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Assessment of Heavy Metal Accumulation in Freshwater Fishes in Irrigation Tanks, Anuradhapura**Gamagedara, H.M.C.D.¹, Jayaratne, R.L.², Edirisinghe, E.M.R.K.B.^{1*}**¹*Department of Chemical Sciences, Rajarata University of Sri Lanka, Mihintale, Sri Lanka*²*Department of Biological Sciences, Rajarata University of Sri Lanka, Mihintale, Sri Lanka**ranjith_e@rjt.ac.lk**Abstract**

Sri Lanka is well known for its dense freshwater irrigation tanks, especially in dry zones, which play an important role in sustaining both the environment and human livelihoods by providing essential resources such as drinking water, irrigation for agriculture, and nutrition through fish proteins. However, heavy metal contamination poses a significant threat to the sustainability of these valuable freshwater irrigation tanks due to their persistence and non-biodegradability. These heavy metals tend to accumulate in living organisms and biomagnified and have harmful effects on high tropic level organisms like humans who rely on aquatic fish species via food chains. This study was carried out to assess the heavy metal accumulation in muscle and liver parts of freshwater fishes, Tilapia (*Oreochromis* sp.), and striped snakehead; *Lula* (*Channa striata*) in Kammalakkulama, Hammillewa, Kirindegama, and Madawalagama tanks in Anuradhapura district, Sri Lanka. The Inductively coupled plasma mass spectrometry (ICP-MS) was used to analyse the randomly collected fish samples for total Cadmium (Cd), Arsenic (As), Lead (Pb), and Mercury (Hg) in the tanks. The results indicated a significant difference ($p < 0.05$) in the detected concentrations of heavy metal levels in tested samples among the four tanks. The highest concentrations of Cd (2.098 mg/kg) and As (0.366 mg/kg) were recorded in the liver of Tilapia in the Kammalakkulama tank. The highest Pb (5.509 mg/kg) and Hg (2.015 mg/kg) concentration was recorded in the Tilapia muscle in the Hammillewa tank and the Lula muscle in the Madawalagama tank respectively exceeding the WHO/FAO standards. The accumulation levels of these heavy metals were higher in the fish liver compared to their muscle in most of the samples. Arsenic (As) showed a significant positive linear relationship ($R^2 = 0.531$) between their dry body weight and accumulated concentration in the Tilapia muscle. The canonical discriminant analysis showed a significant differentiation among the four tanks concerning heavy metal levels in fish tissues.

Keywords: *Channa striata*, Heavy metals, Irrigation tanks, ICP-MS, *Oreochromis* sp.