

# 2<sup>nd</sup> International Congress and 3<sup>rd</sup> National Conference on Biotechnology of Medicinal Plants and Mushrooms

Joint Organizers:

*University of Zanjan and Tea Research Center  
August 28-29, 2019, Lahijan*





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2<sup>nd</sup> International Congress and 3<sup>rd</sup> National Conference

# Biotechnology of Medicinal Plants and Mushrooms

Joint Organizers: University of Zanjan & Tea Research Center

August 28-29, 2019 – Iran, Lahijan



UNIVERSITY OF ZANJAN

IRANIAN BIOTECHNOLOGY SOCIETY



## Congress information and organization

### The Second International Congress and Third National Conference on Biotechnology of Medicinal Plants and Mushrooms

In continuation of the scientific approach of University of Zanjan and Iranian Medicinal Plants Society on the special focus of applied research in the field of biotechnology of medicinal plants and mushrooms of Iran and in the following from the First International Congress and Second National Conference on Biotechnology of Medicinal Plants and Mushrooms of Iran, relying on scientific and practical efforts of all the institutes of science and national organizations of the country and some of the famous countries in this field, **the 2<sup>nd</sup> International Congress and the 3<sup>rd</sup> National Conference on Biotechnology of Medicinal Plants and Mushrooms** were embarked **jointly at the Tea Research Center on August 28-29, 2019, Lahijan**, with an opening ceremony followed by a series of lectures delivered by honorable guests and members of the keynote forum in all world. The highlights of the congress, were the Video Conference keynotes forum by Prof. Pierre Sourzat- France, Prof. Paola Angelini-Italy, Prof. Nazim Şekeroglu-Turkey, Dr. Sevgi Gezici -Turkey, Dr. Esmail Emran-Afghanistan, and in person presents such as: Dr. Mohammad Bagher Rezaei; Dr. Valiollah Mozaffarian; Dr. Behzad Ghare Yazdi, Dr. Shokrallah Hajivand, Dr. Fazlollah Safikhani and Dr. Gholamhasan Kazemi,... Iran. More than 150 articles were received which of them 100 were accepted including 20 articles as Oral and 80 articles as Posters. This congress will be held periodically by the **University of Zanjan** in one of the provinces of Iran or other countries around the world. Candidates hosting Congress must formally announce their readiness to the Congress Permanent Secretariat at Zanjan University. It should be noted that the *Research Institute of Modern Biological Techniques in university of Zanjan* with a national approach to biotechnology of medicinal herbs and mushrooms has scientific and national authority in this field in Iran. We appreciate the cooperation and scientifically supports of the Islamic World Science Citation Center (ISC), International Society for Mycological Sciences (ISMS), Association of Medicinal Plants of Turkey, as well as Iranian Medicinal Plants Association, Iranian Biotechnology Society and the Iranian Horticultural Science Association.

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**The Congress Joint Organizers : University of Zanjan & Tea Research Center**

**Chief of Congress: Dr. Mohsen Najafian & Dr. Shokrollah Hajivand**



**Scientific Secretaries : Dr. Bahram Maleki Zanjani & Dr. Ali Seraji**



**Executive Secretaries : Dr. Ali Ammarellou & Dr. Mohammadnaghi Padasht**



Other information of congress are in: <http://ic-bmpm2019.ir>



## Sustainable wild harvesting and domestication strategies of medicinal and aromatic plants in Turkey

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### Abstract

Medicinal and Aromatic Plants have mainly obtained two sources; one is wild harvesting another is agricultural production. Similarly other countries on the worldwide, most of these plants, about 80%, have been provided from natural resources and some of them, having big market demand, have been cultivated in the fields. These plants are important raw materials for many industries like spice, herbal tea, plant based extracts, food additives and mixtures, essential and fatty oils, natural cosmetics, perfumery, nutraceuticals and pharmaceuticals. Because of huge market demand, low agricultural production, low cost, easy reach and similar reasons many plant species have currently been will collected in Turkey. Mostly wild harvested plants are oregano, thyme, laurel, sumac, sage, mountain tea, rosehip, carob, rosemary, orchids, linden, chestnut, wild fruits and edible mushrooms. In these plant species, domestication studies were achieved and some of them such as oregano, thyme, laurel, sage, rosemary have been cultivated in the fields, recently. Nevertheless, wild harvesting of these cultivated species are going on in order to their distinguished flavor characteristics. These wild collected materials are blended to products for increasing quality. Some medicinal and aromatic plants used in spice, herbal tea, perfumery and pharmaceutical industries have been cultivated in the fields. These plants are oregano, cumin, mint, coriander, poppy, anise, fenugreek, fennel, sage, oilrose, lavender, blackcumin, etc.

The main sources of wild harvested medicinal and aromatic plants are forests, highlands, meadows and pastures. Thus, these plants are called as Non-Wood Forest Products (NWFPs) and Non-Timber Forest Products (NTFPs). Yield and quality of wild collected plants could easily affected environmental and climatic changes by the years. Thus, annual production quantity and quality for standardization cannot be determined. Sustainability both raw material production and quality is crucial criteria for sustainable industrial production. Protection, development and sustainable use of natural sources is insurance of our future. In this context, sustainable wild harvesting and agricultural production of medicinal and aromatic plants are very important. In this context, Good Collection Practices (GCP) and Good Agricultural Practices (GAP) guidelines released by WHO-FAO are important sources for this aim. In this concept, oregano domestication is a good sample for domestication of MAPs in Turkey and domestication studies have been gradually achieved for other important plants species.

**Keywords:** Cultivation, Domestication, Medicinal and Aromatic Plants, Sustainable wild harvesting



## Truffles cultivation in France and Europe.

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 Former Director of the Truffle Research Center in Cahors-Le Montat (France).

### Abstract

Truffle cultivation is 200 years old, which is very young compared to wheat cultivation which is 5,000 years old. It was invented at the beginning of the XIXth century by sowing acorns in suitable calcareous soils. Truffle production flourished during the XIXth century due to the following: 1) the clearing of campaigns, 2) the massive destruction of French vineyards by Phylloxera, 3) urbanization (population shift from rural areas to cities) at the beginning of the XXth century. The World Wars marked the truffles steep decline.

In front of decline of the truffle production, the French Institute INRA invented the mycorrhizal controlled plant checked with the black truffle *Tuber melanosporum*, marketed from 1974. Plantations of inoculated trees saved the black truffle of Perigord. Thanks to these inoculated and then mycorrhizal plants, truffle production has spread to other countries, for example: New Zealand, Australia, North Africa (Morocco) and South Africa, Chile, Argentina, and the United States of America. In France they are two species that are mainly cultivated: *Tuber melanosporum* and *Tuber aestivum/uncinatum*. Spain has become a major producer of *Tuber melanosporum* thanks to the irrigation of truffle plantations. Italy produces many species of *Tuber* but is mainly interested in *Tuber magnatum*, the precious white truffle of Alba. Close to Europe, Iran naturally produces *Tuber aestivum*.

The principal conditions for successful truffle production are :1) using well mycorrhized plants, 2) suitable soil, 3) Mediterranean or Atlantic climate, 4) Cultivation practices designed to maintain an equilibrium which favours the fructification of a pioneering type of fungus. A mycorrhized tree by the truffle has on its root system the mycorrhizae of the truffle. Mycorrhizae are the organs of the symbiosis between the fungus and the tree. Several species of truffle host trees can be used: *Quercus pubescens*, *Quercus ilex*, *Corylus avellana*, *Pinus* sp., *Carpinus betulus*, etc. The two limiting factors of the climate with *Tuber melanosporum* are the drought and the freezing of the truffles. The fruiting bodies of truffles survive 20 to 25 days of drought. They can freeze when their internal temperature reaches minus 1.5 degree Celsius. This is not the case of *Tuber aestivum/uncinatum* which is harvested before the cold weather of the winter.

The techniques of truffle production were rationalized for the tilling of the soil, the management of the water and the pruning of trees during several decades. The purpose of the tillage of soil is to aerate it and facilitate the growth of truffles. With climate change, irrigation of truffle plantations becomes essential. Truffle growers provide 20 mm of water every 10 days on average. The trees are pruned to maintain an open space required by *Tuber melanosporum*. Spore supplies are nowadays carried out to strengthen the production potential. In conclusion, truffle cultivation consists to manage balance between main different factors: 1) soil, 2) water and climate, 3) growth of the tree and mycorrhizas propagation.

**Keywords :** *Tuber melanosporum*, *Tuber aestivum/uncinatum*, Mycorrhizal plants, Tilling, Irrigation, Pruning.



## Herbal are the most important in Nature and Natural resource

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Nature is very importance of humans has needed to survive, was provided us: food, water, animals, plants, air, bacteria, soils and so on. Plants or herbals play a very important role. They are one of the most important parts of the life of all the organisms living on this planet Earth. Herbal medicinal products have again become popular. In general, herbs are used for health, flavoring, vitamins, mineral, essences, garnishing food, medicinal purposes and as vegetables. Iran, China and India are renowned for its traditional herbal medicines that date back thousands of years and their People have used the herbs or herbal extracts in natural health products for thousands of years to help health. Herbal therapy in Iran also dates back to a long time ago and a number of writings regarding this issue are left by great physicians e.g. Avicenna and Razes. Iranian botanists have led to recognition of around 150 spontaneous families of Angiosperms containing 124 Dicotyledonous, 22 Monocotyledonous and 4 Gymnosperms families. Totally there are about 1450 genera and 8000 species which nearly 2000 species are endemic of Iran. So in this manner and because of important medicinal and aromatic plants in country and scientist interested are eventually identified the phyto-chemical in parts of plants that relieved fever, pine, cold and used that knowledge to produce aspirin and other natural products. Researchers are also studied some natural products and have found them to be useful. Omega-3 fatty acids, for example, may help lower triglyceride levels. Herbs seem harmless, some can be potentially dangerous. Taking herbal remedies is tempting and on some products has shown that may have no effect or may be harmful.

**Keywords:** Iran; Avicenna; Herbal. Traditional remedy and Medicinal plants.



## Medicinal and Aromatic plants in Gilan

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### Abstract

The Gilan province with an area of ca14042 Km<sup>2</sup> Is located in North Iran, bordered for North by Caspian Sea, North west by Ardebil, North west By Soviet Azerbaijan. from South by Ghazvin and South West by zanzan, from East by Mazandaran provinces. Because of the various climatic conditions (Average of rainfalls, temperature, topographic condition), the province has a very rich flora. Which is studied carefully by the author. by means of preparing colouring flora of Gilan. After publishing Flora of Gilan I have found some interest in Gilanian peoples which they want to know about medicinal plants in their province, and after that, I began to prepare a book about Medicinal and Aromatic plants of Gilan, first of all referred to published books and references which is given some information with emphasis on well documented medicinal plants, and finally have collected and catch some usage of medicinal plants from references as example. Mozaffarian 2013, Identification of medicinal and Aromatic plants of Iran. As all of the world, Gilanian Medicinal plants are divided into 3 groups, including indigenous well documented medicinal plants, cultivated ones , often came from other parts of the Iran or are foreigner adapted to Ecological conditions of the region, and Aromatic plants which are indigenous odorant plants and people at the first, thinks they could be Medicinal or at least have some especial usage. Finally as a result came across to 580 Medicinal and aromatic plant species in Gilan which are belong to 108 families, 111 species of them are Aromatic plant without any documented medicinal usage but together with good information about the essences and chemical ingredients, 131 cultivated plant species which by product of them used by people as fruits, vegetables and so on... 25 plant species which mostly are imported from other countries and used as spices and traditional medicinal plants. The author beside the determination of Medicinal and Aromatic plants and point to medicinal usage of them, for easier determination for Non experienced peoples attached colouring photos of all medicinal plants which is prepared by himself in the nature for easier method to being acquaint with this heavy work have prepared some Power point which are show to audiences.

**Keywords:** Gilan province, Medicinal plants, Ecological conditions.



## Mushrooms Genomic Projects

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### Abstract

Bioinformatics is the field of science in which biology, computer science and information technology combined with each other to form a single discipline. Bioinformatics is considered as a part of biocomputing that is mostly related to “processing biological data”. For processing and interpretation of molecular data from fungal genomic projects using bioinformatics software, a range of web-based tools can be used for analysis of genomes, genes, DNA, RNA and protein sequences of fungi. Fungal genomes & genes can be analyzed through the different BLAST(s) or BLAT(s) at (<http://www.ncbi.nlm.nih.gov>) or <http://genome.ucsc.edu/> for similarity compare. DNA-to-protein translation software: <http://au.expasy.org/tools/dna.html> and multiple sequence alignments of nucleotide or amino acid sequences can be performed using <http://dot.imgen.bcm.tmc.edu:9331/multi-align/multi-align.html> and graphically composed in BOXSHADE with [www.ch.embnet.org/software/BOX\\_form.html](http://www.ch.embnet.org/software/BOX_form.html). ([http://arep.med.harvard.edu/labgc\\_adnan/projects/Utilities/revcomp.html](http://arep.med.harvard.edu/labgc_adnan/projects/Utilities/revcomp.html)) is a program for comparing reverse and forward DNA sequences. Overlapping sequences can be assembled using: [www.sequence.neurobio.upr.clu.edu/cap.cgi](http://www.sequence.neurobio.upr.clu.edu/cap.cgi). Sequences can be checked for contaminating sequence by [www.ncbi.nlm.nih.gov/VecScreen/VecScreen.html](http://www.ncbi.nlm.nih.gov/VecScreen/VecScreen.html). Predicted restriction sites in DNA could be mapped using (<http://darwin.bio.genesee.edu/~yin/WebGene/RE.html>). Genefinder (optimized for *A. niger*) is for conforming to consensus motifs for the translation initiation site, stop site, left and right intron junctions and intron branch-points. ORFs could be constructed by [www.molecularworkshop.com/programs/orf100.html](http://www.molecularworkshop.com/programs/orf100.html). SignalP [www.cbs.dtu.dk/services/SignalP/#](http://www.cbs.dtu.dk/services/SignalP/#) submission: predict secretory signal peptides and locates their cleavage sites. Web gene [www.itba.mi.cnr.it/webgene](http://www.itba.mi.cnr.it/webgene) contains a series of gene analysis and prediction programs including CpG islands to locate probable ORF's and HCpolya to predict polyA signals. Mat Inspector <http://transfac.gbf.de/cgi-bin/matSearch/matsearch.pl>: Searches a sequence against a database of fungal transcription factor binding domains. TMHMM [www.cbs.dtu.dk/services/TMHMM/](http://www.cbs.dtu.dk/services/TMHMM/): for prediction transmembrane domains within a peptide sequence. Bioinformatics software's are designed to fulfill: 1- To enable efficient methods for storage, retrieval, analysis and access to various types on genomics and biological information. 2- To develop new algorithms and statistics with which to assess relationships among members of large data sets, such as methods to locate a gene within a sequence, predict protein structure, function, cluster gene or protein into families of related sequences. For better understanding-analyzing of fungal genomes, all of genomes molecular information must be combined to form a comprehensive picture of normal cellular activities to those researchers may study how these activities are altered in different states. Therefore, the field of bioinformatics has evolved such that the most pressing task now involves the analysis and interpretation of various types of genomes including fungal genomes and molecular data.

