

# Assessment of heavy metals in benthic macroinvertebrates, water and sediments in River Isiukhu, Kenya

## Abstract

A major ecological challenge facing freshwater resources such as rivers is the influx of chemical contaminants from anthropogenic sources. A report on the levels of heavy metals, namely Zn, Cu, Cr, Cd and Pb in benthic macroinvertebrates, sediments and water along River Isiukhu, within Lake Victoria catchment area in Kenya is presented. Families of benthic macroinvertebrates that were investigated included Gerridae, Baetidae and Unionidae. Samples were digested using the appropriate acid combination and analysed using Spectra AAS Varian 200. Physicochemical parameters were measured on-site using mobile Hydrolab Quanta. Pearson's correlation matrix and post hoc Tukey's test were used to show the relationship between metal concentrations in the various matrices at significant differences accepted at  $p \leq 0.05$ . Positive correlations were obtained for heavy metal concentrations in sediments and benthic macroinvertebrates with significant correlations observed for Zn ( $r = 0.655$ ,  $p = 0.029$ ) and Cu ( $r = 0.641$ ,  $p = 0.034$ ). Sediments presented the highest range of heavy metal concentrations compared to water and benthic macroinvertebrates and presented the only matrix with quantifiable Pb levels. The range in heavy metal concentration in benthic macroinvertebrates samples were as follows: Zn, 30.73–46.64, 21.93–38.17, and 26.85–41.69 mg/kg, Cu, 1.17–6.54, 1.11–3.87 and 1.15–5.79 mg/kg, Cr, 0.47–1.61, 0.22–0.74 and 0.25–0.92 mg/kg, for families Unionidae, Baetidae and Gerridae respectively. Heavy metal concentration profile along the river indicated an influx of pollutants from anthropogenic sources due to rapid urbanization along the river.

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