of imidazolium cations combined with the chloride (Cl^-), bromide (Br^-), hexafluorophosphate ($[PF_6]^-$) and tetrafluoroborate ($[BF_4]^-$) and Hydrogenosulphate $[HSO_4]^-$anions were investigated. Furthermore, the additional conditions such as the ionic liquid concentration, anion effect, the contact time, the solid–liquid ratio and temperature were further optimized. The higher extraction efficiency (from 1.4 to 3.1 mg trigonelline per 1.0 g of died weight of the plant material) was obtained with the IL assisted extraction method.

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CHEMODIVERSITY OF VOLATILE COMPOUNDS IN NINE *FERULA* (APIACEAE) SPECIES FROM IRAN

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The genus *Ferula* L. belonging to the Apioideae subfamily of Apiaceae consists of c. 177 species which are mostly distributed throughout the central Asia, of which 32 taxa containing 16 endemic species are growing in Iran[1-3]. A chemodiversity of essential oil components in nine Ferula species (F. hirtella, F. badghysii, F. diversivittata, F. foetida, F. tabasensis, F. orientalis, F. galbaniflua, F. gummosa and F. persica) were studied. The oils were obtained by hydrodistillation from aerial flowering parts of samples and analyzed by GC-MS. The identified constituents revealed significant qualitative and quantitative differences among species studied. For the evaluation of chemotaxonomic significance of the essential oil components, each specific and or common identified compound was used as marker. α-Pinene was the common component almost in all analyzed oils except for the first three species. Germacrene B and germacrene D were the major compounds of *F. hirtella*, while verbenone isomers were the principal ones for *F. diversivittata*. The major constituents in other species studied were myrcene, thiophene derivatives, sabinene, nonane and octane, β-pinene, carotol and sabinene, respectively. Finally, a detailed discussion on chemodiversity and chemotaxonomic relationship among species investigated are presented.

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LED LIGHT SPECTRUM INCREASE ROSMARINIC ACID CONTENT IN SHOOT OF *MELISSA OFFICINALIS* L.

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Light emitting diodes (LEDs) could provide specific quality and quantity of light for normal plant growth (1). *Melissa officinalis* L. is one of the most important medicinal plants in the world that has many applications in drug and flavoring industrials. Rosmarinic acid (RA), an ester of caffeic acid and 3, 4-dihydroxyphenyllactic acid which was isolated for the first time from *Rosmarinus officinalis* L. leaves and later found in other species of Labiatae and Boraginaceae. RA has interesting properties which has led to a broad range of applications from food preservatives to cosmetics (2). RA can be found in many plants but usually rosemary plant is used as the major source. This matter has caused to increase of demand and price of the plant. Therefore, finding other plants containing high amount of RA is very important to introduce as new sources. RA can be found in all plant organs of *M. officinalis*. Its content in leaves is about 6% of the dry weight. We cultivated lemon balm rhizomes in pot and putted in four incubators contain LED lamps with spectrum of red (100%), blue (100%), 70% red plus 30% blue and white (100%) with 300 $\mu mol.m^{-2}.s^{-1}$ light intensity and in greenhouse conditions as a control. The amount of rosmarinic acid in shoot had the highest content in red LEDs. The highest amount of RA in red LEDs was 4.616 µmol/gDW. In incubator containing red LED light, the amount rosmarinic acid has increased 44.52% in comparison with greenhouse light. According to our results, the use of lemon blam under LED lights especially red LED could useful for increasing of RA.

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ETHNOBOTANICAL INVESTIGATION OF MEDICINAL PLANTS FROM ABADEH (NORTH OF FARS PROVINCE)

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Although the science of synthesis of the chemical drugs (Pharmacology) is widely progressed, this mater never decreases the value of the medicinal plants so that the recent century was called "Return to Nature". Iran by having famous scientists like Ebn-e-Sina, Abooreyhan Birooni, Zakaria Razi and also rich diversity of the medicinal and endemic plants has been able to keep the ethnobotany and conveying it to others and today using of medicinal plants has a high value in all areas of Iran [1, 2, 3]. In this study for description of the role of the ethnobotany and mixing it with scientific researches, the Abadeh plants were investigated. The data obtained by the interview method with the local experience people. Seventy species belong to 20 families totally determined. For each plant, the scientific and local name, parts used and approaches and the local use, were provided.

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PHENETICAL STUDY OF IRANIAN *FERULA* BASED ON MORPHOLOGICAL DATA

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The genus *Ferula* L. belongs to Apiaceae family and tribe Scandiceae with persian name Koma, Barijeh and Anghouzeh consisting of about 170-187 species worldwide and 32 species (16 endemics) in Iran [1, 2]. This genus is the largest member of Apiaceae in Asia and ranks third place in the world. Most of the investigated species were collected and determined from wild habitats. In this study, for the first time, Phenetical situation of the genus of Iranian Ferula were investigated through PCA and CA analyses of 31 morphological data. Total species classified in two main groups and four subgroups. In addition, these groups compared with traditional classification of Drude [3]. Somewhat, our results were different with common classification in Flora Iranica [4]. Presence of pilus on sheath surface, number of dorsal vitta of mericarps, width of leaf segments, pilus of leaves underside, shape of leaf segments, pobesences of mericarp and ovary and breadth of mericarp wings were important the first main factor and length and width of sheats, length of leaf segments and stem base diameter were second main factor in our groups based morphological data, respectively.

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STUDY OF VASCULAR PLANTS OF BAMU NATIONAL PARK (FARS PROVINCE)

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In this research, vascular plants of Bamu National Park (48000 ha.) situated in Fars province were studied [1]. Analyses of all collected plants (450 species) showed that because of climatic conditions, 94% of them were flowering in spring; also, hemicryptophytes and therophytes possess abundant growth form with 39.6% and 23.5%, respectively [2, 3]. Phytogeographically, Irano-Turanian elements comprise 69% of species. Eighty-eight species of the park are endemic in Iran. Finally, analyses of formations showed that cushion forms are abundant.

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SURVEY ON QUALITY AND QUANTITY ON ESSENTIAL OIL CULTIVATED ACCESSIONS OF *SATUREJA ATROPATANA*, *SATUREJA ISOPHYLLA* AND *SATUREJA KHUZISTANICA* IN YAZD

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Satureja atropatana, *Satureja isophylla* and *Satureja khuzistanica* are of the endemic species of this genus in Iran. Different species of satureja are used in food, Healthy, cosmetic and medical industries. this research has been carried during2009-2013 in medicinal plants research station in Yazd province with the coordinates of longitude and latitude 55 31 49 north, 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) seeds 2 accessions of satureja atropatana, 2 accessions of Satureja khuzistanica and 1 accessions of satureja isophylla obtained from the research institute of forests and Rangelands, were planted in jifypot and in the green house. Then seedling were sown on the main floor. 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 results showed ,the highest and lowest of percentage of essential oil and oil yield(*Satureja atropatana*) accession TA1 respectively were (0.21%-0.46%), and (.95-4.3Kg/ha).The highest and lowest of percentage of essential oil and oil yield accession TA2 respectively were (.17%-.65%), and (1.81-6Kg/ha). The highest and lowest of main composition of essential oil were para- cymen (26.2%-43.5%), Gamma terpinene (14.7%-25.6%), thymol (11.6-19.3%), carvacrol (1.3%-4.2%). para-cymen was dominant composition in the both accessions. The highest mean of essential oil, oil yield and component was related to accession TA2, with origin East Azarbayjan province. The highest and lowest of percentage of essential oil and oil yield (*Satureja khuzistanica*) accession, HKP respectively were 3.88%-5.04%), and (13.8-31.28Kg/ha). The highest and lowest of percentage of essential oil and oil yield accession EK respectively were (3.23%-3.43%), and (7.98-22.76Kg/ha). The highest and lowest main composition of essential oil accession HKP were paracymen (2.11%3.5%), gamma terpinene (3%3.43%), thymol (0.66%-1.73%) and carvacrol (78%-89%) during 4year. The highest and lowest main composition of essential oil accession, EK were paracymen (1.57%-2.3%), gamma terpinene (1.29%-2%%), thymol (0.5%-35)and carvacrol (90%92.6%).The crvacrol was dominant composition in the both accessions.The highest mean of essential oil (4.57%), essential oil yield (22.24Kg/ha)and component of phenol (89.44) was related to accession HKP with origin Lorestan province. The highest and lowest of percentage of essential oil and oil yield (*Satureja isophylla*) respectively were (0.2%-.27%)and (0.9%-1.13%Kg/ha) during 4 years. germacrene B (27.58%) was dominant composition in species.The main compositions of essential oil were para- cymen(26.2%-43.5%),Gamma terpinene(2.6%-6.76%),thymol(3.3%-8.3%),carvacrol(1.8%-1.8%). Alpha pinene (1.4%-3.3%),alpha terpinene(.45%-3.72%),e-caryophyllen(2.5%2.6%)during 4years.

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EVALUTION OF ANTILEISHMANIAL ACTIVITY OF THE ESSENTIAL OIL OF *MEDICAGO LUPULINA*' LEAVES AGAINST LEISHMANIA MAJOR (MHOM/IR/75/ER) PROMASTIGOTES BY USING MTT AND MICROSCOPY METOD

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Leishmaniasis induced by protozoa of the genus *Leishmania* can be evaluated as a zoonotic disease. This disease created significant global health problems with high endemicity in developing countries including Iran. The prevalence of leishmaniasis has increment in the absence of a vaccine. Different medicines are exploited for treatment of Leishmaniasis but their side effects and drug resistance cause to seek new effective compounds. Traditional plants such as *Medicago lupulina* are a valuable source of new medicinal factor. The essential oil was ready by Distillation with wather. The essential oil was dried and solved in DMSO 5% solvent. *Leishmania major* promastigotes were cultured at 25 ± 2°C in stationary phase in RPMI- 1640 medium complemented with 10% fetal calf serum and antibiotic Penicillin- Streptomycin. Then by using MTT assay, the biological activity of plant essential oil in analogy to glucantime on *L.major* promastigotes was evaluated. The optical density due to breaking of the tetrazolium salt MTT [3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide] into a colored product formazan by the parasite was measured using ELISA reader and IC50 values were evaluated. All tests were repeated in Triplicate. Also Microscopy evalution by PBS was do. Plant essential oil and glucantime interdicted the growth of promastigote forms of *L.major* in vitro after 24, 48, 72 hours of incubation. IC50 of glucantime for *L. major* (*MHOM/IR/75/ER*) promastigotes was 27, 12 and 8 µgr/mL and IC50 values for essential oil of *Medicago lupulina* against *L.major* (*MHOM/IR/75/ER*) was 720, 250 and 110 µgr/mL. Glucantime was more effective than plant essential oil had profound effects on promastigotes of *L. major*. In microscopy study Cell Shrinkage and Cytoplasmic Condensation were observed in promastigotes. As regards, plant essential oil had anti- leishmanial effects in vitro, further works are required to appraise the essential oil effect on *Leishmania* agent in animal models.

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ECONOMICAL AND MEDICINAL IMPORTANT AGAROPHYTES IN IRANIAN SOUTH COASTAL WTERS *GRACILARIA CORTICATA* (J.AG.) J.AG. & *GRACILARIOPSIS LONGISSIMA* (S.G.GMELIN)

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This researching were done with sampling Gracilaria in Sistan and Baluchestan (Gwatr, Pozm, Chabahar and Tang) and Gracilariopsis in intertidal Coasts of Hormozgan Provinces in Summer 2008. The samples were transferred to the center and prepared for analyzing. This analyzing were done with week acid in two hours and boiling with 4 litter Fresh water and then filtered. Agar gel used amount 10, 20, 30, 40 and 50 gr. In 100 mli. Milk. Best result aplied in amount 20 and 30 gr. This research were done 6 time. The results show that the average in one Kg of wet weight aplied about 125 gr. Dry weight and from 100 gr. Dry weight aplied 18.42 and 13.03 gr. gel powder from Gracilaria and Gracilariopsis respectively [1- 3].

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PERFORMANCE OF BROILERS FED DIETS SUPPLEMENTED WITH EUCALYPTUS [*EUCALYPTUS GLOBULUS* (L.)] POWDER AS A NATURAL GROWTH PROMOTER

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Eucalyptus [*Eucalyptus globulus* (L.)] is one of the most widely investigated trees in relation to their biological activities. The leaves of the plant contain a variety of components with different therapeutical effects such as antioxidant [1] and antibacterial activities [2], but little is known about the potential nutritive properties of eucalyptus in broiler chicks. Therefore, this experiment was carried out to evaluate the effects of different levels of eucalyptus leaf powder (ELP) on growth performance and intestinal microflora content of broiler chicks. A total of 126 one-d-old straight-run broiler chicks (Ross 308) were randomly assigned into three dietary groups each with three replicates of 14 chicks. The dietary groups included: basal diet without any supplement (control), and basal diets supplemented with 0.1 or 0.2% ELP. The experiment lasted for 21 d. Feed intake and body weight gain was not affected by dietary treatments. However, in the overall period, chicks fed diet supplemented with 0.1% ELP had lower feed conversion ratio compared with the other groups. No difference in gastrointestinal pH levels and in *Lactobacillus* and *Escherichia coli* counts in the ileal and cecal contents were found between the ELP-supplemented and control groups. These results suggest that inclusion of ELP in broiler diet has a potential to improve feed conversion ratio, but this improvement appears to be not mediated by a change in the microbial population of the gut.

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EFFECTS OF DIFFERENT METHODS OF DRYING ON ANTIOXIDANT CAPACITY IN MEDICAL MUSHROOM OF AGARICUS BLAZEI

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Button mushroom of blazei with the scientific name of *Agaricus blazei*, belonging to Agaricaceae family, is one of the most important edible-medical mushrooms [1]. One of the most important preservation methods of agricultural products is drying which prevents microbiological and chemical spoilage, reduction of food mass, and significant save in transportation and preservation costs. In the present research impacts of two casing soils of compost and vermi-compost in conjunction to drying methods of oven, microwave and freeze-drying on antioxidant capacity of the mushroom are verified. Measurement of antioxidant capacity of extracts was carried out according to Liu et al. With a few changes. For better assessment of antioxidant activity, IC50 factor was used which indicates the concentration of extract that is able to reduce initial DPPH free radical concentration to 5 percent of the initial amount. Results showed that the most antioxidant capacity of mushroom samples is related to microwave method in both culture soils, treatment of freeze dry in casing soil + vermi-compost. Whereas the least antioxidant capacity was related to the oven method in casing soil+return compost of mushroom. Reduction of antioxidant capacity of products by some heat treatments is due to decomposition of natural antioxidants during the drying process, whereas increasing anti-oxidant capacity during drying process is due to Maillard reaction and reduction in time of decomposition of polysaccharides.

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EFFECTS OF *ALOE VERA* EXTRACT ON CARCASS COMPOSITION AND BACTERIAL FLORA OF INTESTINE IN SIBERIAN STURGEON (*ACIPENSER BAERII*)

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Regarding the beneficial effects and benefits of the herb *Aloe vera* and its applicationin various industries such as pharmaceuticals and food industries, this study investigated the effects of *Aloe vera* extracton growth parameters and bacterial flora of the Siberian sturgeon (*Acipenser baerii*). In this study, a total of 360 numbers of Siberian sturgeon weighted average 10.95 ± 0.04 (g) randomly distributed in four treatments including a control group and three experimental groups (each with three replications) were used. So, *Aloe Vera* extract powder ratio of 0.5%, 1% and 1.5% were added to the food. After eight weeks of feeding in the fiberglass vans and physicochemical parameters of water daily registration, biometry carried out and necessary samples collected. In this study, The body composition can be affected by a combination of diet and daily feeding amount placed percent [1, 2]. The results of this study showed that the amount of protein, lipid, carbohydrate, ash and moisture of Siberian sturgeon farmed in different treatments compared to the control group is no statistically significant difference ($p > 0.05$). In this study, the increased use of *Aloe vera* in the diet, the amount of protein and lipid decreased. So that the maximum amount of protein and lipid, respectively, in treatment 1.5% and 0.5% and least amount of protein and lipid the control group was observed. Amounts of carbohydrate, ash and moisture content compared to the control group were associated with a reduction. Meanwhile, total count of bacteria intestine in the treatment and control groups did not show significant differences ($p>0.05$), but significant increase in the count of anaerobic bacteria were observed compared to the control group ($p<0.05$). The result showed that *Aloe vera* extract can be effective in improving lactic acid bacteria of Siberian sturgeon.

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ANTIBACTERIAL ACTIVITY OF SUPERNATANT CULTURE BROTH OF ENDOPHYTES ISOLATED FROM *PETROSELINUM CRISPUM* ON SOME FIELD ISOLATES OF VETERINARY BACTERIAL PATHOGENS

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Bacterial endophytes are ubiquitous colonizers of the inner plant tissues where they do not normally cause any substantial morphological changes and disease symptoms. Endophytic bacteria are harmless that reside within the plant hosts and known to boost the growth and development of host plants probably by secreting growth hormones.These bacteria are known to enhance growth and yield of plants by fixing atmospheric nitrogen, solubilization of phosphate, production of phytohormones and siderophores, possession of antagonistic activity as well as reducing the level of stress ethylene in host plants..In this study, we focused on the isolation of bacterial endophytes from one medicinal plant *Petroselinum crispum* screening them for activities against some field isolates of animal bacterial pathogens. Random samples from asymptomatic leave and branche of one medicinal plant namely: *Petroselinum crispum* were collected. For isolation of endophytic bacteria, the disinfected portions of the plant were distributed onto the isolation media.To examine endophytic bacterial contents, the bioassays were conducted using growing colonies in PA and YEA inactivating them by chloroform. To test antibacterial activity of endophytic bacterial culture broth, filter-sterilized supernatants were poured in cylinders on each bacterial plate. A total of 16 phenotypically distinguishable bacterial endophytes were isolated in pure form one medicinal plant. In part of supernatant culture broth of all 16 isolated endophytes the most effective herbs was *P.crispum.* Endophytic in *P.crispum* Investigation proceeds in order to classify the microorganisms and exploit the potential of the substance produced to inhibit these pathogenic bacteria.

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EFFECTS OF *ALOE VERA* EXTRACT ON CARCASS COMPOSITION AND BACTERIAL FLORA OF INTESTINE IN SIBERIAN STURGEON (*ACIPENSER BAERII*)

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Regarding the beneficial effects and benefits of the herb *Aloe vera* and its applicationin various industries such as pharmaceuticals and food industries, this study investigated the effects of *Aloe vera* extracton growth parameters and bacterial flora of the Siberian sturgeon (*Acipenser baerii*). In this study, a total of 360 numbers of Siberian sturgeon weighted average 10.95 ± 0.04 (g) randomly distributed in four treatments including a control group and three experimental groups (each with three replications) were used. So, *Aloe Vera* extract powder ratio of 0.5%, 1% and 1.5% were added to the food. After eight weeks of feeding in the fiberglass vans and physicochemical parameters of water daily registration, biometry carried out and necessary samples collected. In this study, The body composition can be affected by a combination of diet and daily feeding amount placed percent [1, 2]. The results of this study showed that the amount of protein, lipid, carbohydrate, ash and moisture of Siberian sturgeon farmed in different treatments compared to the control group is no statistically significant difference ($p > 0.05$). In this study, the increased use of *Aloe vera* in the diet, the amount of protein and lipid decreased. So that the maximum amount of protein and lipid, respectively, in treatment 1.5% and 0.5% and least amount of protein and lipid the control group was observed. Amounts of carbohydrate, ash and moisture content compared to the control group were associated with a reduction. Meanwhile, total count of bacteria intestine in the treatment and control groups did not show significant differences ($p>0.05$), but significant increase in the count of anaerobic bacteria were observed compared to the control group ($p<0.05$). The result showed that *Aloe vera* extract can be effective in improving lactic acid bacteria of Siberian sturgeon.

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EFFECTS OF ORGANIC MANURE AND NITROGEN FERTILIZER ON SOME GROWTH TRAITS OF BALANGU SHIRAZI *(LLALEMANTIA ROYLEANA)*

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Due to lack of efficient use of medicinal plants cultivation and medical care in recent years has provided an opportunity to use valuable medicinal plant as Balangu .However, chemical fertilizers and manure by increasing the nitrogen content increases the chlorophyll has been followed by greenness, ability to absorb sunlight, photosynthesis and the production of plant growth and yield will increase The trial was an opportunity to evaluate the effects of different rates of manure and chemical fertilizers on some growth traits of medicinal plants Balangu Shirazi trial randomized complete block design with three replications in research farm control of both fertilizer livestock at four levels (0, 10, 20 and 30 tons per hectare) and nitrogen fertilizer (0, 60, 120 and 180 kg per hectare) to be implemented in the spring of 1391. The results of data analysis showed that the organic fertilizers for fresh weight and dry root weight to 5% for other traits was a significant percentage.The effect of nitrogen fertilizer for all traits was a significant at 1% percentage.Most of the fresh weight of root, root, leaf dry weight, respectively, with an average of 0/25, 0/27, 0/7, 0/13, 22/5,22/5,21/8, 3/6 and 3/9 gram of 180 and 120 kg per hectare to 30 tonnes per hectare of fertilizer and manure, and in order to the highest number of branches, number of flowers per branch and the number of flowers per plant with an average of 7/58, 8/63, 9/386, 406/461, 96/06 and 102/86 belongs to organic fertilizers 30 tons per hectare and 180 kg of fertilizer per hectare and the lowest values in all traits was given control [1].

