



Impact of anthropogenic activities and the associated heavy metal pollution in Sundarbans waterways: threats to commercial fish and human health

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Abstract The exposure of fish to heavy metals is a significant concern for human health and natural ecosystems. Despite being a critical issue, the extent of contamination in tropical fish from developing countries like Bangladesh remains somewhat unexplored. In this study, ten economically vital fish species (*Osteogeneiosus militaris*, *Arius gogora*, *Harpadon nehereus*, *Mugil ephalus*, *Pseudapocryptes elongates*, *Apocryptes bato*, *Labeo bata*, *Tenualosa toil*, *Notopterus notopterus*, and *Pampus chinensis*) from the Pasur River, Bangladesh, were analyzed by atomic absorption spectrometer for the concentrations of four concerned heavy metals, viz., As, Cr, Cd, and Pb, and the associated human health

risks. The mean concentrations (mg/kg) followed the order of As (3.30 ± 1.43) > Pb (2.32 ± 0.73) > Cr (0.63 ± 0.29) > Cd (0.37 ± 0.24). Additionally, the bioaccumulation factor of the metals in the investigated fish species followed a decreasing trend of As (824.75) > Cr (781.25) > Cd (744) > Pb (385.83). While most species fell below the minimum bioaccumulation line, a few exceptions were noted for some species specific to metals. Health risk assessments indicated no significant carcinogenic and non-carcinogenic risks for both children and adults, although children exhibited greater vulnerability to both types of health effects. Multivariate analysis and local perceptions supported the conclusion that heavy metals primarily originated from anthropogenic sources related to development activities adjacent to the riverine areas.

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