



**2<sup>nd</sup> National Congress on Medicinal Plants**  
**15, 16 May 2013**  
**Tehran- Iran**



# **ABSTRACTS OF ORAL PRESENTATIONS**



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**PREVENTIVE EFFECTS OF AN ORAL RINSE PEPPERMINT  
ESSENCE ON CHEMOTHERAPY-INDUCED ORAL MUCOSITIS**

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Oral Mucositis (OM) is a significant and frequent complication of chemotherapy, which results in delayed or incomplete chemotherapeutic management. This study was conducted to determine the effects of an oral rinse *peppermint* essence (PE) in prevention of chemotherapy- induced OM. In this double blind clinical trial, 40 patients with colon or rectum cancers who admitted for chemotherapeutic management randomly divided to equal placebo and PE groups. PE and placebo groups were received 10 drops of oral rinse PE or placebo, three times a day, from the first day of chemotherapy up to the fourteenth day, respectively. A bipartite questionnaire was used for obtaining demographic and clinical information. The evaluation of OM was measured using the WHO scale. Content and inter-rater methods were used for validity and reliability of tools, respectively (r=0.93).

The incidence of OM between the PE group (15%) and placebo group (50%) was significantly different (p<0.05). The risk of OM in the placebo group was 3.3 higher than the PE group. Moreover, a significant difference (p<0.05) between the grade and incidence time of OM was found between both groups. According to these results, it seems that oral rinse PE is effective, safe and well- tolerated method for prophylactic treatment of chemotherapy-induced OM.



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**THE EFFECT OF GREEN TEA EXTRACT ON CHRONIC  
ERYTHEMATOUS CANDIDIASIS IN COMPARISON WITH NISTATIN**

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*Denture stomatitis* is very common oral mucosal lesion, affecting approximately 50% of denture wearers in some populations. Microbiological swabs from the palate and denture surface will confirm the presence of yeasts – *C. albicans* is the most common followed by *C. glabrata*, *C. tropicalis* and others. The association of these procedures with the use of topical antifungal drugs on the affected areas and on dentures is relevant as well. Widespread emergence of microbial (bacteria, fungi, virus etc. resistance to present drugs represents a serious problem in treatment of such kind of infections. More recently an increased interest to use natural antimicrobial compounds, like plant extracts of medicinal plants possess a characteristic flavour and sometimes show antimicrobial and antifungal activity. The antifungal activity of medicinal plants has already been studied extensively. *Camellia sinensis* seems to be valuable sources for antifungal drugs, especially against *Candida albicans*. Green tea leaves (*Camellia sinensis* L.) has been shown variable antifungal activity *in vitro* against *Candida albicans* in different harvest time. The aim of the present study is to evaluate the efficacy of green tea extract in compared with that of nistatin drop in the treatment of denture stomatitis. This is an open, randomized, controlled, experimental Double Blind Clinical Trial study with 30 patients in two parallel groups, 15 patients will receive nistatin drop and the other ones green tea extract(0.58%). The patients will be recommended to use mouthwash 4 times a day each time 15-20 drops for 5 min and after that they should prevent from eating and drinking for 30 minutes, and they are suggested to use the drug in two weeks at a specific time. Amount of inflammation and erythema, will be recorded before and after treatment in each session. To determine improvement, we have used two criteria: rating system for density of mycological culture and, erythema surface of palatal mucosa on days 0, 7, 14 after commencement of therapy. After selection of the patients, at each visit, mycological samples will be taken from the palatal mucosa and fitting surface of the denture and will inoculated on Sabouraud's dextrose agar plates. Samples will be taken with sterile cotton swabs and inoculated by rolling the swab over the culture media, then will incubate at 37 °C and after 48h the colonies will be counted and expressed in terms of densities. At each visit, the erythema of the palatal mucosa will be measured with a graded absLang and will record according to 6-point scale. 27 patients were entered the trial. The green tea extract group (group A) consisted of 11 females and 4 males. The nistatin group (group B) contained 9 females and 3 males. The erythema surface of the palatal surface was significantly reduced in both groups at follow-up visits Compared with the pretreatment condition. No significant difference was seen between the two groups at the same visits. This study indicated that Green tea extract can be effective in reducing the number of *Candida* colonies and reducing the erythematic area which was comparable to nistatin drop in the management of denture stomatitis.



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**ELECTRONIC IDENTIFICATION OF IMPORTANT MEDICINAL  
PLANT FAMILIES OF IRAN**

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As we know, identification and grouping of certain families for medicinal plants is very essential. In this study, an interactive identification key designed for 101 plant families of Iran. The total descriptions for comparative study based on the 411 families. The focused plants are very important for traditional and modern medicine. Some of them are cultivated as ornamental, industrial and/or other purpose. By using an algorithm named as EID (Electronic Identification) many of morphological characters of these plants analysed [1]. The Indian and Australian plant families reviewed [2, 3] and improved to ethno botanical terms of classical botanical courses in Iran. Also, making an analytical report for identifying procedure is very important and new for the Electro-Botany as modern and practical botany. In this system, the inflorescence and vegetative characters are important for determination but the user may select one or more by multiple selection tools from any observations on specimen, quantitative or qualitative and even conventional questions such as usages, groups, common names and so on. An illustrated glossary with English and Persian index makes simplicity to know statements and selecting or deselecting any answer. In addition, plotting a dendrogram for identification process distinguishes factors between the visual and virtual aspects, automatically. Therefore, this research utility as a rapid guide helps any experts, botanist or non-botanist to know and determine medicinal plant family and prepare documentations for observations, easily. An electronic museum exists in this system that helps to do descriptive and comparative studies. It is very useful and user friendly application for education particularly in taxonomy and classification of medicinal plants.

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**CHEMICAL-GENETIC PROFILE ANALYSIS OF THYMOL IN  
*SACCHAROMYCES CEREVISIAE***

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The antifungal activity of thymol was evaluated using the broth microdilution assay with *Saccharomyces cerevisiae*. The results indicate that minimum inhibitory concentration (MIC<sub>100</sub>) for thymol is in the range of 80-100 µg/ml. Chemical-genetic profile analysis was completed with thymol using ~4700 haploid *S. cerevisiae* gene deletion mutants to find out the mode of action of thymol in the yeast cell. 76 *S. cerevisiae* deletion mutants with the greatest degree of susceptibility to subinhibitory concentration of thymol (50 µg/ml) were selected by digital analysis. Cellular roles of deleted genes in the most susceptible mutants and gene ontology annotation analysis using online gene profiling software (Profcom, gprofiler and GeneMANIA) indicate that the targets for thymol include pathways involved in telomere length maintenance. Finally, Spot test analysis of targeted mutants confirmed the accuracy of our large-scale approach to detect drug sensitive mutants.

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**EVALUATION OF THE EFFECT OF ORGANIC FERTILIZERS AND  
MULCH APPLICATION ON GROWTH, DEVELOPMENT, ESSENTIAL  
OIL CONTENT, AND MICROBIAL LOAD IN PEPPERMINT (*MENTHA  
PIPERITA* L.)**

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Today in medicinal plants culture, organic culture is noticeable because of undesirable effects of chemical fertilizers. Another important problem about medicinal plants is microbial quality, so it is necessary to evaluate utilization of organic culture on microbial contamination of medicinal plants. This experiment about peppermint culture was set up as split plot on the basis of randomized complete block design with 8 treatments and 3 replications. The utilization of organic compounds as a main factor included: 1-untreated control, 2-urban compost applying, 3-organic manure applying, and 4-organic manure applying with wood chips mulch, and harvest as a sub factor included two harvest were used. Morphological traits, essential oil content and yield, and microbial contamination, were measured and compared in each treatment according to the standard guidelines. Result of means comparison ( $p < 0.05$ ) indicates that the utilization of organic fertilizers and matter increased growth and development indexes, yield, and essential oil content and yield, so that total herb yield and essential oil yield on two harvest were at maximum level in organic manure applied plots ( $472.2 \text{ g/m}^2$  and  $14.5 \text{ ml/m}^2$  respectively), these enhancements were more significant in first harvest. In terms of microbial contamination, none of the fertilizer treatments increased microbial contamination in first harvest, and application of mulch could decrease microbial load significantly. In second harvest, organic fertilizers especially organic manure, only increased mesophilic aerobic bacterial contamination. According to microbial quality standards all the samples were standard in mesophilic aerobic bacterial contamination for pretreated consumption. The samples of first harvest and just the compost fertilized samples of second harvest were standard in coliforms contamination for pretreated consumption and only the compost fertilized and mulch treated samples of first harvest were suitable for crude consumption. None of the samples were standard in mold and yeast contamination for any consumption. Totally although increasing mesophilic load in first harvest, organic fertilizers caused peppermint yield and essential oil content enhancement and mulch could decrease microbial load. First harvest not only was better in yield, but also was in more desirable condition for consumption in microbial quality.

