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Autocotoxicity, ethnomedical and phytochemical studies of Nepeta binadulensis Jamzad, a highly endangered medicinal plant of Iran

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Nepeta binadulensis Jamzad is a rare medicinal plant of Iran which is highly endangered by severe harvesting and unsustainable herbal collection. A research was conducted to study the ethobiological background, ethnomedical use and chemical properties of this species in the wild habitats during the years 2003 and 2004, to understand their conservation biology as well as to predict their behavior under systematic cultivation. Results indicated that this species grows in north-facing slopes at altitudes of 2300 to 2700 m, mean annual rainfall ranging from 350 to 370 mm and mean annual temperature of 6 to 7 °C. This plant grows on light soils with a neutral pH and poor in mineral content. Height of individual plants varies from 46 to 52 cm with a crown diameter of 39 to 42 cm, a plant density of nearly 4 plants m⁻² and a dry matter of 23 to 72 g m⁻². Plant density, biomass, plant height, crown diameter and also soil coverage of this species decreased by increasing slope inclination. There was no relationship between essential oil content, slope and altitude. The whole growing period of this species is about 153 days being equivalent to 1978.9 GDD. Results showed that the aerial parts of N. binalulensis are used mostly by local people to treat digestive disorders, nervous disorders and depression. Essential oils of the aerial parts of plants collected from two regions, Dowlat Abad and Freiz, were slightly yellow and the yields were 0.5% (v/w) in both regions. Eighteen components representing 95.2% and 97.5% of the total oils of these regions were identified, respectively. The major constituent of the oxygenated monoterpenoids-rich oils was 1,8 Cineole (77.8% and 73.2% respectively). References: Franz C. Plant Research and Development 1993; 37: 101-111. Pushpagaran, P. On conservation biology, domestication and commercial cultivation of wild medicinal and aromatic plants. In: Eds. Raych and Huri: Recent Advances in Medicinal, Aromatic and Spice Crops, New Delhi: Today and Tomorrow Printers & Publishers; 1992: 2: 431-436. Rustaiyan A and Nadjki K: Flav Fragr J 1999: 14: 35-37.

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Molecular identification of the traditional Tibetan medicinal plant Gentianopsis paludosa (Gentianaceae) using diagnostic PCR and PCR-RFLP based on nrDNA ITS regions

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Gentianopsis paludosa (Munro ex J. D. Hook) Ma (Gentianaceae) is a widespread species and commonly used in Tibetan folk medicine as clearing away the heat-evil and removing toxic substances [1]. There are 10 species of Gentianaceae recorded as herbal drugs in the Tibetan Medicines [2]. The other species are often marketed as G. paludosa, and thus, the therapeutic effects of G. paludosa are not achieved. Methods to distinguish G. paludosa from the 9 other species of Gentianaceae are limited by the current morphological and chemical methods [3]. In this investigation, two molecular methods for authentication were applied based on the sequences of nuclear ribosomal DNA internal transcribed spacer (nrDNA ITS) regions. For diagnostic PCR, a pair of species-specific primers was designed and used for the rapid identification of G. paludosa. For PCR-RFLP, we identified a distinctive site which can be recognized by the restriction endonuclease Dra II in the nrDNA ITS1 region of G. paludosa. PCR-RFLP analysis was established to differentiate G. paludosa from the other species of Gentianaceae. These methods provide effective
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Biochemical studies on the volatile oils of Laurus nobilis L. plants grown in Egypt
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As part of an intensive screening program to introduce new species of medicinal and aromatic plants to Egyptian cultivation and industry, the plant Laurel (Laurus nobilis L.- Lauraceae) [1] was analysed. The chemical composition of the fresh essential oil isolated by hydrodistillation was investigated by GC and GC-MS [2]. The fresh oil was obtained in 0.5 - 0.8% (v/w). It consisted mainly of (50.36%) 1,8 cineole. Additionally other oxygenated monoterpenes were identified. The principal compound was α-terpineyl acetate (19.97%) and terpineol 4- (6.48%), accounted for 26.45% of the oil. Additional oil constituents found in concentrations above 1% include α-terpineol, eudesmol γ, α-terpineol and 3-carene. Experiments were carried out to test qualitative and quantitative differences on the oil stored under cold storage conditions (4 °C) for one year. Minor variations in the content of the oil were obtained using cold storage conditions. Increases of 1,8 cineole, α-terpineol, terpinolene, and 1,8-terpinolene and decreases of terpeneol-4-ol, α-terpinyl acetate and γ-eudesmol content were observed. The antimicrobial activities of the two oils were tested using the inverted petriplate method. The volatile oils showed prominent antimicrobial activities against fungi, Gram positive and Gram negative bacteria at a very low concentration (10 µl). References: [1] Mabey R., Mcintyre M., Michael P., Duff G. and Stevens J. (1988). "The New Age Herbalist". Collier Books Macmillan Publishing Company New York. p. 76. [2] Adams, R. P. (1998) Identification of Essential oils by Ion Trap Mass Spectroscopy. Academic Press, New York.