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APPLICATION OF ESSENTIAL PHENOLIC ORGANIC COMPOUNDS EXTRACTED FROM MEDICINAL SMOKE ON HEALING OF DIABETIC WOUNDS IN RATS

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Medicinal smoke of jennet feces has a lot of antimicrobial effects according to an old Iranian tradition.For the first time the chemical compound from indirect burnning jennt facess was convert as gas phase to liguid phase by invented instrument. The chemical compound was extracted with to polar and non polar organic phase. The most commonly detected components in organic (polar) phase is o-Methoxyphenol (Guaiacol). In diabetic patients, progression of healing takes longer and thus using new medication to accelerate it is required. Thus, the present study aimed at investigation the effect of Guaiacol extracted form Jennet feces on wound healing in diabetic rats. In this : normal, Diabetic- control (Positive control treatment with anji pars as individu experimental study, 30 wistar male rats were randomly divided into 3 equal groupsal cream and negative control treatment with normal saline) and diabetes (induced through intraperitoneally injection of aloxone). A circular full- thickness wound with a diameter of 2 cm was created on the side body of rats. In the test subgroup, the wounds were treated with a daily topical dose of 0.5, 1 mg/ml of Guaiacol during 21 days. The process of wound healing was assessed by macroscopic and microscopic studies on days 4, 7, 14, and 21. The macroscopic study, showed delays in healing of the diabetic group in comparison with the normal group and after the seventh day, wound healing showed considerable change in the test subgroup in both normal and diabetic rats ($p<0.05$). In the diabetic groups microscopic study, granulation tissue organization increasing of neoangiogenesis and re-pithelization was observed in the test subgroup. Also, the Guaiacol receiving subgroup showed impressive improvement compared to the saline subgroup. Conclusion: Topical that extract can accelerate the process healing of diabetic wounds [1- 3]

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THE STUDY ON MINERAL REQURMENTS IN *PRANGOS FERULACEAE* L., A MEDICINAL PLANT

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Prangos ferulaceae L. (Apiaceae) is regarded as a medicinal plant used traditionally for treatment of intestinal worms, Hemorrhoids, leukoplakic disease, scars and bleeding in Iran, Turkey, central Asia, caucasia and mediterranean for a long time[1]. The plant have also high nutritive value and is used as animal fodder in many parts of Iran. In order to domesticate and cultivate, nutritional requirements of the plants have been investigated. After dormancy breaking of seed using 2 months of stratification at 5ºc [2, 3], seeds were subjected to germination. The seedlings were transfered to different media like vermiculite, sand and hydroponic mediums for establishment and wathered with modified hoagmand nutrient solutions. Our results indicated that hydroponic medium is the best medium for *Prangos ferulaceae* seedling establishment. It was also shown that application of Hoagland nutrient solution for plant cultures with lowered concentration of nitrogen and phosphorus to 1 and 6 mM respectively, resulted in higher growth of plants than control solution. It was concluded that growing on sandy soils had been caused an adaptation to low availability of nutrients in the *prangos* species.

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PROTECTIVE EFFECTS OF VITAMIN E ON SPERM MOTILITY AND QUALITY OF SPERMATOGENESIS IN RATS EXPOSED TO LEAD

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Vitamins are Rich sources of antioxidant substances with high potential in neutralizing the harmful effects of lead on sperm parameters. The purpose of present study was to determine the protective effects of vitamin E on sperm motility and quality of spermatogenesis in rats exposed to lead. In this experimental study, 36 male Wistar rats weighing 180 ± 20 were randomly allocated into 4 groups (n= 9): gavage with distilled water (control), vitamin E, Lead acetate (Pb), and Pb with vitamin E. After 30 days exposed to lead. Rats were killed, and sperm count, motility and morphology sperm, chromatin assay, weighting of epididymis and testis were done. Data were analyzed using statistical methods such as Kruskal- Wallis, Wilcoxon, U Mann- Whitny and chi-square by SPSS 21 software, p value less than 0.05 was considered statistically significant.The results of study showed that weight gain of rats, epididymis weight, percent of Non-life sperm and greater than 50% sperm motility, had significant difference in the study groups (P < 0.05), and vitamin E and control (gavage) groups had the most weight gain and lead group had the least weight gain. Highest Sperm motility was in the control group that significant difference with all groups. Minimum mobility less than 50% in Pb group was highest than other groups (05/0 <p). Most sperm dead was found in the lead group that with the control group and the group receiving vitamin E had no significant difference. Also the group lead with vitamin E were statistically significant with vitamin E and control groups. There were no statistically significant differences between the study groups in testicular weight, percentage of normal morphology and normal DNA (P> 0/05).The results of study indicate that significant effects of vitamin E on rat's weight gain, epididymal sperm titers and dramatically reduce the toxic effects of lead on sperm death

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ANTICONVULSANT EFFECT OF HYDRO-ALCOHOLIC EXTRACT OF *NIGELLA SATIVA* ON SEIZURES IN PENTYLENETETRAZOL-INDUCED KINDLING MODEL IN MALE MICE

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With respect to epilepsy prevalence and the fact that some of the patients remain refractory to available antiepileptic drugs, design of suitable drugs, without unwanted side effects is necessary [1]. The use of plant extracts to treat diseases is proposed as a therapeutic modality. Nigella sativa (NS) has been used for a long time in traditional medicine for some of nervous disorders like epilepsy. The aim of this investigation was to provide a scientific basis for traditional use of NS in epilepsy [2]. A total of 60 male NMRI mice weighing 25-30 g were randomly divided into six groups including: 1. PTZ, 2. positive control (PTZ and valproate 150mg/kg, as an anticonvulsant drug), 3 to 5. Mice received NS extract at three doses of 200, 400 and 800mg/kg, and 6. Mixed group which received NS (200mg/kg) and valproate (100mg/kg) i.p. All groups were kindled by 11 injections of PTZ (35mg/kg) with an interval of 48 h. In the 12th injection, all groups were tested for PTZ challenge dose (75mg/kg). The phases of seizure (0-6), threshold and duration of second and fifth phases were observed for 30 min after PTZ injection [3]. Data analysis showed that NS could reduce intensity and duration of seizures. In addition, there was no phase 5 following NS treatment. Anti-epileptic effect in mix group was not more than the NS group. Antiepileptic effect of chronic administration of NS was established and it was more effective at a dose of 200 mg/kg than doses of 400 and 800mg/kg. Meanwhile, NS could reduce seizure phases better than valproic acid.

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STUDY OF MEDICINAL PLANTS OF THE HOLY QURAN

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Quran is a comprehensive research book and higher studies, new facts have been discovered. Many botanical name is given in the Qur'an that surprising facts about the uses of these plants have been discovered. In this study, based on the medicinal properties latest research and medical purposes have been investigated some of these plants. In this study, Have used known databases (Medline, Embase, Cinahl, Biomedcentral, Pubmed, Science Direct, SID) Related search for resources using keywords (Medicinal plants, Quran, medical and scientific names of plants) and their Persian equivalents. The data were analyzed and prepared. Each of the plants mentioned in the Holy Quran (onion, manna, figs, grapes, garlic, lentils, olives, ginger, etc.) with unique properties that are in this study Quran names, scientific names, doctors discovered their application forms have been described in detail. Knowledge of the Holy Quran in describing this issue is addressed That contribute to the health of body and soul, as well as knowledge about plants and their medical expenses can be paving the way for intensive research and discovered chemicals used to make drugs are needed for a variety of diseases.

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PHARMACOLOGICAL PROPERTIES OF HONEY IN THE QURAN

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Honey known as a preventive and therapeutic substance of the disease and in the Holy Quran is mentioned as a healing of this substance. Also dedicated a chapter in the Quran. In this paper, there are the benefits of honey in modern medicine and the Quran in the use and application of honey and aim is to help investigate the clinical applications and honey hygienic in this study. In this study, Have used known databases (Medline, Embase, Cinahl, Biomedcentral, Pubmed, Science Direct, SID) Related search for resources using keywords(Antimicrobial, Anti-Oxisant Wound Healing , Eys disorders, Hony, Gastric ulser) and their Persian equivalents. Honey is healing for humans in the Quran, and the rhetoric of healing is used only for honey as an edible. Also Scientists have discovered to honey have the effects of anti-cancer, anti-inflammatory, immune system and wound healing, cough and more. Due to the effects of honey seized and to invoke the Holy Quran has confirmed, Therefore, we can further clinical research to obtain the best outcome for the use of this substance.

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INTERACTION OF SALICYLIC ACID AND SALINITY ON ESSENTIAL OIL COMPONENT AND PHYTOCHEMICAL CHARACTERISTICS OF LAVENDER (*LAVANDULA ANGUSTIFOLIA*)

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The aim of this study was investigated the interaction of different treatments of salicylic acid and salinity on essential oil component of lavender. In this study, three levels of salinity (50, 100, and 150 mM) was used. Also Salicylic acid treatments were used as foliar sprayed at three levels (200, 400 and 600 mg/L). Regarding treatments, 48 components were identified in essential oils which the main essential oil components were borneol, camphor and β-Phellandrene. The borneol (9.9%) and camphor (20.10%), at the salinity of 50 (mM) and 100 (mM) reached to their maximum respectively while β-phellandrene (20.97%) in the salinity treatment of 150 (mM) reached to its maximum. The major compounds in interaction of various treatments of salicylic acid and salt were, β-phellandrene, borneol, camphor, epi-α-cadinol and 1,8 cineole. The β-phellandrene (0.32%) and camphor (13.83%) in the treatment of the interaction of salinity 50 (mM) and 200 and 600 (mg/L) salicylic acid were highest amount. In the 150 (mM) salt and 600 (mg/L) salicylic acid treatment the borneol (21.26%) was highest. The results show that the lowest concentration of chlorophyll a and b occurred in the interaction of 200 (mg/L) salicylic acid and salinity on 150 (mM). The results showed that the salinity of 150 (mM) and salicylic acid 200 (mg/L) carried an increase in the uptake of Na while K and Ca concentrations in the highest salt concentration were decreased. In this study, Cheloregenic acid, Qercetin, Narengenin and Caffeic acid was measured. Cheloregenic acid was highest at 400 (mg/L) of treated salicylic acid while at the salinity of 150 (mM) and 600(mg/L) SA it showed the lowest value. Interaction between Salt and 600 (mg/L) salicylic acid treatments were the more effective concentration [1, 2].

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THE USE OF HERBS AND SUPPLEMENTS IN THE TREATMENT OF HEPATITIS

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In Asian countries, especially India and China can be used of natural products and supplements, herbal medicines for the treatment of liver disorders and hepatitis have a long time. At present, the Chinese herbal formulas used in western countries for treatment of the condition. In this study, are discussed plants and complementary medicine for the treatment and control of hepatitis. In this study, Have used known databases(Medline ,Embase , Cinahl , Biomedcentral, Pubmed,Science Direct, SID) Related search for resources using keywords(Hepatitis, herbal medicine, phyto-sterols, catechin, green tea, D-alpha tocopherol ,Schizandra ،Liquorice ،phyllantus ، Artichoke , Reishi mushroom) and their Persian equivalents. Plants are known such as dandelion, plantain, chicory leaves, and brain artichokes and many other plants have liver protective properties. In liver disease and chronic viral hepatitis herbal remedies are effective in several ways including: Protect liver cells against toxins and viruses, enhance the body's immune system, stimulates bile secretion and compensation. Interferon and antiviral drugs used for the treatment of hepatitis drugs and medicine. But today, due to the high cost and lack of success in some cases require a less costly and without undesirable side effects. Therefore, most researchers, practitioners and authorities in the use of complementary and herbal medicines, it is essential for the control and treatment of hepatitis.

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A STUDY ON THE EFFECT OF *CITRULLUS COLOCYNTHIS* EXTRACT ON THE APOPTOSIS OF CANINE MAMMARY TUMOR CELLS USING FLOW CYTOMETRY

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Mammary tumors are the most common tumors among female dogs. According to extensive research in the field of cancer treatment, the numbers of chemicals which are used to treat cancers (including breast cancer) are increased considerably. The high costs of some of these chemical compounds, unresponsiveness of some neoplasms to the compounds, drug resistance and side effects are among the factors which necessitates further studies to identify new safe drugs (especially herbal ones). In the present study to determine the effect of Citrullus colocynthis extract on canine mammary tumor cell, the cell line was obtained from Pasteur Institute, Tehran, Iran and was cultured according to the standard protocol. Citrullus colocynthis extract was obtained using percolation technique. The cell line was cultured in 96-well plates and treated with the extract at concentrations of 20, 40, 60, 80 100 microgram/ml and the results were evaluated by colorimetric method (MTT) after 48 hours. The MTT diagram was drawn at the next step and IC50 was calculated as 72 microgram/ml. Cells were treated with IC50 concentration and then were stained with Annexin-V and PI. Flow cytometry was used to study the effect of the extract on apoptosis induction and decrease in tumoral cells growth. The results showed a significant ($P<0.05$) dose-dependent effect of Citrullus colocynthis extract on canine mammary tumor cells at concentrations of 40, 60, 80 and 100 microgram/ml compared to the control group. The results of flow cytometry indicates the impact of the plant extract on apoptosis rate which was significant ($P<0.05$) compared to negative control (ethanol treated).

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EFFECT OF *TRIGONELLA FOENUM GRAECUM L.* ON DIABETIC RAT MEMORY

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Diabetes mellitus can impair the processes relevant to learning, memory and cognition in humans and laboratory animals. Considering the evidences on the curing effects of fenugreek on diabetes and its role in strengthening memory and mental health, this study investigated chronic administration of intraperitoneal of aqueous extract of fenugreek on learning and memory and oxidative stress in the hippocampus in diabetic rats. In this study, 24 male rats were divided into 4 groups, 6 rats each one. Group I or control group: a simple nutrition (injection of normal saline). Group II or diabetic, diabetic with streptozotocin 60 mg / kg and nicotine amide 110mg / kg. Group III: diabetic treated with aqueous extract of fenugreek (8mg / kg / day), the Group IV: diabetic treated with aqueous extract of fenugreek dose (2mg / kg / day. After four weeks of treatment. Glucose was measured by glucometer. Total antioxidant capacity measured by FRAP (Ferric Reducing Antioxidant Power) assay. Malondialdehyde was determined by the Spectophotometeric method. Also, each of the groups were tested by water maze and shuttle box in order to check the memory. Treating diabetic rats with aqueous extract of fenugreek caused significant reduction ($P<0.01$) in their weight compared to diabetic rats group, increasing the level of total antioxidant protein($P<0.001$ and decreasing the amount of lipid peroxidation(Group III $P<0.01$, Group IV $P<0.001$)) in the brain tissues .The results of studying spatial memory by water maze showed that the amount of time it takes for the animal to find the hidden platform (escape latency) ($P<0.001$), the distance to find a hidden platform (travel distance) ($P<0.001$), and the time remaining in the target quadrant (time in target quadrant) ($P<0.01$) in the treatment group was significantly lower compared to the aqueous extract of fenugreek diabetic one. The results of Passive-avoidance response and memory with shuttle box showed that the aqueous extract of Fenugreek can reduce the time of remaining in a dark room ($P<0.01$), as well as a significant reduction in Latency Time ($P<0.01$) in treated rats compared to diabetic. Administration of *Fenugreek* is effective in the capability of maintaining information in the memory stores and reminding them and also increased antioxidant activity in the diabetic rats with concentration related manner. It seems that high content of phenolic which are antioxidants, could affect memory improvement.

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EFFECT OF CINNAMON ON SPERM PARAMETERS IN DIABETIC RATS

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Cinnamon is one of the most ancient and well-known medicinal plants, and its role in the treatment of a wide range of diseases has been studied [1-3]. The purpose of this study was to investigate the effect of *Cinnamon* on spermatogenesis, total antioxidant and MDA levels in male diabetic rats. In this experimental study, 24 male Wistar rats weighing approximately 200 gram were used. The rats were randomly divided into 4 groups of six each: group 1: control group(fed with normal diet); Group 2; diabetic with streptozotocin 60 mg / kg and nicotine amide 110mg / kg(fed with normal diet); Group 3: diabetic(fed with 8gram cinnamon /kg diet); group 4: diabetic (fed with 2gram cinnamon /kg diet. This treatment continued for 4 weeks. Blood glucose, total antioxidant capacity, malondialdehyde and sperm profiles were determined. Results were evaluated with SPSS and Tukey test. Blood glucose in diabetic rat which received cinnamon, significantly reduced compared with diabetic animals ($p<0.001$). Cinnamon also led to reduction of body weight ($p<0.001$) and malondialdehyde (MDA) levels ($p<0.001$). On the other hand, Cinnamon increased total antioxidant capacity ($p<0.01$) and normalized sperm profiles ($p<0.01$). According to the results of this study it can be concluded that consumption of Cinnamon extract reduce malondialdehyde (MDA) levels, body weight and normalized sperm profile and thus can be used to treat sexual dysfunction in males.

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CONTACT AND FUMIGANT TOXICITY OF *CINNAMOMUM VERUM* ESSENTIAL OIL ON *TUTA ABSOLUTA* (LEPIDOPTERA: GELECHIIDAE)

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Tuta absoluta (Meyrick) (Lepidoptera: Gelechiidae) is one the most important insect pests of plants family of Solanaceae, especially tomato. This insect can cause up to 80–100% of yield losses in both greenhouse and open-field tomato production, if no control measures are taken. Due to the negative effects of insecticide use, many researchers have been considering another ways to control this pest. In the current study, an alternative solution based on the use of natural products as "bio-insecticide" has been suggested. Thus, the toxicity of essential oil of *Cinnamomum verum* was evaluated against larvae of *T. absoluta*. The aerial parts of the plant were obtained from Medicinal Plants and Drugs Research Institute of Shahid Beheshti University. Essential oil from *C. verum* was obtained by hydrodistillation with in situ steam generation in a Clevenger apparatus. Extracted essential oils were dried via anhydrous sodium sulphate. Toxicity of the essential oil against the fourth instar larvae of *T. absoluta* was evaluated by contact and fumigation method into small boxes (4.5×5×7 cm^3) at 25±1°C, 60±5% RH and photoperiod of 16:8 h light and dark. The experiments were replicated four times with at least 10 larvae in each replicate. In the contact method, essential oil solution was diluted with acetone and each larva was treated with 0.5 µl of every one using a micropipette. On the other hand, in the fumigant assay, different volumes of the essential oil were set on a filter paper (1 cm^2) pasted inside the door of the experimental boxes. Mortality was recorded after 24 hours post treatment. Probit analysis was done using polo-plus software. The Results showed that the LC_{50} value of *C. verum* in the contact method was 39201 (30822-39299) μgL^{-1} and in fumigation test showed 38.678 (35.210-41.524) μlL^{-1} (air), respectively. Also, concentrations caused 90 percent mortality in fumigant and contact tests were 53.707 (49.146-62.695) μlL^{-1} (air) and 122678 (72073-583710) μgL^{-1}, respectively. Chemical constituents of the oil had been determined previously by gas chromatography/mass spectrometry and twenty five components were identified where cinnamaldehyde, linalool, cinnamaldehyde para-methoxy, eugenol and trans-caryophyllene were the major constituents. In the previous study, *C. verum* had been one the most powerful essential oils among 34 essential oils were tested for their nematicidal activities. Likewise, in this study, the essential oil extracted from *C. verum* had potential to be employed effectively, against *T. absoluta*.

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MEASURING LETHAL TOXICITY OF *THYMUS DAENENSIS* CELAK AND *ZATARIA MULTIFLORA* BOISS ESSENTIAL OILS ON *TUTA ABSOLUTA* (LEPIDOPTERA: GELECHIIDAE) USING TWO DIFFERENT BIOASSAY METHODS

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Botanical insecticides are an attractive alternative to synthetic chemical insecticides in modern agriculture due to its safety for human health and non-target organisms. Plants produce secondary low-molecular metabolites act as defense barriers against phytophagous insects. In this study, short-term effects of essential oils extracted from *Thymus daenensis* Celak and *Zataria multiflora* Boiss were examined on survivorship of the tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), a key pest of Solanaceae crops, causing severe loses (up to 80–100%) in product and market favoring. The plants had been taken from Medicinal Plants and Drugs Research Institute of Shahid Beheshti University. Essential oils from both plant materials were extracted by hydrodistillation using a Clevenger apparatus, after air drying. Extracted essential oils were dried via anhydrous sodium sulphate. Toxicity assays were conducted using contact and fumigation methods against the fourth instar larvae of the tomato leaf miner. Experimental units were small boxes (157.5 cm^3) keeping under laboratory conditions (25±1°C, 60±5% RH and photoperiod of 16:8 h light and dark). In the contact method, 0.5 µl volume of every essential oil solutions (1778, 4073, 9332, 21379, 50000 mgL^{-1} in *T. daenensis* and 3090, 6165, 12302, 24547, 50000 mgL^{-1} in *Z. multiflora* treatments), diluted with acetone was put on dorsal section of each larva of the two treatments using a micropipette. Also, in the fumigant assay, different volumes of the essential oils (25.47, 28.15, 31.21, 34.58, 38.21 µl/L air, in *T. daenensis* and 15.92, 19.10, 23.63, 28.79, 38.21 µl/L air, in *Z. multiflora* treatments) were set on a filter paper (1 cm^2) pasted inside the door of the experimental boxes. Control in contact test was treated only by acetone, but in fumigant experimental control, there wasn't applied any solution or solvent. Mortality was calculated after 24 hours and Probit analysis was done using polo-plus software. Both experiments were replicated three times. LC_{50} and 95% confidence interval in *T. daenensis* and *Z. multiflora* treatments in the contact method illustrated, 11284 (7269-21347) and 11130 (8975-13586) mgL^{-1}, respectively. But 50 percent mortality produced in *T. daenensis* and *Z. multiflora* treatments in fumigant assay were 26.46 (24.70-27.64) and 25.25 (23.37-27.52) µl/L air respectively. Thus, the essential oils extracted from *T. daenensis* and *Z. multiflora* can be considered as two powerful bio-insecticides with similar lethal effects against *T. absoluta* in the contact and fumigation manners and show efficient functions in the integrated pest management programs.

