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### Abstracts

*Chairman and Issue Editor:*  
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out changes the growth, phenological and habitat characteristics of *Melissa officinalis* L. population size and location (GPS mapping). In 2010, we have implicated these research data to carry out future assessment of the risk analyze and impact of global climate change on its population distribution and conservation status. Neural network and genetic algorithms have been identified as stochastic self-learning methods to investigate hidden regularities between different data. Certain factors, such as biological characteristic of plants, habitat of the populations, anthropogenic threats and climate change have been identified as the key elements. In fact, vulnerability of plant population, particularly will increase central and northern part of the country, as they identified to be comparatively stressful environment under global climate change and anthropogenic threats, which included: poor land management, increasing population pressure, and excessive collection of plants. References: 1. Hughes L (2000) Trends Ecol Evol 15: 56-61 2. IUCN-WHO-WWF (1993) Guidelines on the Conservation of Medicinal Plants, IUCN, Gland, Switzerland, 50 p. 3. Bishop JG, Schemske DW (1998) Ecol 79: 534-546

PL34

NMR and MS profiling of chemosystematic markers in triploid *Populus tomentosa*

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Chemosystematics, or chemotaxonomy, is the attempt to classify and identify plants, according to demonstrable differences and similarities in their secondary metabolites. Thus, chemotaxonomic markers are powerful tools for the identification of a wide variety of plants [1]. Chinese forest scientists have been making significant efforts to develop fast-growing trees due to the extreme shortage of wood resources. Triploid *Populus tomentosa* Carr. (Salicaceae), the cloned hardware poplar species from *Populus tomentosa*, has been receiving the most attention [2]. However, secondary metabolites of triploid *P. tomentosa* have never been studied to date, though poplars have been widely used in folk medicines for the treatment of various diseases [3]. This work was carried out to investigate the secondary metabolites and the chemosystematic markers from triploid *P. tomentosa*. Column chromatographic purification of triploid *P. tomentosa* extracts resulted in the isolation of twelve phenolics: grandidentatin, isograndidentatin A, isograndidentatin B, caffeic acid, populoside A, salireposide, luteolin, salicortin, apigenin, populoside, *p*-coumaric acid, and 7-O-caffeoylsalirepin. The structures of the isolated secondary metabolites were extensively elucidated and characterized by spectroscopic method, including 1D and 2D NMR, and EI, FAB and MALDI-TOF MS. This was the first investigation of the secondary metabolites of triploid *P. tomentosa* wood. The isolation of isograndidentatin A, isograndidentatin B, grandidentatin, here in triploid *P. tomentosa* was interesting and glucosides of 1,2-dihydroxycyclohexane acylated by *p*-coumaric acid (or *p*-coumaric acid derivatives) could be considered as useful chemosystematic marks within the Salicaceae family, which was also well in accord with the our previous conclusion [4]. Acknowledgement: This work was financially supported by Program for New Century Excellent Talents in University (NCET 2010), Foundation for the Development of Science and Technology in Tianjin Universities (No. 20080616), National Natural Science Foundation of China (NSFC, No. 31000279) and Natural Science Foundation of Tianjin City (No. 09JCYBJC15800). References: 1. Bohm BA (1987) The Bot Rev 53: 197-279. 2. Si CL et al. (2011) Bioresources 6: 232-242. 3. Si CL et al. (2009) Chem Nat Compd 45: 634-636. 4. Si CL et al. (2009) Biochem Syst Ecol 37: 221-224.

PL35

Effects of autumn and spring sowing on yield, oil content and fatty acid composition of safflower (*Carthamus tinctorius* L.) cultivars in Shirvan region

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Yield, oil content and fatty acid synthesis of crop are influenced by a lot of factors such as genotype, ecology, morphology and management (planting date, plant density, fertilization etc.). The aim of this study was to determine effect of Autumn and spring sowing on yield, oil content and fatty acid composition of safflower (*Carthamus tinctorius* L.) cultivars