**Key words:** Fungal Genomes, Molecular Data, Analyzing, Bioinformatics Software



## Iranian Committee for Development of Science and Technology of Medicinal Plants and Traditional Medicine

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*1: Members of Medical Plants and Traditional Medicine Sciences and Technologies Development Headquarter*

### Abstract

Recognizing the importance and status of medicinal plants science and technology and traditional medicine and in line with global trend, Islamic Republic of Iran has launched a range of systematic measures for better exploitation of this realm. In this regard, in 2008, “Committee for Development of Science and Technology of Medicinal Plants and Traditional Medicine” was established in Vice-Presidency for Science and Technology. The general office for monitoring and evaluation of natural products and supplements associated with Food and Drug Administration; Deputy for traditional medicine associated with Ministry of Health and Medical Education; Institute of medicinal plants of Jihad University (ACECR); Ministry of Agriculture and its affiliated organizations and institutions; Directorate general of food, medicine, and hygiene industries of Ministry of Industry, Mine and Trade; Technical and Vocational Training Organization; Ministry of Cooperatives, Labour and Social Welfare; the national network of research and Technology of medicinal plants; Deputy for Life Sciences of Presidential Center for Innovation and Technology Cooperation (CITC); and Vice presidency for Research and Technology of Ministry of Science, Research and Technology. Moreover, around 120 universities, scientific and research institutions and organizations of science and technology of medicinal plants and traditional medicine contribute to development of this area.

**Keywords:** Science ,Technology ,Medicinal Plants, Organization.



## Dietary plants and natural products for prevention and management of cancer and neurodegenerative diseases: clinical evidence and molecular mechanisms

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### Abstract

Cancer and neurological diseases such as Alzheimer's disease (AD), Parkinson's disease (PD), amyotrophic lateral sclerosis (ALS), prion and motor neuron diseases etc. are of growing health problem around the world. According to World Health Statistics reports, these disorders and diseases affect millions of people, and their incidence is expected to continue to increase rapidly for the next years. Medicinal plants are good resource of natural compounds/products, which possess wide range of biological activities that contribute to prevent these diseases. Since no effective therapy has still been revealed to fight cancer and neurodegenerative diseases, herbal therapy offers extremely great opportunities for innovation effective treatment strategy. Dietary plants (fruits, vegetables, spices, cereals, and edible tubers/roots) including natural bioactive compounds such as phenolic acids, flavonoids, tannins, stilbenes, curcuminoids, resveratrol, lycopene, carotenoids, quercetin, catechin, naringenin, organosulfur, curcumin, genistein, isothiocyanates, capsaicin, gingerol, anthocyanins, coumarins, lignans, quinones, and others have been demonstrated to possess valuable health benefits beside basic nutrition. In fact, these dietary compounds are believed to exhibit diverse range of anti-carcinogenic and anti-neurodegenerative activities. Previous reports clearly showed that their molecular mechanisms mostly originate from their antioxidant and free radical scavenging properties beyond function of regulating detoxifying enzymes. A considerable number of chemopreventive and neuroprotective agents obtained from dietary medicinal plants currently used in clinically. Furthermore, a numerous clinical trials on the use of dietary medicinal plants and their molecular mechanisms to prevent and treat these diseases are still ongoing. However, more information about the health-promoting properties and the possible risks of dietary herbal medicines are needed to make certain regarding of their efficacy and safety.

This review covers the most recent literature on human clinical trials and molecular mechanisms of dietary plants and natural compounds for chemoprevention and neuroprotective

**Keywords:** Dietary, Cancer, Neurodegenerative, Natural products.

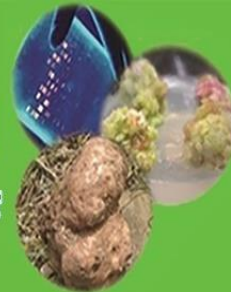


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## A research on goji berry (*Lycium* fruit) as a ‘superfruit’: multifunctional natural agent for the management of neurodegeneration, cancer and oxidative damage

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### Abstract

Goji berry is commonly consumed as herbal tea, and also used for the production of tincture, wine, and juice as a nutritional supplements. It has recently gained a growing popularity in many Asian and European countries as a “superfruit” owing to its potential health benefits and numerous pharmacological functions associated with the eyes, kidney, liver, and immune system. This research was aimed to investigate antioxidant, anticancer and neuroprotective properties of the goji berry fruits. The fruits were extracted with methanol-MeOH and distilled water-dH<sub>2</sub>O, and subjected to various biological assays at various concentrations (from 100 to 1000 µg mL<sup>-1</sup>). Their neuroprotective potentials were tested through enzyme inhibitory assays AChE and BChE, which are closely related to pathogenesis of Alzheimer's disease. Anticancer activities of the fruit-extracts were evaluated using MTT assay against MCF-7, A549, HeLa human cancer cells, and non-tumorous HUVECs. *In vitro* methods including DPPH, ABTS, FRAP, and CUPRAC were performed to determine antioxidant capacities of the extracts. The fruit extracts exerted significant inhibition towards ChE enzymes even at the tested minimum concentration, particularly the MeOH fruit-extract caused higher enzyme inhibition with the inhibition percentage of 78.04±1.02% on AChE and 61.80±1.18% on BChE. Regarding of anticancer activities, the fruits demonstrated strong anticancer properties on tested human cancer cells (IC<sub>50</sub> values ranging from 38.14±1.02 to 176.90±0.41 µg mL<sup>-1</sup>) in a time and dose dependently. Furthermore, the highest anticancer activity was found against HeLa cells that was followed by MCF-7 cells (IC<sub>50</sub>=113.75±0.96 µg mL<sup>-1</sup>). Their remarkable free radical scavenging and metal chelating activities can probably contribute to enhance immune system, which lead to powerful anti-cancer and anti-neurodegeneration effects. Overall, the results suggest that goji berry is a potential natural agent to use for oxidative stress related diseases including cancer and neurodegenerative diseases.

**Keywords:** Goji berry; Cancer protective; Alzheimer's disease; Oxidative stress; Neurodegeneration



## Cultivation of *pleurotus ostreatus*: new perspectives between agri-food and medical biotechnologies

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### Abstract

The genus *Pleurotus* (Fr.) P. Kumm. (*Pleurotaceae*, *Basidiomycota*) is a white-rot basidiomycete with valuable biotechnological, medical, and nutritional properties. It is represented in Umbria by six species [*Pleurotus columbinus* QuéL., *P. cornucopiae* (Paulet) Rolland, *P. dryinus* (Pers.) P. Kumm., *P. eryngii* (DC.) QuéL., *P. ostreatus* (Jacq.) P. Kumm., *P. pulmonarius* (Fr.) QuéL.] found growing attached to the cortex of *Salix* spp., *Populus* spp., *Quercus* spp. and *Fagus sylvatica* (Angelini et al. 2017). The aims of this work was evaluate the biotechnological feasibility of *Pleurotus* strains from Umbria, to produce monacolin k in high quantity. Monacolin K is a fungal polyketide based secondary metabolite widely used a prominent drug in hypercholesterolemia (Alarcòn and Águila 2006). Fruiting bodies of *Pleurotus* spp. were collected in different woods from Umbria in autumn and spring of 2017 and 2018. Pure cultures of 25 strains were obtained by excising pieces of trama from inner parts of fruiting bodies and transferring them onto malt extract agar medium and incubated for 14 days at 25 °C. A voucher specimen of the mushrooms was deposited in the PeruMyc herbarium (Department of Chemistry, Biology and Biotechnology, University of Perugia). Mycelium for inoculation of cultivation substrates was prepared on wheat grain using the traditional method (Stametes 2000). The experimental substrate comprise oak sawdust and different mixture of beech, willow and poplar sawdust or wheath straw. The prepared substrate were placed in polypropylene bags with microporus filter. The bags were subsequently kept in a spawn running room at 23 ± 1 °C. Incubation was continued until the entire surface of the substrate was colonized by the mycelium. For induction of *Pleurotus* strains fruiting, the bags were before incubated at 2- 4 °C for 24h and then were kept at 23 ± 1 °C and 65-68 % relative humidity with a 10 h photoperiod. In the cultivation experiment, five replications were carried out for each combination of strain, substrate mixture and its moisture content, level of organic supplementation. The mycelial mass from liquid culture and the fruiting bodies (collected after 2-3 months from solid substrate) were processed for extraction using methanol until exhaustion. The identification and quantification of monacolin k (lactone and acid forms) were carried out on the culture filtrated and extracts by HPLC. The present study allowed to make a comparison between the content of monacolin k present in the mycelia liquid cultures and fruiting bodies of *Pleurotus* spp. cultivated in solid substrate.

**Keywords:** *Pleurotaceae*, *Basidiomycota*, Monacolin.





## Advances in Genetic engineering and its application for Medicinal plants

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At the end of 2018, more than 191.7 million hectares of agricultural land was devoted for Genetically Modified Crop plants (GMCs). These crops are mainly produced in order to protect them against insect pests and/or render tolerance to environmentally safer herbicides. Iran has a rich history of application of herbal medicine. The herbs used to be collected directly from rangelands and therefore some of the most valuable medicinal species may have been lost or are in danger. Different methods of genetic engineering have been developed to break down the gene barrier imposed by conventional breeding systems. Successful gene transfer among distantly related species broadens the gene pool. Genetic engineering can help to boost the production and use of medicinal plants by Production of improved varieties of medicinal plants that can be cultivated with no or less application of insecticides Improved herbal plants with enhanced expression of active ingredient (secondary metabolite of interest) Improved herbal plants with improved tolerance to abiotic stresses Production of Medicinally Important Proteins in non-medicinal crop species such as rice Domestication and cultivation of wild varieties Production of fungal cultivars aimed at combating malnutrition and treating diseases and those that can be used for bio-remediation. In the Basidiomycetes the most exciting aspect of protoplast technology (protoplast fusion) for the generation of novel interspecies hybrids. Genetic engineering can be used as tools to advance our understanding of the basic molecular biology of higher fungi. This technology may also open up possibilities for the commercial production of medical substances found in different mushroom species. Genetic Engineering has been used for common white button mushroom (*Agaricus bisporus*) to resists browning by targeting the genes that encodes polyphenol oxidase, an enzyme that causes browning. Genetically Modified Mushrooms were used to kill malaria carrying mosquitoes. More examples of application of generic engineering for enhanced use of medicinal herbal plants and wild mushroom will be provided.

**Keywords:** Genetic engineering, Medicinal plants, Modified Crop plants (GMCs).



**Assessment of genetic diversity and population genetic structure among the accessions of jeera (*nigella sativa* L.), from Afghanistan and India using morphological, molecular and biochemical traits**

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**Abstract**

Black cumin (*N. sativa* L.) is a crop of great medicinal value, but poorly studied and less tried for genetic improvement. Assessment of the genetic diversity is therefore of crucial importance for its genetic improvement. The present study was undertaken to assess the genetic diversity of the 37 accessions collected from Afghanistan and India. The accessions were sown during late *Rabi* 2014 and early *Rabi* 2015 and evaluated for 11 traits including yield and seed oil content. Black cumin accessions showed significant differences for all the characters including total yield and oil percentage during 2014. During 2015 the accessions did differ significantly for most characters except plant height, number of locules per capsule and seeds per capsule. PCA analysis based on the Morphological traits revealed that there is broad-scale geographic differentiation of the populations of *N sativa* and populations seem to be mixing well at a small geographic scale either because of human mediated commercial exploitation or because of natural out-crossing. RAPD primers were used for molecular diversity analysis of 12 accessions chosen to represent the diversity at phenotypic level. The number of bands produced by each primer ranged from 1 to 11. The highest number of loci were amplified in I.15 and BH.2 primers and the lowest in I.18; the gene diversity observed ranged from 0.00 in primer I.14 to 0.42 in primer I.1 with a mean gene diversity of 0.2. The Polymorphic information contents (PIC) of the 11 RAPD primers used varied between 0.00 and 0.35. Average PIC was 0.22. The genotypes from Afghanistan and India had similar similarity index values within each group (or country) than between them suggesting that short geographical isolation has low influence on the genetic diversity of the genotypes.

**Keywords:** Black Cumin, Afghanistan, Diversity, Biochemical, India, Morphological.



**First report on the isolation of *Alternaria* endophytic fungus from the root of *Capparis spinosa*  
(Zanjan province)**

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**Abstract:**

Caper is one of the plants that has long been used in Iranian traditional medicine as a pain reliever, as well as in the treatment of rheumatism and gout, and has been shown to have an analgesic effect. *Alternaria* fungus is an international fungus widely spread in soil and organic matter. This fungus includes saprophytic, endophytic and pathogenic species. At least 268 metabolites have been reported from *Alternaria* fungi in the past few decades. In this research, the isolation of root endophytes of Caper from Abbar-Gilvan region (Zanjan province) was investigated. After transferring the plant to the laboratory and surface sterilization of the roots, the endophytes isolation was carried out and its molecular detection was investigated. The results showed that *Alternaria alternata* was identified as endophytic, and the conidiophores were relatively short, and the conidia which often lacked the tip, were characterized by a secondary conidia with one to two cells. The conidia chain was often diagnosed on conidiophores with an average length (up to 20 conidia). The molecular detection of this fungus further confirmed its morphological diagnosis. Due to its ability to produce biologically active metabolites, this fungus can be useful for future studies and can be used by pharmaceutical and healthcare industries.

**Keywords:** *Alternaria*, *Capparis spinosa*, Endophyte, Root



## Relationships among some traits in m3 mutant lines of purslane (*Portulaca oleracea* L.)

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### Abstract:

To investigate the relationship among some traits in the M3 mutant lines of purslane that were treated with dimethyl sulfate at 0, 0.08, 0.12, 0.12, and 0.14 percent concentrations, a study was conducted in the year 2018 at the research farm of agricultural college of shahed university through nesting design. The relationships among traits were analyzed through path analysis using stepwise regression in two states with repetition and mean of repetitions. The plant fresh weight (PFW) as the dependent variable and other traits including plant height, number of main stems, number of sub-stems, stem diameter, stem fresh weight(SFW), stem dry weight(SDW), SDW/SFW, leaf fresh weight(LFW), leaf dry weight(LDW), LDW/LFW, plant fresh weight(PFW), plant dry weight(PDW), PDW/PFW, leaf length, leaf width, leaf shape, number of capsules, total chlorophyll, leaf area, and hectoliter were considered as Independent variables. When replicated data were used for path analysis, SFW and LFW were imported in equation due to the significant regression relationship, which it's direct effect on PWW was higher than LFW. The most indirect effect was related to LFW on PWW through SFW. Also, the correlation between these two traits was significant with PWW at 1% probability level. In path analysis with the mean of replications, among 20 studied traits, SFW, LFW, LDW/LFW had significant regression with PWW. SFW had the most direct effect on PWW. The highest positive and negative indirect effect on PWW was through LFW and SFW, respectively. Although LDW had a significant regression relation with PWW, the simple correlation between these traits was not significant. In case of two states, LFW and SFW had a direct and significant relationship with PWW, therefore, in breeding of purslane, it is possible to use of these two traits instead of PWW at the selection stages.