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COMPARISON OF ESSENTIAL OILS EXTRACTED FROM SEVERAL *SATUREJA* SPECIES ON THE TOMATO LEAF MINER LARVAL SURVIVORSHIP UNDER LABORATORY CONDITION

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Essential oils modes of action are varied including inhibition of molting and respiration, cuticle disruption, decline in development and fecundity, and negative effect on the octopamine pathway and are good candidates for insect pest management. The genus *Satureja* (Lamiaceae) are widely distributed in Mediterranean areas, Asia, and North America, constitutes about 200 species of often aromatic herbs and shrubs. This genus is represented in the flora of Iran by 16 species. *Satureja* secondary metabolites are mostly terpenoids, such as carvacrol, γ-terpinene, thymol, *p*-cymene, ß-caryophyllene, linalool, etc. Volatile activity of plant essential oils had been subject of many studies about the plant secondary metabolites and in this study, fumigant assay of three medical plants from family of Lamiaceae, i.e. *Satureja khuzestanica*, *S. rechingeri* and *S. bakhtiarica* were examined against a destructive pest in tomato crops, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae). The *Satureja* species identified and screened by Medicinal Plants and Drugs Research Institute of Shahid Beheshti University. Essential oils were extracted according to Aslan et al. using a Clevenger apparatus and after drying by anhydrous sodium sulphate, were stored at 4 °C in darkness. For evaluation of fumigant toxicity of the substances on the fourth instar larvae of *Tuta absoluta*, different volumes of the essential oils were put on a piece of filter paper (1 cm^2) pasted inside the door of the experimental boxes (157.5 cm^3). At least, 10 larvae were used in each replicate and the experiment replicated four times in the laboratory condition (25±1°C, 60±5% RH and photoperiod of 16:8 h light and dark). The control was conducted in a similar procedure, but without essential oils. Mortality was recorded after 24 hours post treatment. Probit analysis was done using polo-plus software. According to the data, LC_{50} value of *S. khuzestanica*, *S. rechingeri* and *S. bakhtiarica* was 17.53 (15.77-18.25), 34.34 (32.48-35.39) and 25.08 (21.71-31.80) μlL^{-1} (air), respectively and LC_{90} was estimated 28.85 (24.79-39.76), 42.44 (39.93-50.03) and 46.59 (35.32-94.55), respectively. The slope curves (± SE) were also showed as 5.92 (± 1.18), 13.94 (± 3.44) and 4.76 (± 0.77) in *S. khuzestanica*, *S. rechingeri* and *S. bakhtiarica*, respectively. Thus, *S. khuzestanica* had the most toxic effect on T. absoluta, but *S. rechingeri* had severe mortality on the larvae in a limit range of concentrations (33.12, 34.20, 35.79, 37.51 and 39.49 μlL^{-1} (air)).

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HOW DETOXIFICATION SYSTEM OF *TUTA ABSOLUTA* WORKS AGAINST SEVERAL MEDICAL PLANTS ESSENTIAL OILS, IN VIVO

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Essential oils (EOs) are complex compounds formed by aromatic plants as secondary metabolites, which are volatile and characterized by a strong odor. Recently, the use of essential oils in pest management programs has been noticeable, strongly. In insects, esterases represent very interesting enzymatic systems carrying out detoxification mechanism due to their involvement in change of xenobiotics to nontoxic materials. Carboxylesterases (CarEs, EC 3.1.1.1) are large and diverse groups of hydrolases that hydrolyze numerous substrates including esters and certain non-ester compounds. On the other hand, Acetylcholinesterase (AChE, EC 3.1.1.7.) is an important enzyme responsible for the rapid hydrolyses of acetylcholine at the cholinergic synapses, representing a biomarker of neurotoxicity widely used for identifying exposure to anticholinesterase chemicals. In this study, the fourth instar larvae of *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), one of the most harmful pests of solanaceous crops, were exposed to the sublethal concentrations (10.65, 27.79, 13.50, and 21.29 µl/L air) of several essential oils extracted from *Satureja khuzestanica*, *S. rechingeri*, *S. bakhtiarica*, and *Thymus daenensis*, respectively (all from family of Lamiaceae) through a fumigant toxicity assay. These concentrations caused 10 percent mortality in the individuals during 24 hours (in 25±1°C, 60±5% RH and photoperiod of 16:8 h light and dark). After exposure, survival larvae were collected for the enzyme assay. Carboxylesterase assay was conducted by two substrates of α- and β- naphthyl acetate (NA) according to Rahmani and Bandani procedure and AChE assays was done basically according to Ellman et al. The experiments were conducted in three replicates under the above condition. Significance of biochemical results was obtained by randomized one-way ANOVA and the means were compared by Tukey's Studentized Range Test, admitting significant differences at $P<0.05$. The SAS software (version 9.1.3) was used for all analyses. In vivo assays showed that AChE in the low concentration, has been inhibited significantly by *T. daenensis* (df=14, 4; F=5.26; P= 0.0152). However, Carboxylesterase activity of the leaf miner larvae was increased in the treatments significantly when α-NA was used as a substrate (df=14, 4; F=3.62; P=0.045). However, there wasn't any significant changes in this enzyme when β-NA was used as a substrate (df=14, 4; F=3.10; P=0.066). 24-hour post-treated insects with all the EOs were subjected to the native-PAGE electrophoresis in order to study their carboxylesterase. Results showed that there were four esterase isozymes didn't changed clearly in comparison with the control, maybe because of using mixture of both substrates.

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THE EFFECTIVENESS OF THE BIOLOGICAL ACTIVITY OF ESSENTIAL OILS FORM FOUR SPECIES OF APIACEAE AGAINST *TRIBOLIUM CASTANEUM* HERBST

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The red flour beetle, *Tribolium castaneum* is major and cosmopolitan insect. Adults of *T. castaneum* is insatiable feeders on a great variety of grains. This study was conducted to estimate the insecticidal effect of essential oils from four species *Pimpinella anisum* L., *Foeniculum vulgar* Miller, *Coriandrum sativum* L. and *Petroselinum crispum* (Miller) A. W. Hill against *T. castaneum*. Bioassays were performed to determine the insecticidal activity of essential oils from four species of Apiaceae against the red flour beetle, *T. castaneum*. Mortality of insects were determined through fumigant toxicity. Bioassay were conducted with airtight exposure chamber in lab conditions (27±1°C, 75 ± 5% R.H., dark cycle: 12:12 h). Essential oils were obtained by Clevenger-type water distillation. The LC_{50} after 24 h for *P. anisum* and *F. vulgar* were 43.57 and 91.28 µL/L air, respectively. At the 86µL/L air dose level, *P. anisum* and *F. vulgar* essential oil caused 100 and 36% mortality of *T. castaneum* adults within 24 hours of exposure, respectively. Based on the LC_{50} values, the essential oils from *P. anisum* and *F. vulgar* were the most active against *T. castaneum* than the essential oils from *C. sativum* and *P. crispum*. The results suggested that essential oil of *Pimpinella anisum* L. could be used as a potential bio-control agent for stored-product insects [1, 2].

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ANTIBACTRIAL ACTIVITY OF HYDRO-ALCOHLIC EXTRACT *ASTRAGALUS VERUS* OLIVIER (BLACK MILK VETCH) ON *ESCHERICHIA COLI AND STAPHYLOCOCCUS AUREUS* IN KURDISH ETHNOMEDICINE

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Astragalus verus Olivier, has been used as an immuno promoting remedy in Kurdish ethno medicine, Asia (traditional medicine) On the other hand anomalous applying of chemical drugs has resulted in resistant microbe development .Plants and their derivatives have potentials to be used instead of chemical drugs, while their side effects are less and aim of present survey was to determine antibacterial effects of extract [1]. To achieve the aims, in this study hydro- alcoholic extract of Astragalus verus oliver(black milk vetch) was used.The Aerial flowering parts of plant were collected from Mountains at Krmansha Province and air-dried in the shade. The air dried parts were subjected the extract were prepared in different dilutions (800, 400, 200, 100, 50 and 25 mg/ml) applied on *Escherichia coli (ATCC10536)* and *Staphylococcus aureus (ATCC25923)* by Macro broth dilution and Disk diffusion methods. Tetracycline, Vancomycin and distilled water were used as positive and negative control respectively. Minimum inhibitory concentration (MIC) and Minimum bactericidal concentration (MBC) were determined. Based on the results, MICvalue extract is reported at 400 mg/ml for E. coli. About *S. aureus, astragalus verus* olivier2*00*, 400 and 800mg/ml dilutions could prevent from its growth. Thus, 200 mg/ml is considered as MIC and 800 mg/ml is calculated as MBCvalue. Disk diffusion test results showed Average Diagonal zone of growth inhibition dilution to200,400 and 800mg/ml Extract, were respectively, 11/19±0/51, 11/23±0/50, 12/64±0/57 mm and Vancomycin 19±0/33 mm for S. aureus and9/33±0/57, 9/66±0/57mm (400&800mg/ml) and Tetracycline17±0/39mm for E.coli. The results showed ‹Diagonal zone of growth inhibition increased with increas concentration. The extract was observed inhibition zone diameter have the greatest impact on S.aureus (12/64±0/57 mm) and had the least impact on E. coli (9/66±0/57mm). The results achieved in this study showed that: Astragalus verus Olivier extract has growth inhibitory impact on both *E. coli* and *S. aureus* (*S.aureus* is known as more sensitive to the extract than *E. coli).*

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STUDY ANTIBACTRIAL EFFECT OF POLYSACCHARIDE EXTRACT *ASTRAGALUS VERUS* OLIVER *(RASHA GAVAN)* IN KURDISH ETHNOMEDICINE ON *ESCHERICHIA COLI AND STAPHYLOCOCCUS AUREUS*

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The genus Astragalus, Fabaceae family, comprises more than 2, 500 species; of these, Astragalus verus Olivier, known as black milk vetch or Rasha Gavan in Kurdish ethnomedicine, is a medicinal plant that originated in Northwest Persia and Asia Minor. Astragalus species are natural medicinal factories that produce various bioactive compounds with different properties (saponins, falvanoids, fatty acids, alkanes, and various aliphatic and aromatic terpenoids). The Kurds used Astragalus verus as a remedy to enhance the body's natural defense mechanisms against several diseases.aim of the present study was to determine antibactrial effects polysaccharide extract, which could be related to the traditional usage. The Root parts A. verus were collected from Mountains at Kermansha Province of Iran and air-dried in the shade. polysaccharide extract of *A. verus* were prepared by boiling powder in distilled water at 50°C for 12 h and allowed to cool for 45 min. The contents of the flasks were dried in a rotary evaporator to obtain the extract (POL,3. 7 g, 5.11 % w/w).The method agar diffusion and Disk diffusion, MIC and MBC of dilution series were used in Mueller Hinton Broth.The various concentrations of extract(800,400,200,100,50 and 25mg/ml) prepared and applied on E.Coli(ATCC10536), *S. aureus* (ATCC25923). Tetracycline, Vancomycin and distilled water were used as positive and negative control respectively. Disk diffusion test results showed Average Diagonal zone of growth inhibition dilution to 25, 50, 100, 200, 400 and 800 mg/ml Extract ,were respectively 8±0/50, 8±0/50, 9±0/57, 11/33±0/57, 11/66±0/57,12/66±0/57 mm and Vancomycin19±0/33mm for S. aureus and 7±0/50 ,7±0/22, 7±0/57,8/33±0/57, 9/66±0/57, 10/66±0/32 mm and Tetracycline17±0/39 mm for *E.Coli*. The results showed ‹ Diagonal zone of growth inhibition increased with increas concentration. The extract was observed inhibition zone diameter have the greatest impact on S.aureus (12/66±0/57 mm) and had the least impact on *E. coli* (10/66±0/32mm). Moreover, MIC value for *S. aureus* 200, 400, 800 mg/ml andforE.coli800mg/mlhave been showed. The results achieved in this study showed that *Astragalus verus* Olivier polysacharid extract have Antibacterial Activity and growth inhibitory impact on both E. coli and S. aureus (*S.aureus* is known as more sensitive to the extract than *E. Coli*).

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THE STUDY OF GERMINATION STAGE IN *CARTHAMUS TINCTORIUS* AND *CICHORIUM INTYBUS* L.UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Carthamus tinctorius* and *Cichorium intybus* L., this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 4 levels of salinity (control, 2 dS/m, 4 dS/m, 6 dS/m). The results showed that salinity levels hadn't effect on germination percentage, radical and plumule length and fresh weight. The increase of salinity did not reduce the germination percentage and radical and plumule length and fresh weight significantly. Since the classification of saline soils begins from 40 mM [1], so *Carthamus tinctorius* and *Cichorium intybus* L. can be known as a tolerant plant to salinity in germination stage.

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ANTIBACTERIAL EFFECT EVALUATION OF METHANOL EXTRACT LICHENS *PHYSCIA CAESIA*, *COLLEMA CRITATUM* AND *ALTHAEA OFFICINALIS* PLANT COLLECTED IN ILAM ON SOME PATHOGENIC BACTERIA

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Having side effects of chemical drugs, the use of herbal medicines is growing [1] *Althaea officinalis* plant mallow dark as anti mucuc and softener respiratory tract used flowers and roots this plant as anti disinfection dermal wounds traditional consumption [2]. Lichens produce secondary. metabolites the “lichen substances”, which comprise depsides, depsidones, dibenzofurans, xanthones and terpene derivatives. Lichens and their metabolites havemanifold biological activity: antiviral, antibiotic, antitumor, allergenic, plant growth inhibitory, antiherbivore,ecological roles and enzyme inhibitory the purpose of this study antibacterial effect evaluation of methanol extract lichens physcia caesia, collema critatum and althaea officinalis plant collected in ilam on some pathogenic bacteria. Lichens and A. officinalis plant collected from different parts of Ilam province methanol extract which were prepared using the soxhlet device extracts. The alcoholic extract lichens (*physcia caesia*, *collema critatum*) and Althaea officinalis their antibacterial activity at 5different concentrations (25, 50, 100,200,400, mg/ml) was determined by disk-diffusion agar method and the dilution method on، pathogenic (*E. coli*, *P. aeroginosa*, *V. cholera*, *Bacillus cereus Staphylococcus aureus*, *Klebsiella pneumoniae*, *Listeria monocytogenes*, *Salmonella typhi*. The antibiotics Tetracycline and Gentamicin and Erythromycin as a positive control and dimethyl sulfoxide (DMSO) 10% was used as negative control and the MIC and MBC were determined. The results of this study showed that were no statistically significant differences in *V. cholera* in different *Althaea officinalis* L concentrations and E.coli least sensitive ratio *Althaea officinalis* L. The results showed of bacteria *P. aeroginosa* highest sensitivity and Listeria monocytogenes least sensitive ratio *Physcia caesia*, and *V. cholera* cerotype ogava Most sensitive and *Bacillus cereus* lowest sensitivity ratio lichen Collema critatum. amount MICand MBC respectictively for *Althaea officinalis* L, 200 mg/ml، 400 mg/ml) and for *Physcia caesia*, 100 mg/ml، 200 mg/ml and for *Collema critatum*. Respectictively 100 mg/ml، 400 mg/ml). Extrac the lichens (*Physcia caesia*, *Collema critatum*) and *Althaea officinalis* L can be used as antibacterial as products used in the treatment of infections Caused by bacteria.

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THE VOLATILE CONSTITUENT ANALYSIS OF *DIGITALIS PURPUREA* FROM IRAN

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Digitalis purpurea is a species of flowering plant in the genus Digitalis, in the family Scrophulariaceae, native and widespread throughout most of temperate Europe [1]. Digitalis purpurea is an herbaceous biennial or short-lived perennial plant. The plants are well known as the original source of the heart medicine digoxin (also called digitalis or digitalin) [2]. There is some report in which some biological activity was appeared from essential oils of other speciesof this plant. Then analysis of essential oil of this plant could lead to introduction of new source. In this study we investigate essential oil composition of aerial parts (flowers and leaves) of this plant. The essential oil was obtained by hydro distillation method for 3 hours and their chemical components of essential oil were identified by GC/MS. Our results show 65 and 59 components could be identified in the essential oil obtained from leaves and flower of *Digitalis purpurea* which constituting approximately more than 95% of the oil. Based on the GC/MS data, the main components of oil from leaves was phytol isomer, pentadecanone, 6, 10, 14-trimethyl, nonacosane, methyl dodecanoate, thymol and 1, 8-Cineole while oil from flowers was rich in teracosane.

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THE VOLATILE CONSTITUENT ANALYSIS OF *FRANGULA GRANDIFOLIA* FROM IRAN

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Frangulagrandifoliais a medicinal plant in the family Rhamnaceae. It is a native medicinal plant of Iran. The dispersion of this plant is north of Iran. It has two specieswhich are shrubplant that especially grows in forest area. It is perennialplant which in third years could reach to flowering step of life.There is some report in which some biological activity was appeared from essential oils of other speciesof this plant.Then analysis of essential oil of this plant could lead to introduction of new source. In this study we investigate essential oil composition of aerial parts (leafs and young bark) of this plant. It was collected from 1100 meter of Gilan forest province in July 2015. The essential oil was obtained by hydro distillation method for 3 hours and their chemical components of essential oil were identified by GC/MS. Our results show 61 and 60 components could be identified in the essential oil obtained from leaves and flower of Digitalispurpurea which constituting approximately more than 95% of the oil. The main components of oil from root wereγ-Terpinenewhile oil from bark was rich in n-Decane, Menthol and epi-α-Cadinol.

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GREEN SYNTHESIS OF GOLD AND SILVER NANOPARTICLES USING AQUEOUS EXTRACT OF *AJUGA CHAMAECISTUS*

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Metallic nanoparticles show various applications in medicine, biology, biotechnology, and electronics [1]. Among the nanoparticles, silver and gold in particular have attracted attention as anti-microbials, therapeutics, biosensors, and catalysis [2,3]. Many methodologies have been used for the synthesis of nanoparticles, such as physical routs, chemical and photochemical reduction, electrochemical techniques and radiolysis methods. However, these methods are extremely expensive and potentially dangerous to the health and environment. Thus, from both environmental and economic points of view, preparation of nanoparticles *via* a simple method without any hazardous chemicals is highly desirable. This report presents a green synthesis of gold nanoparticles (AuNPs) and silver nanoparticles (AgNPs) by reduction of chloroauric acid and silver nitrate solutions, respectively, using aqueous extract of *Ajuga chamaecistus* aerial parts as a bioreducer and a stabilizer agent. This approach is simple, rapid, cost-effective and stable for a long time, reproducible at room temperature and in an eco-friendly manner to obtain a self-assembly of AuNPs and AgNPs. The resulting nanoparticles were characterized using UV–Vis, FE-SEM and XRD spectroscopic techniques. The formation of the AgNPs and AuNPs were confirmed by surface plasmon spectra using UV–Vis spectrophotometer and absorbance peaks at 425 and 540 nm, respectively. FE-SEM analysis revealed the shape of AgNPs being spherical morphology with an average size range of 20–25 nm, whereas the size of AuNPs is around 30 nm and the particles are spherical in shape. The effects of silver and gold ion concentration, extract quantity and reaction temperature were also investigated on nanoparticles synthesis.

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THE EFFECT OF DIFFERENT METHODS OF DRYING-SUN, SHADE AND OVEN ON THE CONSTITUENTS OF MEDICINAL PLANTS IN THE FLOWERING GOLDENROD "*SOLIDAGO CANADENSIS* "

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Solidago "Solidago canadensis" (known as Canada goldenrod or Canadian goldenrod) is an herbaceous perennial and long days to 30-120 cm height plant of the family Asteraceae native to northeastern and north-central North America but established as an invasive plant in other parts of the continent and in other countries as well. It is often grown as an ornamental in flower gardens.The plant is erect, often forming colonies, long, rod-like, alternate leaves, narrow, long, pointed, sessile and attached to the stem, and tiny yellow flowers at the stem end appear at the top of flowering plant. Flowers are small yellow heads held above the foliage on a branching inflorescence. This plant in Asia, South America and Europe grows, grown in a wide range of weather conditions and is highly resistant to heat and cold. Goldenrod flowering branches extract 60% having at least 2.5% of active ingredient "Hayprosyd" to supply drugs used to treat inflammation of the urinary tract. To investigate the effects of drying conditions on the active substance "Hayprosyd" was designed. This is a cross-sectional study. The project is a study population consisted of four Authentication sun drying methods (experimental and industrial samples), the terms and conditions Shadow Avon - were selected. At the time of flowering field, samples were harvested and dry conditions were defined. Three samples at random from the plant with sun dried sample was used for industrial applications. During these studies, statistical comparison was done by Duncan's multiple range test results showed that there is a significant difference between the methods of drying. Mean comparison showed that the oven method with the Hayprosyd 5.8% and 6.3% Hayprosyd shadow with no significant difference between the highest active ingredient in the drying method was found. However, drying in the sun significantly reduced active ingredient.

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462, 464, 895
THE STUDY OF GERMINATION STAGE IN *SILYBUM MARIANUM* AND *CALENDULA OFFICINALIS* AND *NIGELLA SATIVA* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Silybum Marianum* and *Calendula officinalis* and *Nigella Sativa*, this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 8 levels of salinity (control, 2 dS/m, 3dS/m, 4 dS/m, 5dS/m, 6 dS/m, 7 dS/m 8 dS/m). The results showed that salinity levels hadn't effect on germination percentage, radical and plumule length and fresh weight. The increase of salinity did not reduce the germination percentage and radical and plumule length and fresh weight significantly. Since the classification of saline soils begins from 40 mM [1], so *Silybum Marianum* and *Calendula officinalis* and *Nigella Sativa* can be known as a tolerant plant to salinity in germination stage.

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463, 894
THE STUDY OF GERMINATION STAGE IN *BORAGO OFFICINALIS* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Borago officinalis*, this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 4 levels of salinity (control, 2 dS/m, 3dS/m, 4 dS/m, 5dS/m, 6 dS/m, 7 dS/m), The source of salinity was prepared from Persian Gulf. The results showed that salinity levels had very significant effect ($P \leq 0.01$) on germination percentage. The increase of salinity up to 7 dS/m did not reduce the germination percentage plumule length and fresh weight significantly. The results showed that the highest germination percentage 100% was observed in 5 dS/m. Since the classification of saline soils begins from 4 dS/m [1], so *Borago officinalis* can be known as a tolerant plant to salinity in germination stage.

