



The Balkan Botanical Congress is an international meeting that has been held nearly every three years, since 1997. It brings together botanists from around the world who perform research on plants in the widest sense, as well as scientists who are engaged in the plant sciences and their applications. We were honored to host such an extraordinary scientific event this year in Serbia.

The 7th Balkan Botanical Congress – 7BBC 2018 took place in Novi Sad from September 10th to 14th 2018. The Congress was organized by the University of Novi Sad, Faculty of Sciences, Department of Biology and Ecology and the “Andreas Wolny” Botanical Society, along with the great help of 7 co-organizers and more than 30 supporters and sponsors. It truly was not possible to happen without exceptional help of our co-organizer - the Institute for Nature Conservation of Vojvodina Province who made this congress not only possible, but totally awesome.

7BBC 2018 placed a special emphasis on plants of the Balkan Peninsula and covered various research fields. The Congress was organized into ten sessions: Plant Anatomy and Physiology, Plant Taxonomy and Systematics, Plant Molecular Biology and Genetics, Floristics, Vegetation and Phytogeography, Conservation Botany and Plant Invasions, Phytochemistry and Plant Resources, Agronomy and Forestry, Botanical Collections and History, Ethnobotany and Cryptogam Biology. These topics were elaborated through five plenary lectures given by eminent scientists, as well as in the form of introductory lectures, oral and poster presentations. With an overall number of 387 abstracts presented on the very latest of botanical science, we shared knowledge, expertise and novel ideas. We welcomed nearly 400 scientists to Novi Sad, and we believe that we succeeded in our joint endeavor to make new networks and new connections among botanists. We hope that we contributed to advancements in the wide and beautiful field of botany, ranging from fundamental botanical research to applied botany.

It is our great pleasure to publish this Abstract Book in Botanica Serbica, in the same year that this international journal, a renamed continuation of the Bulletin of the Institute of Botany and Botanical Garden Belgrade, celebrates its 90 year jubilee. On behalf of the Scientific and Organizing committee of 7BBC 2018 we would like to express our gratitude to all contributors, colleagues and sponsors for taking part in the 7th Balkan Botanical Congress, as well as for their efforts and contributions to its successful realization.

Goran Anačkov and Lana Zorić,  
Co-presidents of the Scientific Committee of the 7 BBC  
and guest editors of Botanica Serbica 42 (supplement 1).

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**The 7th Balkan Botanical Congress consists of plenary lectures, introductory lectures of each session, as well as oral and poster presentations on the following topics:**

**Sessions 1.** Plant Anatomy and Physiology

**Sessions 2.** Plant Taxonomy and Systematics

**Sessions 3.** Plant Molecular Biology and Genetics

**Sessions 4.** Floristics, Vegetation and Phytogeography

**Sessions 5.** Conservation Botany and Plant Invasion

**Sessions 6.** Phytochemistry and Plant Resources

**Sessions 7.** Agronomy and Forestry

**Sessions 8.** Botanical Collections and History

**Sessions 9.** Ethnobotany

**Sessions 10.** Cryptogam Biology



**PHENOLIC AND FLAVONOID CONTENT AND ANTIOXIDANT ACTIVITY OF *GLAUCOSCIADIUM CORDIFOLIUM* (BOISS.) BURTT ET DAVIS ETHANOL EXTRACT FROM DIFFERENT PARTS**

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*Glaucosciadium cordifolium* (Boiss.) Burtt et. Davis (syn. *Siler cordifolium* Boiss.) is a monotypic plant of the family Umbelliferae growing in the Mediterranean region. The aim of this work was to determine the content of total phenolics and flavonoids as well as *in vitro* antioxidant activity in 70% ethanolic extracts prepared from different parts (roots, leaves, flowers and stems) of *Glaucosciadium cordifolium*. The antioxidant activity was evaluated using DPPH, ABTS radical scavenging,  $\beta$ -carotene/linoleic acid system while total polyphenolic and flavonoid content were determined via Folin-Ciocalteu method and aluminum chlorid spectrophotometric method, respectively. The results showed that the flower of *G. cordifolium* contain higher amounts of phenolic ( $137.52 \pm 1.11$  mg gallic acid equivalent per gram of extract) and flavonoid compounds ( $155.40 \pm 5.94$  mg quercetin equivalent per gram of extract) than other parts and possess moderate antioxidant activity (the  $IC_{50}$  value of flower extract for DPPH and ABTS radical scavenging were  $216.07 \pm 1.39$   $\mu$ g/mL and  $29.26 \pm 4.62$   $\mu$ g/mL, respectively), which may attributed to a strong free radical scavenging, iron chelating and lipid peroxidation inhibitory activities. It was concluded that the extract of *G. cordifolium* may be a phytochemical source showing antioxidant activity that associate with health benefits.