**Keywords:** Stepwise regression, Path analysis, Correlation between traits, Purslane.

## Study of genetic diversity between some Tea genotypes from Foman

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### **Abstract:**

One of the most important products in the northern region of Iran especially Guilan province is the tea plant (*Camellia sinensis* (L.) O. Kuntze) and plays an important role in the region's economy. Since today many tea plants in the region are being destroyed for various reasons, so having information about the genetics of those trees is helpful in designing breeding programs to reach appropriate plants for specific purposes and conservation of tea germplasm. RAPD markers, using 15 primers, were used to study the genetic relationships of 16 tea plant samples from west of Guilan province (Foman). In total, these 15 primers produced 135 scorable bands, 71.85 percent of which were polymorphic (97 bands) and 38 bands were shown monomorphic pattern (28.15 percent). The calculated PIC for all combinations was from 0.38 to 0.50 at an average of 0.49. Data analysis was performed by NTSYS software using Jaccard's similarity coefficient to determine the amount of similarity and the dendrogram was drawn based on UPGMA. Based on molecular data, the range of similarity between samples varied from 0.484 to 0.867. Samples were divided into three groups at a similarity level of 0.47. The second group (B) was divided into two subgroups at a similarity level of 0.50. Based on released data can be concluded that there is high variability between samples of tea. In general, the study of genetic diversity showed that the RAPD marker could be useful in identifying polymorphic regions and estimating genetic distances and germplasm management in tea plants. Tea (*Camellia sinensis* (L.) O. Kuntze) is one of most important crop in north of Iran especially Guilan province. Today's, many of these plants are at risk of disappearing therefore having information about genetic of them can help in designing of breeding programs. After sampling from young and mature leaves, total DNA was extracted. Ten RAPD markers were used for investigation of genetic relationship between 20 tea genotypes from Lahijan region. Data was analyzed by used of Ntesys software. Usage of 10 RAPD primers produced 112 band and 88 of them showed polymorphic pattern (78.6 percent). Primer P7 produced 15 bands (maximum number) and P7 by producing 7 bands have minimum number. According to cluster analyses, samples were placed in three groups and samples of region of Shahid Eslami research center showed maximum similarity with each other.

**Keywords:** Tea, Genetic Diversity, Molecular Markers, RAPD



## Molecular analysis and genetic relationships of some genotypes of takestan Grapevine

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### Abstract

In the present study, 25 genotypes of grapevines from different regions of Takestan Province were evaluated using 8 pairs of microsatellite primers. The amplified alleles in each locus varied from three (VVS1 and VVMD25) to nine (VVS3 and VVMD6). With a mean of 71.8%, polymorphism ranged from 58.5% as the lowest percentage for VVS2 to 78.8% as the highest percentage for VVMD25. Mean polymorphic information content (PIC) of the markers was 0.69 and ranged between 0.50 for VVS3 and 0.87 for VVMD25. The maximum and minimum gene diversity (H) was 0.05 and 0.87 for VVS3 and VVMD25, respectively. According to Jaccard similarity coefficient and UPGMA algorithm, cluster analysis assigned the genotypes into five groups. Despite similar names, the results revealed that the genotypes belonged to different groups. Beside VVMD, VVS series of markers were also used in the present study and the results showed that these series of microsatellite markers were as efficient as VVMD series in terms of discrimination and polymorphism for studying grapevine cultivars.

**Keywords:** Grapevine , Microsatellite , Genetic diversity



## Study of the amount of rosmarinic acid and expression of some rosmarinic acid synthase genes under drought stress and salicylic acid hormone in *Melissa officinalis* L.

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### Abstract:

Lemon balm (*Melissa officinalis* L.) is among the most important medicinal herbs in the world. Among various secondary metabolites, rosmarinic acid, an ester of caffeic acid and 3, 4-dihydroxyphenyllactic acid, shows a number of various biological activities. Rosmarinic acid synthase and phenylalanine ammonia lyase are two important enzymes in RA biosynthetic pathway. In this study, we investigated different concentrations (0, 0.7, 1.5 mM) of exogenous salicylic acid (SA) under drought stress in 3 levels (0, 1/3 fc, 2/3 fc). Leaf samples were collected from treated and control plants at three stages: before (stage I), during (stage II) and after flowering (stage III). The correlation between PAL, RAS genes and rosmarinic acid (RA) accumulation was compared. RA was evaluated by HPLC apparatus, and the genes expression of PAL and RAS was investigated by real time PCR. It was found that the expression of PAL and RAS genes is closely correlated to accumulation of RA in *Melissa officinalis*.

**Keywords:** *Melissa officinalis* L., drought, Salicylic acid, rosmarinic acid, PAL, RAS, HPLC, Real time



## Changes in protein expression patterns of Lime leaves caused by Witches' broom disease

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### Abstract

Witches' broom, caused by *Candidatus Phytoplasma aurantifolia*, is an important citrus disease in Iran, West Asia, and North Africa that has caused considerable economic damages. This study investigated the effect of the disease stress on leaf proteome. The collected leaves from plants were studied with two-dimensional electrophoresis (2-DE) and mass spectrometry (MS). The High power of 2-DE in separation of proteins allows studying a variety of qualitative changes (presence or absence, and/or displacement), as well as quantitative changes (increased or reduced expression) of proteins. Among 801 leaf proteins analyzed by Melani6 in eight healthy and eight infected bioreplicates, 63 proteins significantly responded to the disease. Nineteen out of these 63 proteins were identified by MS, including proteins involved in coping with oxidative stress, photosynthesis, metabolism, and stress response.

**Keywords:** Protein extraction, Metabolism, Stress response.



**Comparison of secondary metabolites and molecular data (nrDNA and cpDNA) analyses in medicinal herb *Ferula* L. (ferulinae, scandiceae, apiaceae)**

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**Abstract:**

Phylogenetic trees constitute a framework for understanding character evolution and help to predict species features based on their evolutionary relationships, at least among closely related species. The predictive value of phylogenetic trees seems to be particularly important for bio-prospecting: traditional medicinal plant is not scattered randomly along phylogenies but it is concentrated in certain branches of the trees. *Ferula* L. is one of the most promising genera of Apiaceae (Umbellifers), which contains many species that are sources of aromatic oleo-gum-resins with valuable effects in traditional medicine since antiquity. Based on these features of *Ferula* that were subject to phytochemical studies, we compare recent phylogenetic findings inferred from nuclear and chloroplast genomes with the secondary metabolites inferred from available phytochemical data to investigate the phylogenetic relationships within Ferulinae. In total, 137 accessions of Apiaceae—including 8 species of *Leutea* Pimenov and 126 species of *Ferula* as ingroup and three representatives of major lineages of Scandiceae as outgroups—were examined for nrDNA ITS and three noncoding cpDNA regions; *rps16* intron, *rpoC1* intron and *rpoB-trnC* intergenic spacer. Phytochemical compounds were typified in 9 groups as 34 binary characters. After phylogenetic analyses (Maximum Likelihood and Bayesian Inferences), eleven major clades were apparent within *Ferula* and one superclade contain economically important species including the sections of ‘Merwia’, ‘Scorodosma’ and ‘Euryangium’. Two medicinal herb; *F. assa-foetida* L. and *F. gummosa* Boiss. that are sources of asafetida and galbanum, respectively; occurred in the Merwia clade. However, *F. foetida* (Bunge) Regel; another source of oleo-gum-resin, is included in the Scorodosma clade that comprises some Central Asiatic and Iranian species. The phytochemical analyses indicate that organic sulphur compounds, sesquiterpene esters and sesquiterpene lactones have chemotaxonomic value within *Ferula* species.

**Keywords:** *Ferula*, ITSnrDNA, cpDNA, Molecular phylogeny, Medicinal plants, Umbellifers.



## Effect of cutting position and leaves number on ZZ plant rooting and rhizome formation

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### Abstract

ZZ plant (*Zamioculcas zamiifolia*) a member of the family *Araceae* is emerging as important foliage, stem-less herbaceous pot plant due to its aesthetic appearance, ability to tolerate low light and low water and resistance to disease and pests. ZZ plant develops short sprouts from a thick underground tuber-like rhizome. Tuber-like organ in this plant can survive dry conditions for longer periods. ZZ plant is mainly propagated through rhizome division, leaflet and leaf cuttings. However, its slow rate of growth and lower rate of propagation making it very expensive plant. In the present study the aim is to optimize the cuttings rooting rating and rhizome formation. A factorial design (two factor with three and two levels respectively) leaflet cuttings taken from the apical, middle and basal positions of the petiole with one and two leaf in three replications were laid out. The results of study showed that both cutting and cutting leaf number significantly influenced on rooting rate and rhizome formation amount and weight. The root number and rhizome weight at basal cutting and cutting with two leaves was higher than the others.

**Keywords:** ZZ plant, *Zamioculcas zamiifolia*, Apical, Basal, Rhizome, Rooting



## Study the most important leaf fungi pathogens in medicinal plant of *Salix alba* L. in the middle and northern Zagros of Iran

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### Abstract:

The *Salix* L. genus belongs to the Salicaceae family. This plant genus is one of the largest species of woody plants in the northern hemisphere. The number of described species is between 300 and 500 in the world. Among taxonomists there is agreement on the *Salix* species, but there is a difference in the classification of the other genus of this family (*Vetrix* and *Chamaetia*), because they are different in morphological character. The *Salix* genus has 13 trees and shrubs species in Iran, that usually grow in humid areas and beside of streams. These plants, in addition to Iran, grow in many other parts of the world. One of the most important species of the *Salix* genus in the middle and northern Zagros of Iran is *Salix alba* L. (syn: *Salix angustifolia* Willd.). (It is known as the foke and white salix in Iran). In order to investigate leaf fungi diseases, samples from natural resources areas of 4 provinces including, Lorestan, Kermanshah, Kurdistan and West Azerbaijan were investigate and leaf samples contaminated with fungal disease were collected. After identifying the host's species, registration of primary specimens and identification of pathogenic fungi were performed. That 3 fungi species of *Phyllactinia guttata* (Wallr.:Fr.) Lev., *Melampsora allii-fragilis* Kleb. and *Septoria didyma* Fuckel were identified.

**Key word:** Salix fungi, Middle and northern Zagros, Iran



## An analysis of genetic diversity in Lemon balm (*Melissa officinalis* L.) accessions using AFLP markers

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### Abstract:

*Melissa officinalis*, a member of the Lamiaceae family, is one of the most important medicinal herbs that are applied in different fields of industry worldwide. *M. officinalis* contain essential oil and phenolic acids that have pharmaceutical properties including sedative, carminative, anti-microbial, anti-oxidant, neuroprotective effects and anti-cancer. In this study, genetic diversity and structure of 21 *M. officinalis* accessions were examined using amplified fragment length polymorphism (AFLP) markers. For this purpose, 15 primer combinations generated a large number of scorable fragments per primer pair (1592 scorable bands), of which 1402 bands were polymorphic. The primer combination P66/M48 showed the highest markers polymorphism values (PIC=0.28, DI=0.34, and I=0.51), while the lowest values (PIC=0.17, DI=0.20, and I=0.32) is obtained from the P14/M49 combination. The marker index (MI) values with an average of 18.46 showed high values for both primer combinations E/M and P/M. All of the accessions, based on Neighbor-Net clustering method and structure analysis, are assigned to five clusters; with the maximum genetic dissimilarity of 0.51 belonging to accessions from Gilan (Roodbar and Damash). In addition, the principal coordinate analysis (PCoA) data confirmed the results of the clustering. In this study, the genetic distance was not often related to geographical distance. More likely the relationship among them is due to seed dispersal through human interactions. Our findings indicate that AFLP technique is a powerful tool for assessing DNA polymorphism of lemon balm accessions. Also, high genetic diversity of *M. officinalis* accessions provides important baseline data and a better understanding of conservation, management, and collection strategies in germplasm of this species.

**Keywords:** Genetic diversity, Molecular marker, Medicinal plants, Fingerprinting, AFLP.

## Allelopathy effect of Saffron derived from secondary metabolites on seeds germination of medicinal plants

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### **Abstract:**

The interactions of excellent plants with the chemical they are given to each other are called allelopathies. Recently, allelopathies or alternatives are used as a new solution for controlling and enhancing the growth of some plants. The chemicals released by leaves, flowers, seeds, roots, or plant roots can inhibit the growth or decline of another plant growth. Weed growth is one of the main barriers to saffron production, which is a weed in a saffron farm of any other plant. Nowadays, it is possible to take advantage of the agricultural transformation in agriculture. In this research, the seeds of horseradish plants (*Descurainia sophia*) and *Carum carvi* (*Carum carvi*) were selected and sterilized and prepared to prepare for germination under laboratory conditions and to break the seeds of the seed. Seed germination was investigated over 90 days and recorded the extent of their fluctuation. Then a factorial experiment was conducted in a completely randomized design with three replications. During the study, the allelopathy of the arable crops was found on other crops and weeds in the field. The effects of alfalfa green and yellow leaves of saffron reduced the growth of creeping plants in the periodic culture of other plants. Different levels of saffron corn extract have a significant effect on seed germination percentage of cumin seeds. Also, increasing the concentration of these extracts compared to the control treatment, the germination percentage of the seeds of these two plants was influenced by the inhibitory effect of chemical growth. The effect of extract of saffron leaves, more effect on hawthorn plant. This effect can be a factor in reducing the growth of other plants and in fighting biological against some weeds or even other plants.

**Key words:** Medicinal plants, Saffron, Allelopathy



## Effects of explant type and growth regulators on callus induction in four ecotypes of Persian Shallot

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### Abstract

*Allium hirtifolium* commonly known as Persian shallot is an important wild medicinal plant distributed from North West to central and South West of Iran. To establish an efficient protocol for callus induction, the effects of explant type and growth regulators on callus induction in four ecotypes of Persian shallot were evaluated. Two explants types included basal plates and young leaves were cultured on MS media supplemented with  $1.5 \text{ mg l}^{-1}$  of 2,4-dichlorophenoxyacetic acid (2,4-D) or  $1.5 \text{ mg l}^{-1}$  of 1-naphthalene acetic acid (NAA) in combination with 0, 0.5 or  $1 \text{ mg l}^{-1}$  of 6-benzylaminopurine (BAP). All the cultures were maintained at  $25 \pm 1^\circ\text{C}$  in the dark. The results showed that basal plate was the best explant for callus induction when cultured on medium supplemented with  $1.5 \text{ mg l}^{-1}$  2,4-D and  $0.5 \text{ mg l}^{-1}$  BAP. This optimized protocol will be useful for any future breeding improvement programs of Persian shallot using biotechnological means.

**Keywords:** Persian shallot, Callus, Growth regulators, Growth index



## Evaluation of genetic variation of imported Tea genotypes in terms of chromosomal structure

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### Abstract:

Tea [*Camellia sinensis* (L.) O. kuntze], is a woody perennial crop that provides one of the most important beverages in the world. In order to investigation of genetic variation in imported tea genotypes based on chromosomal structure, karyotype of 10 imported tea genotypes were studied through the shoot terminal meristematic by squash methods. For pre-treatment of the samples; the alpha-bromothalim, for stabilization; a stabilizing solution (Farmer), for hydrolyzation; normal chloride acid hydrolysis, also for staining chromosomes; 1.5% aceto orcein were used. Chromosomal parameters included total length of the chromosome, long arm, short arm, arm ratio and centromeric index were analysed. The results of variance analysis showed significant variation among the genotypes in total length of the chromosome, long arm and short arm. The type of chromosomes in all genotypes was metacentric and sub-metacentric with different abundances. There was a high correlation between the total length of the chromosomes and the long arm and between the short arm and the long arm in the 1% probability level. All of the genotypes were diploid ( $2n = 2x = 30$ ). Based on the results of karyotypic analysis and classification of karyotypes, genotypes Sayamakaori, 3019 and DG 39 were classified in class 2B and other genotypes were in classes

1A and 2A, thus genotypes Sayamakaori, 3019 and DG 39 were asymmetric. Principal components analysis based on karyotypic parameters showed that total length of the chromosome and long arm play the most important role in the first component. The first component contained 64.71% of total karyotypic variation. Cluster analysis classified the genotypes into two classes.