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EFFECT OF DROUGHT STRESS ON THE SHOOT ROSMARINIC ACID OF *MELISSA OFFICINALIS* L.

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Drought is one of the most common environmental stress that may limit agriculture production worldwide. Lemon balm is a perennial herb which is extensively used in pharmaceutics and food industries. Rosmarinic acid (RA) is an ester of caffeic acid and 3,4-dihydroxyphenyllactic acid. It is commonly found in the species of the Boraginaceae and the subfamily Nepetoideae of the Lamiaceae (petersen 2003). This matter has caused to increase the demand and price of the plant. Therefore, finding other plants containing high amount of RA is very important to introduce as new sources. Rosmarinic acid has been found in *Melissa officinalis*. In this study, *M. officinalis* seedlings planted in 12 pots were watered three times a week and water treatment applied to them after 33 days. In this way, the factors studied included 4 levels of water deficit stress that were T1 (100% field capacity), T2 (80% field capacity), T3 (60% field capacity) and T4 (40% field capacity). The amounts of rosmarinic acid in shoots had the highest content in T3 (60% field capacity). The highest amount of RA in T3 was 0.51744 µmol/gDW. In this treatment, the amount of rosmarinic acid has increased 23/25% in comparison with the control. According to our results, the use of lemon balm under drought stress especially 60% field capacity could useful for increasing of RA.

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530, 702
HISTOMETRICAL CHANGES OF MUSCULATURE OF DUODENUM AND BLOOD GLUCOSE LEVEL IN SURRI MICE FOLLOWING SOYBEAN CONSUMPTION

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The protein of soy bean has been resulted in many therapeutic attributes and during recent years researchers have interested in finding its other specifications [1, 2]. The objective of this study is surveying histometrical changes of duodenum and blood glucose level in the mice fed on soy bean. For this study a total of immature 30 female Surri mice were used. After adaptation with environment for one week, 20 mice were randomly selected and divided into two groups. The control group was fed with a diet without soy bean and the experimental group received a diet containing 20% soy meal. One day after the end of treatment the mice were anesthetized and blood samples for determination of the glucose rate were taken the heart. After euthanizing, from duodenum some histological sections were prepared, stained with H&E and mucosa and submucosa and muscles were histometrically studied by a light microscope connected to pc and equipped with Axiovision software. Then the data were analyzed statistically using ANOVA and the significant level was considered as P<0/05. The results of histometric studies showed that the thickness of submucosa in the groups consumed soy bean (443.5±61.7) had a significant increase compared with the control group (288.5±17.5), (P<0/05) .Whereas the thickness of mucosa in the group consuming a diet containing 20% of soy bean (1507.5±123.13) did not show any significant change compared with the control group (1482.7 ±65.6). Also thickness of muscular wall in the groups consumed soy bean (167.3±18.2) a significant increase compared with the control group (72.8±7.35)was observed (P<0/05) .Also blood glucose level in the experimental group (62.58±6.47) compared with the control group (53.90±5.48) showed a significant decrease (P<0/05). Long term consumption of soy bean could cause significant changes in duodenal submucosa. Increase in thickness of lamina propria might be a compensatory reaction to reduction of cellular resistance which leads to more vessels for more rapid absorption. This change is dose dependent which in the higher dose, perhaps specific receptors for synthesis of protein have been resisted and lesser reaction has been deduced[3]. Also The thickness of muscular layers could be a compensatory reaction for increasing mechanical activity against decreasing enzymatic activity induced by soy bean. Also long term consumption of soy bean by decreasing blood glucose, might be useful for diabetics. However individuals with diabetes or with hypo glycosemia should be careful in soy consumption.

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SCIENCE KILLING OF

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Since physician paid attention towards the treatment of the disease and the survival of the human health, they discovered several medicines for various diseases. Therefore, in order to strengthen the effects and quick actions of the drugs they created different form of medicines like KHAMIREH, LA'AUQ, JAWARISH, MA'AJUN, SYRUP, DISTILLED EXTRACT, TELA', ZEMAD, etc. As well as an important form namely KUSHTA were also added in their research. The study of medical history shows that the KUSHTA has reached its present state in a long time. Some of the changes occur over the thousands of years in the nature on a matter, can be quickly done in the laboratory, but the experience and the laboratory results of the developed countries have shown that the results of such products are not similar to those which occurs naturally, Although they have the same chemical formula as diamond. Calcified products are divided into three categories: 1. Metals; 2. Non-Metallic minerals; 3. Animal components. Metals are calcified in two ways: a) oxidation, b) carbonization. These substances get converted into dust form under high temperature in such a way that no particle should be felt between two fingers when touched like eye Surmah. In fact these particles are converted into Nano size. Behind these processes, there are some main objectives such as; 1. To reduce drug heat and hardness, to bring softness to hard particles like alum, salt, orpiment, crab, similarly calcium rich compounds like eggshell, shell, snail, gems, and non-precious stones. 2. To reduce toxic effect of certain substances like scorpion. 3. Extraction of substances: as we know composition of all the livings, even human body contains certain elements like gold, silver, iron, etc. In fact such elements can be separated with the help of calcinations process. These elements have a lot of strength and essential functions and are very efficient in certain critical conditions. Before going under calcinations process, metals should get filtered and purified in order to increase their purity and separate useless and harmful substances, and this is done by certain plant juices and extracts. Calcinated medicines have certain benefits that among all other traditional medicines; no drug has been found to be superior to them. They are described as: 1. Very low dose of KUSHTA is more powerful and effective than the large doses of simple forms of traditional medicines. 2. Its uses to improve and strengthen the vital functions and build up the body. 3. Instead of other traditional medicines, its usage is very easy. 4. According to their power of influence and effects they are the most powerful. 5. They give satisfactory therapeutic results in chronic and sexually transmitted diseases. 6. Most of the KUSHTA causes increase in appetite and food absorption. 7. They are efficacious and have a very high absorption rate.

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OPTIMIZATION OF HPLC-FLD METHOD FOR ANALYSIS OF MYCOTOXIN IN HUMAN FOOD AND ANIMAL FEED BY IMMUNOAFFINITY TEST

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Nowadays one of the most important problem in using marine product by human is their toxic residue from marine bio toxin. Mycotoxins are the secondary metabolites of the mold fungi. To date, approximately 300-400 mycotoxins are known that 20 of them were found in food in amounts which were sufficient for harmful to human and animal. These toxins are produced mainly by five fungi genera: Aspergillus, Penicillium, Fusarium, Alternaria, and Claviceps. The aflatoxins are highly toxic and carcinogenic compounds which produce by Aspergillus [1]. In the present study, we optimized the analysis of Aflatoxins (B and G) by HPLC with fluorescence detection and post column UVE system. Chromatographic conditions include isocratic system with H2O/MeOH(45/55) as mobile phase on a C18 column (4.6 mm×250 mm, 5 µm) at flow rate of 1 ml min^{-1}. In this work sample preparation is validated for various sample import to Bandarabbas. Sample preparation included extract with MeOH/H2O (80:20) and purification with immunoaffinity column. The matrix-matched calibration graphs for Aflatoxins (B and G) were prepared by injecting the extracted blank spiked with increasing amount of standards at 3-5µg kg^{-1}levels, giving an acceptable linearity (R^2 = 0.999) over the test range. The comparison between blank and spiked sample peaks showed a minimum recovery 70% for Soybean meal and maximum 90% for Rice. The LOD and LOQ for Aflatoxin B1 were 0.018 and 0.059 ng ml^{-1}, respectively. Finally, we investigated the amount of Aflatoxin B1 and B2 in Calf milk replacer, Fish feed, Millet, Soybean meal, Poultry's Feed Concentrate and Aflatoxin B1, B2, G1, G2 in Rice. Maximum and Minimum level obtained (1.458ppb, ND) Afla B1 and (0.327ppb, ND) Afla B2 for Soybean meal and Calf milk replacer, respectively that all amount were lower on account of Iranian standard.

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CORRELATIONS BETWEEN HORTICULTURAL CHARACTERISTICS AND CHEMICAL VARIATIONS IN *DRACOCEPHALUM MOLDAVICA* (LAMIACEAE) LANDRACES FROM NORTH WEST OF IRAN

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The Moldavian balm (*Dracocephalum moldavica* L.), is an herbaceous essential oil producing and medicinal plant from *Lamiaceae* family (Dastmalchi *et al.*, 2007). Due to its strong effects on the gastrointestinal system and other parts of the body, *D. moldavica* has traditionally been used for treatment of some diseases e.g. stomach and liver disorders in folk medicine. Recently published reports have buttressed its sedative capacity, tranquilizer remedy (Martinez-Vazquez *et al*, 2012) and anti-Helicobacter pylori activity (Najafi *et al*, 2008). The present study was carried out to assess the genetic diversity in Iranian landraces (cultivated populations) of Moldavian balm based on some horticultural traits and essential oil characteristics and to find the correlations between them. Seeds of seven populations were provided from different areas of NorthWestern Iran, Included: West Azerbaijan province (*Naghadeh*, *Keshtiban*, *Topragh Ghalee*, and *Baghchajogh*) and East Azerbaijan province (*Hokm Abad*, *Jahangir* and *Shiraz valley*) and cultivated in the field conditions of Hamadan province. Sixteen horticultural traits were evaluated. Essential oils were extracted from the aerial parts using Clevenger and were analysed by Gas Chromatography-Mass Spectrometry (GC–MS). Based on the results, the landraces from *Shiraz valley* presented remarkably high mean values for plant height, number of nodes per stem and leaf length. The oil content in landraces varied from 0.03 to 0.12% (w/w). Among the tested *D. moldavica* landraces, *Hokm Abad* showed the highest essential oil content (0.12%). On the whole, 41 compounds were identified in essential oils. The dominant constituent for all landraces was Geranyl acetate (19.8%-45.5%) with an exception of *Naghadeh* (Geranial: 23.82%). The considerable correlations were found among some horticultural and phytochemical traits. According to the Pearson coefficients analysis, branch length was confirmed to be positively correlated (r = 0.559 and 0.594) to Geraniol and Nerol percent. The stem diameter was only horticultural character that had positive correlation with the main economical trait of the essential oil content. The present survey demonstrated a broad variety among horticultural traits and essential oil compositions of Moldavian Balm landraces from NorthWestern Iran. These findings could be a useful tool for indirect selection and breeding programs of *D. moldavica* [1].

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EFFECTS OF MYCORRHIZA ON YIELD COMPONENTS AND ESSENTIAL OIL PRODUCTION IN *PIMPINELLA ANISUM*

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The effects of inoculation with vesicular-arbuscular mycorrhizal (VAM) fungi *Glomus intraradices* and non-inoculation on root colonization, plant growth, agronomic characteristics, essential oil content and essential oil yield in *Pimpinella anisum*, were studied under field conditions. The experiment was carried out in a field conditions, in randomized complete block design with three replications. The VAM inoculation significantly increased the root colonization, number of umbel per plant, number of seeds per umbelet, seed yield, essential oil content and essential oil yield as compared to non-inoculated treatment. The effect of VAM inoculation on the root colonization, growth and seed yield of *Pimpinella anisum* was more pronounced, indicating *Pimpinella anisum* as a highly mycorrhizal dependent genotype. VAM inoculation most markedly increases the uptake of phosphorus. In fact; the VAM inoculation could significantly increase root colonization, growth, and essential oil yield in *Pimpinella anisum* for obtaining economic production under field conditions. Therefore, we conclude that the inoculation of arbuscular mycorrhizal fungi into *Pimpinella anisum* plants is a feasible alternative to increase the essential oil production and reduce the use of fertilizers required to obtain economic production of *Pimpinella anisum* under phosphorus-deficient soil condition [1].

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INFLUENCE OF IRRIGATION DISRUPTION ON AGRONOMIC CHARACTERISTICS AND ACTIVE SUBSTANCE OF ANISE

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Pimpinella anisum (anise) is one of the most important medicinal plants, which is used in drug industries. Drought stress, as a main abiotic stress, has a significant influence on growth and metabolic activities of medicinal plants species. In this study *Pimpinella anisum* was planted for the first time in Hamedan conditions with the aim of the evaluation of the effects of irrigation disruption on growth, essential oil content and essential oil yield of anise. Therefore, three irrigation treatments (irrigated plants till flowering stage, irrigated plants till seed filling stage, and irrigated plants till end of growing season as a control), were evaluated in a randomized complete block design (RCBD) with three replications. Results indicated that irrigation treatments had a significant effect on agronomic characteristics of anise. Irrigation disruption at the flowering stage significantly decreased, number of umbel per plant, number of seeds per umbelet, and seed yield as compared to control (full irrigated plants). Also, results indicated that anise seeds essential oil percentage was affected significantly by irrigation treatments. Anise seeds which were obtained from full irrigated plants (control) had lower essential oil content than from the other two irrigated plants. On the other hands, irrigation disruption in flowering and seed filling stages increased the anise seeds essential oil content. As, means comparisons for essential oils showed that essential oil content which was 4.04 percentage in irrigated plants till flowering stage, was reduced significantly to 3.37 percentage in the irrigated plants till end of growing season (control treatment). However, there was no significant difference between both irrigated plants till seed filling and end of growing season stages for essential oil content [1].

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633, 636

REVIEW AND COMPARE PHENOLS AND FLAVONOIDS IN PLANT AND CALLUS (*ARTEMISIA AUCHERI* BOISS) IN THE FACE OF STIMULI LIGHT AND UV RADIATION IN VITRO CULTURE

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Climate factors affect on the production secondary metabolites in plants. Phenols and flavonoids are the most important secondary compounds of plant. In this paper, the objective was to evaluate the effect of light with different frequencies on the production phenols and flavonoids in plant *Artemisia aucheri*. For culture was used of solid culture Murashing and Skoog without growth regulators. Lighting conditions was used of optical radiation 1000.2000 and 3000 lux. In addition it was assumed treatments UV and darkness. For analyzing data and drawing diagrams of software SPSS version 20 and Excel programs were used. During the experiment, the resulting data, the average of three replicates ± SD and results based on one-way ANOVA test, Tukey test and a significant difference on the 0.05 P ≤, were investigated. For detection of artemisinin, the dichloromethanolic extract was analyzed by TLC. Measure phenolic compounds and flavonoids were done into spectrophotometric method. According to the statistical analysis results showed that the rays UV impact on the production phenols and flavonoids such that radiation reduced rates flavonoids and has increased the amount of phenol. The effect of light was different and need to study more. For callus was obtained different results. According to the data obtained it can be concluded light and in particular rays UV is effective on the producing a number of compounds secondary plant (phenols and flavonoids) and according the relationship of these compounds with antioxidant activity plant can be considered the impact of environmental factors.

667, 670, 778, 780, 782

ALLEVIATION OF DROUGHT STRESS DAMAGE IN OCIMUM BASILICUM L. BY SYNERGISTIC ACTION BETWEEN METHYL JASMONATE AND SODIUM NITROPRUSSIDE

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Methyl jasmonate (MJ) is a plant growth regulator that involves in many morphological and physiological processes and has a role in defense systems of plants under stress conditions. In this study, we evaluated the protective effect of MJ and Sodium Nitroprusside (SNP) as a NO donor against the drought stress in sweet basil (*Ocimum basilicum* L.). According to the statistical analysis, drought had a significant adverse effect on length and biomass of plants. Plants that pretreated with MJ and sodium nitroprusside (SNP), significantly reversed fresh and dry lose and relative water content decay induced by the drought stress. The protective effects of MJ and SNP were indicated by extent of lipid peroxidation, increase glutathione (GSH) and ascorbate content, promote antioxidant enzymes and reduce H_2O_2 content in sweet basil plants. The present observation suggested that reduction of drought stress damages in *O. basilicum* by MJ and NO is through the activation of enzymes involved in ROS detoxification (CAT, SOD, POX, APX, GPX) and maintenance contents of molecular antioxidant (GSH and ascorbate). Moreover, the results revealed a mutually amplifying reaction between MJ and SNP in reducing drought stress damages [1- 3].

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MOLECULAR PHYLOGENY OF *DRACOCEPHALUM* L. (LAMIACEAE) BASED ON NRDNA ITS IN IRAN

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Dracocephalum L. belongs to the tribe Nepeteae (Lamiaceae) is mainly distributed in temperate regions of the Northern Hemisphere. This genus includes 70 species in worldwide (with most species in China) and represented by 11 species with 5 endemics in Iran. Plants of this genus have medicinal and therapeutic properties. A total of 41 accessions representing 37 species belonging of *Dracocephalum* and 4 species of *Lallemantia* as outgroups were included in a phylogenetic analysis by using nrDNA ITS sequences. Phylogenetic analyses were performed using Maximum Parsimony, Maximum Likelihood and Bayesian methods.The results of the analysis have shown that *Dracocephalum* is monophyletic, in a basal grade of the tree, *D.grandiflorum* (from China) followed by a small clade (*D. parviflorum* and *D. argunense*). It is then joined by the other small clade including *D. bullatum* and *D.grandiflorum*, which being sister to a large clade including three subclades diverging in a polytomy. Iranian species are mostly nested in the largest subclade and their phylogenetic relationships remained unresolved.

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STABILITY DETERMINATION OF ANNAB SYRUP, A NEW DRUG INSPIRED FROM IRANIAN TRADITIONAL MEDICINE

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Annab (*Ziziphus jujuba* Mill.) is a well-known medicinal plant with traditional indications on cardiovascular system. In traditional medical texts, a decoction consists of Annab and thyme (*Zataria multiflora* Boiss.) is frequently mentioned as a blood diluent and purifier [1, 2]. The traditional term "blood diluents" is referred to anti-hyperviscosity drugs. Hyperviscosity is one of the most important causes of cardiovascular diseases. Today, there are few drugs targeted blood viscosity; therefore, introducing new medicines with this indication is preferable. The decoction of Annab and thyme (DAT) would be a good candidate for this indication but because all decoctions have a short shelf-life, improving and stabilizing the dosage form of this medicine is the aim of this study. Based on traditional manuscript, DAT is prepared via boiling Annab fruit and thyme aerial part in plenty of water. This watery extract with the viscosity of about 1 cP (at 25°C) is susceptible for oxidation and fungi contamination. To resolve this problem, the extract was concentrated by vacuum and heat (60°C) to reach the viscosity of 150 cP. This concentrated extract was then pasteurized and filled in a well-closed 120 ml syrup bottle for accelerated stability testing (40°C temp. and 70% moisture). Physicochemical properties as well as microbial count of the product were determined in the month 0, 1, 3, and 6. The results showed that organoleptic properties of the product are the same in all testing times. The pH showed little changes from 4.77 at the beginning to 4.60 at the end of month 6. Total phenolic content was 9.4 mg/ml at the beginning and was 9 mg/ml at the end. Microbial count was in acceptable range (total bacteria <100 cfu/ml, total fungi and yeast <10 cfu/ml, no *Salmonella sp.*, *E. coli*, *S. aureus*, and *P. aeruginosa*) at all testing times. Based on the results, the concentrated extract of Annab and thyme is stable and can be produced in a form of syrup in pharmaceutical industries.

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723, 766

VARIATION THE YIELD AND MORPHOLOGICAL TRAITS OF PEPPERMINT (*MENTHA PIPERITA* L.) IN RESPONSE TO DIFFERENT LEVELS OF VERMICOMPOST AND WATER DEFICIT STRESS

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Effect of vermicompost and water deficit stress on the yield of peppermint (*Mentha piperita* L.) was investigated in Kermanshah, in 2010. Treatments were 3 levels (0, 5 and 10 ton/ha) of vermicompost and water deficit at 3 levels (100%FC, 75%FC and 50%FC). This experiment was conducted by use factor as randomized complete block design with 3 replications. The results showed that there was a significant difference between the yields and leaf and stem dry weight and plant height, the number of nodes in stem, the number of lateral branches, the number of leaves and leaf length and width. Mean comparisons showed that the highest yield (8ton/ha) and leaf dry weight (13.2 g/p) belong to 10 ton/ha vermicompost at the first time harvest and 4 ton/ha of yield and 8.1 g/p of leaf dry weight at the second harvest in this level of vermicompost. The highest yield (8kg/ha) and leaf dry weight (13.4 g/p) was belonging to 100% FC. Mean comparisons showed that the highest plant height (53.57 cm), the number of lateral branches (12.16 n/p) and the number of leaves (74.23 n/p) belong to 5 ton/ha vermicompost at the first time harvest. Mean comparison of vermicompost indicated the maximum of the number of nodes (18.23 n/s), leaf length (4.12 cm) and leaf width (1.63 cm) were achieved in the 10 ton /ha. Plant height (56.39 cm), leaf width (1.64cm), leaf length (4.14cm), the number of lateral branches (12.87 n/p), leaves (73.52n/p) and nodes in stem (19.29 n/s) were all the highest in 100% FC. Mean comparisons between deficit stress * vermicompost showed that the highest yield with 9 ton/ha and leaf dry weight with 14.9 g/p achieved in 100% FC and use of 10 tons vermicompost per hectare. The maximum dry weight of stem was in these treatments too about 18g/p. Mean comparisons of the treatments showed the highest yield in all treatments between two times of harvest was in the first time harvest. The results showed that peppermint is a hydrophyte plant and it needs to use enough of food and water to increase the yield.

