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# WATER QUALITY IN RIVERS AND LAKES: IMPACTS OF HEAVY METAL POLLUTION AND THE CRITICAL ROLE OF MONITORING

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## Abstract

This study assessed the water quality of the Stavnic River, Romania, by analyzing temporal variations in the concentrations of seven heavy metals: arsenic (As), chromium (Cr), copper (Cu), nickel (Ni), lead (Pb), zinc (Zn), and cadmium (Cd). Utilizing specific pollution indices, this research evaluated heavy metal pollution levels to determine the extent and severity of contamination in surface waters over a five-year period. Results indicated that the average concentrations of heavy metals followed the order Zn > Ni > Cr > Cu > As > Pb > Cd. Concentrations remained within the maximum allowable limits defined by national and international regulations, suggesting low pollution levels and affirming the suitability of the water for human consumption. The use of water quality indices was essential in streamlining data analysis and enabling a clearer understanding of surface water quality over time. These indices facilitated a more efficient monitoring approach, which is particularly valuable for authorities aiming to track changes and ensure environmental safety. The findings contribute to the broader understanding of heavy metal pollution in river systems, providing a reference framework for similar studies in other geographic regions with comparable environmental and industrial characteristics. This research underscores the importance of continuous monitoring and the implementation of preventive measures to mitigate potential risks associated with heavy metal contamination in surface waters.

*Key words:* heavy metal concentration, pollution index, Stavnic River, surface water pollution, water quality monitoring

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