**Keywords:** *Camellia sinensis*, Chromosomal number, Karyotypic symmetry.

## Effect of antioxidant compounds on phenolic content and antioxidant activity of Quinoa

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### Abstract:

Quinoa seed contains proteins, vitamins, minerals, fiber and different types of antioxidants; and this has led to worldwide recognition of highly nutritious seeds that can be used in the pharmaceutical industry as well. Secondary plant metabolites include polyphenols, which are the most important natural antioxidants. Phenolic compounds are also considered to be antioxidants and have a potent antioxidant effect. In this study, five days seedlings of quinoa were transferred to a tray and transplanted for 2 weeks in greenhouse conditions, which was irrigated with  $\beta$ -carotene (0.27 mM) and naringenin (0.35 mM) for 3 days. In this study, leaf extract of seedlings treated with antioxidant compounds was extracted by methanol (80%). Then, phenolic compounds were measured using Folin-Ciocalteu and antioxidant capacity of treated seedlings with  $\beta$ -carotene and naringenin, the DPPH free radical recovery method was performed. It should be noted that the basis of the DPPH free radical recovery method is also based on the free radical scavenging of a substance called 2,2-Diphenyl-1-Picril Hydrazil (DPPH). According to the results, the highest total phenolic compounds were observed for seedlings under the treatment of naringenin (with a rise of 1.4). Also, the results of DPPH test showed that the highest antioxidant capacity was in the seedlings treated with  $\beta$ -carotene. In general, seedlings treated with  $\beta$ -carotene and naringenin showed a higher phenolic and antioxidant activity than the control sample. As a result, antioxidant treatments have a positive effect on the production of phenolic compounds and the quinoa plant's antioxidant activity, which can improve the food quality of the quinoa.

**Keywords:** Antioxidants, Phenolic compounds, Quinoa, DPPH



## Genetic investigation of some Iranian Tea genotypes by using ISSR markers

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### Abstract:

Tea (*Camellia sinensis* (L.) O. Kuntze) is one of most important crop in north of Iran and cultivated in Gulan and Mazandaran provinces. Many of these tea plants are at risk of disappearing therefore having information about genetic and relationships of them can help researchers in designing of breeding programs and Conservation of germplasm. For the first time genetic diversity of tea genotypes from two provinces that cultivated tea was investigated by ISSR markers. After sampling from young and mature leaves, total DNA was extracted by protocol that described by Delaporta. Seven ISSR markers were used for investigation of genetic relationship between 28 tea genotypes. Data was analyzed by used of Ntesys software. Usage of seven ISSR primers produced 60 band and 52 of them showed polymorphic pattern (86.67 percent) and eight of them were showed monomorphic pattern (13.33 percent). Primer P5 produced 12 bands (maximum number) and P2 by producing 7 bands have minimum number. Primer P5 produced 11 polymorphic bands (maximum number) and P1 and P2 by producing six polymorphic bands have minimum number. Polymorphic percent and Polymorphic Information Content (PIC) calculated 86.67 and 0.49, respectively. The similarity range was from 0.31 to 0.78 with an average of 0.62. According to cluster analyses by using Jaccard coefficient and UPGMA algorithm, samples at 54% of similarity were placed in two main groups. Each of these two main groups was divided to two sub-group at 0.58. Based on released data can be concluded that there is high variability between samples of tea.

**Keywords:** Tea, Genetic Diversity, Molecular Markers, ISSR

## Cluster analyses of some Tea genotypes from west of Guilan by ISSR markers

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### Abstract:

Tea (*Camellia sinensis* (L.) O. Kuntze) is one of the most important crops in north of Iran especially Guilan province. Today, many tea plants are being destroyed for various reasons, so having information about their genetics is helpful in designing breeding programs to reach appropriate plants for specific purposes. After selecting young and well expanded leaves, their genomic DNA were extracted by Dellaporta method and 10 ISSR primers were used for investigation of genetic relationships between 15 tea genotypes from west of Guilan. Data was analyzed and clustered by Excel and NTSYS software. Ten ISSR primers yielded a total of 103 scorable fragments that could be scored, of which 75 were polymorphic (73.79 percent) and 28 of them were showed monomorphic pattern (27.18 percent). Primer P9 produced 17 bands (maximum number) and P11 by producing 7 bands have minimum number. Primer P9 produced 11 polymorphic bands (maximum number) and P11 by producing 5 polymorphic bands have minimum number. Polymorphic percent and Polymorphic Information Content (PIC) calculated 73.79 and 0.48, respectively. According to ISSR data calculated similarity were range between 0.31- 0.80 with an average of 0.62. According to cluster analyses by using simple matching coefficient and UPGMA algorithm, samples at 50% of similarity were placed in two groups. The important point in these groupings was the high mixing of genotypes due to cross pollination and propagation by seed in the past. Based on the data obtained, it can be stated that there is a high variation among the genotypes of tea that cultivated in Iran.

**Keywords:** Genetic Diversity, Tea, Molecular Markers, ISSR

## Effect of low irrigation stress on morphophysiological traits of some endemic population

*Nigella sativa* L.

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### Abstract:

*Nigella sativa* L. One-year-old herb belongs to the Ranunculaceae family, whose seeds Oily act as carminative, cathartic, Increment milk, anticoagulant, and strengthen the sexual force in men. Drought is one of the most important factors limiting the growth of plants around the world and is the most prevalent environmental stress that limits almost 25 percent of global crop production. Since the use of irrigation regimes can help as a type of water management in the field, it will help to increase the area under cultivation and determine the optimal pattern. The aim of this study was to investigate the effect of drought stress on morphophysiological traits of the Black Cumin Endemic population, in a randomized complete block design with ten treatments and three replications at the Research Farm of Zanjan University. The results showed that the effect of irrigation regime on stem height was significant at 1% level. The effect of native mass and interaction of irrigation regime and native mass on 1000 seed weight was significant at 1% level. Also, the highest phenol-leaf content was observed in non-stress water treatment in Tehran mass with a mean of 224/00mg / g fresh weight, which showed a significant difference with other treatments. Irrigation regime, native mass and interaction of irrigation regime and native mass on essential oil percentage were significant at 1%. The highest percentage of essential oil was observed in irrigation stress × Kerman, irrigation stress × Shahrekord and non water stress × Shahrekord, which did not show any significant difference. Consequently, considering the state of the water crisis in Iran and its use in the agricultural sector and the need to revise plant cultivation and use of sensitiv genotypic, In this regard, studying and recognizing drought tolerant plants and water management seems necessary for this purpose.

**Keywords:** Drought stress, Endemic population, *Nigella sativa* L.



## The importance of cryopreservation of medicinal plants germplasm

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### Abstract

Medicinal plants, also called medicinal herbs are important sources of medicine and play a key role in human health. Medicinal herbs have a potential source of therapeutics or curative aids. However, the natural habitat of medicinal plants is under increasing pressure as a result of excessive incorrect harvest and unmethodical exploitation that caused to damage medicinal plants density. So there is an international concern for the conservation of germplasm of elite and endangered species of medicinal plants, especially those of recalcitrant types in which seed cannot be preserved. Recently a significant progress has been made on the freeze preservation of plant cell, tissue, and organ cultures in liquid nitrogen (-196°C). Cryopreservation has the distinct advantage of germplasm conservation for a long time. Literature survey showed that cryopreservation has been successfully conducted on the conservation of various types of cells, tissues, embryos, anthers, meristems, protoplasts and hairy roots. This technology permits almost 100% survival of retrieved cultures in some plant species and entire plants have been successfully regenerated from cultures of cryostored explants. The main advantages of cryopreservation of in vitro cultures of medicinal plants included retention of biosynthetic potential of cells, genetic stability of high- yielding somatic hybrids and storage of genetically transformed hairy roots.

**Keywords:** Medicinal plants, Germplasm, Cryopreservation, Survival



## Effect of gallic acid and $\beta$ -carotene for mitigating salinity stress in *Lepidium sativum* seedling

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### Abstract:

Salinity is an important abiotic environmental stress factor threatening agricultural productivity throughout the world. Therefore, the use of compounds that increase the resistance to salinity in plants are very important in reducing damages due to stress. Among these compounds are gallic acid and  $\beta$ -carotene, which include phenolic compounds. For this purpose to study the reduction of salt stress effects with gallic acid and  $\beta$ -carotene in garden cress seedlings, an experiment was conducted in a completely randomized design with three replications. In this experiment, seedlings were transferred to trays containing perlite and irrigated with Hoagland nutrition solution. The seedling grown in a greenhouse with relative humidity of 70%, light and darkness 16:8 hours at temperature 28.25 °C. In this study, 0.5mM of  $\beta$ -carotene and 5mM of gallic acid solutions were sprayed three times a day on five-day seedling. Then seven-day seedlings were treated with Hoagland solution containing NaCl 25mM. After emergence of the signs of salinity, seedlings were transferred to the laboratory for analysis. Activity of catalase, guaiacol peroxidase and ascorbate peroxidase enzymes was evaluated. The results showed that salinity treatment increased the activity of these enzymes compared to control. Seedling treatment with  $\beta$ -carotene and gallic acid increased the activity of these enzymes in comparison with control and salinity significantly. Seedling treatment with  $\beta$ -carotene+NaCl and gallic acid+NaCl, only activity of catalase enzyme showed a significant increase compared to other treatments. The results of this study indicate that the use of  $\beta$ -carotene and gallic acid increases the activity of antioxidant enzymes and so the plant acts resistance against stress.

**Keywords:** Antioxidant, Gallic acid,  $\beta$ -carotene, Salinity stress



## Study of genetic diversity between Tea genotypes called Darjeeling

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### Abstract:

Germplasm collection and evaluation is the most important step in plant breeding programs. Different molecular markers have been used for this type of evaluation. Among them RAPD marker was one of the most useful markers in order to identify genotypes and different varieties of apples. In this study, genetic diversity of 34 genotypes of tea that according to report have relationship by Darjeeling Tea were evaluated by 10 RAPD primers. In total, these 10 primers produced 98 scorable bands, 73.84 percent of which were polymorphic (72 bands) and 26 bands were shown monomorphic pattern (26.53 percent). The average number of bands was 9.8 for each primer. Data were analysed using NTSYS software with applying the simple matching similarity index for measuring genetic similarities and dendrogram was drawn based on UPGMA results. Primer P7 produced 12 bands (maximum number) and P6 by producing 6 bands have minimum number. Primer P8 produced 9 polymorphic bands (maximum number) and P6 by producing 5 polymorphic bands have minimum number. In a general manner, the results of molecular data were classified samples in six groups at 77% of similarity. Polymorphism rates obtained in this study were high (73.84 percent). Calculated Polymorphic Information Content (PIC) range was from 0.28 to 0.50 for each primers and for all primers was 0.49. Based on molecular data, the scope of samples ranged from 0.46 to 0.99. The genetic similarity between samples was high, Finally, investigating the genetic variation indicated that RAPD marker is a suitable approach to determine the polymorphic loci and to estimate the genetic distance between genotypes of tea.

**Keywords:** Genetic Diversity, Germplasm, Molecular Markers.

### AFLP-based genetic diversity assessment of *Elaeagnus angustifolia* L.

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**Abstract:**

Genetic diversity among Russian olive genotypes in three different regions of East-Azerbaijan province of Iran country includes Tabriz, Maragheh and Malekan were assessed using molecular AFLP markers. All genotypes were analyzed with 14 EcoRI-MseI primer combinations. A total of 439 informative and polymorph AFLP markers was generated and analyzed. Based on Jaccard Similarity Index, the minimum genetic similarity was observed between genotype 19 (from Malekan region) and 27 (from Maragheh). The principal coordinate analysis (PCoA) showed the suitable genomic distribution of AFLP markers among individuals. The highest (0.83 %) and lowest (0.33 %) polymorphic information content achieved by primers combination MTTT-EGA and MGT-ETA respectively. Cluster analysis using molecular data and UPGMA algorithm, classified the studied genotypes in three distinguished groups. The genotypes at the same geographical region did not classified in the same group based on clustering by molecular data. This study is the first scientific report dealing with using of AFLP markers for genetic diversity analysis in *Elaeagnus angustifolia* L. We supposed that these markers could identify and distinguish genotypes with far genetic distance, i.e., heterotic groups in a good way.

**Keywords:** *Elaeagnus angustifolia*, Genetic diversity, Quantitative traits

**The impact of foliar application of nitrogen nano- chelated fertilizer on oil content and quality attributes in Olive (*Olea europaea* L.)**

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**Abstract**

Olive oil, one of the oldest known vegetable oils, consumption is increasing due to its nutritional and healthy qualities. The content and quality attributes of the oil is related with nutrition management, in particular by Nitrogen fertilizers. Among different kinds of nitrogen fertilizers, nano-nitrogen products are becoming popular, although there is only limited information on their field efficiency. Thus, in this study, the effects of nano-nitrogen fertilizers (nano-N) foliar sprays on oil content and quality in olives (*Olea europaea* L. cv. Zard) were studied during 2017 and 2018 growing seasons. Fertilizers were used during the bud-swelling stage, before blooming, pit hardening stage and shortly after harvest of table olive, at the concentration 6 (nano-N1) and 8 (nano-N2) gr nitrogen nano-chelated per liter. The results showed that nano-N2 caused improvements in quality indices including free fatty acids, peroxide values, spectrophotometric indices and pigment contents. The olive content was substantially affected by the nano-N2 treatment. The traits such as antioxidant activity and total phenol content were lower in control than other treatments. Therefore, it can be suggested as a nutritional treatment in the management of olive orchards.

**Keywords:** Antioxidant activity, Foliar application, Nano-fertilizer, Olive.



## Virus elimination of Apple explants in tissue culture using oil extracts from *Hypericum perforatum* and *Pelargonium sidoides*

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### Abstract:

The hydro-alcoholic extract of *Hypericum perforatum* contains 25 % hypercine per ml. It has been recently referred to as an antiretroviral combination that has been able to permanently change the effects of AIDS from a deadly disease to a controllable chronic disease. In the current work we detected different viruses including ASP, ACLS, ASG, ApM, TRS, ToRS using ELISA and RT-PCR methods from the shoot tips explants of the apple (*Malus pumila*, an indigenous cultivar Soltani Shabestari). Then, we tried to eliminate the detected viruses using chemotherapy methods. We compared the elimination efficiency of different compounds including ribavirin (2 and 4 %), hypercine (5 and 10 %), and extracts of *Pelargonium sidoides* (5 and 10 %). The results of detection by ELISA and RT-PCR showed that this cultivar is contaminated with both ASG and ACLS viruses. Following the chemotherapy different criteria such as survival rate (%), number of branching, lateral shoot length (cm), main shoot length (cm), total leaf number and rate of elimination (%) were scored. Referring to explants growth and regeneration, we could not get good results from the application of *Pelargonium* extract into the growth medium and ribavirin 4% as well. The treatment of hypercine was managed to eradication ASG at rate of 50% and ACLS at rate of 33.2%. The ribavirin 2 % only eliminated the ASG at rate of 83%.