775, 781

INVESTIGATION ADAPTABILITY AND YIELD OF EXTERNAL AND INTERNAL CULTIVARS OF CANNABIS (*CANNABIS SATIVA* L.) UNDER PLANT DISTANCES

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In order to comparison of different cannabis genotypes under plant distances, this research was conducted at research institute of forests and rangelands, Alborz research complex station in 2012-2013. The experiment was conducted in split plot in the form of a randomized complete block design with three replications. The main factores were Futura 75 from Germania genotype and two populations of Isfahan and Yazd. The sub factors were plant distances 50*50, 40*40, 30*35 and 20*25 cm. Analysis of variance showed significantly difference between two years, plant density and interaction of genotype and density on plant height, stem diameter, the number of lateral stem, lateral stems weight, main stem weight, leaf weight, total weight of plant and total yield at $P \leq 0.01$. The results of mean comparisons between genotyps indicated that stem diameter (3.1 cm) and the number of lateral stem (38.4 number/main stem) belong to Futura 75 from Germania. the highest lateral stems weight (41.17g), leaf weight (44.58g), total weight of plant (142.65g), the highest main stem weight (69.13g), and total yield (4492.6 kg/ha) achieved from populations of Isfahan. the highest lateral stems weight (41.02g), main stem weight (70.41g), leaf weight (46.59g), total weight of plant (157.8g) achieved from cultivated 3.6 plant/m^2. mean comparisons between of plant distance indicated that the highest total yield (5957.7 kg/ha) achieved from cultivated 20 plants/m^2. The results of mean comparisons between years * plant distance indicated that the highest total yield (17856 kg/ha) achieved from cultivated first year* 20 plants/m^2.

791, 801, 805, 809, 811

EFFECT OF FOLIAR APPLICATION OF CHITOSAN AND CHITOSAN NANOPARTICLES ON PLANT GROWTH, FLOWERING AND YIELD OF MARIGOLD (*CALENDULA OFFICINALIS* L.)

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The production of medicinal plants as raw material for industry must associate quality with biomass formation and, with this purpose, the application of chitosan has been studied in marigold. The objective of this study was to compare the effect of chitosan and chitosan nanoparticles on plant growth, flowering and yield in marigold. The experiment was conducted in 2015 under semi-arid condition (35°30' N and 51°17' E) during the period from May to August and the treatments consisted of doses of the chitosan (0, 100, 150 and 200 ppm) and chitosan nanoparticles (0.001 and 0.002 Eq) applied by foliar spraying once at 40 days after sowing and twice at 40 and 60 days after sowing. The experiment was arranged in a factorial based on completely randomized design, with three repetitions. The results indicated that chitosan increased most of vegetative and floral characters. Regardless of the concentration of the compound, the chitosan improved the morphological (plant height, leaf number plant, leaf length and breadth, leaf area plant), physiological (total dry mass plant, absolute growth rate and harvest index) parameters and yield components thereby increased flower yield of marigold [1- 3].

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THE STUDY OF FERTILIZERS TYPES ON ESSENTIAL OIL, YIELD AND YIELD COMPONENTSOF *THYMUS DAENENSIS*

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*Thymus daenensis*a belong to lamiaceae family, it have importance in traditional medicine ,therefore, In research, to study of fertilizers types on the percentage of essential oil, yield and yield components of *Thymus daenensis* a test was carried out as a randomized complete block designs at three replications in chaharmahal va bakhtiary province in 2015. result showed that all fertilizers treatments had significant difference on *Thymus daenensis*a, so that the highest and the lowest essential oil, yield and yield components was demonstrate in fertilizers treatments and control, respectively [1, 2].

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CYTOTOXIC ACTIVITIES OF THE ESSENTIAL OIL AND EXTRACTS OF *CUSCUTA EPITHYMUM* AND *PYRETHRUM ROSEUM*

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Cuscuta epithymum is a parasitic plant assigned to the Cuscutaceae or *Convolvulaceae* family, depending on the taxonomy. It is red-pigmented, not being photosynthetically active. It has a filiform habit, like a group of yarns. Its leaves are very small, like flakes. Its flowers, disposed in little glomerules, have a white corolla, with the androecium welded to the corolla. *Cuscuta epithymum* is a rootless, wholly parasitic plant that occurs most commonly on heather (Calluna vulgaris), gorse (*Ulex europaeus*) and clover (Trifolium) species. Clover dodder is native to Europe, but occurs almost worldwide. It is a member of the Convolvulaceae family, which includes Ipomoea and Convolvulus species, many of which are commonly known as bindweed and morning glory. Clover dodder is normally insect-pollinated, but can also self-pollinate. Clover dodder is used in traditional medicine as a purgative and to treat disorders of the liver, spleen and urinary tract. However, there has been little scientific investigation into the actual effectiveness of its use. *Cuscuta epithymum* is used to treat cancer and neurological and psychiatric diseases. *Cuscuta epithymum* plant used in traditional medicine *pyrethrum roseum* plant. This plant were collected from of Iran [1]. Cytotoxic activities of essential oil, and 80% methanol extracts and 100% n-hexan extracts of these plants were assessed on one human cancer Molt4 cell line with the MTT assay [2]. The test results obtained, essential oil and extraction of 80% methanol and *Cuscuta epithymum* and mixing *Cuscuta epithymum* and *pyrethrum roseum* plants has been active, and can certainly were more active reported mixed, but both hexane extraction plants has been completely disabled.

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PROXIMATE COMPOSITION AND ANTIOXIDANT ACTIVITY OF IRANIAN BROWN ALGAE-*DICTYOTA DICTOMA*

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Marine macroalgae (seaweeds) are rich in bioactive compounds that could potentially be exploited as functional ingredients for both human and animal health applications [1-2]. For example, it has been proven that the inclusion of small amounts of algae in fish feed results in positive effects in growth performance and feed utilization efficiency [3]. This study was carried out to assess proximate and fatty acid composition of the brown macroalgae-*Dictyota dichtoma* gathered from southern coasts of Qeshm Island and antioxidant properties of its polar and nonpolar extracts. The studied algae showed high carbohydrate content (28.20±1.88% DW), protein content of 6.12±0.33% DW and low lipid composition (0.52±0.05 % DW). The ash content was 23.49±0.76 % DW and the amount of moisture was 2.37±0.13 % DW. It also has a low energy of 1489 Kcal/Kg. Palmitic acid and Stearic acid were recorded as the most abundant saturated fatty acids (SFA). Palmitoleic acid and oleic acid were the major monounsaturated fatty acids (MUFA). Linoleic acid (polyunsaturated omega-6 fatty acid) and arachidonic acid were found to be the predominant polyunsaturated fatty acids (PUFA). The hexane extract of this algae showed the highest antioxidant activity of 247.74 µg/ml in DPPH assay compared to the dichloromethane, ethyl acetate and ethanolic extracts.

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ISOLATION AND IDENTIFICATION OF VOLATILE COMPONENTS FROM THE LEAVES (MALE AND FEMALE) AND SEEDS OF *CANNABIS SATIVA* BY GC/MS

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Leaves and seeds of *Cannabis sativa* (Cannabinaceae) were collected from farms of Agricultural School (Ferdowsi University), Mashhad, Iran, in September 2015. Composition of the essential oils were identified by GC and GC/MS . Totally 17, 56 and 60 components (99.3%, 97.4% and 97% of oils) were identified in seeds, leaves (Female) and leaves (Male), respectively. Identification of components were based on comparison of mass spectra with stansards. *E*-caryophyllene was as major component in seed (24.9%), female leaves (15.5%) and male leaves (19.8%). Other major components of seed oil were α-humulene (8.2%), α-bisabolol (7.2%) and *E*-β-farnesene (6.4%). The major components in female leaves were α-bisabolol (9.0%), Phytol (5.7%) and α-humulene (5.1%) and in male leaves were α-bisabolol (9.3%), α-humulene (6.3%) and *E*-β-farnesene (4.8%).

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ANALYSIS OF GARLIC CORM AND OLIVE LEAVES BY GC/MS

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In this project hexane extract of *Allium satium* corm, and leaf of *Olea europea* was prepared and analyzed by GC and GC/MS. 39 components of *Allium sativum* extract were identified (75.7 % of whole components). Also 28 components of olive leaf extract were identified (74.2 % of whole components). 1,2-Benzene dicarboxylic acid, bis (2-ethyl hexyl) ester (12.1%), triacontane (5.3%), octacosane (6.6%), nonacosone (4.0%), heptacosane (4.9%), hexacosane (5.4%), tetracosane (4.3%), eicosane (6.4%), octadecadienoic acid, methyl ester (4.2%) , heptadecane (6.1%) and hexadecane (4.1%) were identified as major components in *A. sativum* extract. In olive leaf, eicosane (9.0%), hentriacontane (11.9%), tritriacontane (15.3%), dotriacontane (5.0%), nonacosane (4.3%) and bis (2-ethyl hexyl) phthalate (4.0%) were major.

904

THE EFFECT OF DIFFERENT CULTURE MEDIA ON THE VEGETATIVE AND CHEMICAL CHARACTERISTICS OF *LEPIDIUM SATIVUM*

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In order to study the effect of different culture media on the vegetative and chemical characteristics of Nasturtium (*Lepidium sativum*), various media were used including soil, rice bran, composted manure and spent mushroom compost (SMC), in eight different compound and ratios. The experiment was performed into randomized complete block design with three replications. The results showed that the highest length and width of leaves and plant height was observed in the treatments of field soil alone, 1/3 soil+1/3 rice bran+1/3 SMC, ½ soil+1/2 SMC, and the lowest amount was related to the treatment of 1/3 field soil+1/3 composted manure+1/3 rice bran. Also, the highest and the lowest percentage of seed germination was observed in the treatment of 1/3 field soil+1/3 rice bran+1/3 SMC, and ½ field soil+1/2 composted manure, respectively. The results indicated that the different culture media had various effects on the nutrients content. According to the results of this experiment, using SMC in soil and for different purposes will cause to the advent of the short and long term changes in soil properties and due to high levels of organic matter and nutrients existed, can have positive effects on the physical and chemical properties of soil and cultivated plants and can replace with many conventional beds [1, 2].

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EVALUATION OF GERMINATION *CRATAEGUS ARONIA* UNDER DIFFERENT CLLTURES WITH DIFFERENT LEVELS OF SALINITY

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Crataegus aronia tinctourum is valuable medicinal industrial and resistant of salinity plant that it is from Iran and it has been used in pharmaceutical industries. This research has been implemented for getting the best culture under supportable Max level of salinity in modder. In orther to study effects of different levels of NaCl on rate and percentage of seed germination of modder under 4 different culture with Factor completely randomized design and fave replications in closed system were conducted. Treatment of sanility included: 5 levels of NaCl (0, 10, 15, 20, 25 dSm-1) and treatment of culture included: sandy-clay soil, normal soil, sandy soil and perlit. In this examination has been used seeds with eliminated thin lyer with chafe sandstorm. Results indicated that by increasing salinity, germination were reduced. Percentage of seed germination on dSm-1, 10 level of salinity had geart reduced, and also rate and percentage of seed germination of modder on sandy-clay soil and normal soil were so better than sandy soil and perlit Results dont show that Interact bittwen different levels of salinity and culture, different conclusion on seed germination [1-3].

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THE ANALYSIS OF ESSENTIAL OIL OF *ADIANTUM CAPILLUS-VENERIS* AND THE ANTIBACTERIAL EFFECT OF ITS EXTRACT ON MRSA

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Effect of chemical antimicrobial compounds has encouraged researches to focus on alternative drugs. Investigation about plant originated compounds with antibiotic properties has been high lighted the present study was to investigate the antibacterial effects of total extract and different fractions of the *A. capillus-veneris* against methicillin resistance *Staphylococus aureus*. The global increasing of drug resistance of factious agent as well as serious sides . *Adiantum capillus-veneris* was purchased from grocery in Tehran. It was scientifically authenticated and total extract and chloroform, methanol and etheric fractions were prepared using maceration method. Standard agar diffusion method was used to evaluate the antimicrobial activity of the extract and fractions against bacterial strains. Antibacterial activity was not defined as the diameter varage of inhibition zone following incubation time. In this study, chemical composition of essential oil of *A. capillus-veneris* was analyzed for the first time. The essential oil was analyzed by GC and GC/MS; 13 compounds were identified. The major components in essential oil were phytol (59.9%), *p*-menth-4(8)-en-3-one (8%) and nonanal (8%). This study was done for the first time.

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IDENTIFICATION OF VOLATILE COMPONENTS FROM THE ROOT OF *ARCTIUM LAPPA* BY GC/MS

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Composition of the essential oil from the leaves of *Artium lappa* (Asterceae), which was collected from Mashhad (Farms of Agricultural School), was identified by GC/MS. Totally, 24 components (87% of essential oil) were identified. The oil contains mainly1,3-cyclooctadiene (%53.5), *E*-caryophyllene (% 7.3), β-selinene (% 6.0), 9,10-dehydro-isolongifolene (% 5.9), 7-methyl-3,4-octadiene (% 3.6) and levomenol (% 3.4). Identification of the components was based on comparison of their mass spectra with standards. The chemical composition of essential oils from the herbs is being reported for the first time in Iran. Antioxidant activity of the methanol extract of *A. lappa* root was investigated by DPPH method and was compared with rutin. It has a suitable antioxidant activity.

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ACETYLCHOLINESTERASE INHIBITORY (ACHEI) ACTIVITY OF *MATRICARIA CHAMOMILLA* L. EXTRACTS

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Alzheimer's disease (AD) is the origin of dementia and common neurodegenerative syndrome among older people. The pathogenic background of AD is not comprehensively identified, but it seems that cholinergic system disturbance is involved in it. Recently, medicinal plants have attracted a great deal of attention as potential sources of natural drugs. *Matricaria chamomilla* L. (Asteraceae) is a famous medicinal plant with a wide range of biological activities. In this study, we evaluated the AChEI activity of *M. chamomilla* [1]. *M. chamomilla* aerial parts were collected from Fars province. Total methanolic extract and different fractions (hexane, methanol and residual) were prepared. AChE inhibitory activity of the extracts was evaluated using the Ellman method with some modifications. Total methanolic extract and methanol fraction inhibited the activity of acetylcholinesterase enzyme with IC_{50} values of 750±1.2 and 475±4.6 µg/ml respectively (in comparison to donepezil as positive control). In this study, total methanolic extract and methanol fraction of *M. chamomilla* aerial parts showed promising inhibitory activity on acetylcholiesterase enzyme. However, further investigation is needed for isolation and structure elucidation of effective phytochemicals.

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EVALUATION OF BIOCHEMICAL COMPOSITIONS OF IRANIAN JUJUBE (*ZIZIPHUS JUJUBA* MILL.) ECOTYPES FROM ISFAHAN REGION

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Jujubes are well known for their medicinal properties. Iran has one of the most important germplasm centers for jujube ecotypes and the people are extremely familiar with their traditional usages to remedy of diseases.In the past few years, there has been a growing interest in the jujubes as a table fruit, chiefly due to their nutritive and health promoting values. It aids weight gain, improves muscular strength, increases stamina and strength Liver function. In this research, we studied twelve jujube ecotypes in Isfahan region and measured their biochemical characteristics. The ascorbic acid, total phenolic, flavonoid, protein and mucilage contents were ranged between 183.04 – 403.62 mg/100g FW, 4.05 – 8.8 mg GAE/g, 153.41– 250.12 mg/g FW, 1.06 – 3.95 % and 18.58 – 37.97 mg/100g DW respectively. The highest level of ascorbic acid was measured in "Zavvareh" ecotype. The highest level of total phenolic, flavonoid and protein contents were observed in "Isfahan", "Ganje-Ghobad" and "Anarak" ecotypes respectively. Finally the "Koohpayeh" ecotype had the highest level of mucilage content.The results of fruit biochemical characteristics demonstrated that there are significant differences between ecotypes of different regions. So it can be concluded that there is high biochemical diversity in Iranian jujube ecotypes and these mentioned ecotypes can be usedin the future breeding programs.

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STUDY OF CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF *ROSA PERSICA* ESSENTIAL OIL

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Iranian rose flower or Varak (R.percica sp.) belongs to the rose flowers species. Being a perennial shrub type it has quite a lot of ramifications which propagate by seed. The purpose of this study is to identify the chemical compositions present in the essence of Varak plant (R.perisca). For this purpose, this plan was collected from the Ashtian region of Markazi province in (2014) and after drying in ambient temperature the extraction of the essence oil was carried out by implementing steam distillation method. The constituent compositions of the essence oils were separated and identified by the use of Gas Chromatograph (GC) devices and Gas Chromatograph connected to Mass Spectrometry (GC/MS). In the essence of these plants 56 compositions were identified so that the main part of this essence was constituted from Hydrocarbon (Alkans). Among the identified compositions the active ingredient of Heptacosane with (11/6) has the highest percentage and after that stands Isobutyl phthalate (11/48), Nonacosane (8/88), Dibutyl phthalate (6/26), Pentacosane (5/96), Hexadecanoic acid (3/95), Linalool (3/8), Ethyl linoleolate (3/73), Hexyl Hexoate (3/67), octacosane (3/43) are the main constituent compositions of this plant. Essences of aromatic plants have been used for the different purposes such as food, drug and aroma from the ancient periods. Due to the resistance of some microorganisms against antibiotics, using antibacterial plant products has been increased in the recent decades. In the recent years, plant essences have been paid attention due to their potential capability in treatment of infectious diseases and protection of foods against toxic effects of oxidant compounds. This research studied the antibacterial effect of essence of rosapersica on 4 different hot positive and hot negative bacteria by using disk, by help of Moller Hinton Agar (MAH) culture and evaluation of corona diameter of non-growth. The results showed that the related plant species don't have antibacterial effects.

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THE ANATOMICAL RESPONSES OF A MEDICINAL PLANT HYSSOP (*HYSSOPUS OFFICINALIS* L.) TO STRESS CAUSED BY VARIOUS CONCENTRATIONS OF NACL

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Salt stress as a major adverse factor can lower leaf water potential, leading to reduced turgor and some other responses, and ultimately lower crop productivity in arid and semi-arid zones. By 2050, more than 50% arable land will become salinization. Salt tolerant plants can minimize the detrimental effects of high salinities by producing a series of anatomical, morphological and physiological adaptations. In In this study, Seedlings of *Hyssopus officinalis* were subjected to 0, 50, 100, 150 and 100 mM NaCl and Changes in anatomical traits in shoot and root were evaluated. *Hyssopus officinalis* L. (Hyssop) is one of the most popular herbal preparations, consisting of about 15 species, is mainly distributed in Central Asia, South Europe, and North Africa. Results showed that the vascular cylinder/cortical parenchyma ratio was affected by salinity levels of NaCl were different from no NaCl added (control plants). A diminution in absolute values of the variables and a major reduction in vascular tissue dimensions were observed, which suggests that the lack of tolerance to salt stress could be related to a deficient adaptation to absorb and transport water and nutrients from the roots. We concluded that High salt content, especially chloride and sodium affects plant growth by modifying their anatomical trait, this is due to osmotic effects and ionic imbalances affecting plant metabolism. Anatomically, it affects cell division and expansion processes and reduces the size of meristems, cortex and vascular cylinder [1-3].

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ANATOMICAL STUDY IN HYSSOP (*HYSSOPUS OFFICINALIS* L.) DURING DROUGHT STRESS

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Hyssop with it is scientific name (*Hyssopus officinalis*) from lamiaceae family is a herbaceous plant with several years of age that is like a shrub or sub shrub with square-shaped stem ranges from 50 to 70 cm in height. The stem is woody at the base from which grows a number of straight branches. This plant has been used by many people to cure diseases. Its flowery sprouts are used for stimulation and also a wind breaker and also for lung diseases and cold. The oil extract hyssop is good for curing cough, pertussis, and bronchitis, breathing problems, cold and the flu. Also hyssop extract has some antibacterial and antifungal characteristics and it used for food industries and cosmetics. In this study we research the anatomical changes in control and two different concentration of drought stress induced in hyssop seedling. Drought stress is especially important in countries where crop agriculture is essentially rain-fed and is a dangerous problem for humanity and for nature that global warming causes that is a major a biotic constraint limiting crop production worldwide. Drought also is one of the most important environment stresses that influences metabolism and growth of plant. Qualitative features as vascular bundle, cortex diameter from epidermis to pith, epidermis thickness, and presence of bilateral phloem and size of vascular bundle were studied. Statistical analysis of result of present study revealed that by use of selected set of features studied species are separated clearly. The above mentioned anatomical changes in response to the highest drought level could be considered as anatomical function to adapt and tolerate Hyssop to drought stress [1-3].

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202, 207, 213
INVESTIGATION OF TOTAL PHENOLIC CONTENT, EXTRACTABLE TANNIN, CAROTENOID AND VITAMIN C IN SOME IRANIAN SEA BUCKTHORN POPULATIONS

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Sea buckthorn (*Hippophae rhamnoides* L.) is a unique and valuable plant currently being investigated for its medicinal values all over the world. Its fruits are an excellent source of bioactive phytochemicals such as carotenoids, tocopherols, sterols, vitamin C, organic acids and polyphenols. The berries have been shown to have a wide array of phenolic compounds including flavonols, flavones, phenolic acids and tannins. The phytochemical composition of the berries is affected by growing conditions and maturity. The active substances of medicinal plants synthesis with direction of genetically process but their synthesis can take great effect from climatic factors. In this study, we investigated total phenolic compound, extractable tannin, total carotenoids and vitamin C in fruits of some Iranian wild sea buckthorn populations in 10 natural habitats. Results showed that the maximum total phenolic compound was in Gachsar (2.645 %) and the lowest amount was in Yoosh (2.010 %). About tannin the highest content of fruits measured in Gachsar (0.477 %) and the lowest amount was in Yoosh (0.168 %). Also the highest carotenoid content measured in fruits of Disin region (1.349 mg/g), whereas the lowest content was related to Dehdar (Taleghan) region (0.880mg/g). At last Maximum content of vitamin C existed in fruits of Shemshak population (1301.360 mg/100 g fw) and minimum content existed in Gelyard (Taleghan) population (89.268 mg/100 g fw) [1-3].

