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**»ENVIRONMENTAL RESOURCES,
SUSTAINABLE DEVELOPMENT
AND FOOD PRODUCTION«**

OPORPH 2023

**November 9-10th, 2023
Tuzla, Bosnia and Hercegovina**

**Environmental resources, sustainable development
and food production – OPORPH 2023: Book of Abstracts**

The Symposium is the traditional meeting that takes place every second year, and this Book is a serial publication that accompanies it. The Book contains the abstracts of plenary lectures and oral presentations, along with the posters' abstracts, presented at VIII International scientific-professional symposium "Environmental resources, sustainable development and food production" – OPORPH 2023, held on November 9-10 2023 in Tuzla, Bosnia and Herzegovina, organized by Faculty of Technology, University of Tuzla in cooperation with Association of Chemist of Tuzla Canton.

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SINGLE AND MULTI-LAYER SOLID PHASE EXTRACTION FOR EFFICIENT EXTRACTION OF COMPOUNDS OF EMERGING CONCERNS FROM WATER

BY DUŠAN RAKIĆ✉, IGOR ANTIĆ, JELENA ŽIVANČEV, MAJA BULJOVČIĆ, ZITA ŠEREŠ, NATAŠA ĐURIŠIĆ-MLADENOVIĆ

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Contaminants of emerging concern (CECs) include a large group of unregulated synthetic or natural chemicals such as pharmaceutically active compounds (PhACs), personal care products, illicit drugs, hormones, pesticides in current use, micro- and nano-plastics, per- and polyfluoroalkyl substances (PFAS), and many others. As a consequence of anthropogenic activities, they can end up in the environment mainly through wastewater streams. Consequently, CECs are present in different types of water resources where they can exhibit harmful effects on the environment and human health. For their detection and quantification, it is very important to reduce/remove interferences during the sample preparation, not impairing the efficient extraction of the compounds of interest. Solid phase extraction (SPE) is probably the most widely used technique for CECs extraction from water samples. The aim of this study was to compare the efficiency of extraction of selected CECs achieved by two different SPE sorbents, single and multi-layer sorbents. The model water solution was prepared, containing 12 PhACs, 16 pesticides in current use, and 9 PFAS. The following combination of sorbents was investigated (i) single-layer HLB, (ii) multi-layer: HLB plus a mix of WAX, WCX, and PPL and (iii) multi-layer: mix of WAX, WCX, and PPL plus HLB. Multi-layer sorbents differed in the order of the layers where WAX, WCX, and PPL were mixed before packing in the SPE syringe. The quantification of CECs in collected extracts was done by UHPLC-MS/MS. For the multilayer cartridge with HLB sorbent in the bottom layer, the extraction efficiency of CECs in the range from 60 to 120% was achieved for 60% of compounds, while with HLB in the upper layer, acceptable recovery (60-120%) was accomplished for 50% of compounds. The cartridge with a single-layer sorbent showed the efficiency of CECs retention similar to the HLB sorbent placed in the upper layer of SPE. The poor extraction of some CECs when multi-layer sorbent was used should be further investigated to elucidate the possible reason (e.e. insufficiently well-optimized solvent composition for their elution or inhomogeneity of the mixed sorbent bed).

Keywords: contaminants of emerging concern; multilayer SPE

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