



Determination of heavy metals in *Oreochromis niloticus* from Sooriyawewa reservoir, Sri Lanka

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Abstract

Fish are ideal bioindicators for monitoring aquatic ecosystems due to their sensitivity to environmental changes and ability to accumulate substances like heavy metals. This study analyzed the heavy metal levels in *Oreochromis niloticus* (Nile Tilapia), water, and sediments in the Sooriyawewa reservoir, Sri Lanka. Consumable-sized fish ($n = 10$) (22.0 ± 1.1 cm) were randomly collected from the fresh catch of fishermen. Water and sediment samples were collected in triplicate from three locations nearby: cultivation lands (L1), reservoir dam (L2), and the major inlet (L3). Atomic absorption spectrophotometry (AAS) was used to measure copper (Cu^{2+}), lead (Pb^{2+}), and cadmium (Cd^{2+}) in the fish tissues (liver, gill, skin, flesh), and in water and sediment. Results revealed that the highest concentration (0.45 ± 0.2519 mgkg^{-1}) was in the liver while the lowest concentration was in the flesh which were not detectable. Heavy metal accumulation in fish tissues followed the order $\text{Cu} > \text{Pb} > \text{Cd}$, with Cd being undetected. However, Cu concentration in the liver did not exceed the maximum permissible limit (0.5 mgkg^{-1}) set by the WHO. Heavy metal levels were consistently lower in water than in sediments, with only Cu detectable in water. In sediment samples, heavy metals were distributed in the order of $\text{Cu} > \text{Pb} > \text{Cd}$ and they were significantly lower ($p < 0.05$) at L2 while highest was found at L3. According to the results, Cu, Pb, and Cd concentrations in the fish, water, and sediment did not exceed the recommended maximum permissible limit by WHO. However, further research and regular monitoring are essential to evaluate the potential health hazards.

Keywords

Nile Tilapia, Sooriyawewa reservoir, heavy metals, atomic absorption spectrophotometry