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INVESTIGATION OF TOTAL PHENOLIC CONTENT AND EXTRACTABLE TANNIN IN SOME IRANIAN SEA BUCKTHORN POPULATIONS

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Sea buckthorn (*Hippophae rhamnoides* L.) is a unique and valuable plant currently being investigated for its medicinal values all over the world. Its fruits are an excellent source of bioactive phytochemicals such as carotenoids, tocopherols, sterols, vitamin C, organic acids and polyphenols. The berries have been shown to have a wide array of phenolic compounds including flavonols, flavones, phenolic acids and tannins. The phytochemical composition of the berries is affected by growing conditions and maturity. The active substances of medicinal plants synthesis with direction of genetically process but their synthesis can take great effect from climatic factors. In this study, we investigated total phenolic compound and extractable tannin content in fruits and leaves of some Iranian wild sea buckthorn populations in 10 natural habitats. The maximum total phenolic compound amount of fruits was detected in Gachsar (2.645 %) and the lowest amount was in Yoosh (2.010 %). Also, the maximum total phenolic amount of leaves reported from Gachsar (7.228 %) and the lowest amount was in Shahrestanak (2.340 %). About tannin the highest content of fruits measured in Gachsar (0.477 %) and the lowest amount was in Yoosh (0.168 %). Also, maximum and minimum tannin content in leaves was respectively in Gachsar (3.563 %) and shahrestanak (1.269 %) [1-3].

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THE EFFECT OF RATE AND METHOD APPLICATION OF NITROGEN AND MICRONUTRIENTS ON YIELD AND ESSENTIAL OIL OF DRACOCEPHALUM MOLDAVICA

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This study was conducted to investigation the effect of nitrogen and micronutrients on yield and quality of *Deracocephalum moldavica* L. The experiment was conducted as a factorial experiment in randomized complete block design with four replicationsNitrogen treatments consisted of four levels N_0 (Not used), $N_1$and N_2 (Consumption of soil nitrogen sources ammonium nitrate, respectively, 100 and 150 mg kg^{-1} soil pots), N_3 (Spraying ammonium nitrate with a concentration of 1% +N_1 and 4 levels of micronutrients including M_0 (Not used), M_1(Soil application of micronutrients iron, zinc and manganese, 50 mg kg^{-1} of soil in each pot), M_2(foliar application of micronutrient) and M_3(Soil application and foliar application of micronutrients, respectively) Analysis of variance indicated that the main effect of nitrogen in all traits except leaf length was a significant, main effect of micronutrients in most of the traits except leaf length and width was significant and the number of branches. Interaction effects of nitrogen and micronutrients in leaf width, shoot fresh weight, shoot fresh weight, more performance, and shoot dry weight, leaf dry weight, dry flower and essential oil significantly. The results obtained in this study, the use of nitrogen in Level N_3 and the use of micronutrients M_2 can significantly increase the performance *Deracocephalum moldavica* L. which also makes efficient use of farm inputs.

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EFFECT OF SPRAYING IRON AND ZINC FERTILIZER ON LEMON BALM ESSENTIAL OIL COMPONENT

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Lemon balm (*Melissa officinalis* L.) belonging to the Lamiaceae family is a perennial herb [1]. It grows wildly in Europe and the Middle Asia and is used as aromatic, culinary and medical herb [2]. Therapeutic properties of Lemon balm are sedative, carminative, antispasmodic, antibacterial, antiviral, antifungal, anti-inflammatory and ant oxidative, mainly due to the content of essential oil and the presence of phenolic acid esters [3]. In this research order to study the effect of spraying iron and zinc sulfate fertilizer on lemon balm essential oil component at Khoramabad city climate. A factorial experiment was conducted based on a complete randomized design with three replications. Two factors including iron sulfate fertilizer at control, 2 and 5 ppm and zinc sulfate fertilizer at control, 2 and 5 ppm. Essential oils isolated by hydro-distillation with Clevenger apparatus. The essence fraction identified and measurement by GC/MS. The result obtained from this study led to identification 28 fractions on lemon balm volatile oil. In the essential oil of lemon balm jeraniol (66.65%), Trans caryophilen (8.41%), caryophylen oxide (4.99%), verbenol (2.17%), citronellol (1.615%), alpha morelol (1.525%), germacrin D (1.38%) and alpha cadinol (1.68%) were the major components. Results show that increasing the essence amount, 5 ppm zinc sulfate treatment was best treatment. In this study according the results, the jeranol component was observed 66.65% of whole volatile oil fraction of lemon balm, which is considerable high. But the citronellol component allocated only 1.6% of all lemon balm components. In this research to be seemed the fertilizer and climate condition caused the differences on amount of essence component in medicinal plant.

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A PRELIMINARY SCREENING OF IRANIAN MEDICINAL PLANTS FOR ACETYLCHOLINESTERASE INHIBITORY ACTIVITY

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Alzheimer's disease rises with predictions of 115 million being affected by 2050 due to aging of the population, continuing lack of progress in identifying, effective treatment modalities and lack of predictive diagnostic techniques. Inhibition of acetylcholinesterase is the key enzyme which breakdowns acetylcholine, is considered as a promising strategy for the treatment Alzheimer's disease [1]. Due to more potency and less side effects of herbal plants, bodies of attempts have been focused on finding new sources from nature with an acetylcholinesterase inhibitory effect. For this aim, microplate colorimetric assay base on Ellman technique [2, 3] was used for 37 medicinal plants to evaluate their inhibitory properties for AChE enzyme. Based on our results, leaves Ruta graveolens, Artemisia chamaemelifolia, Leucojum aestivum, Galanthus transcaucasicus, Paeonia mlokosewitschii showed the maximum inhibitory effect by 54.91 %, 56.24 %, 31.68 %, 55.46 %, 46.34 % respectively in a concentration of 10 mg/ml. The median inhibitory concentration (IC_{50}) value of samples was 7.94 mg/ml, 7.91 mg/ml, 15.86 mg/ml , 8.51 mg/ml , 8.01 mg/ml respectively compared to Galantamine with an IC_{50} of 2.3 µM. For more details, bioautographic-based thin layer chromatography for Artemisia chamomilla methanolic extract was done to achieve active fractions as white spots in a yellow background.

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ESSENTIAL OIL YIELD AND COMPOSITION OF SUMMER SAVORY INFLUENCED BY DIFFERENT AMMONIUM SULPHATE CONCENTRATION

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Satureja hortensis L., is an important medicinal plants belongs to lamiaceae family. In order to study, the effect of different levels of Ammonium Sulphate on essential oil yield and component of summer Savory, an experiment based on randomized complete block design (RCBD) with 5 treatments and three replications on Karaj climate conditions was conducted. The treatment including five levels of ammonium sulphate consist of: control (without fertilizer), 40, 60, 80 and 100 kg/h of ammonium sulphate that as split application (three week after sowing) was applied. At full flowering stage, the plant samples of all treatments were harvested and essential oil yield and components (consist of 26 combinations with GC-MS apparatus) were measured. The results showed significant differences among treatments on some factors measured. Among 26 identified components in different treatments, just 12 combinations were affected by ammonium sulphate fertilizer. Also, essential oil yield significantly affected by treatments. With increasing ammonium sulphate concentration, essential oil yield significantly increased. The highest essential oil yield (49.97 ml/m^2) related to 100 kg ammonium sulphate and the lowest content (16.32 ml/m^2) belongs to control. Carvacrol, as the main component in this plant was affected by treatments. The maximum content (52.06%) in 40 kg ammonium sulphate and the minimum content (46.57%) in 60 kg ammonium sulphate were detected[1, 2].

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THE EFFECT OF BIOLOGICAL FERTILIZER ON *CARTHAMUS TINCTORIUS* VEGITATIVE GROWTH STAGE

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In order to study the effect of biological fertilizer including different portions of shrimp skin on *Carthamus tinctorius* vegetative growth stage, this experiment was conducted in the University of Nahavand, using a completely randomized design with three replications. Treatments included 6 levels of biological fertilizer (control, 1.5 gr on the soil, 3 gr on the soil, 1.5 gr incorporated with soil, 3 gr incorporated and urea). The results showed that application of biological fertilizer had significant effect on fresh and dry weight. The highest fresh and dry weight was obtained in 1.5 gr shrimp skin incorporated with the soil.

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ANTIOXIDANT AND CYTOTOXIC POTENTIALS OF *LALLEMANTIA IBERICA*

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Lallemantia iberica, known commonly asdragon's head, is a flowering plant in the mint family,Lamiaceae. The plant has been cultivated for its seeds in southwestern Asia and southeastern Europe since prehistoric times. The seeds have been used infolk medicineas stimulant anddiuretic [1, 2]. The leaves are used as apotherbin Iran [3]. In this study, the methanolic extract from the seeds of*Lallemantia iberica* (Lamiaceae), collected from Kermanshah area was obtained by soxhelet apparatus and its antioxidant activity was evaluated by DPPH radical scavengingassay andits cytotoxic activity was estimated using brine shrimp lethality assay. The results showed that the plant possesses moderate antioxidant and good cytotoxic potentials.

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THE STUDY OF GERMINATION STAGE IN *CARTHAMUS TINCTORIUS* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Carthamus tinctorius*, this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 4 levels of salinity (control, 3dS/m, 5dS/m and 7 dS/m). The source of salinity was prepared from Persian Gulf water. The results showed that salinity levels didn't affect on germination percentage, radical and plumule length and fresh weight. The increase of salinity did not reduce the germination percentage and radical and plumule length and fresh weight significantly. Since the classification of saline soils begins from 40 mM, so *Carthamus tinctorius* can be known as a tolerant plant to salinity in germination stage.

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INVESTIGATING THE EFFECT OF CALCIUM NITRATE AND POTASSIUM NITRATE APPLICATION ON CONTENT OF TOXIC COMPONENTS OF TARRAGON ESSENTIAL OIL 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 [1-3].

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STUDY THE EFFECT OF FOLIAR SPRAY OF CALCIUM NITRATE AND POTASSIUM NITRATE ON MACRONUTRIENTS UPTAKE OF TARRAGON IN "RAY" REGION

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Proper applications of nutrient during plant growth not only have a major role to increasing yield, but also affect the quantity and quality of their essential oil. In this study effect of calcium nitrate and potassium nitrate on vegetative traits, essential oil content, absorptions of nutrition in tarragon were evaluated. This research was conducted using Factorial experiment based on Complete Randomized Block Design with three replications in Ray area in 2010. Both fertilizers had four different levels (0, 1.5, 3 and 6 g/l). Results showed that foliar application of $Ca(NO_3)_2$ and KNO_3 significantly ($p < 0.01$) affected Absorption of mineral elements in leaf dry matter. Nitrogen uptake increased with increasing concentration of both fertilizers. High content of potassium was detected in plants treated with 1.5 g/l calcium nitrate and 6 g/l potassium nitrate. Amount of phosphorus in dry matter decreased with increasing concentration of both fertilizers. The highest content of calcium detected in plant treated with 6 g/l calcium nitrate and 1.5 g/l potassium nitrate [1- 3].

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EFFECT OF FOLIAR APPLICATION OF CALCIUM NITRATE AND POTASSIUM NITRATE ON MICRONUTRIENTS AMOUNT OF TARRAGON IN "RAY" REGION

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The effect of foliar applications of $Ca(NO_3)_2$ and KNO_3 on micro elements composition of leaf was investigated. The experiment was conducted in 2010 in Rey, Tehran, Iran using Complete Randomized Block Design with three replications. Both fertilizers had four different levels (0, 1.5, 3 and 6 gram Per Lit). Tarragons were sprayed tree times starting at 30 days after cutting in 20 day intervals. Contents of micronutrients of leaf were determined by atomic absorption and spectrophotometric method. Results showed that $Ca(NO_3)_2$ and KNO_3 had a significant effect on all of the mineral content of leaves. The highest values of Cu, Mn, Zn and Fe were obtained from 3 grams Per Lit $Ca(NO_3)_2$ than other treatments, but the higher content of Mg observed in 1.5 grams Per Lit $Ca(NO_3)_2$ applications. In the case of KNO_3, the higher accumulation of Fe, Zn and Mn obtained from 6 grams Per Lit KNO_3. 3 grams Per Lit foliar KNO_3 applications caused the higher contents of Mg and Cu in tarragon leaves. The interaction effect of $Ca(NO_3)_2$ and KNO_3 applications was significant for all of micronutrients [1- 3].

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EVALUTION OF ANTIOXIDANT PROPERTY OF LEAVES EXTRACT OF *ADIANTUM CAPILLUS-VENERIS* FROM SOUTH EAST OF MARIVAN

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Adiantumcapillus-venerisis cultivated as a popular garden fern and houseplant.It is found in temperate climates from warm-temperate to tropical, where the moisture content is high but not saturating, in the moist, well-drained sand, loam or limestone many habitats. Adiantumcapillusveneris Linn has been recommended in ancient literature of Unani system of medicine as an important ingredient of many formulations for the treatment of urolithiasis. Its decoction has long been used for the same purpose by several Unani physicians.We collected this plant in November 2015 from southeast of marivan. Extractions methanolic were performed with a Soxhlet apparatus. Antioxidant activity was determined in the 1,1-diphenyl-2-picryl-hydrazyl (DPPH) and ferric reducing power tests. The extract had significant antioxidant activity in all assays, IC50 values were found to be 60.255µg/ml in leaf extracts respectively for their antioxidant activity by DPPH assay and reduced Fe^{3+} ferricyanide complex to the ferrous form (Fe^{2+}).The findings indicated promising antioxidant activity of crude extracts of the plant and needs further exploration for their effective use in both modern and traditional system of medicines.

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ANTIMICROBIAL, ANTICANCER AND ANTIOXIDANT PROPERTIES OF HEART OF PALM TREE FROM BAM AREA

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Date tree (*Phoenix dactylifera* L.) belongs to palm family (palmacae). The plants have high economic value and is cultivated in hot climates of southwest to southeast [1]. The heart of palm is a white, edible and sweet material located in the crown of tree. It mainly constituted of the stem cells of the trunk and leaves of the plant before changing into wood [2]. Biological activities of the total methanol extract of the heart of palm tree cultivated in Bam area of Iran were investigated in this research. Antimicrobial activity was evaluated using disc diffusion and minimum inhibitory concentration determination methods. Anticancer potential was determined by brine shrimp lethality assay and antioxidant property was measured by inhibition of 2,2-diphenyl-1-picryl hydrazyl (DPPH) stable free radical method. Heart of the palm exhibited suitable antibacterial activity against *Psudeomonas aeruginosa* (MIC = 125 µg/ml) and *Shigella dysenteriae* (MIC = 250 µg/ml) and good antifungal activity against *Aspergillus brasiliensis* (MIC = 500 µg/ml). The extract of heart of palm not only didn't kill the tested shrimp in the highest concentration, but also helped their survival and number of dead shrimps in control solutions were higher than in samples. This result suggests that the methanol extracts of the heart of palm can probably help cell division and accelerate it. Heart of the palm didn't exhibit suitable antioxidant property in DPPH test (IC_{50}=1030µg/ml).

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767, 770, 778, 780, 782

ALLEVIATION OF DROUGHT STRESS DAMAGE IN *OCIMUM BASILICUM* L. BY SYNERGISTIC ACTION BETWEEN METHYL JASMONATE AND SODIUM NITROPRUSSIDE

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Methyl jasmonate (MJ) is a plant growth regulator that involves in many morphological and physiological processes and has a role in defense systems of plants under stress conditions. In this study, we evaluated the protective effect of MJ and Sodium Nitroprusside (SNP) as a NO donor against the drought stress in sweet basil (*Ocimum basilicum* L.). According to the statistical analysis, drought had a significant adverse effect on length and biomass of plants. Plants that pretreated with MJ and sodium nitroprusside (SNP), significantly reversed fresh and dry lose and relative water content decay induced by the drought stress. The protective effects of MJ and SNP were indicated by extent of lipid peroxidation, increase glutathione (GSH) and ascorbate content, promote antioxidant enzymes and reduce H_2O_2 content in sweet basil plants. The present observation suggested that reduction of drought stress damages in *O. basilicum* by MJ and NO is through the activation of enzymes involved in ROS detoxification (CAT, SOD, POX, APX, GPX) and maintenance contents of molecular antioxidant (GSH and ascorbate). Moreover, the results revealed a mutually amplifying reaction between MJ and SNP in reducing drought stress damages.

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INVESTIGATION THE COST OF *SALVIA OFFICINALIS* PRODUCTION IN KARAJ

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Today, the exploitation of medicinal plants in different countries is on the rise. For many reasonsMedicinal plant production is not possible with old methods or harvest from nature. Agricultural production of this plantsafter ensuring that cultivation and production farm is the right thing, needs to investigation the Economic justification for the decision and planning according to costs and incomes. Human have to increase the area under cultivation of medicinal plants and improve economic yield. Plan for cultivating medical plants needs to examine the costs and incomes. So in this research cost-benefit of salvia were investigated in Karaj. Seeds of plants were planted in the farm of Alborz station in 2013.Plants were harvested at flowering stage. Production costs were calculated with notes the daily costs. Prices asked of groceries, Wholesalers and web sites.Prices to produce in one hectare for seed (6kg= 12000000 Rials), Various types of fertilizers (Manure, 10m^3& NPK, 100 kg= 8000000 Rials), Preparations farm (6500000 Rials), farmhand (15000000 Rials), Rent land and water (70000000 Rials), Unanticipated costs (8500000 Rials), Total costs (120000000 Rials). Sage yield was 3-4 tons dry shoot in the first year (The average 3.5 ton per hectare). Price per kg of dry shoot in wholesale was 30000-35000 riyals (The average 32500 rials). Gross income from the sale was approximately 113750000 rials. According to the plant can be harvested several times per year during second year to fifth, without the cost of land preparation and seed and planting, Seems to be economical production of this plant in Karaj.

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ECONOMIC INVESTIGATION OF PRODUCTION *MELISSA OFFICINALIS* AND *THYMUS DAENENSIS*

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Labiateae Traditionally was used as medicinal plants (jamzad, 2009). *Thymus daenensis* and *melissaofficinalis* essential oil is used in food industry, Pharmaceutical, Health & Beauty. That's why they have a special place in world trade. So an economic analysis of these plants can be useful in the management of medicinal plant production and informing the manufacturers. Therefor in this research the benefit of the thyme and lemon balm in Karaj were studied. Plant seedlings were planted in the farm of Alborz station in 2013. Every year plants were harvested. Production costs were calculated with notes the daily costs. Plants were harvested at two years. Prices asked of groceries, Wholesalers and web sites. Prices to produce in one hectare for Preparations farm (6500000 Rials), seedling (50 thousand, per seedling 500Rials= 2500000 Rials), farmhand (25000000 Rials), Rent land and water (70000000Rials), Unanticipated costs (8500000Rials), Total costs (135000000Rials). The leafy shoot is used in lemon balm. The yield in the first year was 0.7-3 ton in different treatment (The average 1850 kg per hectare). Plants, 2 to 3 times were harvested in the second to fifth years and the yield was 4-10 ton/ha (Abbaszadeh, 2015; Zakerian, 2012).The flowering shootis used in *Thymus daenensis.* The yield in the first year was 0.5-1 ton in different treatment (The average 750 kg per hectare). Plants, 2 to 3 times were harvested in the second to fifth years and the yield was 2-4 ton/ha (Abbaszadeh, 2015). So Ifflowering *Thymus daenensis* pound sold 180000 rials Gross income is 13500000 Rials. Because of high yield of lemon balm, produce this plant from first year and thyme from second year can be economic.

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THE EFFECT OF DIFFERENT LEVELS OF DIETARY HARMALA SEED POWDER ON PERFORMANCE OF BROILERS

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Currently, there is primary and obligatory requirement to identify and introduce new and effective plants for producing natural antibiotics with high biological potentials and low side effects [1]. Phytobiotics are compounds of plant origin, which can be replaced like probiotics and prebiotics with growth promoter antibiotics. The main motivations to use the medicinal plants as growth promoters in poultry feed include anti-bacterial property, antioxidant activity, stimulation of appetite, increase the secretion of digestive enzymes, and boost the immune system. Of years away, the effective compounds in plants have been used to prevent types of bacteria and fungi [2]. Harmala with the scientific name of *Peganum harmala* is a perennial and non fluff plant from the family of Nitrariaceae. Seeds from this plant are rich in carbohydrates, lipids, proteins, minerals, alkaloids and amino acids. Alkaloids are the active compounds of harmala which also known as Beta-Carbolines, and accumulate in parts of the seeds and roots of the plant. They include Harman, Norharman, Harmine, Harmalol, Harmaline, Vasyzin and Vasyzinun. It has been reported that the addition of 250 mg/lit of harmala extract to drinking water improved body weight gain and feed conversion ratio in broilers, but had no effect on feed intake [3]. In this study, 288 one-day old Ross 308 broiler chicks were randomly assigned to 4 treatments and 4 replication of 18 birds in each per treatment. The experimental treatments were control (with no feed additive), 0.02% Virginiamycin as growth promoter antibiotic, 0.25% harmala seed powder and 0.50% harmala seed powder. Feed intake, body weight, body weight gain, and feed conversion ratio (FCR) was recorded weekly. The data were analyzed in a completely randomized design using GLM procedure of SAS. Comparison of means was conducted by Duncan's multiple range rest. The results of this study showed that 0.50% dietary harmala seed powder significantly ($P<0.05$) reduced feed intake and body weight gain when compared to other treatments in all phases of rearing period but had no significant effect on FCR of broilers. Although the number of taste buds in birds is less than of mammals, however the chicks are able to feel the feed taste to some extent. Since harmala seed contains high levels of alkaloids as the main active ingredients, the additions of harmala seed powder may resulted to bitter smell of the diet and thereby influence on appetite and reduce feed intake and performance of broiler chickens [3].

