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 (Rox., ex Coq.) 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).

Objective

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.

Methods

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 (sat) 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 (urens) oils (from two localities) and eight P. hirsuta (hirs) oils (from one locality, collected in two different years). Among other, Table includes acronyms (Acr), No. of identified compounds (Cd Nt) and % of identified compounds (% id). Different organs are highlighted with different color. Figure includes PCA (left) and UPGMA (right) analyses (results of nMDS analysis are not shown, because no new relations compared to PCA and UPGMA analyses were observed). In PCA, only names of compounds that contributed the most to 1st and 2nd PC are given.

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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