

**Bioaccumulation of Heavy Metals in Selected Tissues of Fresh Water Fish in Rajarata Area and Marine Fish in Trincomalee Coastal Area**

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Bioaccumulation of heavy metals in fish depends on various factors, including agricultural runoff, industrial pollution, and domestic waste dumping. Consuming fish contaminated with heavy metals such as Cd, Pb, and As poses health risks to humans. This study aimed to determine the concentrations of these heavy metals in different tissues (Kidney, Bones, Flesh, and Gills) of freshwater fish species including Tilapia (*Oreochromis niloticus*), Lella (*Tor khudree*), and Korali (*Etropus suratensis*) from Nuwara Wewa in the Rajarata area, as well as marine fish species such as Hurulla (*Amblygaster sirm*), Salman (*Sardinella longiceps*), and Parau (*Caranx inobilis*) from the Trincomalee coastal area. The furnace mode of the Atomic Absorption Spectrophotometer was employed for heavy metal analysis. Results indicated varying average concentrations in freshwater fish, ranging from Cd  $0.01 \pm 0.00$  to  $3.05 \pm 0.08$  mg/g and Pb  $0.36 \pm 0.04$  to  $6.88 \pm 0.08$  mg/g on a dry weight basis. Similarly, marine fish exhibited concentrations ranging from Cd  $0.04 \pm 0.04$  to  $3.15 \pm 0.80$  mg/g and Pb  $2.07 \pm 0.02$  to  $54.27 \pm 0.05$  mg/g, respectively. Notably, the concentration of As fell below the detectable range of the furnace mode of the AAS. The detected levels exceeded the maximum permissible limits set by the World Health Organization (WHO), with standard limits for Cd, Pb, and As being 0.0002 mg/g, 0.0005 mg/g, and 0.0068 mg/g, respectively. Significant differences ( $P < 0.05$ ) were observed among different tissues of the fish species for Cd, Pb, and As. In freshwater fish, bones and gills tended to exhibit higher concentrations of Cd and Pb, while in marine fish, kidneys and gills showed higher amounts of these heavy metals. These findings underscore the importance of addressing heavy metal contamination in aquatic ecosystems to mitigate health and environmental risks.

**Keywords:** Bioaccumulation; Fresh water fish; Heavy metals; Marine water fish; Atomic absorption spectroscopy