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THE EFFECT OF DIFFERENT LEVELS OF DIETARY HARMALA SEED POWDER ON CARCASS CHARACTERISTICS OF BROILERS

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Medicinal plants and their effective compounds can develop the useful microbial populations (e.g. lactic acid bacteria) and inhibit pathogenic and non beneficial microbes' colonization in the gastrointestinal tract, increase the length of villi and improve the performance of broiler chickens [1]. The advantages of medicinal plants utilization in poultry diets include their simple usage, the absence of adverse side effects likelihood on animal performance, and leaving no harmful residues in their products. Harmala with the scientific name of *Peganum harmala* is a perennial and non fluff plant from the family of Nitrariaceae. Seeds from this plant are rich in carbohydrates, lipids, proteins, minerals, alkaloids and amino acids. Alkaloids are the active compounds of harmala which also known as Beta-Carbolines, and accumulate in parts of the seeds and roots of the plant. They include Harman, Norharman, Harmine, Harmalol, Harmaline, Vasyzin and Vasyzinun. Dried harmala seeds contain 35% protein, 17% oil and Harmaline, Harmine, Harman, Harmalol, Peganin, Isopeganin, Dipeganin, Vasizin and Vasyzinun alkaloids [2]. Alkaloids, Flavonoids and anthraquinones are the main phytochemical compounds of harmala. It has been reported that harmala extract decreased the body weight and increased the relative weight of liver in broilers [3]. In this study, 288 one-day old Ross 308 broiler chicks were randomly assigned to 4 treatments and 4 replication of 18 birds in each per treatment. The experimental treatments were control (with no feed additive), 0.02% Virginiamycin as growth promoter antibiotic, 0.25% harmala seed powder and 0.50% harmala seed powder. At the end of experimental period (42 day of age), two birds from each cage with the closest body weight to the cage mean weight were selected and slaughtered after recording their live body weights and their carcass, breast, thigh, liver, and abdominal fat weights were measured in proportion to live body weight. The data were analyzed in a completely randomized design using GLM procedure of SAS. Comparison of means was conducted by Duncan's multiple range rest. The results of this study showed that the carcass, breast, thigh, and liver percentage didn't have any significant differences among treatments, but 0.50% dietary harmala seed powder significantly ($P<0.05$) reduced abdominal fat percentage. The decrease in abdominal fat percentage can be attributed to bitter smell of diet containing 0.50% harmala seed powder resulting to decrease in feed intake and hence lipogenesis and increases in gluconeogenesis caused reduction in abdominal fat percentage [3].

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ESTIMATE THE COST OF PRODUCTION OF MEDICINAL HERBS LAVENDER AND ROSEMARY , IN ALBORZ PROVINCE

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Due to the increased interest in the use of medicinal plants and the world's population is increasing too, Medicinal plant production cost is essential. Due to lack of water and soil, we need to better manage accurately calculate production costs, And know the sale price. In this research the benefit of the lavender and rosemary in Karaj were studied. Plant seedlings were planted in the farm of Alborz station in 2011. Every year plants were harvested. Production costs were calculated with notes the daily costs. Plants were harvested at 3 years. Prices asked of groceries, Wholesalers and web sites. Prices to produce in one hectare for Preparations farm (6500000 Rials), seedling (30 thousand, per seedling 2000 Rials= 60000000 Rials), farmhand (20000000 Rials), Rent land and water (70000000Rials), Manure& NPKfertilizers (10000000Rials), Unanticipated costs (8500000Rials), Total costs (175000000Rials).The yield of lavender flower in the first yearwas about 50 kg, in the second year was 150 kg and in the third year was 250 kg. Shoot yield is 6-10 ton/ ha. Shoot yield of rosemary in the first year was 3-4 ton and leaf yield was 1.5- 2.5 ton /ha. According to the plant can be harvested several times per year during second year to fifth, without the cost of land preparation and seed and planting, Seems to be economical production of this plant in Karaj

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STEROLS FROM AERIAL PARTS OF *CENTAUREA BEHEN*

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The aerial parts of *Centaurea behen* (Asteraceae) were extracted in petroleum ether. The extract was partitioned using MeOH. Three sterols structures were isolated and purified from MeOH fraction based on various chromatographic techniques. Their structures were established on the basis of physical and spectroscopic analysis including NMR, and EI-MS, and by comparison with the literature data. All compounds were isolated from *C.behen* for the first time, Which one of them is reported in the genus Centaurea initially.

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THE STUDY OF THE USE OF MEDICINAL PLANTS IN INFANTS UNDER THE AGE OF TWO IN HEZARJERIB-NEKA, IRAN

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Preparing a balm to relieve pain and accelerate the healing process has been focused on in medicine for a long time. Considering the tendency to drugs with natural origins and the accessibility to medicinal plants, the common and traditional treatment methods using medicinal plants were studied on the infants up to the age of two in Hezarjerib, Neka. A study to determine the traditional treatment methods based on the use of medicinal plants was designed and carried out using cluster sampling method. The population of this study includes the women over 30 who had a vaginal delivery in the rural areas in Hezarjerib, Neka. After the preparation of the questionnaire, the required information was obtained through interviews by the interviewer and then coded, classified, and categorized. The results showed pristine and rich data obtained through interviews with the knowledgeable rural women participating in this study in the field of the traditional treatments for infants. Some these treatments are as follows: fragrant violet and chicory as an antipyretic and a cold reliever, Plantain weed to boost strength and soften the throat, Angelica tea and brewed peppermint with rock sugar to relieve stomach pain and cramps, breast milk with sweet Artemisia to relieve earaches and stomach cramps, musk willow with willow-leaf as an antipyretic, quince seeds, shoots, and leaves for sore throats and coughs caused by pneumonia, brewed Mespilus leaf to treat diarrhea. A variety of infant care methods has been found in this study as well. considering the high prevalence of the use of medicinal plants in the infants and babies' treatment and disease prevention, more research would provide the required grounds to use medicinal plants more scientifically and reasonably. By recording the traditional treatment methods among people, it is necessary that we help maintain and efficiently use them.

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THE SCREENING OF IRANIAN PLANTS AGAINST *CANDIDA ALBICANS*

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Candida albicans is a diploid fungus that grows both as yeast and filamentous cells and a causal agent of opportunistic oral and genital infections in humans. It's mentioned that about two decades ago *Candida* sp. was commonly regarded as little more than culture contaminants, however because of developed resistance in recent years, this organism has become a major human pathogen [1]. The most common diseases that caused by *Candida albicans* are infections of the mou`th among children less than one month old, the elderly and those with weak immune systems like HIV / AIDS, the medication used after organ transplantation, diabetes, the use of corticosteroids, and forvaginal infections occur more commonly during pregnancy, in those with weak immune systems, and following antibiotic use[2]. In a project for searching new antifungal compounds from Iranian plants we screened over 90 extracts from different plants species belong to Labiatae, Asteraceae and Boraginaceae. The extraction carried out using three different solvents (*n*-hexane, ethyl acetate and methanol) via maceration method. Then *in vitro* antifungal activities of all extracts were assessed against the important human pathogenic yeast; *C.albicans* ATCC10231. CLSI guidelinewas used for determination of minimum inhibitory concentration (MIC) of samples [3]. Among tested extracts around 10 extracts showed good MIC values ranged from 125 to 1000 µg/mL, which was comparable with MIC values of Nystatin31.25µg/mL.All experiment repeated in triplicate. Themost active extract was selected for further phytochemical analysis using phytochemical experiments including column chromatography, HPLC and mass spectrometry techniques for finding active compounds which is ongoing.

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THE EFFECTS OF OLIVE LEAF EXTRACT ON SERUM TNFA AND CRP CONCENTRATION AFTER CEREBRAL

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The role of inflammation in pathophysiology of neurodegenerative disease is well accepted. In chronic cerebral hypoperfusion, microglial cells activation and white matter lesions are involved in brain injury, but the role of inflammation is complex. The purpose of this study was to examine the effects of olive leaf extract, with regarding the antioxidant and antiinflammation effects of olive leaf extract, on serumTNFα and CRP concentration after inducing of cerebral hypoperfusion in rats. Wistar rats were divided into five groups of control, hypoperfusion, (hypoperfusion + 100mg/kg extract), (hypoperfusion +200mg/kg) and(hypoperfusion + 300mg/kg).In the hypoperfusion group both common carotids were permanently coccluded. Surgery without occlusion of the carotid was applied on the control. After two weeks, olive leaf extracts with dosages 100, 200 and 300 mg/kg was given to the animals by gavage technique for 25 days. Then blood samples were taken from them after applying deep anesthetizes on them and the serum concentration of TNFα and CRP was measured by ELISA method. There was not significant alterations in TNFα concentration between groups. In comparison with the control group, olive leaf extract with 300mg/kg dosage decreased the CRP significantly ($p<0.05$), there was not significant difference in CRP between other groups. The findings indicate that rapid compensatory mechanisms of blood flow in this model, prevented the inflammatory markers alterations in serum. It seems that olive leaf extract with anti-inflammatory and anti-oxidative effects decreased the CRP concentration in comparison with control group significantly.

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EFFECTIVE HERBS TO TREAT NOSE BLEEDING

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Nose bleeding is one of the most prevalent bleedings in human beings and it could be for simple reasons like scratch in the nose due to touching the medial part of the nose and the vessel nodes with nails and finally scratching the phlegm. Nose bleeding could be because of some interior problems including high blood pressure, disease that generate bleeding, infectious disease likeTifoied, and Measels. To determine effective herbs for treating, 100 species have been proposed in Iranian traditional medicine : Alabniyat an Haghayeghal adviyeh (Movafaghaldin Abou Mansour Ali Alhervi) [1]: True myrtle (*Myrtus communis*). Kholasatoal hekmat (Mohammad Hosein Aghili Kharasani Shirazi [2]: Common jujube tree (*Zizyphus vulgaris*), Horsemint (*Mentha arvensis*), Sweet basil (*Ocimum basilicum*). Allajalamraz farsi (Hakim Mohammd Sharif Khan Dehlavi) [3]: Aleppo oak (*Acacia Arabica*), Dwarf pomogranata (*Punica grantum*), Aleppo oak (*Quercus infectaria* oliv.). Gharabadin Salehi (salehebn Mohammad ebn Mohammad Saleh Ghaeni Harvi) [4]: Camphor tree (*Cinnamomum camphora*), Fiber flax (*Linum usitatissimum*). Ghanun fi Teb (Avicenna) [5]:, French leek (*Allium porrum*) Boswellia sacra Flueck, Zakhire kharazmshahi (Seid Esmaeel Jorjani) [6]: Willow (*Salix* SPP), Ervum lens (*Lens sculentum* Erum), Common pursland (*Portulaca oleracea*), Basil (*Ocimum basilicum*). Mojarabat Farangi (Hakim Mettissaheb) [7]: *Petracarpus santalinus*, Currant-fruited rhubarb (*Rheum ribes*). EksirAzam (Hakim Mohammad AzamKhan)[8]: Garden lettuce (*Lactuca sativa*), Fumitory (*Fumaria parviflora*) , Pumkin (*Cucurbita pepo*), Poppy (*Pumkin alba*).

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ANTIMICROBIAL PROPERTY OF PHENOLIC COMPOUNDS

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Forthousands of years, natural products, especially medicinal plants have been usedin the treatment of various diseases. In recent years according to scientific advances in the identification and isolation of compounds and low side effects, medicinal plants have been lionized. Among these compounds can be pointed to Rosmarinic acid in the *Melissa Officinalis* plant and Curcumin in the *Curcuma Longa* plant that have strong antioxidant and antimicrobial properties. In this experiment, these compounds were used for the synthesis of silver nanoparticles, the formation of silver nanoparticles confirmed with mixed color changeand UV-Visible spectroscopy. Their antimicrobial activity was measured against human pathogenic bacteria; the results showed that this compound can be used for the treatment of infectious diseases that is economically affordable.(Kannan et al. 2014; Mimica-Dukic et al. 2004)

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THE STUDY OF GERMINATION STAGE IN *CARTHAMUS TINCTORIUS* UNDER SALINITY STRESS

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In order to study the effect of salinity on germination stage in *Carthamus tinctorius*, this experiment was conducted in the University of Nahavand, using a completely randomized design with four replications. Treatments included 4 levels of salinity (control, 2 dS/m, 4 dS/m, 6 dS/m). The results showed that salinity levels hadn't effect on germination percentage, radical and plumule length and fresh weight. The increase of salinity did not reduce the germination percentage and radical and plumule length and fresh weight significantly. Since the classification of saline soils begins from 40 mM [1], so *Carthamus tinctorius* can be known as a tolerant plant to salinity in germination stage.

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MEASUREMENTSOF ANTHOCYANIN, VITAMIN C AND CAROTENOID IN PLANT EXTRACT OF *SPATHEPHOENIX DACTYLIFERA* L. (TAROONEH)

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Phoenix Dactylifera A collection of flowers in each inflorescence branches grownon a diet of dates in the series are drawn oval wooden sheath [1].Spathe of date palm (which is called Tarooneh by Persian folk) and its aroma water is widelyused in Persian traditional medicine but according to the best of our knowledge lack is done on its chemicalcomposition or standardization of the herb for its quality control in herbal market [2].For this purpose, this plant was collected from shoshtar North of Khuzestan.The amount of anthocyanin and carotenoidof plant extracts was measured using UV-Vis spectrophotometer [3].Vitamin Cwere obtained by the AOAC's official titrimetric method (AOAC, 1990) [4]. For this purpose,the plant parts were dried at room temperatureand ground mechanically. Each part was extractedin n-hexane (Merck) for 8 h in a Soxhlet apparatusin the presence of anhydrous Na_2SO_4[5].The results showed that the total oil content of the plant was 6.04%, the amount of anthocyanin was 0.27μm per gr dry, and the amount of carotenoids was 0.024 mgr per gr fresh plant.Volatile constituents and preliminary pharmacognostic evaluation of Tarooneh can give some useful data for further phytochemical analysis, quality control and standardization of Tarooneh.

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EVALUATION THE AMOUNT OF FLAVONOIDS COMPOSITIONS, CHELATING ACTIVITY OF RED HAWTHORN AND BLACK HAWTHORN COMPARED TO EDTA STANDARD

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Most of chronic diseases such as cardiovascular diseases are directly related to the high production of free radicals in body. Due to high antioxidant activity and chelating metals, herbal compositions can reduce the obnoxious effects of radicals by using a diet full of antioxidants, plan are the most important sources of natural antioxidants[1]. In this research, after preparing the seeds of red hawthorn plant and black hawthorn plant, samples were dried in shade and pulverize by electric mill. %90 methanol extract was prepared from samples with maceration method. In order to determine, total flavonoid compositions were evaluated through colorimetric method with color reagent of Aluminum Chloride [2]. The complex power of iron was evaluated by herbal extracts based on the methods of Denis et al. in 1994[3]. based on the obtained results from the experiment, the total flavonoid compositions of the seeds of red hawthorn and seeds of black hawthorn was measured 2.433±1.274 and 4.933±1.270 milligram of quercetin per gram of extracts. In the concentration of 100µg/ml, using EDTA standard, the amount of iron's chelating was measured as %22.11, the seeds of red hawthorn as %25.44, and the seeds of black hawthorn as %43.44. The research findings have shown that the seeds of black hawthorn had higher flavonoid property compared to red hawthorn. In the concentration of 100 mg/ml, the %90 methanol extract of intended plants performed better than EDTA standard and the seeds of black hawthorn had higher iron chelating than iron.

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MS (MULTIPLE SCLEROSIS)

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God has created a treatment for any pain in the nature. Overcoming MS by remedial herbs People with MS (Multiple Sclerosis) or living with a MS patient, please do not lose this paper and read it. If you or your loved ones are not suffering from this disease, I request you to share this article even unread to help in healing the MS patients because now a person may need to know this important information. The paper, line by line is very critical for patients with Multiple Sclerosis. One of diseases that hearing its name may make people terrified is MS or Multiple Sclerosis because Medicine has no remedy for this disease like many other ones and it just destroy the patient's body and intensify his/her health problems. However, in the traditional medicine, MS is defined simply and that is why it is curable and even it could be said that it has a very simply remedy. MS is coldness emerged in the brain and nerves and it should be cured by warmth. However, this simple definition does not mean that the treatment duration is like a cold, but by the following simple ways, patients could improve significantly during a 4-6 month period of treatment: The simplest method of treatment is to eat warm-natured foods particularly the following ones:

1. Fig: 7 figs soaked in a glass of water (both water and figs be eaten) nightly
2. Olive: 7 olives fasting in the morning, and 7 olives two hours after dinner (factory marinated olives)
3. Lubricating those parts of body with sensory and motor weakness by olive oil
4. Avoiding cold odors and industrial odors, and having perfume of rose and smelling it continuously
5. Using laxatives and digestives to keep the alimentary tract healthy
6. Research conducted in US indicates that a teaspoonful of saffron weekly could help to treat MS. Scientists discovered a substance in saffron that is effective in treating diseases, particularly MS and arteriosclerosis. The curing substance in saffron is called Crocin and it contributes to protect brain cells and prevents damages in fat producing brain cells.

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DETERMINING THE BEST METHOD OF GERMINATION FOR *CAPPARIS SPINOSA*

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The caper bush or *Capparisspinosa* is from Capparidacea family and as a medicinal plant has an essential role in traditional medicine.It seems necessary to investigate the best method of germination of this species because of its seed dormancy. This study has taken place in National Botanical Garden of Iran in 4 replications randomly. Five treatments were used as mechanical scarification, chilling, chemical treatment in sulfuric acid 10 and 20 min, also integrated one which treatments were 10 minutes in sulfuric acid and chilled for 60 days and also 20 minutes in sulfuric acid and chilled for 90 days. Accordingly, the germination percentage and rate were measured. The Highest percent of germination were related to integrated treatment 20min in sulfuric acid and 90 days of chilling with 3.73 percent of germination.

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A STUDY ON INHIBITORY EFFECT OF ETHANOLIC EXTRACT OF THE *CYPERUS ROTANDUS* ON ACETYLCHOLINESRERASE ACTIVITY

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Dementia is a progressive decline in mental andcognitive abilities that may be caused by brain injury or disease. There are several types of dementia from which Alzheimer disease (AD) is the most prevalent [1, 2]. Given the high need for medicines with fewer side effects to treat diseases such as AD. This study investigated the inhibitory effect of extract of the Cyperusrotanduson the activity of acetylcholinestras [3]. Activity of the enzyme acetylcholinesterase (AchE) was measured by Ellman method. Then, Lineweaver Burk plot was usedto calculate Km, V_{max} and Ki. In all the phases, theenzyme's concentration was constant and its activitiy was measuredin six different concentrations of acetylthiocholine (5, 10, 15, 20, 25 and 30 mM) at room temperature (25^0C) and based on the optical absorption at 412 nm wavelength. Experiments were conducted in the presence of various concentrations of physostigmine (5.0, 75/0, 1, 5.1 and 2) (mg / 100ml) and also in the presence of various concentrations of Cyperusrotandus (1.0, 2.0, 3.0, 4.0, 5.0, 6.0 and 7/0) (mg / ml). Finally, the different levels of inhibitors' concentration and activity percentages were plugged into Dixon plot and IC_{50} of inhibitors was calculated. Ki of *Cyperus rotandus* was found to be almost 40times as big as the Ki of physostigmine. IC_{50} of physostigmine and *Cyperus rotandus* were 21.2 µg/ml and 139µg/ml, respectively. Given the mechanism of enzyme inhibitory effect, lower levels of Ki and IC_{50} will lead to the higher inhibitory effects. Therefore, results show that physostigmine is a stronger inhibitor than *Cyperus rotandus*. Moreover, with purification of the extract, higher inhibitory effects could be expected. In addition, *Cyperus rotandus* does not have the side effects (nausea, vertigo, etc.) of chemical medicines such as physostigmine.

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EFFECT OF HYDROALCOHOLIC EXTRACT OF HENNA (*LAWSONIA INERMIS*) ON LIVER ENZYMES AND DEVELOPMENT IN NEONATAL MALE RATS BORN FROM TREATED MOTHERS

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Considering the important role of the liver in relation to metabolism of chemical composition and plasma protein synthesis and also excessive use of herbs (medicinal plants) in traditional medicine, particularly Hanna; current study was conducted with purpose of investigating the effects of hydroalcoholic extracts of henna on the activity of liver enzymes and blood biochemical factors and development of neonatal male mouse liver. In this experimental study, 40 male Wistar rat were participated, they were divided into 5 groups of 8 mothers who had previously received specific doses of 100, 200, 400 mg of the henna extract during their pregnancy and in experimental groups 1, 2 and 3 respectively. After the end of 22 days neonatal period, the rats were weighed and assessment of liver enzymes, albumin and protein were performed. Histological examination was performed after preprocessing through the steps of slicing, smears and staining with hematoxylin-eosin. The hydroalcoholic extracts of henna caused significant increase in liver enzymes including ALP, AST, ALT and protein, this increase is dose-dependent and was observed in the treatment groups than in the control group($p<0.05$). However, other variables such as infants birth weight, liver weight, and albumin level was not significant in the treatment groups than control group. There was mild, moderate or severe pathologic changes in liver of groups whom receiving henna extract. Research has shown that methanolic extracts of henna root cause repeated abortion in mice, rats and guinea pigs, and this effect was attributed to the most existing composition in hydro alcoholic extract, apigenin [1]. It also has been shown that apigenin metabolism is quiet slow, and the slow uptake and excretion phase of this material could lead to flavonoid accumulation in the body [2]. Histopathological changes in the liver tissue of groups treated by henna extract showed that presence of hepatic necrosis may be due to effects of apigenin in occurrence of apoptosis. apigeninincrease reactive oxygen species, cytochrome C production and release from mitochondria into the cytosol, and consequently, cause processing and subsequent induction of prokaspaz 9 and finally apoptosis through induction of caspase 3 activity and rapid reduction of trans-membrane potential [3]. Results of enzyme tests and histopathological changes in liver shown that hydroalcoholic extracts of henna cause damage in newborn mice liver and suggesting that this herb should be used with caution during pregnancy, although more study is needed in this area.