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Sumac: An underutilized plant in rural communities of Khorasan
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Sumac (Rhus coriaria L.) belonging to the Anacardiaceae family is a small tree or shrub. It grows widely in Mediterranean countries, North Africa, South Euphr, Afghanistan and Iran (1). R. coriaria is a medicinal plant popularly known to people in Iran due to its multiple applications such as pharmaceutical, conditinal and industrial properties. Its main medicinal effect is related to tannins. Also it has multiple biological effects including antibacterial, antimicrobial and antioxidant (1,2). Dehbar county in Khorasan province is one of the main natural habitats of R. coriaria in Iran, where in autumn fruits are collected widely from its natural habitat by rural people. This species is critical to the livelihood of many rural people of the area and has the potential to alleviate poverty being a source of income generation for local communities. Fruits being accepted as ‘wild organic product’ are collected by local communities on the basis of cooperative systems. In such cases, natural resource authorities of the area allow the rural people to collect the fruits and share the benefits. This has lead to proper protection of this plant in the vicinity of villages. Morphological characteristics and yield differ between northern and southern slopes where in northern slopes, shrubs have an average plant height of 157 cm, crown area of 232 cm, plant density of 14375 plant/ha and fruit yield of 1507 kg/ha compared to southern slopes with an average plant height of 112 cm, crown area of 203 cm, plant density of 14500 plant/ha and fruit yield of 789 kg/ha. Better understanding of habitat and plant criteria based on autecological studies and also means of propagation provide insights to better utilization. References: 1. Özcan, M. et al. 2004. Bulg. J. Plant Physiol. 30:74 – 84. 2. Lank, L. et al. 1998. Phytotherapy Res.12:s152-s153.

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The effect of Cu2+ on the accumulation of daidzein, genistein and coumestrol in the tuberous roots of White Kwoa Krua [Pueraria candollei Grah. var. miriflora (Airy Shaw et Suvatbandhuru) Niyomdham]
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The White Kwoa Krua [Pueraria candollei Grah. var. miriflora (Airy Shaw et Suvatbandhuru) Niyomdham] is a famous medicinal plant of Thailand. Its tuberous roots accumulate estrogen like substances such as daidzein, genistein and coumestrol. The purpose of this study was to investigate the formation and concentration of Cu2+ that can maximise daidzein, genistein and coumestrol in the tuberous roots of the White Kwoa Krua. Two experiments were conducted on 1 and 3 year old plants of White Kwoa Krua during 2001 – 2004 at Suranaree University of Technology. Experiment 1 was a 32 factorial in RCB with 4 replications. The forms of Cu2+ compounds used were CuCl2, CuSO4 4 and Cu-EDTA. The concentrations of Cu2+ were set at 0, 100, 500 and 500 ppm. The extraction and the analysis of daidzein and genistein were done according to the method of Murphy [1] and Frank et al. [2] by HPLC technique. Experiment 2 was RCB with 4 treatments and 4 replications. The treatment were CuCl2, MnCl2 4 and FeCl2 at 1000 ppm each, and distilled water was used as control. The amount of coumestrol was examined using the method of Khanna et al. [3] by TLC technique. The Cu2+ at 300 ppm showed the highest amount of daidzein (44.69 ppm) and genistein (28.45 ppm). All treatments with Cu2+ compounds gave more daidzein and genistein than the control. CuCl2 at 1000 ppm resulted in the highest amount of coumestrol. CuCl2, MnCl2 and FeCl2 at 1000 ppm can stimulate coumestrol accumulation. Acknowledgements: Suranaree University of Technology and the Thailand Research Fund (TRF). References: [1] Murphy, P. A. (1981) J. Chromatogr. 211: 166 – 169. [2] Frank et al. (1994) J. Agri. Food Chem. 42: 1905 – 1913. [3] Khanna et al. (1999) Transactions of the Illinois State Academic of Science. 92: 167 – 179.

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Self-mating effect on growth traits and silymarin production for some selected lines among milk thistle (Silybum marianum L.) varieties
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Ten selected lines for each purple and white head flower varieties of milk thistle, Silybum marianum were assessed for five growth traits and silymarin production among three generations: open parents, selfing progenies and selfing offspring. Highly significant variations existed between lines, varieties and generations as well as their interactions in all tested traits. The line characters for each variety were subjected to analysis of variance only for open parents opposite to selfing offspring, and seemed highly significant variations. The selfing offspring generation produced higher mean value in all purple variety traits except no. of flower heads. Contrarily, the parent generation produced higher values in all white variety traits.