



IHC
Lisboa 2010

**SCIENCE AND
HORTICULTURE
FOR PEOPLE**

ABSTRACTS · Volume I

28th International Horticultural Congress

Lisbon Congress Centre | August 22-27, 2010



www.ihc2010.org



ISHS
International Society for Horticultural Science

prove the micropropagation rate of Chinese foxglove (*Rehmannia angulata*). This will be useful to produce large quantities of plant materials for further biochemical characterization, phylogenetic analysis, pharmacological research and pharmaceutical production.

Sm08.263

Radioprotective Activity of Some Medicinal Plants Extracts

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Exposure to radiation has significantly increased during the past hundred years with the development and use of x-rays and radioisotopes in medicine and through environmental pollution from nuclear weapons and power plants. Because radiation can induce mutagenic changes, interfere with the immune system, and lead to the development of cancers, agents that could protect the body from radiation effects would be of great benefit. In this study, aqueous extracts of saffron (*Crocus sativus*), yarrow (*Achillea nobilis*), and scholar tree (*Sophora japonica*) reduced mutagenic effects of γ -radiation on albino Wistar rats. The most effective radioprotection and anti-mutagenic activity were demonstrated by the saffron extract, which reduced frequency of chromosomal aberrations in bone marrow cells (35.7% at 3 Gy; 17.1% at 5 Gy) and sperm cells (26.9% at 3 Gy; 16.4% at 5 Gy) and restored cell division. Radiation was applied in a gamma-ionization chamber at the Rk-hund-20000 facility located at the Institute of Radiation Problems in Baku using an average power of 1252 rad \cdot sec⁻¹.

Sm08.264

Antioxidant Activity of *Lavandula latifolia*, *Salvia lavandulifolia* and *Thymus mastichina* Collected in Spain

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Industry has been using antioxidants and their positive effects in order to maintain food quality and to prolong its long life. Some of these compounds are synthetic; however, it might be highly desirable to find out natural antioxidants. Aromatic plants help to improve organoleptic qualities of food products and also contribute to their preservation. Owing to this, the antioxidant activity of some populations of *Lavandula latifolia* (Ll), *Salvia lavandulifolia* (Sl) and *Thymus mastichina* (Tm) have been evaluated. Ten populations of Tm and 12 of each Sl and Ll have been collected at flowering stage during the summer of 2009 around Castilla y León (the Central Region of Spain). The vegetal material was dried in dark and room temperature conditions before hydrodistillation. Dry plant material and dry residues after hydrodistillation were used for analysis. Total phenolic content and antioxidant activity were determined. Two methods have been used to determine the antioxidant activity: 1) Free-radical scavenging (DPPH), and 2) Reducing power assay. The results showed that Tm had the higher content in essential oil, although there was high variability among the populations, indicating the selection will be possible in the three species. Total phenolic content and antioxidant activity of dry plant material were higher than hydrodistilled dry material, showing that a considerable portion of antioxidants was retained in the remaining hydrodistillation-aqueous water and the essential oil. Total phenolic content and antioxidant activity of dry plant material were also higher in Tm. In the case of hydrodistilled dry material, there were no differences between Tm and Sl, both species had higher phenolic content and antioxidant activity than Ll. Although there have been variability among the populations and selection would be possible, Tm is postulated as the most interesting species from an antioxidant activity point of view.

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Volatiles from *Coriandrum sativum*: Comparison of *in vitro* and *ex vitro* Grown Plants

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Coriandrum sativum (coriander) is commonly used, raw or cooked, in Portuguese gastronomy. Coriander is also used in traditional medicine as a carminative and as a digestive aid. The fruits essential oil is used in food flavouring and in perfumery and is also responsible for the digestive and stimulant effect as well as for fungicidal and bactericidal activity [1]. *In vitro* *C. sativum* plants were established by micropropagation in MS medium from *in vitro* grown 3 weeks old coriander seedlings. Six months after multiplication, some plants produced anthocyanins and maintained this phenotype for, at least, two years under *in vitro* micropropagation. In the present work, the volatiles of fruits and of *ex vitro* and *in vitro* *C. sativum* plants, with (A) and without (B) anthocyanin production, were studied. The volatiles were isolated by hydrodistillation and analyzed by GC and GC-MS. The fruits volatiles were dominated by linalool (82%), with γ -terpinene (4%), camphor (3%) and geraniol (3%) as other major compounds. Linalool was present in the volatile fractions of A and B *in vitro* and of *ex vitro* grown plants in small relative amounts (0.1%, 0.1% and 0.3%, respectively). Dodecanal (17%), n tetradecanal (15%) and n nonane (7%) were the dominant compounds in the *ex vitro* plants volatiles. β Phellandrene (37%, 45% in A and B, respectively), terpinolene (both 9%), β -sesquiphellandrene (4%, 6% in A and B, respectively) and α phellandrene (2%, 3% in A and B, respectively) were the major compounds in of A and B *in vitro* grown plants. Despite the anthocyanin production in A *in vitro* grown plants, the volatile profile was quantitative and qualitatively very similar to that of B *in vitro* grown plants.

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In vitro Establishment of Aromatic Geranium from Brazil

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The aim of this work was to realize *in vitro* establishment of aromatic *Pelargonium graveolens* L'HÉR ex Ait. from Brazil. The completely randomized design was used. A 4 x 4 x 2 factorial scheme was utilized in the first assay, testing four concentrations of sodium hypochlorite (1.0; 1.5; 2.0 and 2.5%), four immersion times (8, 10, 12 and 14 minutes) and with and without pulverization with fungicide and antibiotic of the mother plants before removing explants. In the second assay a 4 x 4 x 2 factorial scheme was utilized, testing four concentrations of mercury chloride (0.06; 0.08; 0.10 and 0.12%), four immersion times (8, 10, 12 and 14 minutes) and with and without pulverization with fungicide and antibiotic of the mother plants before removing explants. For the third assay a 4 x 2 factorial scheme was utilized, testing four concentrations of salts of the MS medium (25%; 50%; 75% and 100%) and two types of explants (nodal and leaves). The evaluated variables were regeneration (%), contamination (%), number of shoots per explants, dry weight of the aerial part (mg). Sodium hypochlorite at 1.2% for 12 minutes was efficient for disinfection of geranium explants. The concentrations of 0.09 and 0.08% of mercury chloride for 12 and 14 minutes, respectively, presented best results for contamination control. The use of leaf explants in MS medium containing 39.8% of its salts allowed major regeneration rates of geranium.