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PREPARING POWDER EXTRACTS OF GINGER *(ZINGIBER OFFICINAL*) TURMERIC (*CURCUMA LONGA*) AND BLACK PEPPER (*PIPER NIGRUM*), USING NANOTECH AND DETERMINATION OF INSECTICIDES PROPERTY RATE OF THE EXTRACTS ON APHIDS

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One of the most important factors and harmful agents in agriculture is insects. Non selective pesticides often use to control them as uncontrolled. Some efforts have been made to replace chemical insecticides with plant originated compounds to produce healthy products with low pesticides residues and providing insecticides compatible to the environment in recent years. For this aim a plan has been made to produce three extracts of ginger (*Zingiber officinal*), turmeric (*Curcuma longa*) and black pepper (*Piper nigrum*) and determination of insecticides property rate of the extracts on aphides. For this , the plants were extracted. For making extracts into powder ,convert to nano size and investigate particles size and forms used spray drier, ball mill and SEM respectively. Identification of agent groups and separation of compounds used with IR and GC respectively. The mortality of aphids due to the extracts was investigated after 5, 10, 15 and 20 minutes. The results for ginger extract were 68, 88, 94 and 100 percent , for turmeric extracts were 48, 60, 80 and 100 percent and for black pepper extracts were 20, 40, 80 and 100 percent respectively. Among these, the ginger extract had the best efficacy with the mean 87.5 percent.

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SALT STRESS MITIGATION BY SEED PRIMING WITH SODIUM NITROPRUSSIDE DURING GERMINATION AND EARLY SEEDLING GROWTH OF BLACK CUMIN (*NIGELLA SATIVA*)

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Among the plant growth stages, seed germination, seedling emergence and establishment are key processes in the survival and growth of plants [1]. Environmental stresses, especially salt stress, can play an important role in the reduction of the plant growth stages, particularly during germination in arid and semi-arid regions in Iran [2]. Sodium nitroprusside (SNP) pre-treatment has been found very impressive in reducing the adverse effects of salinity stress [3]. In this research, in order to assay the role of SNP (as nitric oxide donor) on early seed germination andseedling growth of black cumin (*Nigella sativa*) under salt stress, an experiment was conducted in a factorial arrangement based on completely randomized design with 9 treatments and three replications. The experimental treatments were including different concentrations of SNP (0, 25 and 50 µM) and salinity (0, 50 and 100 mM). The seeds of black cumin which were primed with different concentrations of SNP for 24 hour, for germination under salt stress, they transferred into sterile petri dishes which contain 10 ml NaCl. The results showed that an increase in salt stress reduced germination percentage and rate, radicle and shoot length, seedling dry weight, seed vigor indexand relative water content and increased electrolyte leakage and proline content. Pretreatment with the highest concentration of SNP caused an increase of plant tolerance to salinity stress. The application of SNP greatly caused the increment of germination percentage and rate and in conclusion enhanced fresh and dry weight of black cumin under salt stress.

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AN INVESTIGATION ON THE FLOWERING HABITS OF FOUR IRANIAN POPULATION OF THYME FIRST REPORT OF GYNODIOECY IN IRANIAN (ENDEMIC) THYME SPECIES

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Gynodioecy, as defined by Darwin in 1877, is the occurrence of two kinds of individuals in natural populations: bisexual or hermaphrodite plants, which here will be called male-fertiles or (Mf), and females, here described as male-steriles or (mS). Many plant species are gynodioecious, but male sterility often occurs only atvery lowfrequencies. Precise counts of mS in natural populations are rare or isolated, however. Only a few species have been extensively sampled. When the frequency of mS reaches a sufficiently high level for the situation to be qualified as a polymorphism, gynodioecy sets an interesting problem related to the breeding system [1]. The processing industry needs high quality, homogenous and standardised raw material. Thus it is important for thyme producers to have high quality cultivars with a good level of homogeneity. Rey et al. (2004) showed that crossing male sterile (MS) with male fertile (MF) plants to breed hybrids is an adequate approach to improve homogeneity of thyme cultivars. The purpose of this study is to determine of percentage of gynodioecious in four population Iranian thyme *T. daenensis*, *T. migricus*, *T. transcaspicus* and *T. pubescens* collected from Semnan, West Azerbaijan, Khorasan and East Azerbaijan respectively, in Mashhad environmental conditions.This experiment was performed at the Research Station of the Faculty of Agriculture, Ferdowsi university of Mashhad. Highest percentage of gynodioecious observed in *T. migricus* species with 75 present. The percentage of gynodioecious in *T.daenensis*, *T. transcaspicus* and *T. pubescens* were 58.33, 8 and 9.1 % respectively. Naturalpopulations show very high variation in female frequency, from 5% to 95% depending on the population, with a meanvalue slightly above 60% in southern France. In *Thymus vulgaris* L. the percentage of mS plants varies greatly, from 5 to 95%. This is a particularly wide variation for a gynodioecious species. In short, female plants carry a CMS gene blocking the development of functionalanthers, while hermaphrodites either do not have such aCMS gene or carry at least one nuclear restorer allele thatrestores male function [2]. Overall, females compared to hermaphrodites produced more but smaller flowers, had higher fruit set, higher total seed production, and produced heavier seeds that germinated better [3].

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COMPARISON OF ESSENTISL OIL COMPOSITIONS OF *ACHILLEA MILLEOFILIUM* EXTRACTED USING HD, SPME AND MICROCROWAVE DISTILLATION TEQUNICHES

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Three different methods: hydrodistillation (HD), microwave-assisted hydrodistillation (MAHD) and Ultrasonic assist with headspace solid phase microextraction (UA-HS-SPME) have been applied for the first time together for the extraction of volatile organic compounds of *Achillea millefolium* L from Iran. The oils obtained were analyzed by GC–MS. The extraction time while using the MAHD is no more than 24 min using a microwave power of 300 W. In the presence of Ultrasonic assist with headspace solid phase microextraction (UA-HS-SPME), the highest extraction efficiency was achieved with a 100 µm polydimethylsiloxane (PDMS) fiber. Different experimental parameters such as fiber's coating type, sonication time, extraction time and temperature, and desorption time were investigated. The major component by three methods of HD, MAHD and UA-HS-SPME were carvacrol as 64.31%, 54.04% and 77.13% respectively. Differences were observed both in the composition of the essential oil and from the energetic point of view. The essential oil obtained with microwave (MAHD) methods contained substantially higher amounts of oxygenated compounds and lower amounts of monoterpenes than conventional method. The in situ microwave heating is safe and versatile. It presents time and energy saving advantages, and therefore it can also be considered useful for industrial applications.

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CYTOTOXIC EFFECTS OF *CUSCUTA EPITHYMUM* AQUEOUS EXTRACT ON HUMAN ACUTE MYELOBLASTIC LEUKEMIA CELL LINE

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One of the major paths for drug development is the study of bioactivities of natural products. Therefore, the aim of this study was to compare the cytotoxic effects of aqueous extract of whole *Cuscuta epithymum*, which is a traditional medicinal herb commonly used in Iran and other oriental countries, on the human acute myeloblastic leukemia (HL60) and another human lymphocyte Jurkat (JM) cell lines. *In vitro* cytotoxic screening with various concentrations (200-12.5µM) of the extract was performed using methyl tetrazolium bromide test (MTT) in three times (24, 48, 72h). The minimum effective concentration of the plant extract was 12.5 µM, and increasing the dose to 200 µM induced increasingly stronger effects. The inhibitory concentration 50% (IC50) of the extract against HL60 was about 87, 62 µM in 24 and 48 hours and 52 µg/ml in 72 hrs. In contrast, the extract did not have cytotoxic effect for the JM cells at these doses. The findings of the present study suggest that *C.epithymum* is toxic against HL60 tumor cells. Whether or not such effects can be employed for the treatment of such tumors must await future studies.

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OPTIMIZED TECHNIQUES FOR MITOTIC STUDIES IN HOLY THISTLE (*CNICUS BENEDICTUS* L.)

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Chromosomal studies are almost one of the main research topics in all plants, speciallyin the medicinal plants which have not had asignificant genetic references. In this case, Holy thistle *(Cnicusbenedictus* L.) From Asteracea family is a world's highly valuable medicinal plant which the leaves and twigs of this plant are harvested at flowering stage due to the composition of cnicin (a sesquiterpene lactone, esterified with a substituted acrylic acid, and belonging to the germacranolide class of natural products).*C.benedictus* has been used as an antipyretic, appetizer, blood purifier, carminative in herbal medicine. In the mitotic studies, different methods at each stage of slide preparation, from collecting root tips to chromosome staining, were applied to determine the best method for studying its chromosomes. Results showed that root tips, which were collected from germinating seeds were better than those from young seedlings. Optimized technique consisted of apical root meristem pretreated in 0.05% colchicine for 3 hours at 4 °C. After washing, explants were stabilized in alcohol+acetic acid glacial (3:1). 1M HCl at 60 °C to hydrolyze and soften root tissue. In order to determine the best chromosome staining method, we used 2% Aceto- orcein at room temperature for 19 h. Finally, the samples were crashed by 45% acetic acid. The results showed that holy thistle had chromosome number 2n=2x=22.This improved protocol allowed the identification of chromosomes in mitosis division.

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CYTOGENETIC STUDY OF *CNICUSBENEDICTUS* AS A MEDICINAL PLANT

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Holy thistle (*Cnicusbenedictus*) is an annual plant widespread from Asia Minor to the Caucasus, including Syria, Iran, and Afghanistan, and in Mediterranean Europe. Infusions and extracts of the aerial parts of this species are applied in traditional medicine, as their aromatic-bitter taste is assumed to increase appetite and gastrointestinal secretion [1].Several samples of the plants were collected from natural populationsof the rangelands across Fars providence. Several karyotypic characteristics such as long arm, short arm and were studied. Then, according to information chromosome numbers and ploidy levels of species were identified. Chromosome characters, including: Total lengths of chromosomes, long and short arm's length and arm ratios were determined. Karyotypic symmetry of species was determined by using the total form percentage (TF%), Relative length of the shortest chromosome (S%) and The mean of Chromatin (X) parameters. The result showed that, there was diploid (2n=2x=22). This is the first record of basic chromosome numbers of X=11 observed on *C. benedictus*. Karyotypic formula and karyotypic symmetry showed that the plant was 9m +2sm, allocated to 1A class, whichindicating the presence of a primitive symmetrical karyotype in this spice.

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CYTOTOXIC EVALUATION OF *HAPLOPHYLLUM VIRGATUM* VAR. *VIRGATUM* AGAINST RAJI CELL LINE

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The genus Haplophyllum with the local name of "Sodabi," is represented in the flora of Iranby 30 species of which 14 are endemic. Various members of the genus are used in traditional medicine. The present study is focused on the cytotoxic activity of methanolic extract that was isolated from of dried leave and roots of the *Haplophyllum virgatum.*The plants were gathered from Hormozgan province-Iran and dried at room temperature. Leave and rootsof dried plants extracted three times with methanol for 24 h. The metanolic extract was partitioned sequentially between **Et2O,** CH2Cl2, n-butanol and water. The cytotoxic properties of the isolated partitions were examined against Raji cells using the MTT assay. All results were expressed as IC_{50} values (the concentration of extract that inhibited cell proliferation up to 50% of the negative control).Results showed that Et2O extract had highest cytotoxic effect on this cancerous cell line.

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THE EFFECTS OF HEAVY METALS ON THE MORPHOLOGICAL CHARACTERISTICS OF CENTAUREA CYANUS

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It is known that environmental stresses, suchas heavy metals, industrial chemicals and pollutantsmay be some morphology and growth characteristics of plants affected.The effect of environmental conditions on morphologicalvariation in plant traits has been studied before [e.g. 1, 2, 3]. The effects of heavy metals, from Cemencompany in Hamedan province, on the some morphological characters of polluted Centaurea cyanus (Asteraceae) were investigated. Determination of heavy metals (Cd, Ni and Cr) in collected soils and plants from the control and company area was performed using Flame Atomic Absorption Spectrophotometry. The control sites were from 5 km distance of the company. For morphological studies 12 charecters were choosed and studied. Results showed high Cd, Ni and Crconcentration in polluted soil, and high Crconcentration in polluted plant in compared to control samples .The results showed that heavy metals can cause to some abnormalities in stracture of vegetative parts in plants that were grown on polluted area. Decreasing of shoot length, leaf lenghtand changing of color flowers were some effects of heavy metals. The different morphological characters of *C. cyanus*indicate flexibility of this species in various ecological circumastances.

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FORMULATION STUDIES OF MUCOADHESIVE TABLETS CONTAINING STEM BARK EXTRACT OF *ZIZIPHUS JUJUBA* BASED ON IRANIAN TRADITIONAL DOCUMENTS.

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Based on traditional documents, the stem bark of *Ziziphus jujube* powder is suitable to cure Aphthous. On the other hand, mucoadhesive tablet is one of the various routes of drug delivery for curing the buccal disease. The aim of this work was to design a mucoadhesive tablet of *Z. jujube* stem bark and formulation studies. Tablets containing stem bark extract of *Z. jujuba* were formulated. Materials were mixed and changed to granules and then tablets through direct compression. Properties such as in vitro and in vivo mucoadhesion, drug release, water uptake, disintegration were carried out. Properties of the tablets showed excellent mucoadhesion and released high amount of the active ingredients (48%) immediately and completed after approximately first hour. They had a good adhesion in buccal cavity without irritation and they can be suitable for the treatment of irritation, pain, and discomfort associated with Aphthous. Moreover, it was simple to apply by mean of patient compliance. For this purpose, clinical studies are currently underway. This study showed that the kinetics of release of the active substance from mucoadhesive tablet was obeyed the zero order kinetic. The water up take and DS increase, raised during the time passing. Increasing the hydration property may result in higher releasing of the active ingredients and finally the disintegration is increasing too.

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LED LIGHT SPECTRUM INCREASE ROSMARINIC ACID CONTENT IN SHOOT OF *MELISSA OFFICINALIS* L.

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Light emitting diodes (LEDs) could provide specific quality and quantity of light for normal plant growth (1). *Melissa officinalis* L. is one of the most important medicinal plants in the world that has many applications in drug and flavoring industrials. Rosmarinic acid (RA), an ester of caffeic acid and 3, 4-dihydroxyphenyllactic acid which was isolated for the first time from *Rosmarinus officinalis* L. leaves and later found in other species of Labiatae and Boraginaceae. RA has interesting properties which has led to a broad range of applications from food preservatives to cosmetics (2). RA can be found in many plants but usually rosemary plant is used as the major source. This matter has caused to increase of demand and price of the plant. Therefore, finding other plants containing high amount of RA is very important to introduce as new sources. RA can be found in all plant organs of *M. officinalis*. Its content in leaves is about 6% of the dry weight. We cultivated lemon balm rhizomes in pot and putted in four incubators contain LED lamps with spectrum of red (100%), blue (100%), 70% red plus 30% blue and white (100%) with 300 $\mu mol.m^{-2}.s^{-1}$ light intensity and in greenhouse conditions as a control. The amount of rosmarinic acid in shoot had the highest content in red LEDs. The highest amount of RA in red LEDs was 4.616 µmol/gDW. In incubator containing red LED light, the amount rosmarinic acid has increased 44.52% in comparison with greenhouse light. According to our results, the use of lemon blam under LED lights especially red LED could useful for increasing of RA.

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SYNTHESIS OF NOVEL NOSCAPINE DERIVATIVES AND INVESTIGATION OF THEIR ANTIBACTERIAL ACTIVITY

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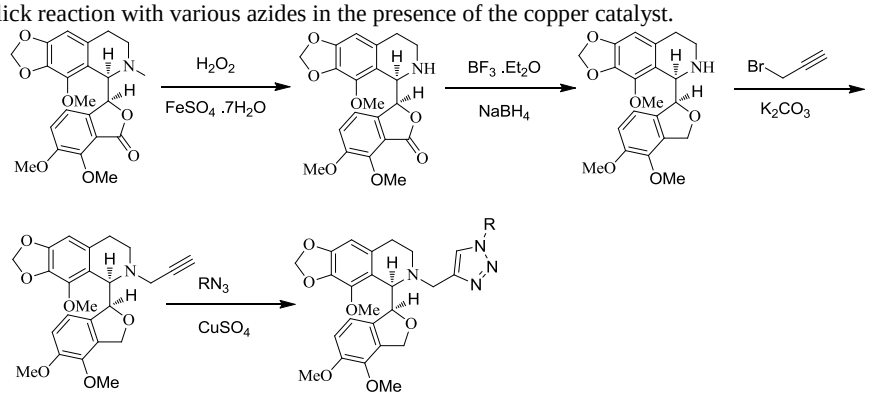
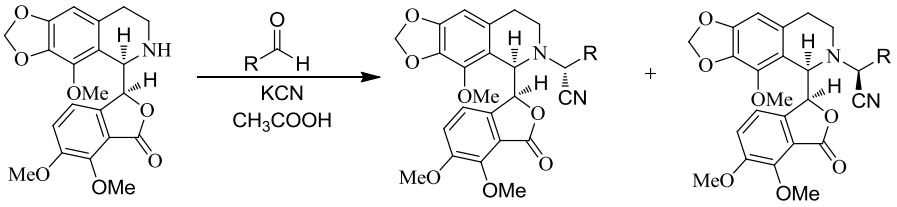
Noscapine is an alkaloid that mostly extracted from opium [1,2]. In this paper synthesis of new derivatives of noscopine is reported. Firstly, nornoscopine was synthesized by N-demethylation reaction and then the carbonyl group was reduced. Subsequently, triazole ring was constructed on the molecule by propargylation of the secondary amine followed by click reaction with various azides in the presence of the copper catalyst.



Secondly, new noscapine derivatives were synthesized by the three-component Strecker reaction with various aldehydes. All of the reactions proceeded stereoselectively and in one case the absolute configuration of the product was deduced using X-ray crystallography.



Finally, antibacterial activities of the synthesized compounds were investigated on Staphylococcus aureus and Escherichia.coli, and MIC values were calculated. Experiments showed that the aminonitriles had a better effect on inhibition growth of both bacteria.

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ISOLATION, STRUCTURE ELUCIDATION AND BIOLOGICAL EFFECTS OF ETHYL ACETATE EXTRACT OF ULVA FLEXUOSA

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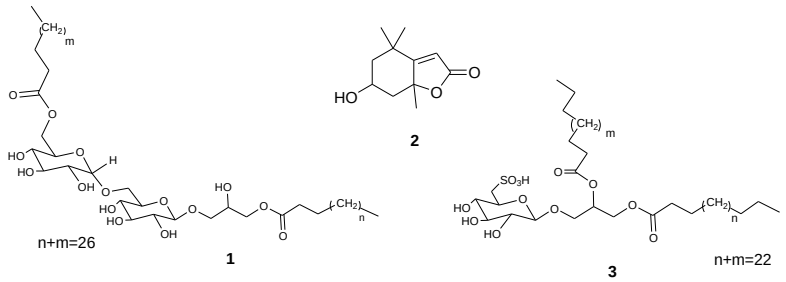
Seaweeds (Marine algae) belong to a group of eukaryotic known as algae. Seaweeds are classified as Rhodophyta (red algae), Phaeophyta (brown algae) or Chlorophyta (green algae) depending on their nutrient, pigments and chemical composition. Marine algae are rich and varied source of bioactive natural products, so it has been studied as potential biocide and pharmaceutical agents and have been used as human food. Ulva is one of the genus in Phylum Chlorophyta, class Ulvophyceae, order Ulvales, family Ulvaceae. The Chlorophyta are perhaps the least prolific producers of secondary metabolites amongst the macroalgae. Anyhow, a wide range of compounds, predominantly terpenes, polyphenols and steroids, have been reported in various marine green algae [1,2]. The cytotoxic and antibacterial activities of different extracts of marine macro Ulva flexuosa, from the Persian Gulf, Hormozgan islands, were investigated. The ethyl acetate extract showed considerable antimicrobial and cytotoxic activities.In the present study, we have undertaken a phytochemical investigation on the ethyl acetate extract of Ulva flexuosa. The extract was separated using repeated column chromatography. This study led to the isolation and structure elucidation of seven compounds includingbeta-Sitosterol, daucosterol, octacosan-1-ol,hexadecanoic acid, tetradecanoic acid and1, 2, 3 compounds. This compounds discribed for the first time from this seaweed.Their structures were established by high – field NMR techinues (1H-NMR, 1H-1H COSY, HMQC, HMBC).



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THE EFFECTS OF N-3 PUFA SUPPLEMENTATION ON THE SERUM LEPTIN LEVELS AND APPETITE SENSATIONS IN OBESE PEOPLE: A RANDOMIZED DOUBLE-BLIND PLACEBO-CONTROLLED CLINICAL TRIAL

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Obesity, as a common health problem results from an imbalance between energy intake and energy expenditure. Leptin, a polypeptide hormone primarily secreted from adipocytes and participated in appetite control and energy expenditure. Obese people show leptin resistance state science the disturbance in blood-barrier function in brain. Dietary factors can affect on the circulatory leptin. This study was aimed to determine n-3 PUFA on the serum leptin level and appetite status in obese people. This randomized, double-blind, placebo controlled clinical trial was performed on 60 obese subjects with body mass index 30 (kg/m^2) and above in 2012 in Tabriz. The eligible subjects were randomly allocated to intervention (consumed two capsules containing 1 g/ day n-3 fatty acids [180 mg EPA, 120 mg DHA]) and control (consumed capsules containing paraffin twice a day) groups. Duration of study was 4 weeks. Blood samples were collected at baseline and at the end of study. Serum leptin levels were assessed using enzyme linked immunosorbent assay (ELISA) method. Visual analogue scale questionnaire was completed for evaluating appetite sensations. After assessing the normality of data using Kolmogorov-Smirnov test, data were analyzed by SPSS software. Statistical significant was defined as $p< 0.05$. Serum leptin levels were increased non-significantly in intervention group ($p>0.05$). N-3 PUFA had the significant positive effect only on the fullness sensation in intervention group ($p=0.034$). In other appetite items, no obvious changes was seen. In placebo group, leptin did not change significantly ($p>0.05$) and changes in appetite were not significant (p>005). According to our results, n-3 PUFA can modulate satiety and increase energy expenditure probably through the influencing on the secretion of leptin. Short-term period of study can justify the non-significant changes in circulatory leptin. Further studies are needed to confirm these results.

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