**Keywords:** Chemotherapy, Hypercine, Tissue culture, Virus contamination



## Medicinal characteristics and alkaloid production from callus of *Vinca rosea* (Catharantus roseus L.)

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### Abstract

*Vinca* genus is a perennial shrub that belongs to the family of Apocynaceae and is native to Madagascar and India. Secondary metabolites of this plant that contain valuable anti-cancer agents, vinblastine, vincristine, and anti-high pressure materials, Ajmalicine and isoserpentine. Vinblastine (VLB) and vincristine (VCR) are powerful anticancer drugs. During the last 40 years they have been used for the treatment and cure of thousands of patients. These indole alkaloids are important drugs used in chemotherapy at different types of cancer, particularly Hodgkin's lymphoma, leukemia and drugs used as sulfate salts to patients. They are used specifically with a band and being MTs, causing them to collapse and preventing cell division. These alkaloids at high doses are lethal to cells and in low concentrations inhibit cell division in the metaphase stage of mitosis. Despite advances in synthesis of pharmaceutical compounds, alkaloids extracted from the *Vinca* plant. Several factors such as drought due to climate change, plant diseases and pests, and fluctuations in plant growth conditions that limited plant production resources. The problem is that the amount of ingredients materials that is very low in field conditions. It is likely that cell culture can overcome these obstacles, the cells in cell culture can be much more efficient to achieve with chemical compounds. More efficiency, management, and are working hand and embryo callus mass culture suspension to start the bioreactor is suitable. The aim of this review is to know with the recent progress in this research and with its exciting perspectives. The pharmacognostical aspects of the *Catharanthus* alkaloids cover botanical, historical, phytochemical and analytical data.

**Keywords:** Alkaloid, Callus, Tissue Culture, Vinblastine, Vincristine.



## **Barriers of anticancer alkaloids production vineblastine and vincristine from (*Catharanthus roseus* L.)by cell suspension culture**

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### **Abstract**

Vinca rosa (*Catharanthus roseus* L.) is a very important anticancer plant that belong to Apocynaceae family whose medicinal properties have been widely studied. The major significance of this plant is due to the presence of two indole alkaloids that play anti-cancer role in patients. ajmalicine is root alkaloid and vineblastine and vincristine are found in leaves addition of both of this effective materials are obtained by Condensing of Vinodolin and cataractin. The importance of vinblastin as an anticancer drug has led to a very high cost of the vinblastine drug. The pharmaceutical and economic value of these alkaloids encourage to explore new methods for synthesizing and studying biotechnological pathways. For the cheaper production of this drug, but so far, the alkaloid dimer is discussed only in callus and organ production, and efforts to produce it by cell culture method have been fruitless. Extraction of this alkaloid from the leaf using several extraction methods in the past Is. These methods include extraction of the catheter with dilute acid or methanol as solvent, heat, boiling or methanol, extraction of soxhlet with dichloromethane and extraction of the supercritical fluid of CO<sub>2</sub> using methanol as a solvent. Unfortunately, these methods It involves long and tedious methods and requires the use of large amounts of expensive organic solvents, which are costly. Therefore, the use of cell Suspension techniques, despite the limitations, is of great importance.the aim of this study is reviw about this plants prouduction and processing new methods.

**Keywords:** Ajmalicine, Alkaloid, Vinblastine, Vincristine, Suspension culture.



## Effect of altitude on quantitative and phytochemical properties of *Achillea tenuifolia* essential oil in Zanjan natural habitats

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### Abstract

*Achillea Tenuifolia* is one of the benefit medicinal plants that belong to Astraceae family have been used in traditional medicine because of their antibacterial and anti-inflammatory properties in the treatment of diseases, inflammation, tenderness, gastrointestinal problems, hypotension and gallbladder failure, and in new medicine in the manufacture of ointments and creams. The aim of this project was determining of the effect of altitude on quantitative characteristics and phytochemistry of essential oil of *Achillea Tenuifolia* in zanjan conditions. The samples of inflorescences and leaves of were collected in agh gadick mountain in taham village in zanjan province at full flowering stage in june and July 2019. For sampling, this plant was selected from 4 height [1550m, 1750m, 1950m and 2150m]. location with definite distance (200 meter) and three replication at length of one transect. Then air dried parts of the plants (50 gr) at room conditions subjected to hydrodistillation for 4h using a Clevenger apparatus and then essential oils analyzed by GC and GC/MC. results showed, there is no significant difference between leafs oil yields of *Achillea Tenuifolia* In four height, while there is significant difference between the oil yields of flowers ( $p < 0.01$ ) and the highest percentage of flower oil (0.1%) belong to 1750m. Major components of flower oils were Camphor (20%), 1,8-cineole + limonene (10.2%) and spathulenol (8%) were the major constituents of the oil obtained in a yield of 0.27.2%.

**Key words:** Altitude, *Achillea Tenuifolia*, Hydrodistillation, Essential oil, Phytochemistry.



## Investigating of the domestication properties of *Mindium laevigatum*(vent.) rech.f . & schiman-czeika in Zanjan mountians condition

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### Abstract

*Mindium laevigatum*(Vent.) Rech.f. & *Schiman-Czeika* is one of the benefit medicinal plants that belong to Campanulaveae family and it is endemic plant of Iran and Turkey that widely used as blood purifier, antiasthma and antidyspnea specially used as an antihemorrhoid drog in traditional medicine. This plants Persian name is ghole shekafteh, and in zanjan Province called jenjedasi and narnar its former scientific name: *Michauxia laevigata* Vent .This family have very important characteristic is their usage in treat of various diseases such as tonsillitis, laryngitis, bronchitis and warts because of their strong gel and Flavonoids that obtained from seed, flowers and stem gum. Sample seeds and plant materials were collected from the 2200 m and 1950 m altitudes in two place in Zanjan province. The main flowering stem height at this stage varied from 90 cm to 2.10 in full bloom and leaves lead to dring with ripening of seed capsules at this time. preliminary results of seeds planting in nursery showed that seed have not hard dormancy but dry and cool storage in room condition along to after growth season have effective to germination of seeds in comparison by other Incentive methods for germination such as treatment by  $KNO_3$  and  $GA_3$ .Seedling transfer was very difficult because the extra root growth in the four-leaf stage was 10-15 cm on average and it was possible to move the seedling very hard because of this problem we used to planting seeds in main filed.that seem the must useful method to planting *Mindium laevigatum* .

**Keywords:** Domestication, Seedling, Germination, *Mindium laevigatum*.

## Effect of medicinal herbs to enhance the transmission of nerve signals

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### **Abstract:**

Brain cells (neurons) are responsible for receiving and sending messages to other neurons. Billions of neurons in the brain are associated with thousands of branches of yarn with other neurons. The message in the neuron is in the form of an electric momentum. This electrical message moves along the neuron or Exxon transmitter. When the message reaches the extremity of Exxon, it secretes a chemical substance called the neurotransmitter. It transmits a short distance between the two nerves or the synapse to the other neuron. The research has shown that ten plants of Gutocula, Rosemary, Wacha, Aschugand, Bacon moniari, Ginkgo biloba, Golden root, Brahmi, Basil, Ginsing increase the chemical transport of neurons. These plants, which contain secondary metabolites, unlike drugs, strengthen the synaptic of the brain cells and also increase the expression of the NT3 and NGF genes. Analysis of Real Time PCR showed that after exerting these two genes, these two genes expanded significantly in the expression of NT3 and NGF genes. The phenolic compounds, flavonoids, erythromycins, fluoroglosinolins and podophyllotoxins in the extract of these plants are an incentive to express these genes. The expressed proteins of these two genes in the synaptic space strengthen the transmission of neural signals. The expressed proteins from the NT3 gene have 372 amino acids and a weight of 41940 kDa, and for the NGF gene, it has 241 amino acids and a weight of 26667 kDa. The above proteins have been investigated in terms of spatial shape and their optimization based on phosphorylation and glycosides to prove the best performance in the form of phosphorylation.

**Key words:** Neurons, Gene expression, RT-PCR



## Synthesis, characterization, and simulation of green tea extract loaded nanoliposome and its effect on skbr3 human breast cancer cell line

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### Abstract:

The chemopreventive actions of green tea extract are thought to be due to its major polyphenol, (-)-epigallocatechin-3-gallate (EGCG). The instability and low level of bioavailability in water and physiological fluids make administering EGCG impossible at chemopreventive doses. Nanocarriers and nanotechnology have an important role in improving the kinetics and dynamics of EGCG. To protect EGCG and increase its delivery efficiency, we have encapsulated it in 1-palmitoyl-2-oleoyl-sn-glycero-3-phosphocholine (POPC) made liposomes. The characteristics and morphological properties of the nanoliposomes were studied by dynamic light scattering (DLS) and scanning electron microscope (SEM) also their antiproliferative effect was observed by using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay in SKBR3 breast cancer cells. Nanoliposomes have appropriate physicochemical properties including uniform particle size ( $73.75 \pm 5$  nm), low negative charge (-14 mV), high entrapment efficiency ( $91 \pm 2\%$ ), enhanced stability, improved sustained release and increased intracellular uptake compared to native EGCG. Thus, it was evident that nanoliposomes may aid drug penetration into cells and inhibited the growth of SKBR3 breast cancer cell lines in a dose-dependent manner with higher IC<sub>50</sub>. Also, the coarse-grained molecular dynamics simulation results show that EGCG molecules located at the hydrophobic region of lipids patches in early stages of liposome formation and the majority of EGCG molecules placed in hydrophobic regions of the liposome.

**Keywords:** Epigallocatechin-gallate, Nanoliposome, Breast cancer, Simulation.



## Introduce of some important seasonal medicinal herbs in province of Zanjan

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2: Research Institute of Modern Biological Techniques, University of Zanjan, Zanjan.

### Abstract:

For more centuries, people have been using plants to improve their health. Throughout the years, plants have been used as food or medicine to treat or prevent diseases. As the first writings on medicinal plants in Iran came about 5000 years ago during the Sumerian period. Zanjan province, with its climatic and climatic variation, is one of the provinces with a plentiful diversity and diversity of vegetation, unique and unique. The existence of cities with very hot climates such as Tarom, to areas with a very cold climate such as Mahanshan and Zanjan has given it a special status. Due to the fact that medicinal herbs have been used by humans since ancient time and today their use is increasing process. Therefore, in this research it is tried to introduce the main herbs of the province of Zanjan . The most commonly used herbs will identified and, as far as possible, their botanical information will be presented in an illustrative way and their uses fully reviewed. It is worth noting that in Zanjan there are more than 70 active medicinal plants markets and more than 100 seasonal sites for present of mountain medicinal herbs , which are supplied to the people.

**Keywords:** Folklore remedy, Medicinal properties, Zanjan province.



**The cultivation of Medicinal Rainbow Mushroom**  
**" *Trametes versicolor* (L. : Fr.) Pilat " in Iran**

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**Abstract**

The Rainbow Medicinal Mushroom is often noticed with its former scientific name " *Coriolus versicolor*". Based on authoritative scientific resources (Hobbs, 1995), this fungus has anti-tumor and anti-hepatitis properties. According to the results of the experiments (Cynthia wenner, 2012), the fungus is has a positive effect on the treatment of breast and prostate cancer due to its active ingredient PSK (protein-bound polysaccharide K). Concerning cultivation of this fungus in Iran, Firstly, forest areas, wood cutting areas, and forest accumulation sites in the forest and yard were visited and Sampled from fungal decayed wood and also, the fungal Basidiocarps. After transferring the samples to the laboratory, Macroscopic and microscopic examinations were performed and the species of fungus was identified and confirmed. In the next step, from the fungal cap and also from wood fungal decayed tissue Cultivated. Then the saprophytic fungi such as *Trichoderma* spp were removed from the culture media. In the next step, by using the Selection and cultivation of filaments tip of the mycelium, purification was performed. From the Pure cultivation *Trametes versicolor* used for the desired purposes which included morphological studies Of fresh and old mycelium, cultivation fungus and inoculation. Though in this research from the method of propagation of known edible fungi such as oyster mushroom " *Pleurotus ostreatus* " used as a control and comparative index but using innovative changes in the usual methods, transfer of mycelium to the sterile beech wood chips was carried out. After the vegetative growth stage in the incubator, to forcing the fungus to produce reproductive organs, a series of laboratory experiments was carried out. Finally, the cultures were transferred to a forest area (Pasand Natural Resources Research Station) in Mazandaran province. The result was that the mushroom caps successfully grew up on the beech wood chips.

**Keyword:** cultivation, medicinal Rainbow Mushroom, *Trametes versicolor*.

## Identification and mycotoxin profile of *Fusarium* species isolated from Maize in several provinces of Iran

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### Abstract

Diverse species of *Fusarium* cause severe reduction of yield and accumulation of a wide range of harmful mycotoxins in the kernels. Sampling was carried out from infected fields in ten major maize-producing provinces in Iran. Isolated *Fusarium* species and their mycotoxin profiles associated to maize ear rot and kernel contamination were examined. The 551 strains were isolated from 182 samples of maize kernels, and identified as species of *Fusarium* genus. Among the 234 representative strains identified at species level by translation elongation factor (*EF-1 $\alpha$* ) sequences, the main *Fusarium* species were: *F. verticillioides* and *F. proliferatum*, representing together 90% of the Iranian *Fusarium* population, and, at a lesser extent, *F. incarnatum equiseti* species complex (FIESC), *F. thapsinum*, and *F. redolens*. Fumonisin (FBs) production by *F. verticillioides* and *F. proliferatum* representative strains was analysed, showing that all strains produced FB1. None of *F. verticillioides* strains produced FB2 nor FB3, while both FB2 and FB3 were produced only by *F. proliferatum*. Total mean of FBs production by *F. verticillioides* (505  $\mu\text{g/g}$ ) was higher than *F. proliferatum* (238  $\mu\text{g/g}$ ). The incidence of different *Fusarium* species in this research showed the great concern because of the toxigenic risk associated to these species. Furthermore, the diversity of the species identified increases the toxigenic risk associated to *Fusarium* contaminated maize kernels show multi-toxin contamination with harmful consequences on human and animal health all over the world.

**Keywords:** Mycotoxin, Maize, Fumonisin, Trichothecenes, Harmful



**Compare the chemical compound of shell and all fungi organs of *Terfezia claveryi* in Lorestan province (Iran).**

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**Abstract**

Wild mushrooms are collected in many countries in order to feed and earn money. Truffles, (Pezizales, Pezizaceae) are a group of ascomycetous fungi that are packed in their shells and usually formed below the soil surface. Truffles include different genus from ascomycetes, that some of them are edible and are counts to the most expensive foods. One of the most important of them is *Terfezia* species that with a group of other fungal species are known as to desert Truffles. One of the edible species that grows in Lorestan province (Iran) is *T. Claveryi* and the villagers collect them for nutrition, and some believes that the shell of fungi is less nutritious than fruit body of fungi and does not consume the shell. In order to investigate the chemical compound of the shell and all organs of *T. claveryi*, sampling of this fungus were achieved from some areas of Lorestan province and separate samples from the shell and all organs of fungus were prepared for each area. These samples after drying in the shade were milled. And analyzed by chemical analysis by using NIR. Qualitative traits include the amount of protein (CP), digestible dry matter (DMD), water soluble carbohydrates (WSC), insoluble fiber in acidic detergents (ADF), non-soluble fiber materials in neutral detergents (NDF), Ash (ASH) and crude fiber (CF) content were analyzed. The average of these compounds was calculated and it was determined that the mean of crud protein (CP), digestible dry matter (DMD), water-soluble carbohydrates (WSC) and ash content (ASH) the shells of these fungi was higher to compared to the analysis of these compounds in all fungi organs. It is recommended that all organs of the fungus be fed because it has a higher nutritional value.

