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BOOK OF ABSTRACTS

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T3-P-58 Comparative chemical analysis of essential oils from different organs of three *Pastinaca Taxa*

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KEYWORDS: three *Pastinaca taxa*; five plant organs; essential oils; GC-FID and GC-MS; multivariate statistics

INTRODUCTION:

Pastinaca sativa subsp. *sativa L.*, Apiaceae (parsnip) is cultivated mainly in the temperate regions of the world because of its edible root. The roots of the best quality are obtained from the plants from the first year, in which this biennial plant usually forms only leaf rosette. In the second year, flowering stems emerge (the plant is cultivated for two years in order to obtain fruits for reproduction). Wild-growing P. sativa subsp. *urens* (Req. ex Godr.) Čelak. is widely distributed in Europe and *P. hirsuta* Pančić is endemic in the central part of the Balkan Peninsula (east Serbia, North Macedonia and south and west Bulgaria).

OBJECTIVES:

To investigate and compare the composition of the essential oils obtained from roots, leaves, stems, flowers and fruits of cultivated *P. sativa* subsp. sativa (from the first and/or the second year) and wild-growing *P. sativa* subsp. urens and *P. hirsuta* from Serbia.

METHOD / DESIGN:

Essential oils were isolated from dried and comminuted plant material by hydrodistillation using Clevenger-type apparatus for 2.5 h. The composition of essential oils was determined by GC-FID and GC-MS and analyzed using multivariate statistical methods: principal component analysis (PCA), non-metric multidimensional scaling (nMDS) and unweighted pair-group arithmetic averages clustering (UPGMA).

RESULTS:

Twenty-nine parsnip essential oils were investigated: 11 *P. sativa subsp. sativa* oils (from four localities; the oils of roots and leaves from both the first and the second year, and of the other organs from the second year), 10 *P. sativa* subsp. *urens* oils (from two localities) and eight *P. hirsuta* oils (from one locality, collected in two different years). *Pastinaca sativa* subsp. sativa roots from the first year provided the highest oil yields (0.51-0.77%, w/w). The roots of this taxon from the second year (0.02%), and the roots of other investigated *Pastinaca taxa* (0.10-0.14%) had notably lower oil yields. Regarding other plant organs, high oil yields were generally obtained for fruits (1.40-3.90%) and flowers (0.43-0.93%), and low oil yields for leaves (0.07-0.16%) and stems (0.03-0.13%).

In general, 13 to 53 compounds were identified in the essential oils; identified components accounted for 89.4-98.6% of the oils. Phenylpropanoid myristicin was the most abundant in the root essential oils of both investigated *P. sativa* subspecies (39.7-82.5%). It is interesting to note that the oil of *P. sativa* subsp. sativa roots from the first year also contained high amounts of terpinolene (14.8-28.7%), which significantly decreased in the oil of this taxon from the second year (1.2%). In *P. hirsuta* root oils another phenylpropanoid apiole (30.9 and 25.8%) was dominant and the quantities of myristicin were somewhat lower (11.6 and 20.3%). Cultivated *P. sativa* subsp. sativa leaf essential oils were dominated by myristicin (42.8 and 41.4%) and in the leaf oils of wild-growing parsnips (*P. sativa* subsp. *urens* and *P. hirsuta*), γ-palmitolactone was the most abundant (22.6-47.5%). Additionally, the leaf oils of both investigated *P. sativa* subspecies contained significant amounts of sesquiter-

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penes (36.0-46.2%), e.g. (E)-β-farnesene (13.8-22.4%). Compared with the leaf oils, corresponding stem oils were qualitatively similar. However, in the stem oils, the contents of sesquiterpenes were lower [e.g. (E)-β-farnesene 4.9-14.4% in *P. sativa* oils] and the contents of myristicin (64.9 and 63.3% in *P. sativa* subsp. *sativa* oils) and γ-palmitolactone (50.6-60.4% in wild-growing parsnips oils) were higher. The flower and fruit essential oils were dominated by aliphatic esters. The most abundant in *P. hirsuta* oils were hexyl butanoate (61.9% in the flower oil; 22.0 and 58.4% in the fruit oils) and hexyl hexanoate (17.0% in the flower oil; 59.8 and 29.1% in the fruit oils), and in the oils of both *P. sativa* subspecies the dominant was octyl butanoate (26.1-31.4% in the flower oils; 53.6-79.0% in the fruit oils). In PCA and nMDS analyses of the oils (except fruit oils), the separation of all three investigated *Pastinaca taxa* was noticed. The same relations were observed in UPGMA analyses of the leaf, stem and flower oils. In the case of statistical analysis of the fruit oils and UPGMA analysis of the root oils, the samples of two subspecies of *P. sativa* were grouped together.

CONCLUSIONS:

Wild-growing parsnips are equally interesting sources of essential oils as cultivated parsnip. Locality and year of collection did not significantly influence relations among taxa observed in multivariate statistical analysis.

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T3-P-59 Significance of microscopic characters in quality control of herbal teas

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KEYWORDS: Herbal teas; quality control; microscopic analysis; macroscopic analysis; foreign matter

INTRODUCTION:

Phytotherapeutics, are plants and plant-derived products represented by wide spectra of agents, which are used for treatment or prevention of various pathological conditions. Nowadays, the usage of phytotherapeutics increased, as evidenced by the fact that 80% of the world's population applies some form of herbal medicine. Of all the phytopreparations, herbal teas are the most commonly used, due to the fact that they are widely present on the market. It is very important that herbal teas meet proscribed quality and safety standards. The quality of tea blends can be observed from two points of view: the first relates to adherence to the declared ingredients content, and the second to meeting the needs of users. Herbal tea´s quality can be assessed by using microscopic, macroscopic and foreign matter analysis.

OBJECTIVES:

The aim of the conducted study was to evaluate the authenticity of five commercially available tea samples that are suggested for use by patients suffering from diabetes type 2, anxiety and tension, intestinal problems and hypertension by application of microscopic and macroscopic methods of analysis and quality control of tea mixture for blood sugar lowering by foreign matter analysis.

METHOD / DESIGN:

All the samples have been analyzed by microscopic and macroscopic methods in order to identify raw herbal material in tea

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