under Shirvan conditions. This research was conducted at Research Farm of the Faculty of Shirvan Agriculture, Ferdowsi University of Mashhad, Iran in 2009-2010. Five safflower cultivars (Cinaa, CW-440, Sahuripa-88, Ghochan local and Isfahan local) were used in this study. The research was randomized complete block, split plot design with three replications. Different sowing time significantly affected yield, oil content and fatty acid composition of the genotypes used in this study. There was interaction between genotypes and sowing times. According to the results of this research; Cina had highest yield in autumn and spring sowing (2989 and 2120 kg/ha respectively). Also Sahuripa-88 has showed the highest oil content in autumn and spring sowing (32 and 28.9% respectively). Yield and oil content in autumn sowing was highest (847 kg/ha and 2.1%). The palmitic, stearic and oleic acid increased but linoleic, and linolenic acid decreased in autumn sowing. According to the results of the study it was found that autumn sowing was suitable than spring sown and Cina genotype have desirable potential for planting in Shirvan region.

PL36

Discovery of new indoleamine-2,3-dioxygenase inhibitors from *Carthamus tinctorius*

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Indoleamine-2,3-dioxygenase (IDO) is the rate limiting step of tryptophan catabolism. As its expression is induced by Type II interferone (INF- $\gamma$ ), it is involved in inflammatory diseases [1]. In neurological disorders, degradation of tryptophan can reduce serotonin synthesis, which is related to major depression [2]. Furthermore, quinolinic acid originating from tryptophan catabolism has neurotoxic effects. In cancer cells, the expression of IDO leads to a local suppression of T-cell responses and promotes immune tolerance. Therefore, IDO is an interesting target for therapeutic intervention in these conditions [1]. As *Carthamus tinctorius* L. was used in ethnopharmacology against inflammatory diseases and also against cancer [3] and depression [4], this plant was investigated for IDO inhibitors. Three lignans isolated from *Carthamus tinctorius* seed oil cake were tested for inhibition of IDO in peripheral blood mononuclear cells (PBMCs), namely arctigenin, trachelogenin and matairesinol. Arctigenin and trachelogenin inhibited IDO with IC<sub>50</sub> of 26.49 and 57.35  $\mu$ M whereas matairesinol showed only slight activity. Acknowledgement: This work was supported by the TWF ("Tiroler Zukunftsstiftung") and the Austrian Science Fund (FWF: S10703). References: 1. King N] and Thomas SR (2007) Int J Biochem Cell Biol 39: 2167-2172 2. Miura H et al. (2008) Stress 11(3): 198-209 3. Blaschek W et al (eds) (2007) Hagers Enzyklopädie der Arzneistoffe und Drogen (4) 6 ed. Wissenschaftliche Verlagsgesellschaft mbH Stuttgart 73-5 4. Zhao G et al. (2009) Eur Neuropsychopharmacol 19: 749-758

PL37

Effects of chemical and organic fertilizers on number of corm and stigma yield of saffron (*Crocus sativus*)

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Saffron (*Crocus sativus* L.) is the world's most expensive spice and 95% of the production is coming from Iran [1]. The aim of this study was to better understanding the effects of different organic and chemical fertilizers on number of corm and stigma yield of saffron. This experiment was conducted in Organic Farm of Ferdowsi University of Mashhad, Iran based on CRBD with three replications. The experimental treatments were four different fertilizers including chemical (50-250; 100-250 and 300-250 kg/ha N-P<sub>2</sub>O<sub>5</sub>), cow manure (20, 40 and 60 t/ha), sheep manure (20, 30 and 40 t/ha) and hen manure (5, 10 and 15 t/ha). The results which is reporting here, came from fifth year of the experiment. Results showed that the highest fresh flower and dry stigma yield were

... fertilizer (300–250 kg/ha N-P2O5) and then ... (20t/ha) treatments. Fresh flower and dry stigma ... by increasing the nitrogen level in chemical ferti- ... ressing sheep manure levels. The same results has been ... by Behnia et al [1]. Behzad et al [2] showed that application ... kg ammonium phosphate plus 30 tons of cow manure produced ... the highest stigma yield. Rezvani moghddam et al. [4] reported that cow ... and chemical fertilizers produced more flower and stigma yield than ... hen manure. Sheep manure at 40t/ha produced the highest mother ... corm and replacement corm per clump. Saffron is a low nutrient de- ... mand plant and requires a modest amount of nutrients [3]. References: ... 1- Behnia MR et al. (1999) Agron Crop Sci 182: 9–15. 2- Behzad S et al. ... (1992) Acta Hort 306: 337–339. 3- Housini M (1998) Iranian Scientific ... and Industrial Research Organization, Press -Khorasan Center. 4- Rezvani ... Moghaddam P et al. (2006) 2nd International Symposium on Saffron ... Biology and Technology. Iran.

