

**BOOK OF ABSTRACTS**  
**THE 2<sup>ND</sup> BALKANS - CHINA**  
**MINI-SYMPOSIUM ON NATURAL**  
**PRODUCTS AND DRUG DISCOVERY**



МИНИСТАРСТВО ПРОСВЕТЕ,  
НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА



**11-13 April, 2019**  
**Belgrade, Serbia**

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

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## The pygidial gland secretions of ground beetles (Insecta: Coleoptera: Carabidae): antimicrobial and antitumour activity of the natural products

Marija Nenadić<sup>1</sup>, Marina Soković<sup>2</sup>, Jasmina Glamočlija<sup>2</sup>, Ana Ćirić<sup>2</sup>, Vele Tešević<sup>3</sup>, Ljubodrag Vujisić<sup>3</sup>, Nikola Vesović<sup>1</sup>, Srećko Ćurčić<sup>1</sup>

<sup>1</sup>Institute of Zoology, Faculty of Biology, University of Belgrade, Belgrade, Serbia.

<sup>2</sup>Institute for Biological Research "Siniša Stanković", University of Belgrade, Belgrade, Serbia.

<sup>3</sup>Faculty of Chemistry, University of Belgrade, Belgrade, Serbia.

In beetles, secretions are products of different exocrine glands, of which particular emphasis is on pygidial glands, which are common for the suborder Adephaga. Antimicrobial activity of the pygidial gland secretions of six selected ground beetle species was observed against human pathogens. A microdilution method was applied in order to determine minimum inhibitory concentrations (MICs), minimum bactericidal concentrations (MBCs) and minimum fungicidal concentrations (MFCs). We tested 16 laboratory and clinical strains of human pathogens (eight bacterial gram-positive and gram-negative species, and eight fungal species). The secretions of tested ground beetles have a certain level of antimicrobial activity, which differed between species, which is caused by the difference in chemical composition of the mixtures. The highest antibacterial effect was observed after treatment of most pathogens with secretion of *Laemostenus punctatus* and *Carabus ullrichii*. The highest resistance of tested pathogenic strains was noticed after treatment of the secretion of *Calosoma sycophanta*, which achieved antibacterial effect against *E. coli* only. The secretions of *L. punctatus* and *C. sycophanta* each showed a strong antifungal effect compared to positive controls.

Inhibition of the proliferation of human tumor cell lines and porcine non-tumor cells by the secretion of adults of four ground beetle species was observed as well. The sulphorhodamine B (SRB) assay was applied to establish GI<sub>50</sub> values of the tested secretions. All secretions have shown certain antiproliferative effect on the tested cell lines, but statistically insignificant in most cases, which confirms the absence of cytotoxicity on the non-tumor cell line. Special emphasis is put on the secretion of *L. punctatus*, which reached approximately 50% inhibition of cell proliferation (GI<sub>50</sub> value) of MCF7 (breast adenocarcinoma) cell line, and showed a potential antitumour activity. The antimicrobial, antitumour and antiproliferative potential of the secretions of ground beetles was demonstrated for the first time in this study.