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Bioaccumulation of some selected heavy metals in some edible fish species from three reservoirs in Polonnaruwa district

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Abstract

Bioaccumulation potential of selected heavy metals (Pb, Cd, Cr, Cu and Zn) in head, muscle & skin of food fish species inhabiting in Minneriya wewa (8° 1' 60 N, 80° 54' 0 E), Kaudulla wewa (8.1500° N, 80.9166° E) and Parakrama Samudraya (7.9000° N, 80.9667° E) were assessed for a period of nine months in 2011. In addition, water, sediment, phytoplankton and zooplankton samples were taken concurrently from the sampling locations for determination of bioaccumulation pattern of the metals. The heavy metal concentrations were measured following standard test procedures and analysis was done by AAS. Metal concentrations of water did not exceed the permissible levels given by the SLS drinking water standards. The sediment associated range of Pb (425.3-1017.2) and Cd (30.0-65.1) (in µg/g dry weight) in lakes showed high accumulation than the probable concentrations given for Pb (128 µg/g) and Cd (5 µg/g) in sediment. The Cr (0-97 µg/g), Cu (10.4-102 µg/g) and Zn (24.5-49.4 µg/g) levels were remained much below the given probable effective concentrations of Cr (111 µg/g), Cu (149 µg/g) and Zn (459 µg/g) in soil respectively. Pb and Cd were the highly accumulated metals in phytoplankton (Pb: 6.95-1300.29, Cd: 2.00-179.63 µg/g) and zooplankton (Pb: 9.41-2497.5, Cd: 2.30-220.83µg/g) in all the locations of the reservoirs than the Cr, Cu, and Zn concentrations.

Both Pb and Cd were highly accumulated in the head region compared with skin and muscle of the collected fish from the reservoirs and exceeded the maximum permissible levels in fish for human consumption. Highest amount of Cr (30.15±2.31µg/g) level were detected in muscle of the *Puntius dorsalis* in Minneriya wewa and the highest concentration of Cu was recorded in head part of the *Etroplus suratensis* (2.18±1.90 µg/g) in Kaudulla wewa. Cu levels in head, muscle and skin of all fish species collected from three reservoirs did not exceed than the permissible level given for whole freshwater fish (20µg/g). The most abundant of heavy metal recorded in all body part of fish was Zn and the greatest amount was detected (113.93±10.55µg/g) in the head part of *Puntius dorsalis.*

Key words: Bioaccumulation, heavy metal, plankton, sediment, fish