## PL38

## Proteolytic activity in latices of Asteraceae and Campanulaceae

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In the order Asterales only two species are known to have proteolytic activity in their latices, first Taraxalisin from dandelion *Taraxacum officinale* Webb s.l. and second Parthenain from Guayule *Parthenium argentatum* L. Both are characterized as serine endopeptidases [1]. Proteolytic enzymes isolated from plant latex have received special attention in the pharmaceutical industry and biotechnology due to their property of being active over wide range of temperature and pH. Nearly half of the commercially available enzymes are proteases, frequently used in food processing, tenderization of meat, brewing, cheese elaboration, bread manufacturing, leather and textile industries [1]. In this investigation the latex of 40 species of the Asteraceae family and 8 species of the Campanulaceae, which are not biochemical characterized before, were collected in the Botanical Garden Berlin. To determine proteolytic activity we used the fluorogenic substrate BODIPY FL- casein (Molecular Probes, Inc., USA) [2]. To investigate the type of endopeptidases, the latex samples were pre-incubated with specific inhibitors for serine proteases (AERBSF (4-(2-Aminoethyl)-benzenesulfonyl fluoride hydrochloride), cysteine proteases (E64 (4-(2-Aminoethyl) benzenesulfonyl fluoride hydrochloride)), aspartic proteases (Pepstatin A) and metalloprotease (EDTA) and the remaining activity was determined. In both families highly active serine proteases were found. References: 1. Domsalla A, Metzger MF (2008) *Planta Med* 74: 1–13 2. Menges DA et al. (1997) *Anal Biochem* 251: 144–147

## PL39

Antioxidant Properties and Phenolic Composition of *Viburnum opulus* from Turkey

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*Viburnum opulus* L. (Caprifoliaceae) growing in Kayseri and surroundings is named as gilaburu. The fruit juice of gilaburu is consumed as a traditional drink. In many parts of the world, gilaburu is used for anti-spasmodic, anti-inflammatory, anti-allergic, sedative and diuretic purposes. Research on antioxidant effects of gilaburu is limited. In this study the antioxidant effects of different extracts of gilaburu are investigated. Water and methanol (70%) extracts were prepared. The antioxidant activity of the extracts was determined using 1,1-diphenylpicrylhydrazin (DPPH<sup>•</sup>), 2,2'-azino-bis(3-ethylbenzthiazoline-6-sulphonic acid) (ABTS<sup>•+</sup>) radicals and lipid peroxidation activity by the  $\beta$ -carotene bleaching test. The content of total phenols, flavonoids, flavonols and anthocyanins, and the reductive activity of the extracts were also analyzed. BHT, BHA, ascorbic acid, and gallic acid were used as positive controls. Methanol extracts of dry fruits rich in phenolics showed more scavenging activity on DPPH<sup>•</sup> (IC<sub>50</sub>: 0.104 mg/ml) than other extracts, whereas methanol extracts of fresh fruits rich in anthocyanins (0.47 ± 0.05 mg cyanidin-3-glycoside/g extract) more scavenged the ABTS<sup>•+</sup> radical (TEAC: 0.92 mM). The aq. methanol extract better reduced ferric(III) to ferrous(II) than the water extract. All extracts inhibited linoleic acid peroxidation in the  $\beta$ -carotene bleaching test to almost the same degree. References: 1. Özer E (2000) MSc Thesis, Selçuk University Institute of Sciences, Konya. 2. Özer E, Kalyoncu IH (2007) *Selçuk Journal of Agriculture and Food Sciences* 21: 46–52. 3. Çam M, Hızıl Y (2005)

Erciyes University Project, Project No: EUBAP-FBT- 03–51. 4. Aksoy A, Güvensan A, Akçiçek E, Öztürk M (2004) International Symposium on Medicinal Plants: Linkages Beyond National Boundaries, Islamabad, pp 65–70.