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**DETERMINATION OF HYPERICINE CONTENT IN NINE  
*HYPERICUM* SPECIES**

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*Hypericum* genus is one of the most important medicinal plants which contain 17 species in Iran. There are three species of shrub endemic to Iran. In this research, nine species of *Hypericum* collected in June and August 2010 were studied. For Hypericine content 1 gram of plant was extracted in two steps, chloroform extraction then methanol extraction using a soxhlet device. Hypericin content was measured by HPLC, using the following condition, mobile phase: (methanol 68%, ethyl acetate 20% and sodium hydrosulphate (0.1 M) 12%) and stationary phase C<sub>18</sub>, and UV detector : set on 590 nm. Hypericine content in flowers, leaves and stems was determined *H. androsaemum* L. detected in *H. apricum* (in flowers 0.061% and leaves 0.005% ), in *H. armenum* (flower 0.003% ), in *H. asperulum* (in flower 0.025% , leaves 0.004%, and stems 0.003% ), in *H. hirsutum* L. (flower 0.007% ), in *H. linarioides* (flower 0.007%), in *H. tetrapterum* (flowers 0.008% , leaves 0.014%, and stem 0.001%), and in *H. vermiculare* (flowers 0.005%), in *H. perforatum* (flowers 0.124% , leaf 0.028% , stem 0.003).



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**THE EFFECT OF MEDICINAL AND AROMATIC PLANTS ON  
CARCASS CHARACTERISTICS AND INTESTINAL MORPHOLOGY IN  
BROILERS**

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Dietary antibiotics have played an important role in animal production as growth and health promoters. However, the use of most antibiotic growth promoters has been banned in many countries, especially in the European Union, because of public concerns about their residues in the animal products and the development of antibiotics-resistant bacteria. Aromatic plants and essential oils extracts have become more important due to their potential antimicrobial and stimulating effects in the animal digestive system. The aim of this study was to evaluate the effect of *mint (Mentha longifolia)*, *basil (Ocimum basilicum)*, *parsley (Petroselinum crispum)*, *dill (Anethum graveolens)*, *coriander (Coriandrum sativum)*, *garlic (Allium sativum)* on the carcass characteristics and small intestinal morphology of broiler chickens. 480 one-day old broilers were assigned to eight groups with 3 replicates of 20 birds per pen and fed with a basal diet (control) or basal diet supplemented with 1.5% mint, basil, parsley, dill, coriander, garlic respectively or 0/015% Antibiotic Virginiamycin. There was no difference in carcass characteristics and fat pad and small intestinal length ( $p>0.05$ ). Villi height was not changed significantly in any segment of small intestine ( $p>0.05$ ). Effect on villi height to crypt depth ratio and villous height to basal width ratio was significant ( $p<0.05$ ). It can be concluded that the medicinal and aromatic plants have positive effect on broiler performance.





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**CHEMOTAXONOMIC EVALUATION OF IRANIAN SPECIES OF  
SALVIA BASED ON FATTY ACID COMPOSITIONS OF SEED OILS**

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The compositions of the essential oils of three Iranian *Salvia* species, growing wild in Iran were studied by GC-MS. Taxonomically; distinction between the three species is problematic. The seeds of the three taxa obtained from 6 natural populations, the fatty acid methyl esters (FAMEs) were subjected to isolate the essential oil and analytical assessment of the oil was carried out using gas chromatography coupled to mass spectroscopy (GC/MS). Thirty-nine components were characterized for *S.verticillata* with Lupeol (20%), heptacosane (11%), linolenic acid, methyl ester (10%), Betulin (9.0%), glycine (7.3%) and octanoic acid (6.9%) as the major constituents. For *S. nemorosa* 21 components were identified with Azafrin (22.4) Digitoxin (17.3%) hexopyranosiduronate (16.9%), Fenretinide (13.4%) and Astaxanthin (8.5%) as the major constituents. Our data identified 23 components for *S.aethiopsis* with linolenic acid, methyl ester (61.8%), palmitic acid, methyl ester (18.3%), heptacosane (9.6%) and nonacosane (3.5%). Fatty acid composition of *Salvia* seed oils could be used as a chemotaxonomical marker. The obtained led to the conclusion that the *salvia* species complied with the standard requirements for the plant species, so that it can be used as a high quality raw materials for the production of phytopreparations [1, 2].

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**STUDY ON SOME HEMATOLOGICAL PARAMETERS OF  
JUVENILE BELUGA (*HUSO HUSO*) FED HERBAL  
SUPPLEMENTED DIET**

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Sturgeons are an ancient group of chondrosteian fishes with fossil records dating back to the Lower Jurassic period. They are among the highly endangered fish species because of overfishing for meat and caviar production, degradation of habitat, and spawning grounds along with environmental pollution. *Huso huso* is one of the most important species of sturgeon in the Caspian Sea [1]. This study was conducted to investigate the effects of dietary ginger, garlic, nettle (0 and 1%) on some blood parameters of Beluga (*Huso huso*) juveniles (25.1±1.9 g). The study was carried out on 80 Beluga. After 8 weeks feeding on the experimental diets, blood haematological parameters were measured. The results revealed that dietary ginger, garlic and nettle had no effect on leukocytes (WBCs) count, Hb and MCH index ( $p>0.05$ ). However, HTC in fish, fed dietary ginger (25.92±1.25) and nettle (28.99±1.56) showed significant increase than control group (17.57±1.00) ( $p<0.05$ ). Mean cell haemoglobin concentration (MCHC) in garlic group (47.01±2.03) significantly increased than control group ( $p<0.05$ ) but in nettle group (22.31±1.27) this index showed significant decrease than control ( $p<0.05$ ). Mean corpuscular volume (MCV) in garlic group (308.05±29.01) showed significant decrease and in nettle group (872.24±119.73) showed significant increase than control (753.69±158.19) ( $p<0.05$ ). Red blood cell counts in ginger group (0.57±0.03) ×10<sup>6</sup> showed significant increased than control (0.36±0.05) ×10<sup>6</sup>. These results indicate that these herbal diet can improve some haematological parameters in Beluga which should be taken into account in future studies.

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**STUDY THE ETHNOBOTANY OF MEDICINAL PLANTS IN DARAB,  
FARS PROVINCE**

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Traditional knowledge about medicinal plants is very valuable and old people of cities have so much information about it. Death of these people contributes to the loss of this knowledge. Therefore it is necessary to be recorded this information. Traditional methods for the identification of medicinal plants and their medicinal effects are essential. This article presents the results of a study on identification of important medicinal plants, used to treat diseases in Darab region, by local residents. It is also the first field research into medicinal plants conducted in the area with ethno botanical methodology. Plant species are collected from various locations in the region Darab and were identified by Flora Iranica. This work is based on observations, interviews, and guided trips during their flowering season. For each plant species a scientific name, local name, and organ used as common therapeutic form was recorded. The information was collected between March to October in 2011. Generally 50 medicinal plant species belonging to 30 families are listed in this paper.



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**PHYTOCHEMICAL ANALYSIS AND ANTIBACTERIAL EFFECT OF  
*ACHILLEA TENUIFOLIA* LAM.**

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Asteraceae, the largest family of angiosperms, comprises about 1500 genera and 23000 species, distributed in three subfamilies and seventeen tribes. The genus *Achillea* is composed of 115 species of perennial herbs, all native to temperate regions of the northern hemisphere [1]. Aerial parts of different species of this genus are widely used in folk medicine for preparation of herbal teas with antiphlogistic and spasmolytic activity [2]. One document published about two centuries ago as Makhzan-Ol-Advieh, recommended it for bladder stone and urinary obstruction [3]. In recent studies, the extract of this genus exhibits pharmacological activities like anti-inflammatory and antiallergic [4], antihelminthic, cholagogue, antibacterial and antioxidant properties. Therefore, the many uses of *Achillea* species have created wide interest in their phytochemistry and *Achillea tenuifolia* Lam., a perennial herb, distributed in some regions of Iran [5] was candidate for phytochemical analysis. The methanolic extract of *Achillea tenuifolia* Lam. afforded a dichloromethane fraction from which Stearic acid, Lupeol,  $\beta$ -sitosterol, Methyl gallate, besides three flavones have been isolated for the first time and the structures of the isolated compounds were elucidated based on NMR (one dimensional and two dimensional techniques), IR and MS spectra. In case of salvigenin (one of the flavones) effect of solvent on <sup>1</sup>H-NMR spectra have been studied. Although considering the numerous uses of this genus in folk medicine, the antibacterial effect of plant in comparison with some antibiotics is under investigation and the preliminary results showed interesting results. Surprisingly, in some cases the extract has more activity than antibiotics.

