

Environmental impact of mining activity in Bor area as indicated by the distribution of heavy metals and bacterial population dynamics in sediment



The environmental impact of inorganic pollution is pronounced in water adjacent to Bor Copper Smelter Complex (RTB Bor, Serbia), with Cu, Zn, Pb, and As being the main determinants of aquatic pollution pattern. Communities of microorganisms present in the sediments are mainly affected by heavy metal pollution. Some groups of bacteria can be considered pollution bio-indicators, due to their sensibility and ability to bioaccumulate heavy metals, thus contributing to reducing pollution. This study investigates the relationships between trace element accumulation and heterogeneity in sediment bacteria community structure found in water streams adjacent to the Bor Copper Smelter Complex (RTB Bor, Serbia). Our results showed no contamination with copper, zinc, nickel, iron, and chromium, but did show a low to moderate contamination with lead and a moderate to high contamination with arsenic in aquatic sediments within the area of interest. Spatial heterogeneity in sediment-associated bacterial communities did not relate significantly to location of sampling sites, except for iron reducing bacteria. Iron reducing bacteria and nitrifying bacteria

were the best distinguishing groups of bacteria. However, only iron reducing bacteria were significantly influenced by sampling locations. The iron reducing bacteria has correlated negatively with the degree of sediment contamination with lead, and therefore, we suggest that this group of bacteria could serve as potential bio-indicators of inorganic water contamination in Bor RTB area.

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