**Keywords:** Truffle, *Terfezia*, Chemical compound, Lorestan



## Ecological, morphological and molecular study on some mushrooms in province of Zanjan (Iran)

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### Abstract

As part of their research work on Iranian mushrooms at the University of Zanjan, the authors received in April 2018 some reports of collective mushrooms at the villages of Minan and Loulak Abad (Zanjan, Iran). Field research was conducted to determine the collection site of the mushrooms and obtain samples for morphological and genetic studies. Putatively species were collected in cultivated gardens with alfalfa and some trees. Macroscopic and microscopic studies were carried out at the labs of Zanjan University, while genetic analyses were done by ALVALAB (Spain). The plant vegetation of studied area included alfalfa (*Medicago sativa*), sainfoin (*Onobrychis sativa*) and some pasture plants. Apricot trees were also exist in part of the garden (Fig.2). All mushrooms were visited and commonly two types were determined. Type a was observed in the semi-open state of the habitat. The fresh weight is 16 grams, 12 grams belonging to the mushroom cap. The capillary diameter of the fungus was 5.5 cm and the height of the stem was 8.5 cm and stem diameter 1 cm and solid stem. The type b observed completely opened unbalance cup mushrooms with brown gills. Its fresh weight was 19 gr. The cup diameter of type 2 was 7-8.5 cm and long of stem was 10 cm. Dried specimens of type b did not form visible spores on white paper, so we could not photographed their spores. Based on morphology, cytology and ITS rDNA data, the studied species *Hebeloma pseudofragilipes* and *Volvopluteus aff. gloiocephalus* were identified. Reference ITS rDNA sequences from both taxa were deposited in INSDC under the accession codes K785229 and MK785230.

**Keywords:** Local mushrooms, Genetic diversity, ITS.

## Non-seasonal cleistogamy in *Viola caspia*, Iranian medicinal plant

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The mixed reproductive system, the ability of individual plant to develop both chasmogamous (CH), open flowers, adapted to self- or cross-pollination and cleistogamous (CL), closed flowers, obligatorily self-pollinated with reduced floral parts is a common phenomenon in *Viola*. In most Northern Hemisphere violets, cleistogamy is seasonal, the exception is section *Sclerosium* with non-seasonal cleistogamy (simultaneous cleistogamy). In the current study, we focused on the reproduction system of two Iranian endemic violets: *Viola caspia* (subsect. *Rostratae*) and *V. sintenisii* (subsect. *Viola*) collected in North and North Western populations and maintained in the greenhouse collection of medicinal plants at the Research Institute of Modern Biological Techniques (University of Zanjan, Iran). All stages of plant development were carefully evaluated and studied in a season. There were conspicuous differences between two species in flower color and morphology. Both flower types, CH and CL, were simultaneously produced on the same plant, on one branch of white-flowered *V. caspia* whereas *V. sintenisii* developed exclusively violet CH flowers. To our knowledge this is the first report on simultaneous cleistogamy in *Viola* documenting the occurrence of CH and CL flowers on the individual plant, at the same time, on the same branch. This is in contrast to the described non-seasonal cleistogamy in section *Sclerosium* whose CH flowers develop on the primary axis and CL flowers on the short lateral branches. An interesting discovery is also that the *V. sintenisii* of subsect. *Viola* does not develop CL flowers whilst cleistogamy is typical for this subsection.

**Keywords:** Chasmogamy, Cleistogamy, *Viola*



## **Production amount of oyster mushroom by effects of Saffron petals using on substrate of cultivation in compare to sugarcane bagasse and sawdust**

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### **Abstract:**

Yearly, more than 30 thousand tons of saffron petals are produced as waste. On one hand, the excessive increase in population has led to the development of each country's food supplies as a high priority. Due to the high protein content of edible mushroom, this product can play an important role in providing part of the protein that is required. This research has conducted in a completely randomized design with three replications, in order to evaluate the use of saffron petals waste, sugarcane bagasse and sawdust as substrates in the production of edible mushroom. Four different substrates treatments were including wheat straw, sawdust, sugarcane bagasse and combination of straw and saffron petals. The results showed that maximum of yield, number of colony, colony weight, number of mushrooms in colony, mushroom weight, cap fresh weight, mushroom dry weight, cap dry weight, stalk dry weight, cap length, cap width, stalk length, stalk diameter were be in combination of straw and saffron petals treatment. While Cap diameter ratio on stalk, Cap diameter and Stalk fresh weight were the highest in wheat straw substrate. Generally, we can suggest that adding of saffron petals (15 %) to the substrate cultivation of oyster mushroom will increasing the yield of oyster mushroom.

**Keywords:** Mushroom, Agricultural Waste, Nutritional Supplements Mushrooms, P.florida



## Cold plasma as a new technology in food pharmaceutical components processing

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### Abstract:

Cold plasma is a new technology which is originated from the natural phenomenon named tundra. This technology has been used for electronics devices and printing technology before using in agriculture field. It has now been researching for the vast biological area due to its effects on microorganisms, chemical compounds' of food staffs, rheological aspects, nutrition values and organoleptic characteristics of plant and animal foods. Plant products such as pharmaceutical plants are also a new area of scientific investigation subjects for cold plasma applications. Cold plasma in atmospheric pressure has been recorded that it can stabilize nitrogen in plants and soil. Therefore it has an important role in the fortification of plants components. Plasma-induced activation of Phytoactuators in plants also has been recorded by plant physiology experts. In this article, the effects of cold plasma will be discussed on plant components from the view of their quality and quantities. Besides its technological aspect in the pharmacological field will be explained such as active components which are important in food technology.

**Keywords:** Cold plasma, Plant processing, Health, Pharmaceutical

## Study of *Fusarium* species associated with medicinal poppy plants in Afghanistan

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### Abstract:

Opium poppy (*Papaver somniferum* L) is one of the most important medicinal plants which are widely used in medicine all over the world. Some species of the poppies is ornamental plant and the seeds of a number of its species are used in the food industry. Poppy plants have been associated with the most pests and diseases. One of the major diseases is related to *Fusarium* species, in order to study the *Fusarium* genus with poppy during the 1398-1397 years. However, some contaminated poppy plants were collected from various provinces (Kandahar, Helmand, Daikundi and Bamyan), in Afghanistan. The contaminated plant collected and transferred to the laboratory paper by paper bags. Samples were washed with 0.5% Hypochlorite and sterilization water, and cultured on a PPA-based medium after hypochlorite sterilization. The single mycelium growths were transferred to the CLA medium for the sporodochium production within incubated under UV light and fluorescent light frequently 12:12. Single spore and purification method were also done for identifications using the CLA, PDA and SNA media. All isolates (115) were *F. equiseti* (27%), *F. solani* (16%), *F. incomatum* (12%), *F. verticillides* (6%), *F. proleferatum* (8%), *F. croockweelence* (6%), *F. redollens* (6%), *F. sambucinum* (5%), *F. oxysporum* (7%), *F. pseudograminearum* (4%) and *F. tricinctum* (3%). Pathogenicity test of poppy plants in glasshouse showed the *F. oxysporum* and *F. verticillides* can be causal agents while other species have not infected the plants.

**Keywords:** Medicinal, Poppy, *Fusarium*, Afghanistan.



## The effect of *Tagetes erecta* by intercropped with tomato in controlling the white fly pest in Zanjan region

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### **Abstract:**

Tomato (*Luopersicon esculentum* L.) is one of the most important vegetables in the world. Whitefly is one of the constraint in the path Of economic production of tomato crop. To control of this pest, various poisons and insecticides are applied annually. Use of intercropping as a suitable system to minimize the chemical control has many advantages such as restricting the distribution of the pest. In this project, the marigold (*Tagetes erecta*) as a multipurpose and medicinal crop was studied in whitefly control. Therefore, a Complete Block Design (CRD) experiment was carried out in three replicates and eight treatments in 2014 at Zanjan region. Seven cropping patterns (tomato and marigold monoculture), tomato intercropping with 25, 50, 75, 100 (tomato : tagetes) and vice versa. Results indicated that the intercropping with marigold induced high yield component, qualitative crops and lower percentage of whitefly population. Their difference were significant ( $P < 0.05$ ,  $P < 0.01$ ). The highest rate of non-qualified fruits were obtain in 75 : 25 (tomato : marigold) and 100% tomato monoculture. The highest qualified fruits were obtained from 50 : 50 (tomato : marigold) and 50 : 50 (marigold : tomato) treatments. The highest Land Equivalent Ratio (LER) were 1.19 and 1.12 respectively in 50 : 50 (tomato : marigold) and 50 : 50 (marigold : tomato). The lowest LER were obtained in 25 : 75, 75 : 25 which were 0.94, 0.95 and 0.97. The lowest whitefly population was shown in 75 : 25, 25 : 75 treatments which there were no significant difference between 100% (marigold monoculture), 50 : 50 (tomato : tomato).

**Keywords:** Intercropping, Whitefly, Tomato, Marigold, Yield, LER

## Variation of morphological traits of *Capparis spinosa* L. populations in Tarom shit district, Zanjan

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### Abstract

The multi-purpose economic Caper (*Capparis spinosa* L.) among one of the few plants, able to grow well under Tarom Shit conditions. Unfortunately the plant is being damaged by severe genetic erosion, pests and raising pressure. In order to preserve this valuable species and assess genetic diversity, six populations of wild caper plant of the Shit district in very wide area of 752 hectares were chosen and tagged. 18 quantitative phenotypic characteristics based on five randomly sampling individual plants from each population (location) in reproductive stage were collected during summer of 2017. Phenotypic characteristics consist of *vegetative and reproductive segments*. Analysis was done by SAS 9.1 software. Results of analysis of variance showed significant differences for main shoot length, lateral shoot length, number of main and lateral shoots number, *flower length, flower width, flower peduncle length, pistil length, length and width of leaf blade, leaf stalk length, fruit peduncle length, fruit breath (diameter), fruit number, number of opened and brittle flowers, lateral* ( $p=0.01$ ). The others traits except fruit breath were significant ( $p=0.05$ ). A correlation test was carried out to assess the relationship between environmental and genetic distance among populations. The data were subjected to Principal component analysis, Hierarchical agglomerative clustering analysis with squared Euclidean distance. Cluster analysis distinguished wild *C. spinosa* L. populations into four groups. The highest genetic distance based on population morphological traits was at locations of 1, 2 and 3. Locations 4, 5 and 6 formed a separate cluster. The first three principal components justified 81.44% of the total variation that defined as yield factor. The first factor explained 40.33% of total variation of yield, as a dependent variable justified with flower width, flower length, blade stalk length, lateral shoot and main shoot number. The results of the current study revealed that traits such as flower specification, blade stalk length and main and lateral shoots number, fruit size and their components, were principal discriminatory characteristics of evaluated caper plant populations in Shit district.

**Keywords:** Caper bush, Squared Euclidean Distance, Principal component analysis.

## Influence of Arbuscular mycorrhizal fungi on photosynthetic pigments and soluble sugar of Oregano

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### Abstract

*Origanum vulgare* L., popularly known as oregano is a shrubby medicinal and aromatic plant belongs to Lamiaceae family that is indigenous to the Mediterranean, Euro-Siberian and Irano-Turanian regions. *Origanum vulgare* ssp. *gracile*, is one of the most widely distributed subspecies growing in Iran, Afghanistan, North of Iraq, East of Turkey, Northwest of Pakistan, South, and Center of Russia. Arbuscular mycorrhizal fungi are the symbiotic fungi that cause the relationship between the soil and root of the plants and act such as bio-fertilizers. Photosynthetic pigments and soluble sugars are the most important physiological properties of the plants. In order to investigate the effect of arbuscular mycorrhizal fungi on photosynthetic pigments (chlorophyll a, chlorophyll b, total chlorophyll and carotenoids), and soluble sugar of oregano, a completely randomized design with four treatments and three replications was carried out. The treatments consisted of three species of mycorrhizal fungi (*Glomus fasciculatum*, *Glomus intraradices*, *Glomus etanicatum*) and non-inoculated mycorrhizal fungus (control). The results showed that the highest content of chlorophyll a (15.93 mg g<sup>-1</sup>), chlorophyll b (4.71 mg g<sup>-1</sup>), total chlorophyll (20.64 mg g<sup>-1</sup>), and soluble sugar (98.2 mg g<sup>-1</sup>) in *G. fasciculatum* treatment and the highest content of carotenoids (3.25 mg g<sup>-1</sup>) were observed in *G. intraradices* treatment. Generally, it can be concluded that arbuscular mycorrhizal fungi can change some physiological properties of the plant as mentioned, the properties which influence important characters such as yield.

**Keywords:** Carotenoid, Chlorophyll, *Glomus*, Oregano.

## Effect of solvent types on antioxidant activity of Lemon balm under different ammonium/nitrate ratios

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### Abstract

Lemon balm (*Melissa officinalis* L.), member of Lamiaceae family, is one of the important medicinal plant species. It is native to the Mediterranean region, but it is cultivated all over the world. Phenolic compounds are secondary metabolites that they are natural source of antioxidants. Flavonoids constitute the largest group of plant phenolics, accounting for over half of the eight thousand naturally occurring phenolic compounds. This study was performed to evaluate the total phenol and flavonoid contents and antioxidant activity of aqueous, methanolic and ethanolic extracts of leaves of lemon balm grown in peat moss medium with ammonium to nitrate ratios (10:90 and 20:80). The experiments were arranged in a completely randomized design with three replications. The amount of total phenolic and flavonoid contents were evaluated by spectrophotometric methods and the antioxidant activity of the extracts were determined by DPPH (2, 2-diphenyl-1-picrylhydrazyl) radical-scavenging activity method. The results showed that, the aqueous extract of the plant had the greatest content of phenol (1.6 mg GAE/g) in 20:80 ammonium/nitrate ratio. The highest amount of flavonoid (0.14mg QUE/g) was observed in aqueous extract in 20:80 ammonium/nitrate ratio. The methanol extract had the highest content of antioxidant activity (68.5 %) in 10:90 ammonium/nitrate ratio. According to these results, water was the best solvent for the extraction of phenol and flavonoids in 20:80 ratio of ammonium/nitrate. It seems methanol is the best solvent for the extraction of antioxidant activity in 10:90 ratio of ammonium/nitrate.

**Keywords:** Ammonium, Ethanolic extract, Lemon balm, Phenol.

## Influence of harvest day-time on total phenol, flavonoid and antioxidant activity of Oregano

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### Abstract

The genus *Oregano* belongs to the Lamiaceae family and consists of 39 species distributed throughout areas of the Mediterranean, EuroSiberian, and Irano-Turanian regions. *Origanum vulgare* L. subsp. *gracile* which commonly known as Russian oregano, is a hardy perennial grown primarily in herb gardens for culinary use, but is sometimes grown for ornamental purposes too. Medicinal and aromatic plants are important sources of natural antioxidants. Natural antioxidants reduce the risk of diseases such as cancer and cardiovascular diseases. Phenolic compounds are secondary metabolites in medicinal and aromatic plants, which have a high antioxidant power. The present study was conducted to investigate the effect of different harvest day-times (6:00, 9:00, 12:00, 15:00, and 18:00) on total phenol, total flavonoid and antioxidant activity leaves of oregano plant were collected from the Experimental Farms, Urmia University, in June 2016. This experiment was conducted in a completely randomized design with three replications. Total phenolic and flavonoid contents were measured by Folin–Ciocalteu and Aluminum chloride methods, respectively. Antioxidant activity was determined by using Diphenyl Picryl hydrazyl (DPPH) assay. The results showed that the highest total phenolic content (0.88 mg gallic acid/g DW), total flavonoid content (0.45 mg quercetin /g DW), and DPPH (57.6 %) were obtained at 15:00 harvest day-time. In general in terms of antioxidant activity indices, plant harvesting at times 15:00 was better than other times.