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**EFFECT OF DIFFERENT EXPLANTS, GENOTYPES, HORMONAL COMBINATIONS AND CONCENTRATION ON DIRECT REGENERATION OF *MATRICARIA CHAMOMILLA* L.**

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German chamomile (*Matricaria chamomilla* L.) is an important aromatic, grassy and annual medicinal plant which belonging to Asteraceae (Compositae) family. Chamomil has been known as an antibacterial, antifungal, antispasmodic, anti-ulcer, antiviral, sedative, diuretic, carminative, treat skin wounds, mouth sores, hemorrhoids. *In vitro* micropropagation is an effective tool for rapid multiplication of species in which it is necessary to obtain a high progeny uniformity. Effect of different explants (shoot tip, cotyledon and hypocotyls) with four kinds of media (0, 4.4, 8.8 and 13.2  $\mu$ m) BAP in combination with IAA (1.1, 2.2  $\mu$ m) was investigated on direct regeneration of *Matricaria chamomilla*. The maximum regeneration rate (93.87%) and mean number of shoots (11 shoots per explants) were observed in shoot tip on the MS medium containing 4.4  $\mu$ m BAP with 2.2  $\mu$ m IAA. Any regeneration was obtained in cotyledon and hypocotyls. The effect of different landraces (Isfahan, Urmia, Oshnavieh and Shahin dezh) with different concentration of BAP (4.4 and 8.8 $\mu$ m) and Tidiazuron (TDZ) (4.4 and 8.8 $\mu$ m) in combination with 2.2  $\mu$ m IAA on direct shoot regeneration in shoot tip explants of *M.chamomilla* L. were studied. The results indicated that Isfahan landrace had the highest regeneration rate (92.48%) on the media supplemented with 4.4  $\mu$ m BAP in combination with 2.2  $\mu$ m IAA. The maximum mean number of shoots (25 shoots per explants) was observed in Urmia landrace on the media with 4.4  $\mu$ m BAP in combination with 2.2  $\mu$ m IAA. Then regeneration rate (84.21%) on the media supplemented with 4.4  $\mu$ m TDZ in combination with 2.2  $\mu$ m IAA observed in Urmia landrace. The lowest regeneration rate (36.31%) on the media supplemented with 4.4  $\mu$ m TDZ in combination with 2.2  $\mu$ m IAA observed in Shahin dezh landrace. For rooting of regenerated shoots based on MS and 1/2 MS medium were supplemented with (0.5, 1 mg/l) IBA and (0.5, 1 mg/l) IAA. Result of the rooting experiment showed that maximum rooting rate (100%) was occurred on hormone free 1/2 MS medium and MS medium supplemented with 0.5, 1 mg/l IBA. The longest root length (4.46 cm) was achieved on the 1/2 MS medium [1, 2].

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**COST OF OPERATION AND THE REDUCTION OF FERULA FERULA  
ASSA FOETIDA AT THE RANGELAND CHALPO KASHMAR**

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Iran with a great diversity of climate is habitat to grassland and forest vegetation; increased use of rangeland by-products in different industries, existence of cheap labor in less developed countries and strong market demand in developed countries has caused higher importance and attention to utilization of by-products and their derivatives. This study was performed with the purpose to preserve and restore the habitats of ferula ferula assa foetida (acetone), retaining and development of genetic resources, employment and exploitation of production platform by locals rangelands of Chalpo Kashmar. The region which covers an area of 14107.68 hectares is located within the catchment of the central desert and in terms of administrative divisions is one of Kashmar's environs. Studies show that by considering factors such as the authorized percentage for plant exploitation (75 percent), slump percentage in growing process including pests, plants die, disease, decay and the number of useable plants per hectare is 40 stalk per year.

By eliminating non-vegetative areas such as rocky outcrop, 76 percent of pastures are useable. The common harvesting method is the traditional way which due to the amount of molasses and sown extracted from each stalk is respectively 5 and 20 grams. According to the number of exploitable stalks, the whole product in one exploitation period and 4-year restoration will be 8539 kilograms of molasses and 34162 kilograms of sown. In each exploiting period due to local norm each worker is capable of harvesting 2500 - 3500 the plant, accordingly the employment of this plan during harvesting period would be 142 people. Considering the price of molasses and sown of ferula ferula assa foetida (Fall 1391), the annual gross income of harvested crops is 2,137 million Rials per year.





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CELL SUSPENSION CULTURE ESTABLISHMENT OF  
*THYMUS PERSICUS* FOR THE PRODUCTION OF MEDICINALLY  
IMPORTANT TRITERPENOIDS

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In the present study, an efficient protocol has been performed for establishment of *Thymus persicus* (Lamiaceae) cell suspension culture in shake flasks, as a strategy to obtain an *in vitro* triterpenoids producing cell line. Betulinic acid (BA), oleanolic acid (OA) and ursolic acid (UA) are highly valuable pentacyclic triterpenoids because of their wide spectrum of biological activities such as anti-inflammatory, hepatoprotective, antitumor, anti-HIV, antimicrobial, antifungal, anti-ulcer, gastroprotective, hypoglycemic, and antihyperlipidemic [1, 2]. Callus culture was initiated from nodal segments and leaf explants on MS [3] medium containing basic salts and 30 g/L sucrose supplemented with different concentrations of auxins 2,4-D and NAA (0.5, 1.0, 1.5, 2.0, 2.5 and 3.0 mg/L) solely or in combination with cytokinins BAP and Kin (0.1, 0.5 and 1.0 mg/L). High percentage of friable callus was obtained in nodal segments cultured on MS medium supplemented with 1 mg/L 2, 4-D and 0.5 mg/L BAP. Cell suspension culture was established on MS medium supplemented with NAA (0.5 and 2.0 mg/L), BAP (2.0 and 2.5 mg/L) and Kin (0.4 mg/L). The highest growth index obtained from the culture medium containing 2.5 mg/L BAP and 0.5 mg L<sup>-1</sup>NAA. The growth kinetics of the cell suspension culture followed a general growth pattern of sigmoid curve and has shown a maximum specific cell growth rate of 0.76g day<sup>-1</sup>, doubling time of 36 h and cell viability of 86.4 %, respectively. BA, OA and UA content in cell suspension was high during exponential growth phase and decreased subsequently at the stationary phase. The maximum BA, OA and UA production was observed in the stationary growth phase, reaching 54.3±1.58, 3.78±0.37, 6.21±0.81 mg g<sup>-1</sup> dry weight (DW) at day 25 of the culture, respectively. The results of present study are useful to scale-up process and augment the *T. persicus* biological research.

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**CYTOTOXICITY EVALUATION OF TWO PLANT SPECIES FROM  
LEGUMINOSAE FAMILY ON HUMAN CANCER CELL LINES**

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For centuries, plants have been a major source for drug discovery. Some examples of anticancer agents developed from plants are vinblastine, vincristine, taxol and camptothecin. Breast cancer is one of the most commonly diagnosed cancers among women in many countries worldwide. Prostate cancer remains a considerable health problem for men around the world. It is the most frequently diagnosed non-cutaneous cancer and is the second leading cause of cancer death in American men. In the present study, we determined the cytotoxic effects of total methanol extracts and their fractions of two species from Leguminosae family, *Taverniera spartea* and *Tephrosia persica* on MCF-7 and BT-474 human breast cancer cells and also PC-3 and Du-145 prostate cancer cells. Cytotoxicity was evaluated by MTT assay and flow cytometry. Extracts or fractions with an IC<sub>50</sub> value lower than 30 µg/ml were considered active. PC-3 and Du-145 prostate cancer cells were more sensitive to these species than breast cancer cells. Non polar fraction of *Tephrosia persica* showed the highest toxicity on all tumor cell lines tested. Further investigation is needed to determine chemical characterization of the active ingredients and the molecular mechanisms involved in anticancer activities of the extracts [1].

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**STUDY OF THE HAEMOSTATIC EFFECT OF SOME PLANT  
EXTRACTS**

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Stop and avoid bleeding is always one of the main goals and wishes of medical sciences, and different Pharmaceutical methods from chemical to traditional medicine and today's new compounds is used and innovated for this purpose. In this study we will review the effects of 9 herbal medicines which their anti-bleeding properties mentioned and reviewed in traditional medicine, and we will show their coagulation effect and finally the mechanism of clot formation will be discussed.

First we will get the extraction of 9 herbs including snakeroot, chestnut tree, white willow, acacia Arabic wild, dragon s blood, pot marigold, incense, sarcocola, and great-nettle by method of ethanol extraction (Moisten) and then these extracts with different subtilities 0.1, 0.2, 0.5 and 1 ml will be added to complete human blood without coagulation materials. After obtaining the clotting time (CT), we will choose three herbs of snakeroot, Chestnut and Acacia Arabic wild and using the citrated plasma, calcium chloride and extract and with Factor assay test, Fibrinogen and also D-dimer measuring the clot making path has been verified. Three herbs of snakeroot, Chestnut and Acacia Arabic wild with the lowest clotting time has been chosen and again with citrated plasma in presence of calcium the clot has been made. After plasma centrifuging the II, IX and VIII factor will be decreased ( $P<0.05$ ), meanwhile the VII factor had remained unchanged ( $P<0.05$ ). The fibrinogen amount has decreased meaningfully ( $P<0.05$ ) and the amount of D-dimer has not a meaningful increasing ( $P<0.05$ ). The extract of the three herbs especially the chestnut will cause the consumption of internal paths factors (IX, VIII, II) and the external path factors had no considerable increasing. This shows that theses herb's extract will cause clotting via internal coagulation path.