**KEYWORDS:** *Glaucosciadium cordifolium*, antioxidant activity, phenolic compounds, *in-vitro*

**PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY OF *CHAEROPHYLLUM AUREUM* L. AND *C. HIRSUTUM* L. EXTRACTS (APIACEAE)**

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The genus *Chaerophyllum* comprises about 40 annual, biennial or perennial species. Some *Chaerophyllum* species are used as vegetables and spices in culinary in France, Austria and Turkey, as well as in food industry. *C. aureum* L. and *C. hirsutum* L. are perennial plants with white or pinkish flowers that reach a height of up to 120 cm. Both species inhabit moist and shady habitats. The objective of this study was to determine total phenolic contents and potential radical scavenging activity of different extracts of aerial parts of *C. aureum* and *C. hirsutum* collected on Mt. Kopaonik (Serbia). Ultrasound assisted extraction and different solvents (water, methanol, ethanol and acetone) were used in extraction process. For quantification of total phenols in tested samples, the Folin-Ciocalteu reagent was used and obtained results were presented as mg of galic acid equivalents (GAE) per g of dry extracts (DE). Antioxidant activity was measured by ABTS assay, where flavonol quercetin hydrate was used as a positive control, and the results were presented as equivalents of ascorbic acid (vitamin C). Obtained data indicated that aqueous extract of *C. aureum* in concentration of 2 mg/mL, was the richest in phenols ( $226.68 \pm 14.04$  mg GAE/g of DE), while the lowest content was observed in aqueous extract of *C. hirsutum* ( $68.66 \pm 2.12$  mg GAE/g of DE). According to results obtained by ABTS method, the highest scavenging potential possessed aqueous extract of *C. aureum* ( $2.65 \pm 0.01$  mg vit. CE /g of DE), which was in line with used quercetin hydrate activity ( $2.75 \pm 0.00$  mg vit. CE/g of DE). The lowest effect was recorded for ethanolic extract of *C. hirsutum* ( $0.37 \pm 0.01$  mg vit. CE/g of DE). In general, positive correlation between measured total phenolic contents and demonstrated antiradical effect was observed. *C. hirsutum* manifested better antioxidant activity, where aqueous extract was the most promising ABTS scavenging agent with the highest phenolic concentration. Results indicated that tested extracts may have potential application as natural antioxidant.

**KEYWORDS:** *Chaerophyllum hirsutum*, *C. aureum*, extracts, total phenols, antioxidant activity, ABTS

**PHENOLIC CONSTITUENTS, ANTIOXIDANT,  $\alpha$ -AMYLASE AND  $\alpha$ -GLUCOSIDASE INHIBITORY ACTIVITIES OF *PYRUS*  $\times$  *VELENOVSKYI* BARK**