**Keywords:** Antioxidant, Day-time, Oregano, Phenol

**The effect of foliar application of Saffron petal and corm extract in compare to chemical fertilizers on yield and growth of Saffron (*Crocus sativus* L.) under drought stress**

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**Abstract:**

The aim of this study was to compare the effect of water extracts of petals and saffron corms with chemical fertilizers in different irrigation conditions, on quantitative and qualitative yield of crop saffron was a randomized complete block design with three replications that carried out during the growing season of 2015-18 in a farm, located in Ziauddin lands of Torbat Heydarieh, Iran. The main factor included irrigation frequencies, at two levels (three and five times irrigation) and the sub factor including application of fertilizer, petal and corm extract at five levels including (no use of extract and fertilizer (control), corm extract, petal extract, fertilizer 20-20-20 and 50-20-10). The results showed that in the first crop year, the number of leaves per plant was not affected by the treatments but irrigation and fertilizer application significantly increased for leaf and corm yield. The highest yield of petal, was in the treatment of chemical fertilizers. In the second crop year it was observed that vegetative and reproductive traits were strongly affected by irrigation treatments. The treatment of chemical fertilizers had the highest yields of leaf, corm, flower and stigma. Saffron stigma extract increased significantly vegetative and reproductive functions in the second year. Plant growth decreased with the use of corm extract compared to control test, which was not significant in most traits. In the third crop year, the difference of fertilizer treatments with the use of corm extract increased significantly. Also, irrigation treatment in the third year, there was a greater difference in irrigation with regard to vegetative and reproductive traits. However, during three years of experiment, the growth and yield of corm and stigma in saffron increased, but this increase in fertilizer treatment was about 224 and 210 percent, and 117% and 114% using in corm treatment. Generally, stigma of saffron extract can be used as sprays to increase the yield and reproductive performance of saffron. While, corm extract reduces growth and yield of *Crocus sativus* L.

**Keywords:** Saffron, Complete fertilizer, Drought stress, Water extract.

## Effect of *Coriandrum sativum* hydroalcoholic extract and its essential oil on acetic acid-induced acute colitis in rats

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### **Abstract:**

The aim of this study was to determine the protective effects of *Coriandrum sativum* on acetic acid-induced colitis in rats. *C. sativum* (Coriander) has long been used in Iranian traditional medicine and its use as an anti-inflammatory agent is still common in some herbal formulations. Colitis was induced by intra-rectal administration of 2ml acetic acid 4% in fasted male Wistar rats. Treatment was carried out using three increasing doses of extract (250, 500, 1000 mg/kg) and essential oil (0.25, 0.5, 1 ml/kg) of coriander started 2 h before colitis induction and continued for a five-day period. Colon biopsies were taken for weighting, macroscopic scoring of injured tissue, histopathological examination and measuring myeloperoxidase (MPO) activity. Colon weight was decreased in the groups treated with extract (500 and 1000 mg/kg) and essential oil (0.5 ml/kg) compared to the control group. Regarding MPO levels, ulcer severity and area as well as the total colitis index, same results indicating meaningful alleviation of colitis was achieved after treatment with oral extract and essential oil. Since the present experiment was made by oral fractions of coriander thus the resulting effects could be due to both the absorption of the active ingredients and/or the effect of non-absorbable materials on colitis after reaching the colon. In this regard, we propose more toxicological and clinical experiments to warranty its beneficial application in human inflammatory bowel diseases.

**Keywords:** *Coriandrum sativum*, Inflammation, Colitis, Animal model Essential oil

## Isolation and pathogenicity of *Fusarium* species causing root rot on soybean in Golestan province, Iran

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### Abstract

The soybean is valued for its high (38–45%) protein as well as its high (approximately 20%) oil content, which is essential for human nutriment. Root rot disease is the most economical infection in soybean, regarding to the high damage in production all over the world. Species of the genus *Fusarium* as the most prevalent fungi are a common agents on crop root rot disease, which have a great destruction on soybean yields. In order to isolate and identify *Fusarium* species as causal agents of disease, several samplings were collected from different regions of Golestan province during the summer seasons. Isolation was done according to Nash and Snyder (1962) on PPA selective medium. Then identification of *Fusarium* species was carried out based on morphology and sequence data obtained from *tef-1α* encoding region. Totally, 12 species including *F. commune*, *F. compactum*, *F. equiseti*, *F. fujikuroi*, *F. oxysporum*, *F. proliferatum*, *F. redolens*, *F. solani*, *F. semitectum*, *F. subglutinans*, *F. thapsinum* and *F. verticillioides* were identified. Pathogenicity tests were done according to method suggested by Mueller et al. (2003) in a randomized block design with three replications. The results showed, all 12 identified *Fusarium* species have ability to show root rot symptoms on soybean cultivars Dpx and Williams in greenhouse conditions. It is the first time which experimental investigation of *Fusarium* species including *F. compactum*, *F. commune*, *F. fujikuroi*, *F. proliferatum*, *F. redolens*, *F. subglutinans* and *F. thapsinum* on soybean plants are reported in Iran.

**Keywords:** Soybean, *Fusarium*, Oil, Disease



**A review of the anatomical, phytochemical, and pharmacological properties of the medicinal plant Galbanum (*Ferula gummosa* Boiss)**

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**Abstract:**

*Ferula gummosa* Boiss (English name GALBANUM) is one of the Iranian medicinal and industrial herbs and is among the first to export medicinal plants. *Ferula* is one of the most important species of the Apiaceae family and has a thick and meaty root, leaves with deeper and deeper cuts and chisocardium fruit. The active ingredients of this plant are extracted from the root and the stem is eaten by natural and artificial scratches. The plant contains 10%-26% of essence, 60-75% resin, 5-30% of gum. It has been determined that  $\alpha$ -pinene and  $\beta$ -pinene are two main compositions of essential oil of Iran. The genus *Coma* was more or less considered due to various chemical compounds such as coumarin terpenoid, a mixture of aromatic esters, acids and terpene alcohols and lactobacillus trucella. Ecological factors in planting are very important and can have an impact on growth and distribution of plants, in addition to their effects on growth and yielding it. The plant in the perfume and admixture industries, in the soap industry, is used in the production of permanent hair dyes in the military industry for the production of explosives. According to the traditional medical hero, nature is very warm and dry. The antimicrobial properties of the herb, antiseptic, anticonvulsant, antispasmodic, pain reliever, anti-venom, sputum, stimulant, regenerative, suppressor, neutralizing agents and disinfectant of the kidneys and bladders.

**Keywords:** Essential oils, Gum, Phytochemicals



## Survey on *Microstroma album* (desm.) sacc. in middle and north Zagros oake forests

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### **Abstract:**

*Microstroma album* (Desm.) Sacc. is a pathogenic fungi that belongs to basidiomycetes group, and has been reported in various species of oak tree from different countries such as Poland, New Zealand, United States, Canada, Japan and Romania. In order to investigate the condition of this fungi in oak forests of central and northern Zagros, by two methods of, plots (100-meter) and Walking in the woods, on randomly selected regions of Lorestan, Kermanshah, Kurdistan and West Azerbaijan provinces during 2015- 2018 was achieved, And suspicious specimens were collected and surveyed by microscopic method. Of all the surveyed regions from 4 provinces, this fungi was observed only in the wet microclimate and beside the rivers in Lorestan province. Among all oak species in these fields, this fungi was found only on some trees belong to *Quercus branthii* species. The greatest damage was observed in the bottom of the leaf and its damage did not exist on the surface of the leaves or was very small.

**Keyword:** *Microstroma album* , Zagros, Oak, Forest



## Sensory attributes of Iranian and foreign black tea

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### Abstract:

Tea, made from the fresh leaves of the tea plant [*Camellia sinensis* (L.) O. Kuntze] is the second most consumed beverage in the world after water and usually used for its healthy benefits, tea plants are grown in 30 different countries. Discovered about 2700 BC, it is one of the oldest beverages in the world. Today, it is available for consumption in six main varieties, based on the oxidization and fermentation techniques applied. Different concentrations of tea and brewing time are factors influencing the sensory properties and chemical composition of tea beverage. It is possible to determine the tea sensory characteristics at different times, considering different concentrations of tea. For this purpose, in the present study tea quality of two samples (Iranian and foreign black tea) was investigated in various concentrations of tea in four levels (1, 1.5, 2 and 2.5 g / 100 ml water) and the time of brewing in six levels (5, 10, 15, 20, 25 and 30 minutes). Sensory test of tea brew were determined in 48 treatments and three replications. A factorial experiment was conducted in a completely randomized design. The sensory evaluation results of samples showed the best color and flavor in Iranian tea was in 20- 25 minutes and 15 minutes respectively. The best concentration of Iranian tea to achieve the best flavor was 2-2.5 g/ 100 ml. The best sensory utility for color, flavor and taste of foreign tea was at 5-10 minutes and 1-1.5 g / 100 ml concentration.

**Keywords:** Tea, Sensory attributes, Tea, Organoleptic attributes



## Effect of different concentrations of tea and brewing time on tannin as a quality characteristic of tea beverage

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### Abstract:

Tea, made from the fresh leaves of the tea plant [*Camellia sinensis* (L.) O. Kuntze] is one of the most popular healthy beverages in the world. Tea is used globally for its distinctive flavor and health benefits. In terms of tea consumption Iran is in the top 10 countries in the world, while it has about one percent of the world's population. Total tea consumption in the world increased by nearly 5% in 2013 to 4.84 million tons. According to the different ways of processing, especially the extent of fermentation, tea is usually divided into three basic types: green tea (non-fermented), Oolong tea (semifermented), and black tea (fully fermented). Different concentrations of tea and brewing time are factors influencing the sensory properties and chemical composition of tea. It is possible to determine the tea sensory characteristics and the amount of chemical composition of the tea at different times, considering different concentrations of tea. For this purpose, in the present study tea quality of two samples (Iranian and foreign black tea) was investigated in various concentrations of tea in four levels (1, 1.5, 2 and 2.5 g / 100 ml water) and the time of brewing in six levels (5, 10, 15, 20, 25 and 30 minutes). Quality characters include the tannin were determined in 48 treatments and three replications. A factorial experiment was conducted in a completely randomized design. The results showed that tannin amount increased with time and concentration. The amount of tannin at 30 minutes and 2.5 g/ 100 ml of water was 10.18% ( $p < 0.05$ ).

**Keywords:** Tea, Beverage, Black tea, Concentration, Quality

## Spasmolytic effects of hydroalcoholic extract of *Melissa officinalis* on isolated rat ileum

**Samira Khani\***

### Abstract

Lemon balm (*Melissa officinalis*) has spasmolytic activity and is used in gastrointestinal complaints in traditional medicine. In this study, the effect and potency of different concentrations of hydroalcoholic extract of the plant were evaluated on isolated rat ileum. The extract of the leaves of lemon balm was prepared by maceration method and different concentrations of the extract were tested on isolated *N.Mari* rat ileum in an organ bath containing Tyrode solution. To evaluate the potency, the relaxing effect of the extract was compared with the atropine and verapamil ( $10^{-6}$  and  $10^{-7}$  M, respectively). The findings showed that the extract is able to inhibit contraction induced by carbachol ( $6.8 \times 10^{-7}$  M) and KCl (20 M) at concentrations of 4 and 5.6 mg/ml, respectively, and leads to the relaxation of the smooth muscle of the intestine. It was also observed that 4 mg/ml concentration of the extract can exert an inhibitory effect similar to that of  $10^{-7}$  M verapamil. The results show that the antispasmodic effect of *Melissa officinalis*' hydroalcoholic extract is associated with the involvement of muscarinic receptor and calcium channels and that the plant can be proposed as therapeutic agent for gastrointestinal spasms due to its potency.

**Keywords:** Ileum; Lemon balm; *Melissa officinalis*; Rat; Spasmolytic

### Study of the pharmacological properties of *Echium amoenum*

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**Abstract:**

*Echium amoenum* is a biennial or perennial herb indigenous to the narrow zone of northern part of Iran and Caucasus, where it grows at an altitude ranging from 60 to 2200 m. It is one of the important medicinal herbs in traditional Iranian medicine. *E. amoenum* have been advocated for variety of effects such as demulcent, anti-inflammatory and analgesic, especially for common cold, anxiolytic and sedative. The flowers of this plant, commonly used as crops, turn blue-purple after drying is look like pomegranate flowers. The best flower is a flower with white tail and purple petals. Oxtongue flowers have mucilage, flavonoid and anthocyanin with dolphinidine and cyanidine and minor alkaloid of pyrrolizidine. Oxtongue flowers are also useful for women who are deficient in essential nutrients due to their high levels of calcium, iron and nutrients such as potassium, zinc, vitamins C and B and beta-carotene. The plant has a large amount of chemicals called pyrrolizidine alkaloids (PAS) that overuse or long-term use of the plant can cause liver cancer or damage to this important organ. Other properties of Oxtongue flowers are that chewing fresh blossom leaves is beneficial for treating purulent pimples, thrush, tooth decay and heat relief. The amount of flower feed is two to five. Blossom perspiration is useful for sickness, obsession and suffocation. Oxtongue flowers are also recommended because of its soothing properties for the treatment of neurological diseases.

**Keywords:** *Echium amoenum*, Saponin, Mucilage, Medicinal plant



## Effects of freeze drying in food industry and medicinal plants

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### Abstract:

Freezedrying is actually the removal of water from the food in the frozen state by sublimation. In this process, the food is first frozen and then exposed to a high vacuum, whereby ice is sublimated. In the food industry, the interest in freeze drying is high due to the high quality of dry products compared to other high-drying methods. The freeze drying process occurs at low temperatures, so the aroma, taste, color and appearance of the product are maintained intact, and the heat-sensitive nutrients undergo minimal heat damage, and because the whole process takes place in solid state, the wrinkling and structural changes in the product are prevented. In botanical samples, the use of freezedryers can often be used in pharmaceutical applications. Freeze drying maintains the medicinal properties of plants and is better than other methods of storage. Research conducted mainly by the food industry shows that freeze drying preserves the properties of medicinal plants, as well as phenolic compounds, carotenoids, and others that are heat sensitive, are maintained by freeze drying. Although freeze drying is a costly method, it is remarkable for expensive and high-quality products that are of high quality.

**Keywords:** Freeze drying, phenolic compounds, Food industry.

## Efficiency of thin layer chromatography (tlc) to detect rutin in Capparis spinosa L.

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### **Abstract:**

Thin layer chromatography (TLC) is a chromatographic method used to separate non-volatile mixtures. Thin layer chromatography is performed on a sheet of glass, plastic or aluminum foil, which is coated with a thin layer of absorbent material usually like silica gel, aluminum oxide or cellulose. This absorbent layer is known as the stationary phase. Flavonoids are a diverse group of polyphenolic compounds among the secondary metabolites found naturally in various organs of higher plants. Flavonoids are a diverse group of polyphenolic compounds among secondary metabolites found naturally in different organs of plants. Rutin is also one of the flavonoids found in a many plants, including citrus and Caper. It has many medicinal properties including antioxidant, cytological protection, anticancer, neurological and cardiac protection. In this phytochemical study, ten solvent systems were used by thin layer chromatography (TLC) method to detect Rutin in different parts of the Caper collected from West Azarbaijan Province (Mahabad). Results showed that methanol-acetic acid glacial-acid formic acid-distilled water (3: 0.9: 0.9: 0.5), benzene-acetic acid - distilled water (125:72:3) and toluene-ethyl acetate-acetone-formic acid (5:2:2:1) and n-butanol-acetic acid-distilled water-formic acid (7:1:1:0.25) had the best results in detecting and isolating of this component on chromatography paper with the rate of solvent progression (Rf) 0.501, 0.33, 0.54 and 0.559, respectively. The later solvent system, due to proper distinction, separation and contrast, led to a better result, and can be considered as a standard solvent system for the isolation and identification of Rutin among bio-compounds in future research. Among different parts of Caper, the stems had Rutin, which also confirmed the results by High-performance liquid chromatography (HPLC).