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**CHARACTERIZATION OF T-ANOL/ISOEUGENOL SYNTHASE USING  
GENE PREDICTION FOR EVOLUTIONARY STUDIES IN APIACEAE  
FAMILY**

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Apiaceae represent one of the best-known plant families, widely distributed in temperate climate regions where they are often used as spices, vegetables or drugs owing to the presence of useful secondary metabolites such as essential oils (4). Essential oils and their components are gaining increasing interest because of their relatively safe status, their wide acceptance by consumers, and their use in many applications including in flavours and fragrances as well as in medicine (1, 2, 3). *Trans-anethol* (t-anethol) is a major compound of some Apiaceae plants. t-anethol belongs to phenylpropanoids and the accumulation of volatile phenylpropanoids in different plant parts of plants during development is different. Takao koeduka, et. al (5) obtained anise cDNA encoding t-anol/isoegenol synthase 1 (AIS1), an NADPH-dependent enzyme that can biosynthesize t-anol and isoegenol (the latter not found in anise) from coumaryl acetate and coniferyl acetate, respectively. The genes encoding AIS1 and AIMT1 were expressed throughout the plant and their transcript levels were highest in developing fruits. Thus, a study was designed to determine the genetic similarity in some Apiaceae plant for the AIS1 protein. We used the Basic Local Alignment Search Tool (BLAST) to find regions of local similarity between sequences. The program compares protein sequences to sequence databases and calculates the statistical significance of matches. The AIS1 protein had 100% similarity to *Anisum*, 59% to petunia (*Petunia hybrida*) isoegenol synthase 1, 64% to *Populus trichocarpa* and 60% to *Ricinus communis*. The AIMT1 protein sequence had approximately 59% similarity to *Populus trichocarpa*, 40% to basil (*Ocimum basilicum*) and *Clarkia breweri* phenylpropene O-methyltransferases. Thus, in order to design primers, we compared similarity between sequences for the first time with the Multalin software and finally primers were designed based on conserved sequences.

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**EFFECTS OF PERSIAN OAK FRUIT EXTRACT ON BIOCHEMICAL  
AND IMMUNITY PARAMETERS IN RAINBOW TROUT  
FINGERLINGS**

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immunostimulant can boost the immune system of fish [1]. Herbal extracts are one kind of immunostimulant and some of the plants were used to improve the immune system and controlled many diseases [2]. A number of traditional medicinal plants in the Iran such as Persian oak known as immune-enhancing. Persian oak is widely grown in forests of Zagros mountains. *Quercusbrantii* (Persian oak) is the most important species of these forests [3]. Rainbow trout is the most important cultured fish species in Iran. However, the culture of this fish is facing disease threats. The samples were powdered and Extraction procedure was performed at room temperature by 70% alcohol [4]. A basal diet (Beyaz feed Mill, Shiraz, Iran) was supplemented with 0 (control), 0.5, 1 and 2 g. kg<sup>-1</sup> Persian oak extract to formulate five experimental diets. Each diet was randomly assigned to triplicate groups of fish (initial average weight 6.25 g). After 8 weeks of experiment, hematological and immunity parameters were measured. No significance was observed in biochemical parameters such as protein, albumin and globulin, between control and experimental groups fed with herbal diets. Significant differences in IgM, Lysozyme and C<sub>3</sub> was detected on 2 g. kg<sup>-1</sup> than control group (P<0.05). Total Ig and C<sub>4</sub> indicate significant differences with control on 1 g. kg<sup>-1</sup> (P<0.05). Alternative complement pathway (ACH50) increased in 0.5 g. kg<sup>-1</sup> extract (P<0.05). Immunity parameters have increased with a rise in oak fruit extract, explain the efficacy of Persian oak in terms of the health status and non-specific immune response. This may be related to hydrolysable Tannins. Tannins have traditionally been considered anti-nutritional, but tannins of different plant species have specific physical and chemical properties; thus, they have very different biological activities, and detailed study is required to characterize their potential beneficial effects [5]. It is now known that their beneficial or anti-nutritional properties depend upon their chemical structure and dosage. Muller-Harvey and McAllan (1992) reported that tannins divided into condensed and hydrolysable [6]. Benefits of products containing chestnut tannins (hydrolysable tannins) included at low dosages (0.15–0.2 %) in the diet had been showed [7].



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**THE STUDY OF COMPARATIVE ADVANTAGE AND MARKET  
STRUCTURE OF IRAN'S EXPORT FENNEL**

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According to the importance of medicine plants and their substantial contribution in the international trade, the investigation of countries comparative advantage and type of the world market structure of these products is essential. In this regard, the objective of this study is investigation of export comparative advantage of five top exporters of the fennel and also determination of world market structure of this product over the period of 2005-2010. Furthermore, to study the export comparative advantage some indices such as Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA) and Hillman, and to study the fennel export specialization another indices such as the  $\chi^2$ , Michaely (MI) and Contribution to Trade Balance (CTB) have been used. Also, using the CR and HI indices, the structure of fennel world market has been determined. According to the calculated indices, results show that Iran has a good position in the export of fennel in the world and the type of the world market structure of this product is close oligopoly.

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**SURVEY OF ARTEMISININ PRODUCTION IN FIVE ARTEMISIA SPECIES BY HOLLOW FIBER LIQUID-LIQUID-LIQUID MICROEXTRACTION**

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Malaria is the fifth most prevalent infectious disease and the tenth overall cause of death in low income and developing countries [1]. Artemisinin, an endoperoxide sesquiterpene lactone is obtained from annual herb *Artemisia annua*, is currently the most effective means for treatment of malaria and a number of other diseases [2,3]. In current study artemisinin concentration was analysed and compared in *A. annua* and five other species including *Artemisia dracuncululus*, *Artemisia vulgaris*, *Artemisia aucheri*, *Artemisia sieberi* and *Artemisia absinthium* by Hollow fiber liquid-liquid-liquid microextraction with Electrospray ionization ion mobility spectrometry. The leaves and stems of the *Artemisia* species were frozen in liquid nitrogen and powdered in a mortar. The powder of plants was dried in an oven set at 40-42 °C. 100 mg of dried materials were mixed with 10 mL dichloromethane, and the suspension was capped prior to shaking at around 100 rpm for 24 h. Then, for removal the polar and ionic interference one milliliter of sample solution is mixed with two milliliter of pH=12 aqueous solution. The investigation three aqueous solution acidic, neutral and alkaline showed that the removal of interferences was increased in alkaline aqueous solution in comparable acidic and neutral. Dichloromethane and water are immiscible solvents, therefore the polar and ionic interferences are entered to aqueous phase but artemisinin is nonpolar and remained in organic phase. The dichloromethane phases evaporated under purging of N<sub>2</sub> gas. Depending on the species of *Artemisia*, the residue was reconstituted with 3 mL or 24 mL of water and sonicated for 5 min. After being extracted, the extract was filtered through a 0.2 µm nylon paper filter. Then, 3 mL of filtered aqueous solution was extracted by HF-LLLME. The percentage extraction of artemisinin in leaves of all species was higher than stems. The percentage of artemisinin in *A. annua* was the highest, followed by *A. dracuncululus*, *A. sieberi*, *A. absinthium*, *A. aucheri* and in *A. vulgaris* was the lowest.

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**THE EFFECT OF HYDRO-ETHANOLIC EXTRACT OF *ACHILLEA MILLEFOLIUM* ON BETA-ADRENOCEPTORS OF GUINEA PIG TRACHEAL SMOOTH MUSCLE**

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The inhibitory effect of the extract of *Achillea millefolium* (*A. millefolium*) on  $\beta$ -adrenoceptor of tracheal muscle was examined. Effect of three concentrations of aqueous-ethanolic extract, 10 nM atropine, and saline on  $\beta$ -adrenoceptor was tested in non incubated tracheal smooth muscles (group 1) and tissues incubated with chlorpheniramine (group 2). Concentration response curve to isoprenaline was obtained in pre-contracted tracheal smooth muscle in the presence of the extract, propranolol and saline. Values of  $EC_{50}$  and CR-1 (( $EC_{50}$  obtained in the presence of active substances/ $EC_{50}$  obtained in the presence of saline) -1) were measured. Leftward shifts in isoprenaline curves were obtained in the presence of two higher concentrations of the extract compared with saline in both groups. The values of  $EC_{50}$  obtained in the presence of two higher concentrations of the extract only in group 1 were non-significantly lower than that of saline. The values of CR-1 obtained in the presence of all concentrations of the extract in both groups were negative and significantly different with that of propranolol. These results indicated a small stimulatory effect of the extract on  $\beta_2$ -adrenoceptors. The results also suggest a small inhibitory effect on histamine receptors ( $H_1$ ).