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*Pyrus*  $\times$  *velenovskyi* Dostálek (Rosaceae) [*P. pyrastra* (L.) Burgsd.  $\times$  *P. spinosa* Forssk.] is a deciduous tree up to 5 m height. Leaf-blades 2.2–4.8  $\times$  1.3–2.7 cm,  $\pm$  glabrate, elliptic, gradually narrowed to a rather long petiole. This natural hybrid plant was described from Bulgaria, and has been also found in Serbia. The objective of this work was to investigate the phenolic profile, as well as *in vitro* antioxidant,  $\alpha$ -amylase and  $\alpha$ -glucosidase inhibitory activities of dried methanol extract from the bark of this tree. The plant material was collected in eastern Serbia (Jelašnička Klisura gorge). In the dried bark, the contents of different classes of phenolics were spectrophotometrically determined: total polyphenols (10.36%), tannins (8.78%), procyanidins (4.21%) and phenolic glycosides (3.54%). After pre-extraction with dichloromethane, powdered bark was extracted with methanol by bimaceration at room temperature. In obtained dried methanol extract, using aforementioned spectrophotometric tests, the contents of total polyphenols (33.42%) and tannins (21.55%) were determined, and by HPLC, arbutin, chlorogenic acid, catechin and procyanidin B2 were identified. Its antioxidant activity, i.e. ferric reducing capacity (FRAP), 2,2-diphenyl-1-picrylhydrazyl (DPPH) and  $\cdot$ OH radical scavenging ability, as well as the inhibition of the enzymes  $\alpha$ -amylase and  $\alpha$ -glucosidase were assessed using corresponding colorimetric assays. Tested dried methanol extract exhibited significant DPPH and  $\cdot$ OH radical scavenging abilities ( $SC_{50} = 6.85$  and  $12.21$   $\mu$ g/mL, respectively), and ferric reducing capacity ( $10.74$  mmol Fe (II)/g of dried extract), as well as the inhibition of  $\alpha$ -amylase ( $IC_{50} = 11.4$   $\mu$ g/mL) and  $\alpha$ -glucosidase ( $IC_{50} = 5.48$   $\mu$ g/mL).

**KEYWORDS:** *Pyrus*  $\times$  *velenovskyi* bark, phenolics, antioxidant activity,  $\alpha$ -amylase and  $\alpha$ -glucosidase inhibition

**EXUDATE FLAVONOIDS AND PYRETHRINS OF AERIAL PARTS OF *TANACETUM CINERARIIFOLIUM***

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*Tanacetum cinerariifolium* (Trevir.) Sch. Bip. (Asteraceae) is a perennial herbaceous plant, endemic to the east Adriatic coast. The species was first used as an insecticide in Croatia, and later in the rest of the world. The insecticidal action of *T. cinerariifolium* is determined by pyrethrins. These compounds are found in all parts of the plant, but are mainly concentrated in the flower heads. The term pyrethrin refers to the six insecticide active ingredients: Pyrethrin-I, Pyrethrin-II, Cinerin-I, Cinerin-II, Jasmolin-I and Jasmolin-II, but there are many other compounds that also include resinous substances - terpenoids, fatty acids, sesquiterpene lactones, flavonoid aglycones and etc. Exudate (surface, external) flavonoids are aglycones accumulated usually on the surfaces of leaves, flowers, and other tissues, they extracted by glandular trichomes or are extruded through the cuticle. Although the content of pyrethrins in flower heads of *T. cinerariifolium* are well studied the data on content of these compounds in aerial parts are limited, more that to the best of our knowledge there no reports about exudate flavonoids in the species. The aim of present study was to analyze the content of exudate flavonoids and pyrethrins of the aerial part of *T. cinerariifolium*. The samples were collected from a naturally occurring population of the species and from an *ex situ* collection of IBER-BAS. Acetone exudates and hexane fractions of collected plant material of both origins, were comparatively analyzed by GC/MS and TLC. Flavonoid aglycones were identified using co-chromatography with authentic samples on different sorbents: silica-gel, polyamide and cellulose. Luteolin 6-methyl ether, quercetagetin 3,6-dimethyl ether and quercetagetin 3,6,3'-trimethyl ether were detected as main flavonoid aglycones of the studied acetone exudates. Luteolin and scutellarein 6-methyl ether were found in traces. Besides the six main insecticide active ingredients a variety of alkanes were identified in the hexane fractions of studied samples. Pyrethrin-I, Pyrethrin-II and Cinerin-II were present in the largest amount. Differences in the qualitative flavonoid composition and pyrethrin profiles of plant material from naturally occurring population and from an *ex situ* collection of IBER-BAS were not established. The study presents for the first time data for exudate flavonoids of *T. cinerariifolium*.

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**KEYWORDS:** Dalmatian pyrethrum, *Pyrethrum cinerariaefolium* Trev., *Chrysanthemum cinerariaefolium* Bocc, GC/MS, TLC, flavonoid