

# BOOK OF ABSTRACTS

## 3rd International Conference on Plant Biology (22nd SPSS Meeting)



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**Serbian Plant Physiology Society**

**Institute for Biological Research "Siniša Stanković", University of Belgrade**

**Faculty of Biology, University of Belgrade**

**3<sup>rd</sup> International Conference  
on Plant Biology  
(22<sup>nd</sup> SPPS Meeting)**



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## Composition and antibacterial activity of essential oils of *Laserpitium latifolium* and *L. siler* (Apiaceae)

PP4-14

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Essential oils obtained by hydrodistillation from aerial parts of two *Laserpitium* species (*Apiaceae*), wild growing in Romania (*L. latifolium* L.) and Serbia (*L. siler* L.), at flowering stage, were analyzed for their chemical composition and antibacterial activity against different food spoilage bacteria. The results obtained by GC-FID and GC-MS techniques revealed that some components such as  $\alpha$ -pinene, *trans*-verbenole and *trans*-pinocarveol were predominant in both analyzed oils. In addition, yellowish *L. latifolium* oil was rich in  $\beta$ -pinene, sabinene and myrcene, while significant percentage of limonene, verbenone and *p*-mentha-1,5-dien-8-ol was identified in pale blue *L. siler* oil. Furthermore, tested *Laserpitium* species showed moderate antibacterial activity in applied microdilution method. The results indicated that *L. siler* exhibited bactericidal effectiveness in the range of 12.5 mg mL<sup>-1</sup> to 25 mg mL<sup>-1</sup> (MBCs) and it possessed stronger inhibitory effect on bacterial strains in comparison to *L. latifolium* oil. The most sensitive bacterium was *Enterococcus faecalis* (ATCC 19433) (MBCs=50 mg mL<sup>-1</sup> and 12.5 mg mL<sup>-1</sup> for *L. latifolium* and *L. siler*, respectively). Other food contaminants, *Enterobacter cloacae* (human isolate), *Listeria monocytogenes* (NCTC 7973) and *Salmonella typhimurium* (ATCC 13311), showed similar sensitivity to tested agents (MBCs=25 mg mL<sup>-1</sup> for *L. siler* and MBCs=50 mg mL<sup>-1</sup> for *L. latifolium*).

**Keywords:** *Laserpitium latifolium*, *L. siler*, essential oil, antibacterial activity

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## Phenolic compounds in ethanol extracts of different plant organs of *Inula oculus-christi* L.

PP4-15

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*Inula oculus-christi* L. (family *Asteraceae*), grows naturally in Asia, Central Europe and the Balkan Peninsula. Sesquiterpenoids, flavonoids and phenolics as major secondary metabolites contribute to a variety of biological activities of this perennial species. In this research, an emphasis is given

to the analysis of phenolic compounds in ethanol extracts of leaves, flowers, stems, rhizomes, and roots of *I. oculus-christi*. The content of total phenolics (TPC) and total flavonoids (TFC) in extracts of different plant parts of *I. oculus-christi* was determined. Significantly high TPC and TFC were observed in extract of flowers, while the extracts of stems and roots had the lowest content of phenolic compounds. UHPLC–LTQ/orbitrap/MS analysis was performed for separation, identification, and quantification of the major phenolic components in *I. oculus-christi* extracts. A total of 46 compounds detected belong to three structurally distinct groups: 1) hydroxycinnamic acid derivatives (14 compounds); 2) flavonoid glycosides (21 compounds); and 3) flavonoid aglycones (11 compounds). Dominant hydroxycinnamates were derivatives of caffeic acid, esterified with quinic or aldaric acids. The relative abundance of these compounds was higher in extracts of flowers, leaves and rhizomes. From the flavonoid glycoside group, flavone (nepetin, luteolin, apigenin, and chrysoeriol) and flavonol (quercetin, patuletin, kaempferol, isorhamnetin, and 3,3'-dimethylquercetin) derivatives were found in tested samples. Flavonoid aglycones were the most abundant compounds in extracts of flowers. Observed differences in phenolic content highlight the possibility of targeted collection and application of different *I. oculus-christi* extracts considering previously determined biological activities.

**Keywords:** *Inula oculus-christi*, UHPLC-Orbitrap MS, hydroxycinnamic acid derivatives, flavonoid glycosides, flavonoid aglycones

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## Elicitation effects of methyl jasmonate on secoiridoid production in shoot culture of centaury (*Centaureum erythraea* Rafn)

PP4-16

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*Centaureum erythraea* (centaury), a plant with a long tradition of medicinal use, contains bioactive secoiridoid glucosides (SGs). The exogenous application of methyl jasmonate (MeJA) may elicit a response similar to stress, and is used in the present study to induce SG accumulation and expression of SGs' biosynthesis associated genes in centaury's aerial parts. UHPLC-MS/MS analyses have indicated that the addition of 250 μM MeJA to the medium has caused overproduction of almost all investigated secondary metabolites. The most notable change was detected for swertiamarin production, which was several fold-higher in MeJA-treated plants. For the purpose of determining the key genes of MeJA response, we performed a qPCR analysis of all genes potentially involved in the secoiridoid biosynthetic pathway. After five days of MeJA treatment, an increase of relative gene expression was detected for *G8O*, *8HGO7*, *IO*, *7DLGT*, *7DLH2*, *SLS* and *CPR1*. On the other hand, in centaury plants subjected to MeJA treatment for ten days, there was no significant increase in gene expression. For *GPPS* and *LAMT*, decreased expression levels were detected, when