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**PROTECTIVE EFFECT OF HYDRO-ETHANOLIC EXTRACT OF  
NIGELLA SATIVA ON INDOMETHACIN-INDUCED GASTRIC ULCERS  
IN RATS**

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Antioxidant, gastro protective and anti ethanol-induced gastric ulcer effects of *Nigella sativa* have been reported as well as its protective effect on liver. The present study was carried out to examine the preventive effect of hydro-ethanolic extract of *Nigella sativa* on indomethacin induced gastric ulcer and its possible mechanisms. 48 male Wistar rats were assigned to 6 groups: 1) Indomethacin Solvent group (received carboxymethyl cellulose 1%), 2) Indomethacin group (35 mg/kg), 3) ranitidine group (50 mg/kg) and 3 groups that received 3 concentrations of *Nigella sativa* extract (400, 200 and 100 mg/kg). Animals in ranitidine and extract groups were treated by gavage for 5 days, following by administration of indomethacin on the sixth day for inducing gastric ulcer. Acid secretion, ulcer index and biochemical factors (secretion of mucus glycoproteins, malondialdehyde MDA, non-protein sulfhydryl groups in NP-SH) in the gastric mucosa were studied 6 hours later. The ulcer index in extract and ranitidine groups was significantly lower compared to indomethacin. There was no difference between ranitidine, extract and indomethacin groups regarding the rates of acid secretion. Mucus secretion in 100 and 200 mg/kg extract groups was significantly higher than indomethacin group. MDA levels in extract and ranitidine groups were significantly less than the indomethacin group. In addition, MDA levels in extract groups were significantly lower than ranitidine. There was no difference between groups regarding the rate of gastric mucosal NP-SH. Gastric mucosal glycoproteins were significantly increased in 200 mg/kg dose of extract in compared with indomethacin. Results show an anti-ulcer effect of *Nigella sativa* extract on indomethacin induced gastric ulcer, the mechanism of which maybe the inhibition of lipid peroxidation and antioxidant effect of the extract[1,2,3].

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**BRONCHODILATORY EFFECT OF MEDICAL PLANTS AND THEIR  
POSSIBLE MECHANISM(S), *IN VITRO* EVIDENCES**

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Therapeutic effects of several medicinal plants on respiratory diseases were indicated in Iranian ancient medical books. In a series of experiments the bronchodilatory effects (relaxant effects on tracheal smooth muscle) of several plants were examined on tracheal chain of guinea pigs by their effect on precontracted smooth muscle by methacholine or KCl. Possible mechanism(s) of the relaxant effect of medicinal plants including; inhibitory effect on muscarinic and histamine (H1) receptors as well as their stimulatory effect on beta-adrenergic receptor were also examined by their effect on contracted muscles incubated with relevant competitive antagonists. In addition the effects of medicinal plants on calcium and potassium channels were also examined by comparing of their effect on KCl and methacholine induced contraction. All studied plants including; *Nigella sativa* (Ir J Med Sci 1997), *Carum copticom* (Med J Isl Rrep Iran 1998), *Carum carvi* (Med J Isl Rrep Iran 1999), *Pimpinella anisum* (J Ethnopharmacol 2001), *Foeniculum vulgare* (Pharmac Biol 2003), *Portulaca oleraceae* (Med Hypothesis Res 2004), *Bonium persicum* (Ir Bio Med J 2004), *Ocimum basilicum* (Daru 2005), *Cuminum cyminum* (Ind J Pharmacol 2005), *Tymus vulgaris* (Phytother Res. 2006), *Rosa damascena* (J Ethnopharmacol 2006), *Crocus satirvs* (J Pharm Pharmacol 2006), *Satureja montana* (Daru 2007), *Achillea millefolium* (Pharmacologyonline 2009), *Ferula assa-foetida* (Avic J Phytomed 2011) showed significant relaxant effect which were in most cases similar, but in other cases higher and for few plants lower compared to the effect of theophylline at used concentrations. The results also showed inhibitory effect of most studied plants on muscarinic and histamine (H1) receptors as well as their stimulatory effect on beta-adrenergic receptors. Some of the studied plants also showed inhibitory effect on calcium and potassium channels. In conclusion, the results of the present studies showed bronchodilatory effect of several medical plants which was comparable or even higher than the effect of theophylline at studied concentration. The results also suggest possible mechanism of their bronchodilatory effect.



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**DOMESTICATION OF *SATUREJA KHUZISTANICA*; STUDY OF  
NATURAL HABITATS, PROPAGATION METHODS, SELECTION AND  
FIELD ESTABLISHMENT**

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*Satureja khuzistanica*, an endemic herb with interesting pharmacological and biological properties, grows wild in southern parts of Zagros. Herbal drugs of this narrow endemic plant are collected from wild habitats to supply the demands of related industries. A domestication program has been conducted to develop improved varieties and cultivation guideline in marginal lands. In first step, morphological and phytochemical variability was studied among and within populations. Among all populations, those of Abdanan (2.81 %) and Kaver (2.79 %) showed the highest oil yield. Essential oils analyzed by GC-FID and GC-MS showed that all 69 sampled individuals among populations have the high percentage of carvacrol (ranging from 89.59 % to 95.41 %) as main component. Genetic diversity of natural populations was studied using ISSR markers. A total of 158 bands were generated using 13 ISSR primers, of which 120 (88.35 %) bands were polymorphic. Nei's gene diversity ( $h$ ) and Shannon information index were varied between 0.24 to 0.28 and 0.35 to 0.42, respectively. Genetic differentiation of populations was low ( $G_{st}= 0.14$ ) and gene flow ( $N_m$ ) between populations was shown to be 3.06. To optimize different propagation methods of *Satureja khuzistanica* different experiments were conducted. The efficacy of different seed and stem treatments for improvement was studied. The highest germination percentage and germination rate was observed at low concentration of  $GA_3$  (250ppm), followed by chilling stratification at 5 °C, for 7 days. Also soaking in cool water for 24 h has significantly enhanced germination percentage and germination rate compare to control. Results obtained the highest percentage of cuttings rooted (83.4%) and highest percentage of field establishment (44.05) were noted in cuttings which were treated with IBA, 1500ppm. Among the bed planting, cold frame showed has a significant difference with respect to per cent success of rooted cuttings (60.79%) compared to green house (45.4%). Micropropagation of *Satureja khuzistanica* was studied. maximum numbers of shoot (3.18) and highest length of shoot(3.1) were observed on the medium containing 2 mg/l BA after our weeks of culture. The highest rooting percentage (87.5%) was obtained in MS medium containing 1 mg/l of IAA after four weeks. Talent populations were sampled and transferred to field where the genotypes were evaluated in two successive years. Several genotypes with high oil and biomass yield were identified and propagated through tissue culture to make clones. Floral biology of the species was studied and results showed that *S. khuzistanica* is a dominantly cross pollinated species. Parallel with vegetative propagation and cultivation, a synthetic seed breeding approach is followed to gain homogenous seed variety. Several experiments have been conducted to define nutrient and irrigation requirements, plant density, etc., to develop guideline for agriculture production. Based on our primarily results, *S. khuzistanica* is a good plant of choice for cultivation in marginal land and rural development in southern parts of Zagros.





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**CAN *TAXUS* ENDOPHYTIC FUNGI PRODUCE TAXANES-1?**

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*Taxus* endophytic fungi as new source of Paclitaxel and other taxanes were firstly reported by Stierle in 1993[1]. Recently it seems that a noticeable reduction exists in the development efforts leading to Paclitaxel fermentation [2], also some authors believe taxane production by endophytic fungi is only associated with their host. They have speculated about the industrial use of endophytes [3]. We follow *Taxus* endophytic fungi for their potential of taxanes by two parallel methods; high performance thin layer chromatography (HPTLC) for rapid screening of 180 fungal endophytes isolated Iranian yew, *Taxus baccata* L. and polymerase chain reaction (PCR) for evaluation of the presence genes coding for biosynthesis of taxanes in *Taxus* endophytic fungi. A HPTLC method was developed using dichloromethane: acetone as mobile phase after a primary clean-up to find Paclitaxel and 10-deacetylbaaccatin III (10-DAB III). 7 out of these fungal isolates were confirmed to produce 10-DAB III using HPLC-DAD. HPLC positive isolate were furtherer studied by mass spectrometry. The results showed presence 545.2 and 567.2 masses related to both hydrogen and sodium of adduct ion of 10-DAB III in 3 isolate respectively. On the other hands, three main genes coding for Taxadiene synthase (TS), baaccatin III 13-O-(3-amino-3- phenylpropanoyl) transferase (BAPT), 10-deacetylbaaccatinIII-10 $\beta$ -O-acetyltransferase (DBAT) was studied using PCR. Bands of size 334 bp for TS, 200 bp for DBAT, 530 bp for BAPT were amplified studied fungi. These three new 10-DAB III producing endophytic fungi were identified as *Ulocladium*, *Sematosporium* and *Geniculosporium* respectively.

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**INTERACTIVE EFFECTS OF ARBUSCULAR MYCORRHIZAL,  
SALICYLIC ACID AND DROUGHT STRESS ON FRUIT YIELD,  
MORPHOLOGICAL CHARACTERISTICS, ROOT COLONIZATION,  
PHYSIOLOGICAL TRAITS AND SECONDARY METABOLITES OF  
AJOWAN (*TRACHYSPERMUM AMMI* L.)**

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Ajowan (*Trachyspermum ammi* L.) is an annual herb belongs to Apiaceae family. This plant has many therapeutic effects. In the present investigation, the response of Ajowan plant to foliar application of salicylic acid (SA) at three levels of 0, 150, and 300 ppm, irrigation at four levels i.e. control (FC), 25, 50, and 75% FC, and arbuscular mycorrhizal fungus (AMF), *Glomus intraradices*, at two levels as inoculated and non inoculated, along with interaction effects of the treatments were investigated. The measured factors were fruit yield, morphological characteristics, root colonization, chlorophyll, proline, fixed oil content and compositions, as well as essential oil content and compositions. According to the results, inoculation of ajowan root with AMF, foliar application of SA, and drought stress caused a significant increase in the oil content. At 50% FC and under AMF treatment, the maximum essential oil content (4.1%) was obtained. Also, the major essential oil components under different treatments were thymol (27-46%), gamma-terpinene (30-48%) and p-cymene (16.8-22%). The content of fruit fixed oil varied between 6.5-9.6% at different treatments. Petroselinic acid, oleic acid and linoleic acid were the major fatty acids in the ajowan fixed oil. The results showed that interactive effects of AM, SA and drought stress could significantly ( $p \leq 0.05$ ) affect all measured traits. The highest fruit yield (3.58 g/pot), as a major crop yield criteria, was obtained by application of FC irrigation treatment and inoculation with AMF. Moreover, application of SA at concentration of 300 ppm and inoculation of ajowan root with AMF fungus can compensate the water deficit up to 50% of the field capacity [1- 3].

