

Serbian Plant Physiology Society

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Institute for Biological Research „Siniša Stanković”, University of Belgrade

# 2<sup>nd</sup> International Conference on Plant Biology

## 21<sup>th</sup> Symposium of the Serbian Plant Physiology Society

### COST ACTION FA1106 QUALITYFRUIT Workshop



Petnica Science Center, June 17-20, 2015

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*Ruscus hypoglossum* from Serbia as source of new natural antioxidants

PP3-19

Jasmina M Miličević<sup>1</sup>, Violeta D Jakovljević<sup>1</sup>, Miroslav M Vrvčić<sup>2</sup>

(jmilicevic@open.telekom.rs)

<sup>1</sup> Institute for Biology and Ecology, Faculty of Science, University of Kragujevac, Radoja Domanovića 12, 34 000, Kragujevac, Serbia<sup>2</sup> Department of Biochemistry, Faculty of Chemistry, University of Belgrade, Studentski trg 12-16, 11000 Belgrade, Serbia

Species from the genus *Ruscus* are used in herbal medicine because of their anti-inflammatory and vein constrictor properties. The aim of this study was designed for the evaluation of antioxidant activity of aerial parts of *Ruscus hypoglossum* L. in order to investigate the relationship between antioxidant properties and total phenolic and flavonoid content. Aerial parts of *R. hypoglossum* (17075 BEOU) were collected from mountain Žeželj (Kragujevac, Serbia), in September 2012. The air-dried aerial parts of plant (30 g) were broken into small pieces (26 mm) and extracted with 96 % ethanol, acetone and ethyl acetate (150 mL) using a Soxhlet apparatus. With each extract, following antioxidant assays were carried out: DPPH and ABTS free-radical scavenging activity, total antioxidant activity, Fe<sup>2+</sup>-chelating ability, Fe<sup>3+</sup>-reducing power and inhibition of lipid peroxidation. Ethanolic extract of *R. hypoglossum* showed the highest total phenolic content (8.569 mg GAE g<sup>-1</sup>) as well as ABTS radical cation scavenging activity (IC<sub>50</sub> = 3.04 μg mL<sup>-1</sup>) and reducing power (IC<sub>50</sub> = 143 μg mL<sup>-1</sup>). The highest anti-DPPH (IC<sub>50</sub> = 278.37 μg mL<sup>-1</sup>) and ferrous ion chelating ability (IC<sub>50</sub> = 110 μg mL<sup>-1</sup>) were found in ethyl acetate extract. The highest flavonoid content (0.129 mg RU g<sup>-1</sup>) as well as the highest total antioxidant activity (14.976 μg AA g<sup>-1</sup>) and inhibitory activity against lipid peroxidation (IC<sub>50</sub> = 651 μg mL<sup>-1</sup>) were found in acetone extract. These data will provide some useful information for healthier living, as well as for the further screening of plants as potential sources of new natural antioxidants.

**Keywords:** free radical scavenging, reducing power, chelating ability, lipid peroxidation, total phenolic and flavonoid contents

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## Chemical composition and antioxidant activity of three endemic *Nepeta* species methanol extracts

PP3-20

Jasmina Nestorović Živković, Suzana Živković, Slavica Dmitrović, Branislav Šiler, Neda Aničić, Dragana Božić, Danijela Mišić

(jasmina.nestorovic@ibiss.bg.ac.rs)

Institute for Biological Research „Siniša Stanković“, University of Belgrade, Bulevar despota Stefana 142, 11060 Belgrade, Serbia

Methanol extracts of *in vitro* grown shoots of three *Nepeta* species (*Nepeta rtanjensis* Diklić & Milojević, *N. sibirica* L. and *N. nervosa* Royle ex Bentham) were studied for their main secondary metabolites using UH-PLC/DAD/±HESI-MS/MS analysis. Results showed that the major terpene present in the samples was iridoid monoterpene nepetalactone, wherein *trans,cis*- isomer was mostly present in methanol extracts of *N. rtanjensis*, while *cis,trans*-nepetalactone prevailed in *N. sibirica*. *N. nervosa* contained nepetalactone only in traces. Among phenolic acids, rosmarinic acid was predominant in all investigated species, while chlorogenic, neo-chlorogenic and caffeic acids were present in significantly lower concentrations. The results of ABTS and DPPH assays showed that methanol extracts of *N. rtanjensis*, *N. sibirica* and especially *N. nervosa* possess considerable antioxidant activities, and the FRAP assay revealed high ferric reducing capacity for all the tested samples.

Significant antioxidant activity was attributed to phenolic acids, particularly to rosmarinic acid. However, nepetalactone did not contribute notably to the antioxidant potential of the methanol extracts.

**Keywords:** *Nepeta rtanjensis*, *Nepeta sibirica*, *Nepeta nervosa*, antioxidant activity

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## Chemical composition and antimicrobial activity of selected Apiaceae species against oral microorganisms by TLC bioautography

PP3-21

Miloš M. Nikolić<sup>1</sup>, Ana D. Ćirić<sup>1</sup>, Jasmina M. Glamočlija<sup>1</sup>, Tatjana Lj. Marković<sup>2</sup>, Dejan Lj. Marković<sup>3</sup>, Marina D. Soković<sup>1</sup>, Dejan Stojković<sup>1</sup>

<sup>1</sup> University of Belgrade, Department of Plant Physiology, Institute for Biological Research "Siniša Stanković", Bulevar despota Stefana 142, 11000 Belgrade, Serbia.

<sup>2</sup> Institute for Medicinal Plant Research "Josif Pančić", Tadeuša Koščuška 1, 11000 Belgrade, Serbia

<sup>3</sup> Faculty of Dental Medicine, Department of Pediatric and Preventive Dentistry, University of Belgrade, Dr Subotića 8, 11000 Belgrade, Serbia

Recently, plant essential oils have become one of the most valued source of biologically active substances. Plants from Apiaceae family are known as spices because of their flavour, and have been used as household remedies in traditional medicine, in perfumery and cosmetic industry. The aim of this study was to evaluate chemical composition and antimicrobial activity of *Pimpinella anisum*, *Foeniculum vulgare*, and *Anethum graveolens* essential oils by thin layer chromatography (TLC) based methods as repeatable and cost effective. Phytochemical characterization of oils was done by gas chromatography coupled with mass spectrometry (GC/MS) and the presence of dominant components was proved by TLC. Antimicrobial activity against oral microorganisms (*Streptococcus mutans* and *Candida albicans*) was evaluated using TLC-bioautography method. The results of chemical analysis showed trans-anethole for *P. anisum* and *F. vulgare*, and carvone as dominant components of essential oils. The antimicrobial activity against cariogenic bacteria *S. mutans* and opportunistic pathogen fungi *C. albicans* was also reported. A correlation of the antimicrobial activity of the oils from our study and their chemical composition suggests that the presented activity could be attributed to the presence of the major oil constituents. However, the amount of small compounds should not be neglected, as synergistic effect is often observed that is formed by the compounds acting together. In conclusion, TLC based methods are valuable tools, especially for resource constrained laboratories, as they are simple and compare better with traditional microbiological techniques.

**Keywords:** *P. anisum*, *F. vulgare*, *A. graveolens*, essential oil, TLC

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