## PL40

Phytochemical and Antimicrobial Investigation of *Gontscharovia popovii*Yassa N<sup>1</sup>, Farideh Z<sup>2</sup>, Zahra A<sup>2</sup>, Mitra T<sup>1</sup>, Mohammad Reza F<sup>3</sup>, Hossain J<sup>3</sup><sup>1</sup>Department of Pharmacognosy, Faculty of Pharmacy, Tehran University of Medical Sciences and Medicinal Plant Research Center, Tehran, Iran.; <sup>2</sup>Department of Pharmacognosy, Islamic Azad University, Pharmaceutical Science Branch, Tehran, Iran.; <sup>3</sup>Department of Food and Drug Control, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran.

Aerial parts of *Gontscharovia popovii* B. Fedtsch. et Gontsch. from Lamiaceae family (1) was collected from Hadjiabad in South of Iran (Hormozgan Province) on May 2008. It is used for the treatment of cold and infectious disease in folk medicine of South Iran. There is no report on secondary metabolites of this plant. Aerial parts of *G. popovii* were finely powdered and 531 g of sample was extracted with 80% methanol in a percolator. After evaporation of solvent, the gummy remainder was fractionated with petroleum ether (5.49 g), chloroform (1.29 g), ethyl acetate (2.87 g) and the residue named methanol extract (56.42 g). Methanol extract tested for detection of secondary metabolites. It was rich of luteolin glycosides which were isolated with different chromatographic methods and identified with spectroscopic methods. Luteolin, luteolin-7-O-glucoside, luteolin-7-O-rhamnoglucoside and luteolin-7-O-diglucoside were identified from this fraction. Antimicrobial activities of all fractions were tested against four G+ (*Staphylococcus aureus*, *Staphylococcus epidermidis*, *Bacillus cereus* and *Bacillus subtilis*), two G- (*Escherichia coli* and *Pseudomonas aeruginosa*) bacteria and two fungi (*Aspergillus niger* and *Candida albicans*) with micro-broth dilution methods (2). The results showed that methanol extract had antimicrobial activity only on *Bacillus subtilis*. Petroleum ether fraction showed considerable properties on most microorganisms but had no effect on *P. aeruginosa*. Chloroform fraction indicated antimicrobial activities on bacteria and fungus except on *P. aeruginosa*. Ethyl acetate fraction was effective on all strains. References: 1. Rechinger KH (1982) *Gontscharovia Popovii* (Labiatae). In: *Flora Iranica*, Rechinger KH, ed Akademische Druck-u. verlagsanstalt, Graz Austria. 150: pp. 504–505. 2. NCCLS. (2000) *Methods for dilution antimicrobial susceptibility test for bacteria that grow aerobically*. Approved standards 5th ed. NCCLS document M7-A8. NCCLS: Wayne, PA, USA.

## PL41

Quantitative Determination of Galanthamine and Lycorine in an endemic *Galanthus* species: *G. cilicicus*

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*Galanthus cilicicus* Baker, an endemic species of the genus *Galanthus* L. (Amaryllidaceae), is distributed in southern Turkey mainly in the province of Içel [1]. Galanthamine, the most important alkaloid found in Amaryllidaceae species, is used for the treatment of Alzheimer's disease [2]. Lycorine, another important and also a widespread alkaloid found in Amaryllidaceae plants has been proven to have several biological activities [3,4]. A reversed-phase high-performance liquid chromatographic method has been used and validated for the determination of lycorine and galanthamine in *G. cilicicus*. The extraction of both alkaloids in low-mass plant samples, were carried out by a simple and a rapid method utilizing pre-packed columns with diatomaceous earth (Extrelut<sup>®</sup>) [5]. The chromatographic separation was performed using an isocratic system with a mobile phase of trifluoroacetic acid-water-acetonitrile (0.01: 92.5: 7.5) and diode array detector [6]. The linearity of the method was studied by injecting five known concentrations of lycorine in the range of 1–10 µg mL<sup>-1</sup> and five known concentrations of galanthamine in the range of 2.5–20 µg mL<sup>-1</sup>. The calibration curves for lycorine and galanthamine were determined as Y=13.2828995x + 0.4488635 and Y=10.1354031x + 0.5465348, respectively. Validation procedures showed that the method was specific, accurate and precise. The above-mentioned method was applied to the aerial parts and bulbs of *G. cilicicus*. The contents of galanthamine and lycorine in the bulbs of *G. cilicicus*