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**PHYTOCHEMICAL STUDIES AND THEIR BIOACTIVITIES FROM  
BEILSCHMIEDIA**

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A new neolignan [1], 3, 4-dimethoxy-3', 4'-methylenedioxy-2, 9-epoxy-6, 7-cyclo-1, 8-neolign-11-en-5(5H)-one, named (+)-kunstlerone from the leaf was isolated from *Beilschmiedia kunstleri* Gamble [2]. The structure was established through various spectroscopic methods notably 1D- and 2D-NMR, UV, IR and LCMS-IT-TOF [3]. (+)-Kunstlerone showed mild cytotoxicity against various cancer cell lines; A549, PC-3, A375, HT-29 and WRL-68, respectively with different EC<sub>50</sub> value 28.02, 26.78, 33.78, 33.65 and 16.46 µg/mL. These results indicate that cell lines differ in their sensitivity to the same test agent, which may be determined by multiple cell type-specific signalling cascades and transcription factor activities. (+)- kunstlerone also showed a strong antioxidant activity with an SC<sub>50</sub> of 20.0 µg/ml. And also, seven known alkaloids: (+)-nornuciferine, (-)-isocaryachine, (+)-cassythicine, (+)- laurotetanine, (+)-boldine, noratherosperminine and (+)-N-dimethylphyllocaryptine were isolated.

Moreover, (2E, 4E)-7-(3', 4'-dimethoxyphenyl)-N-ethyl-6-(R)-hydroxyhepta-2, 4-dienamide, named (-)-kunstleramide, was isolated from the bark of *Beilschmiedia kunstleri* Gamble [4]. (-)-Kunstleramide exhibited very poor dose-dependent inhibition of DPPH activity, with an IC<sub>50</sub> value of 179.5 ± 4.4 µg/mL, but showed a moderate cytotoxic effect on MTT assays of A375, A549, HT-29, PC-3 and WRL-68 with EC<sub>50</sub> values of 64.65, 44.74, 55.94, 73.87 and 70.95 µg/mL, respectively. Additionally, six known alkaloids: (+)-norboldine, (+)- N-methylisococlaurine, (+)- cassythicine, (+)-laurotetanine, (+)- boldine and (-)- pallidine from the leaves isolated from *Beilschmiedia kunstleri*.

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**HERBS ALLIED DRUGS AND ADULTERANTS**

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Following the widespread use of plants as sources of foods, medicines and cosmetics in the world and Iran, Issues in their manufacturing cycle, The replacement of the herbs allied drugs and adulterants very seriously and put a lot of products are questionable.

Total herbs allied and adulterants may be classified as follow:

- 1- Replacement of quinine as a historical story.
- 2- scientific errors of herbs names in references such as milk vetch.
- 3- carelessness preparations after the harvest and associated with arable weed species.
- 4- use of the same sex as the primary species of mint.
- 5- Replacement with the other species as like as hollyhock.
- 6- Similarity of traditional specimens such as staechus and Caucasian whortleberry.
- 7- instead the total imported herbs such as oliban , Senna and valerian.

What should be done for the solution of these difficulties? Should the international credibility of professionals who have the knowledge to do. In fact, the only recourse is to issue a Voucher number.



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**NATURAL PRODUCTS WITH POTENTIAL PHARMACEUTICAL  
VALUES (CYCLOPAMIN, SWAINSONINE, ISOCUPREIC ACID)**

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A-cyclopamine and cancer:

Misregulation of HH signaling has been shown to cause tumors, including basal-cell carcinoma, medulloblastoma, small-cell lung cancer, pancreatic adenocarcinoma, and some prostatic cancer, also HH signaling has been shown to be important in the maintenance of breast, brain and colorectal cancer.

B- N-alkylated derivative of swainsonine:

The prevention of locoweed intoxication is currently best achieved through the application of management recommendation rotationation pasture grazing, cyclic grazing the idea of a vaccination program for use against locoweed intoxication is the attractive one. In order to enable the low molecular weight plant toxins (such as swainsonine) to provoke an immune response, it must be linked to large carrier molecule such as protein.



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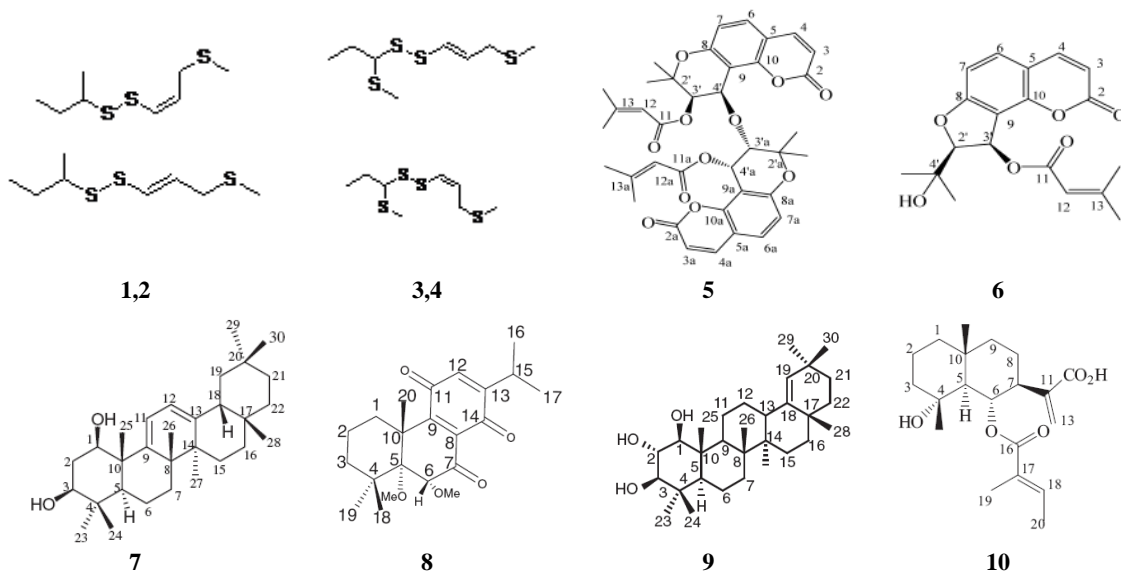
NEW NATURAL PRODUCTS EXTRACTED FROM SOME IRANIAN  
PLANTS

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This presentation reviews the results of researches on phytochemistry of some plants which their chemical composition has been studied for the first time in phytochemistry laboratory, faculty of chemistry, Shahid Beheshti University (last three years). The researches included phytochemical investigation on essential oil and extract of various families of plants such as Lamiaceae (*Salvia*, *Betonica*), Apiaceae (*Angelica*, *Heracleum*, *Ferula*) and Asteraceae (*Artemisia*, *Petasites*). The chloroformic extract of the aerial parts of *Ferula behboudiana* afforded four new polysulphane derivatives (**1-4**) [1]. From the chloroform extract of the aerial parts of *Angelica urumiensis* two new coumarins (**5**, **6**), together with six known coumarins and two known flavonoids were isolated [2]. The aerial parts of *Salvia xanthocheila* afforded one new triterpene (**7**) and one new abietane diterpenoid namely xantoquinone (**8**) [3, 4]. One new triterpenoid olean-18-ene-1 $\beta$ , 2 $\alpha$ , 3 $\beta$ -triol (**9**) along with four known compounds were isolated from *Salvia atropatana* [5]. A new eudesmane-type sesquiterpenoid were isolated from *Sclerorhachis platyrachis* (**10**) [6].



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LAMIACEAE IN FLORA OF IRAN A SOURCE OF IMPORTANT  
MEDICINAL PLANTS

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Lamiaceae is one of the rich species families in the flora of Iran, representing a total of 406 species and 97 infraspecific taxa. Of these, the groups of plants totaling 165 taxa are endemics [1]. Iran is one of the centers of speciation for some Irano-Turanian genera like *Nepeta* and *Stachys*. The other important genera with high species number are *Salvia* (61 species), *Scutellaria* (27 species), *Phlomis* (19 species), *Thymus* (18 species), *Eremostachys* (17 species) and *Satureja* (16 species). Among the endemic monotypic genera, *Zhumeria* is the most important and highly recognized as a medicinal plant. The mountainous regions of west and centre including Zagros and Albourz ranges are habitats of most endemic taxa in Iran. These mountains provide unique niches for the genera like *Nepeta*, *Stachys*, *Salvia*, *Scutellaria*, and *Satureja*. The Chaharmahal-va-Bakhtiari Province places the highest endemic species of Lamiaceae family including 43 species. In contrast the Bushehr Province is the area with lowest number of endemic species (2 species). A survey of distribution pattern of family in Iran shows that the Lamiaceae species are distributed in all parts of the country but there is a decrease of occurrence of the family members from centre towards the east, south east and south.