**Keyword:** Flavonoid, Chromatography, Rutin, Caper



**Effects of echinacea, galbanum, garlic and thyme essential oil mixture or herbal blend on performance, cecal microflora population and immune cell status of Iranian native ducks**

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**Abstract**

This experiment was conducted to examine the effects of a phytogenic feed additive composed of Echinacea (*Echinacea purpurea*), galbanum (*Ferula gummosa*), garlic (*Allium sativum*) and thyme (*Thymus Vulgaris*) blend as an essential oil (EO) or air dried herbal mixture forms on blood parameters of Iran's native ducks. Two hundred forty ducklings were divided into six experimental groups with 5 replicates in a completely randomized design. The treatments were included treatment 1: control (standard diet without any additive), treatment 2: control+10 mg/kg antibiotic growth promoter (avilamycin), treatment 3: control+1 gr/kg of the phytogenic herbal mix, treatment 4: control+2 gr/kg of the phytogenic herbal mix, treatment 5: control+100 mg/kg of the essential oil blend and treatment 6: control+200 mg/kg of the essential oil blend. The results showed that hemoglobin (Hb), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were significantly affected by dietary treatments ( $P < 0.05$ ), so that all medicinal herbs treatments increased Hb, MCH and MCHC density. In conclusion, medicinal plants can cause changes in the indices evaluated in native ducks.

**Keywords:** Antibiotic, Blood parameters, Medicinal herbs, Native duck

## Naringenin increase total phenolic content and antioxidant activity under salinity stress in *Carthamus tinctorius* L

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### Abstract

Salt stress is one of the most important factors that endanger plant growth and production in all around the world. Obviously, the use of compounds that increase salinity resistance in plants is great importance. A study was conducted to investigate the reduction of salt stress by naringenin in medicinal plant of *Carthamus tinctorius* in a completely randomized design with three replications. Seeds of *C. tinctorius* were transplanted in tray containing perlite irrigated with Hoagland solution. Germination started within 48h in a growth chamber at  $25 \pm 1^\circ\text{C}$  with a photoperiod of 16h light under a light intensity of 4000 lux. Then, seedlings were grown in a greenhouse under 70% relative humidity, with a photoperiod of 16:8 h light:dark conditions at  $28^\circ\text{C}/25^\circ\text{C}$ . In this study, five-old seedlings were treated with Hoagland solution containing 0.5 mM naringenin for 3 days. Two weeks seedlings were treated with NaCl solution (25mM). The seedlings were harvested 1 week after salinity treatment. Measurements for total phenolic compounds and antioxidant activity were carried out on 0.1 g of fresh leaves of *C. tinctorius*. Total phenolic compounds content was determined in the leaf tissues according to the Folin–Ciocalteu method. The radical scavenging activity of the leaf extracts was monitored using the stable free radical DPPH (2,2-diphenyl-1-picrylhydrazyl). The results demonstrated that there was no significant difference in the total phenolic compounds content under salinity-stress condition compared to seedlings grown under control condition. However, one week after salinity, the antioxidant activity was more higher in stressed seedlings compared to control condition. Changes in total phenolic compounds content and antioxidant activity under 0.5 mM naringenin were investigated in the present study. Total phenolic compounds content and antioxidant activity in *C. tinctorius* leaves were significantly affected by naringenin. The highest level of phenolic compounds was found in stressed leaves exposed to 0.5 mM naringenin. The results also showed the inductive effect of naringenin on antioxidant activity under salinity condition. Collectively, we concluded that naringenin application provides a better antioxidant capability for *C. tinctorius* to recover from salinity stress.

**Keywords:** Antioxidant, *Carthamus tinctorius*, Naringenin, Salinity.

## Lavender applications and effective mechanisms

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### Abstract:

Lavender is one of the most widely used Medicinal Plants in Iran. This plant is from *L. Lavandula* genus and *L. labiatae* family, which are specially concentrated in the Mediterranean. Aims: This study examines lavender in ancient books and modern research and tries to summarize the specific properties of this plant and the mechanism of its effects in different fields. Results: According to the old physician, the nature of lavender is warm and has a lot of dryness. There are many uses in ancient texts, but traditional medicine scholars believed that it was specific to the brain and its amplifier. An important feature of this genus is antibiotic properties. Lavender contains aldehyde or phenol diterpene alcohol and saponin, which have the most antimicrobial activity to this plant. Its essential oil has the ability to replace antibiotics such as gentamicin. Hydroalcoholic extract of lavender has reduced the biofilm formation of some bacteria. In essential oil and nanoemulsion forms inhibit the growth of *Trichomonas vaginalis* and can be a good choice to metronidazole replacement. It is used to heal the burn and bite of insects. Due to cyclic adenosine monophosphate and linalil acetate, it has a relaxing and antispasmodic effect on the perineum. Perineal massage with Lavender oil can reduce the number of episiotomy cases and severity of tears. Linalol is anti-Alzheimer's and anticholinergic by inhibiting acetylcholine release. The antioxidant properties of this plant also have neuroprotective effects in patients with stroke. In general, compounds such as geraniol, linalol, linalil acetate, cineol, borneol, alpha pinene, camphor, butyric acid, valerianic acid, orsalic acid, and luteolin flavonoids amplify the effect of this plant on CNS regions, and through GABA receptors, causes Relaxing and soothing effects. The use of its essential oil in the form of aromatherapy reduces the severity and duration of pain in the menstrual period and can replace medications such as mefenamic acid. Massage therapy with lavender oil reduces the duration and severity of labor pain and increases the serum levels of endorphins, which has been associated with reduced cortisol secretion, serotonin Increase, Stimulating oxytocin mechanisms and opioid mechanisms. Triphala Lavendar, in supplemented form, has a fairly good effect in reducing the symptoms of attention deficit hyperactivity disorder (ADHD). Linalool is a combination that has anti-cancer properties, but the aqueous extract of lavender has toxic effects on fibroblastic cells, and this Need more attention in drug use.

**Keywords:** Lavender, Medicinal herbs, Traditional medicine, Essential oils



## Effect of gallic acid and $\beta$ -carotene for mitigating salinity stress in *Lepidium sativum* seedling

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### Abstract

Salinity is an important abiotic environmental stress factor threatening agricultural productivity throughout the world. Therefore, the use of compounds that increase the resistance to salinity in plants are very important in reducing damages due to stress. Among these compounds are gallic acid and  $\beta$ -carotene, which include phenolic compounds. For this purpose to study the reduction of salt stress effects with gallic acid and  $\beta$ -carotene in garden cress seedlings, an experiment was conducted in a completely randomized design with three replications. In this experiment, seedlings were transferred to trays containing perlite and irrigated with Hoagland nutrition solution. The seedling grown in a greenhouse with relative humidity of 70%, light and darkness 16:8 hours at temperature 28.25 °C. In this study, 0.5mM of  $\beta$ -carotene and 5mM of gallic acid solutions were sprayed three times a day on five-day seedling. Then seven-day seedlings were treated with Hoagland solution containing NaCl 25mM. After emergence of the signs of salinity, seedlings were transferred to the laboratory for analysis. Activity of catalase, guaiacol peroxidase and ascorbate peroxidase enzymes was evaluated. The results showed that salinity treatment increased the activity of these enzymes compared to control. Seedling treatment with  $\beta$ -carotene and gallic acid increased the activity of these enzymes in comparison with control and salinity significantly. Seedling treatment with  $\beta$ -carotene+NaCl and gallic acid+NaCl, only activity of catalase enzyme showed a significant increase compared to other treatments. The results of this study indicate that the use of  $\beta$ -carotene and gallic acid increases the activity of antioxidant enzymes and so the plant acts resistance against stress.

**Keywords:** Antioxidant, Gallic acid,  $\beta$ -carotene, Salinity stress



## Evaluating the effects of *Ferula Galbaniflua* Resin towards tolerance and dependence to morphine in male mice

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### Abstract

According to the high prevalence of pathologic and physiologic dependence to morphine administration as a strong opioid analgesic, and the following tolerance and physiological - psychological dependence; it seems inevitable to find solutions to reduce these aftermaths. Different types of drugs such as anti-seizures and anti-psychoses have been studied before. But herbal drugs were underestimated in this context. So this study investigated the effects of *Ferula Galbaniflua* resin on tolerance and dependence to analgesic properties of chronic morphine administration in male mice. In this study, adult male albino mice were used which divided into 9 experimental groups. In order to survey the analgesic tolerance, mice received morphine and/or *Ferula* resin either on 5 consecutive days or a single dose. On the fifth day, the hot plate test was performed and latency times were recorded. Besides, dependence assessment was done using naloxone hydrochloride injection on the final day, and the withdrawal symptoms were recorded. There were significant differences between single dose of morphine, normal saline (as the negative control group) and chronic morphine administration which reveals that morphine's effect decreases in chronic use. Interestingly there were no significant differences between the group which received single dose of morphine and the group with chronic morphine plus daily oral administration of *Ferula* resin. The results were almost the same for dependence survey. Based on the results obtained from this study, *Ferula* resin was able to reduce both tolerance and dependence to chronic use of morphine.

**Keywords:** *Ferula Galbaniflua*, Morphine, Tolerance, Dependence.

## Cancer chemoprevention of some selected medicinal plants from Iran in a rat model of hepatocellular carcinoma

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### Abstract

Hepatocellular carcinoma (HCC) is the fifth most common cancer in men and the second leading cause of cancer related mortality worldwide. It is a primary liver cancer that originates in a background of chronic liver diseases and it is widely stated that chronic alcohol abuse, hepatitis viral infection (HBV and HCV), and non-alcoholic steatohepatitis (NASH) are the most common causes of HCC. Other risk factors include tobacco smoking, aflatoxin-B1, food additives, industrial chemicals, and environmental pollutants. We have evaluated the preventive effects of some selected medicinal plants from Iran, including lemon balm (*Melissa officinalis* L.), madwort (*Asperugo procumbens* L.), quince (*Cydonia oblonga* Mill.), oleaster (*Elaeagnus angustifolia* L.) and olive (*Olea europaea* L.) against DEN-induced hepatocellular carcinoma (HCC) in rats. The model of hepatocellular carcinoma was induced by a single intraperitoneal (i.p) injection of DEN (200 mg/kg) as an initiator that after two weeks followed by daily oral administration of 2-acetylaminofluorene (30 mg/kg) as a promoter for two weeks. The extracts-treated rats were pretreated with the extracts intragastrically at three different doses two weeks prior to DEN injection. The marked reduction of serum biomarkers of liver damage and cancer, including alfa-fetoprotein (AFP), gamma glutamyltranspeptidase (GGT), alanine transaminase (ALT), and aspartatettransaminase (AST) were observed in the extracts supplemented animals as compared with HCC rats at the end of the experiment. Moreover, the extracts exhibited *in vivo* antioxidant activity by elevating glutathione (GSH) contents as well as preventing lipid peroxidation in the liver tissues of DEN-treated rats. The relative weight of liver was also reduced in the extracts-treated rats as a prognostic marker in HCC. Our results clearly demonstrated that these plants that have been used to the treatment of different liver diseases in Iranian folk medicine possess chemopreventive effects against HCC in rats and can be proposed as promising candidates for the prevention of primary liver cancer.

**Keywords:** *Asperugo procumbens* L.; *Cydonia oblonga* Mill.

**Congress photos**



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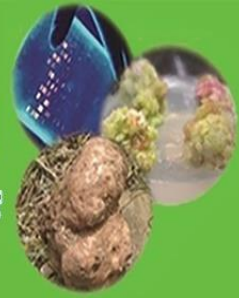




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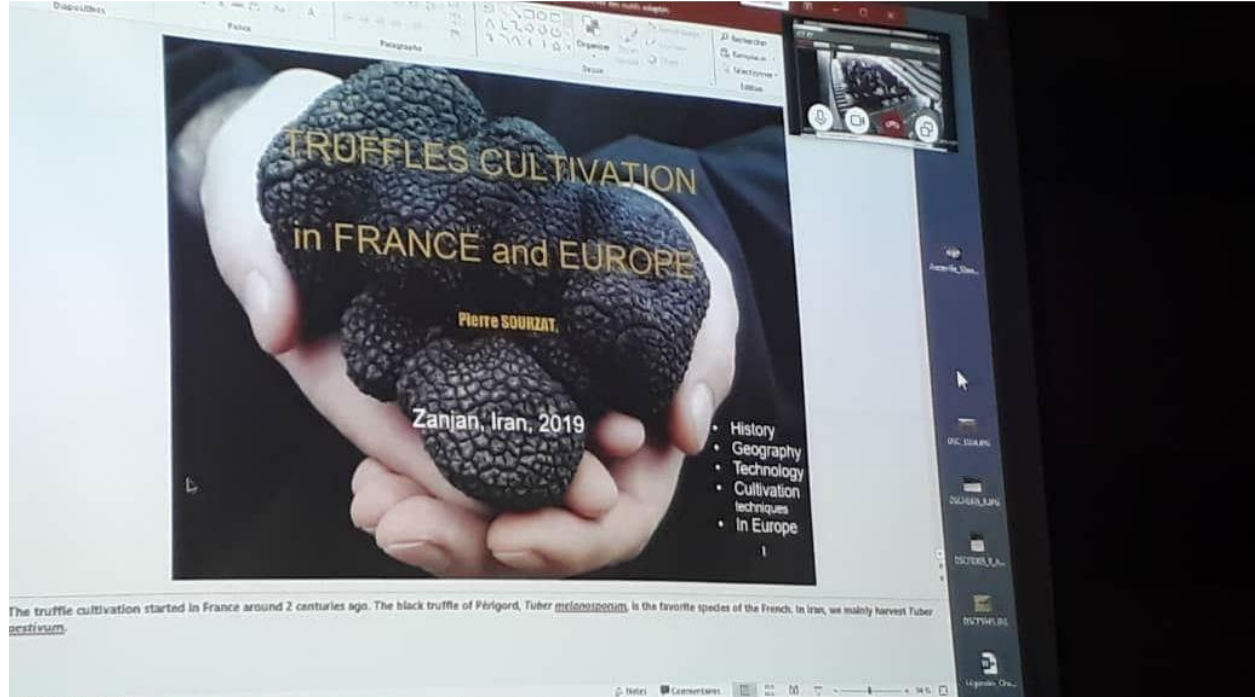
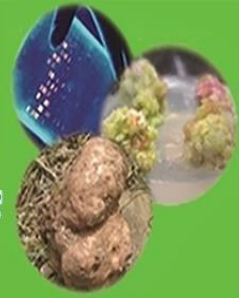




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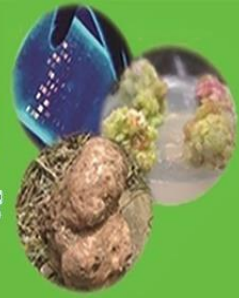





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