

Heavy metals pollution status in surface sediments (rivers and artificial lakes, Serbia)

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Potentially hazardous trace elements, often in literature referred as "heavy metals", are deemed serious pollutants due to their toxicity, persistence and non-degradability in the environment. These elements play an important role in extent of water pollution and threaten the health of populations and ecosystems. As the sink of heavy metals, sediment beds adsorb metals in quantities that are many times higher than those found in the water column in the long-term polluted water environment. It is believed that most of the metal content, as much as 90% in aquatic sediments is bound to sediments. Metal contamination in these sediments could be directly affect the river water quality, resulting in potential consequences to the sensitive lowest levels of the food chain and ultimately to human health.

The objective of this research was the evaluation of heavy metal contamination level in sediments of the most important rivers and artificial lakes in Serbia. The heavy metal enrichment in studied sediments was conducted by using: determination of total metal content, sequential extraction procedure for the fractionation of studied elements, quantification of the metal enrichment degree in the sediments by calculating geo-accumulation indices, determination of actual and potential element availability and application of BRAI index for the assessment of heavy metal bioavailability. The sediments were found to be contaminated by heavy metals to various extents, mostly with Cd, Cu, and Zn.

The significant variation in heavy metal distribution among samples collected in this large region, encompassing all Serbian watersheds, suggests the selective contamination of sediments by heavy metals. Elevated concentrations of elements in most cases were detected in samples of river sediments, since artificial lake reservoirs are usually built in rural areas, where the less anthropogenic pollution. Rivers often flow through the towns and these water basins less or more loaded micronutrients, toxic substances, organic or inorganic, waste materials, depending on the species and type of industrial processes that are often without the necessary technological and mandatory treatment directly discharged into them.

Due to the potential risk of heavy metal pollution in studied sediments, pollution prevention and control measurements seems necessary, especially in areas where we found increased levels of these elements.