Lamiaceae is well known for its medicinal value which corresponds mainly to the structural organs i.e. the glandular trichomes which are mainly of two types: peltate and capitate. Detail studies in some Lamiaceae genera have revealed that the bulk of monoterpenes in essential oil is produced by and stored in the peltate glandular trichomes, while the capitate glandular trichomes have limited storage capacity and some evidences suggest that their secretion consists mainly of a complex of carbohydrates, lipids and proteins [2]. Flavonoid aglycones, the other important compounds in Lamiaceae usually occur externally in the plant secretory structures. It has also been mentioned that their presence is very often correlated with the production of terpenoids [3]. A comprehensive screening of chemical constituents of endemic species of Lamiaceae in flora of Iran with the aim of identifying valuable potentially medicinal plant is highly recommended.

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**NECESSITY OF CORRECT IDENTIFICATION OF MEDICINAL  
PLANTS FOR ACCESS TO A BETTER CONCLUSION**

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Iran was one of the foremost developed countries in ancient times and from time immemorial many medicinal plants are well-known. In this country use of herbal medicine can be traced to the remote past. Traditional usage of medicinal plants focuses on the knowledge of medicinal plants that people have developed over generations; this knowledge is generally held and used only within a limited circle of people such as within specific indigenous or rural communities. Various type of traditional medicine such as herbs, trees or plant roots, fruits, resins and other plant parts are used for treatments of any illness that may inflict human being. In spite of the tremendous progress in the development of modern sciences especially in modern Botany and many investigation that has been done from 1664-2008 by different scientists in Iran, we are witness of many incorrect identification pharmaceutical plants. It is noteworthy that after establishment of Tehran University accessing to European people's knowledge, identifying plants by Iranians and proliferation of botanic knowledge, a new window was opened to individuals interested in medicinal plants. By the progress of modern science of botany the number of identified plants includes 8000 species in Iran. In fact many of them are categorized in pharmaceutical plants. By examining the recent history of pharmaceutical plants in Iran, one can conclude that major part of the traditional medicine knowledge along with the new processing is adapted from the knowledge of European people and other nations. Now the significant difficulty is to translate old and newly adapted of pharmaceutical texts and update some names, comparing its stated pharmaceutical properties, examining its application correctly and avoid invalid translation, because most of the time this information has been entered by inexperienced individuals who lack sufficient knowledge. Just for points to some incorrect use and invalid translation in this article has been listed some incorrect Persian and scientific name of pharmaceutical plants to express and attract your attention to some big mistake that has been done by accepting some similarity between Persian and scientific name of pharmaceutical plants without precise identification of plants.

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**APPLICATIONS OF ESSENTIAL OILS IN FOOD PRESERVATION**

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Currently, there is a strong debate about the safety aspects of chemical preservatives since they are considered responsible for many carcinogenic and teratogenic attributes as well as residual toxicity. For these reasons, consumers tend to be suspicious of chemical additives and thus the demand for natural and socially more acceptable preservatives has been intensified. Many food products are perishable by nature and require protection from spoilage during their preparation, storage and distribution to give them desired shelf-life. Because food products are now often sold in areas of the world far distant from their production sites, the need for extended safe shelf-life for these products has also expanded. There is therefore scope for new methods of making food safe which have a natural or 'green' image. One such possibility is the use of essential oils (EOs) as antibacterial additives. In the production of food it is crucial that proper measures are taken to ensure the safety and stability of the product during its whole shelf-life. In particular, modern consumer trends and food legislation have made the successful attainment of this objective much more of a challenge to the food industry. EOs comprise a large number of components and it is likely that their mode of action involves several targets in the bacterial cell. It is most likely that their antibacterial activity is not attributable to one specific mechanism but that there are several targets in the cell. The potency of naturally occurring antimicrobial agents or extracts from plants, ranges of microbial susceptibility and factors influencing antimicrobial action and their antioxidative properties, aimed at food preservation, are reviewed in this article. Methods employed for estimation of inhibitory activity, mode of action and synergistic and antagonistic effects are evaluated. Hence, it is recommended that more safety studies be carried out before EOs are more widely used or at greater concentrations in foods that at present.



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**SAFFRON, THE FORTHCOMING CHALLENGES AND FUTURE  
PERSPECTIVE**

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Approach to use of medicinal plants and plant products become more prominent its role in the global economic cycle, so increasing use of them is not limited only to growing developing countries, but in the developed countries have a lot of development. Saffron has a long history in Iranian agriculture, and its production is based on indigenous knowledge, particularly in central and southern khorasan and as the most expensive agricultural and medicinal crop worldwide, has a special position among Iranian industrial and export products. At the present, Iran is the largest producer and exporter of saffron, with more Than go percent of the global production of this precious crop is dedicated to Iran .Numerous and widespread usages of saffron, the special properties of this valuable medicinal plant, it's given role in the livelihoods of farmers in some provinces, as well as its high value added, all high light the need for more attention to issues related to saffron. Definitely, world's expectations from a country that considers itself as the master of saffron is very high, and of course, any claim in this regard is defensible only based on research approaches. Among the important challenges ahead are the problem of low yields per unit area and the discriminate increase in saffron cultivation area, instability of saffron price in production sector, lack of attention to the required investment and planning of generate saffron science and specialized, scientific research centers .

Ecological zoning and yield monitoring of saffron in central and southern khorasan showed that age of saffron farms, time of flowering, length of flowering period, corm size, irrigation interval, and amount of manure applied have a positive linear with yield. In addition, results showed if notice to environmental and the nutritional actual needs of saffron, can be achieved to increase performance in per unit area. Saffron is planted in special climate conditions and has a unique growth process. The results showed that precipitation was most effective on the yield during the month of Dec., Jan., Feb., Mar. and Apr. compared with the other months. Regarding minimum and average temperature, the month of Oct., Nov., Dec. and Jan. were the most effective months on the yield. It is hoped that in the future and with additional works, we see the more expansion of the frontiers of sciences, knowledge and technology about saffron.



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**NEUROBEHAVIORAL TESTS, TOOLS FOR  
PHARMACOLOGICAL EVALUATION OF MEDICINAL PLANTS**

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Medicinal plants have been used in many psychological and neurological disorders. Although there are several effective medications for treatment of psychological and neurological disease, they have limited efficacy or may cause adverse drug reaction. Therefore, investigation for newer medications, especially natural products, could be helpful to solve the problem. We have designed preclinical experimental protocols for screening of the neurobehavioral effects of several medicinal plants on depression, anxiety, pain, motor function, learning and memory, seizure, and social behaviors. Forced swimming test and tail suspension test are used for evaluation of anti-depressant effect of the medicinal plants and open field locomotor activity and rotarod are used to assess the motor function. Morris water maze, Y-maze, passive avoidance test, and fear conditioning are used for evaluation of medicinal plants on learning and memory. elevated plus maze and light-dark box for evaluation of anti-anxiety, writhing reflex and formalin test for assessment of analgesic effect, and pentylentetrazole and maximal electroshock model are used for evaluation of anti-seizure effects of medicinal plants



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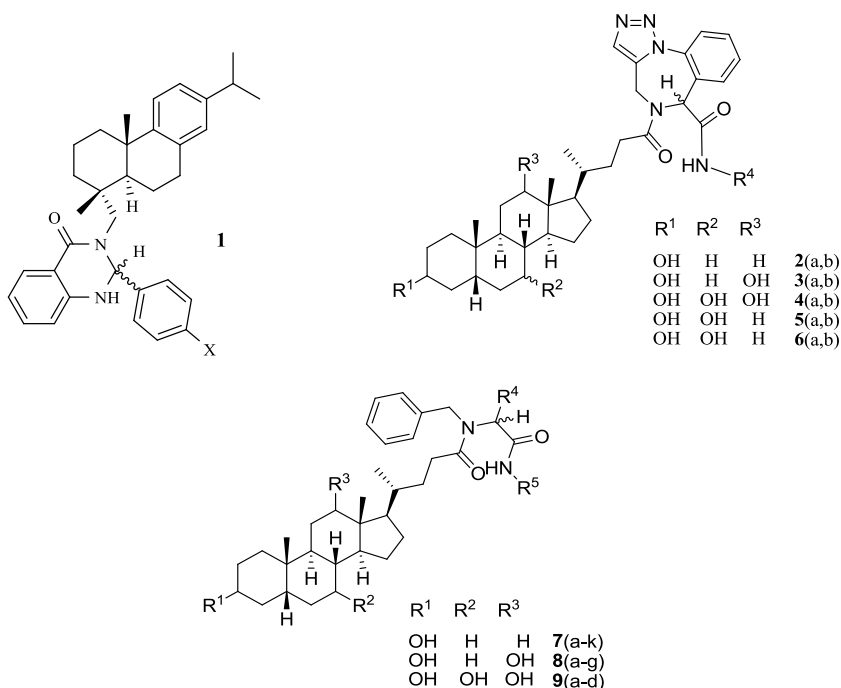
RECENT ADVANCES IN SEMI-SYNTHESIS OF  
NATURAL COMPOUNDS

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Natural products have been widely used as lead compounds for the synthesis of new drugs. Many researches have been developed recently on combining two or more biological active cores in one molecule. The results have shown that this unification sometime cause a synergism which increases the biological activity or sometime an antagonist activity to tune the pharmacological properties [1, 2].

In this paper the synthesis of new derivatives of dehydroabietylamine (DHA) and bile acids using multi-component reactions is reported. Thus a series of novel 2, 3-dihydroquinazolin-4(1*H*)-ones were synthesized by a three- component reaction between DHA diterpene, isatoic anhydride and different aromatic aldehydes in the presence of a catalytic amount of *p*-toluenesulfonic acid. Also, new derivatives of bile acids involved  $\alpha$ - acetamino amides and bicyclic triazolobenzodiazepines were synthesized. Antibacterial activities and cytotoxicity of the products were evaluated.



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**COMPUTATIONAL APPLICATIONS TOWARDS  
HIGH-THROUGHPUT SCREENING OF NATURAL ANTICANCER**

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Annually, more than 10 million new case of cancer are diagnosed based on the World Health Organization (WHO) report and now cancer remains the second leading cause of death. By 2020, the world population is expected to rise to 7.5 billion; of this number, around 15 million new cancer cases will be diagnosed, and 12 million cancer patients will die. The pointed undesirable data demonstrate that cancer is described as a serious challenge in human healthcare and survival. It may indeed be true that more than 60% of the anticancer agents nowadays in clinical application are natural products or natural product-based. The majority of large pharmaceutical companies have reduced the screening of natural products for drug discovery in favor of synthetic compound libraries. Major reasons for this involve the incompatibility of natural product libraries with high-throughput screening and the marginal improvement in applied knowledge for natural product screening in the late 1980s and early 1990s. In recent times, the expansion of novel knowledge and methods has developed the screening of natural products. These technologies compensate for the innate limitations of natural products and offer a unique opportunity to re-establish natural products as a main source for drug discovery. Advanced computational evolutionary analysis methods combined with the increasing accessibility of sequence data enable the application of systematic evolutionary approaches to targets and pathways of attention to drug discovery. The introduction and development of combinatorial chemistry and high-throughput screening revolutionized drug discovery by allowing great number of chemical compounds to be synthesized and screened in short periods of time. Though, this massive growth in the number of compounds screened did not create the expected increase in the number of successfully launched novel drugs. Thus the pharmaceutical industry is rapidly adopting virtual screening techniques aimed at identifying novel anticancer chemical compounds that have the required ingredients to become successful drugs. The computational filtering stage is especially vital for combinatorial chemistry, where billions of compounds can be synthesized from the commodity reagents. Neural networks have a verified ability to model complex relationships between pharmaceutically relevant properties and chemical structures of compounds, and have the potential to improve diversity and quality of virtual screening. Parallel to such modeling are massive virtual screenings. As the pointed, virtual screening is an increasingly significant component of the computer-based search for novel lead compounds. It would be obvious that virtual parallel screening results in a pharmacophore profile for natural compound screened to generate the predicted bioactivity profile. Consequently, virtual parallel screening methodology has the capacity to catalyze drug discovery intensely for all of those diseases where molecular targets or molecular ligands are well defined to generate consistent computer-assisted tools. The *in silico* pharmacological paradigm is continuing in natural product sciences. Based on various application scenarios, virtual parallel screening promises to have a substantial impact for the discovery of novel bioactivities and profiling of natural compounds.





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**MOLECULAR AUTHENTICATION OF PLANTS USING DNA  
BARCODE REGIONS (ITS AND TRNH-PSBA): THE CASE OF  
*THYMUS PERSICUS***

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The utility of the barcode regions (nrDNA ITS) and the plastid intergenic spacer *trnH-psbA* to distinguish between some Iranian *Thymus* species were evaluated. The use of molecular identification techniques, such as DNA barcoding [1], has recently taken on an important role in the identification of plant species [2]. *Thymus persicus* is an endemic species of the genus *Thymus* (Lamiaceae) which grows in Zanjan and West Azerbaijan (Takab) provinces of Iran [3]. Among the Iranian *Thymus* species, *T. persicus* is well differentiated by having the smallest leaf width among *Thymus* species with long non-glandular and short glandular hairs. In order to evaluate the phylogenetic relationships of the *T. persicus* and *T. marandensis* Jamzad, the recently and assumed related species to *T. brachychilus* Jalas and *T. leucotrichus* Hal., a molecular analysis based on nrDNA ITS sequences of 27 accessions belonging to 20 taxa of *Thymus* together with representatives of genera *Origanum*, *Thymbra*, *Satureja*, *Micromeria*, *Gontscharovia*, *Ziziphora* and *Zataria* was performed. While the phylogenetic position of *T. persicus* among the other taxa of *Thymus* is appeared unresolved, *T. marandensis* turned out to be the sister to a group of *Thymus* species including *T. carmanicus*, *T. migricus*, *T. pubescens*, *T. trautvetteri* and *T. daenensis*.

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**POPULATION STRUCTURE AND THE SPATIAL DYNAMICS OF  
GENETIC POLYMORPHISM IN THYME**

**S.M. Hesamzadeh Hejazi**

Many plant species occur as a combination of local populations in discrete patches dispersed across the landscape. The genus *Thymus* provides a particularly interesting situation to study the ecological and evolutionary significance of the spatial population structure. Since the early 1960s, one species, *Thymus vulgaris* has been at the center of ecological and genetic research on the evolutionary dynamics of not just one but two genetic polymorphisms. First, like most lamiaceae, thyme is an aromatic plant: glandular trichomes on the leaves and floral parts contain monoterpenoid essential oils. Thyme plants vary in the monoterpene composition of their essential oils, one monoterpene being present in a high percentage for a particular plant. The secondary compound (chemotype) polymorphism is most likely influenced by the combined and interactive effects of the different features of the abiotic and biotic environment. *Thymus* genus shows genetic variation in the production of monoterpenes, providing a fascinating opportunity to study the ecological role and evolutionary significance of monoterpene production. The second of the two polymorphisms is gynodioecy, a sexual polymorphism in which natural populations contain two types of plants: females and hermaphrodites. Hermaphrodites bear only perfect flowers whilst females bear smaller flowers that lack anthers or have only rudimentary anthers that do not bear pollen. The purpose of this paper is to investigate of cytogenetic, phytochemical and molecular markers on the different individuals of some populations of different species of *Thymus*, with focus on the relationship between markers in a distinction of different individuals from different populations.



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**EVALUATION OF MORPHOLOGICAL AND ESSENTIAL OIL  
VARIATION OF DIFFERENT GENOTYPES OF *THYMUS* SPECIES**

**Hossein Zeinali**

In order to study genetic variation of different thyme accessions, this study was carried out in Agricultural & Natural Resource Research center of Esfahan. The seeds were achieved from Natural Resources Gene Bank of Iran and planted in jiffy pots and in the next step; seedlings were transferred to field in March 2008. Seedlings arranged to be in 1m space between and on rows. Morphological, phenological traits and essential oil percentages were measured during 3 years. Considerable variation was found between accessions for morphological, phenological and essential oil percentages (EOP). Studied accessions varied in Essential oil percentage which was from 1.21% to 3.35%. The highest EOP belonged to *Thymus daenensis* (No=60) of markazi province. Aerial dry matter weights were between 320.47 and 1082.90kg/ha. The lowest and highest were accessions of *Thymus kotschyanus* of Kerman and *Thymus daenensis* (No=40) of Lorestan province, respectively. Essential oil production was different from 5.54 to 33.99kg/ha. Accessions numbers 1, 4, 25, 41, 43, 45 and 61 of *T. lancifolius* and 40, 42, 49, 60 and 72 of *T. daenensis* had the highest essential oil production per hectare and located in the fifth group of cluster analysis. Based on factor analysis, 81.61% of data variations were explained with 5 extracted factors. The first factor named yield factor. In yield factor, plant height, the highest and lowest diameter of plant cover, covering surface, dry and wet yield and essential oil production per hectare had a high loading factor. Therefore, for more yield production, plant height and canopy surface must be considered. Correlation coefficient also confirmed this subject as well. In second factor, essential oil percentage had a high loading factor and named as essential oil factor. Plant height and leaf length had positive loading factor with essential oil percentage. In order to increase essential oil percentage, plant height and leaf length must be better thought-out. In the third factor, length and width of leaf, leaf surface and weight of 1000 seeds had a high loading factor and were named as leaf surface expanding. Number of days to begin flowering and to 50% flowering had a high loading factor and named as phenologic factor. In the fifth factor, length of spike and seed weight had a high and negative loading factor and weight of 1000 seeds had a positive loading factor. In that case by increasing the length of spike and seed weight, the weights of 1000 seed were decreased. Cluster analysis were placed accessions in 5 different groups and confirmed considerable variation among accessions. These results showed that weighed up accessions have significant potential in traits for selection of best accessions to be introduced as new cultivars.