Investigation of heavy metals in edible fish species in a section of Bellanwila-Attidiya canal

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Attidiya Canal receives many industrial effluents. Tilapia and catfish caught from this canal is soil for human consumption. Present study was carried out to identify the types of heavy metals present in a selected section of the Attidiya canal and to determine the heavy metals in tilapia and catfish caught from the same part of the canal. Sampling was done during October 2004-January 2005. Atomic Absorption Spectrometer (flame mode) was used to determine metal levels. The heavy metal concentration in the water was found to be Pb – 0.052 μg/ml, Cu – 0.019 μg/ml, Cr – 0.022 μg/ml, Cd – 0.001μg/ml, Ni – 0.013 μg/ml and Zn0.019 μg/ml. When compared with water quality standards prepared by the Central Environmental Authority (CEA) of Sri Lanka, Pb, Cu, Cr and Cd exceeded the permissible levels and Ni and Zn were below the range. The metals, which exceeded the permissible level in water, Pb, Cu, Cr and Cd, were selected for further analysis in fish species.

The levels of heavy metals in the head region (from anterior point of the snout to the edge of the operculum) of fish were significantly higher than the body region (from the edge of operculum to the caudal peduncle) ($P< 0.05$). Levels of heavy metal concentration in both head and body region positively correlate with the total body length of fish (15 cm – 30 cm, $P<0.05$). Pb, Cu, Cr and Cd concentrations in Tilapia exceed the permissible level (Pb-2.5μg/g, Cu-5μg/g, Cr-2.5μg/g, Cd-0.25μg/g) in both head and body but the Cr level in the body region is below the permissible level upto 17.5 cm of total body length. In Tilapia the heavy metal concentration in the head region [μg/g- (dw)] ranges from 7.45 to 35.60 for Pb, from 5.45 to 27.35 for Cu, from 4.95 to 11.95 for Cr, from 0.25 to 4.95 for Cd. In Tilapia the heavy metal concentration in body region [μg/g- (dw)] ranges from 3.70 to 25.20 for Pb, from 5.60 to 12.05 for Cu, from 4.80 to 6.80 for Cr, from 0.20 to 1.90 for Cd. In Cat fish the heavy metal concentration in the head region [μg/g- (dw)] ranges from 3.20 to 15.30 for Pb, from 3.30 to 11.20 for Cu, from 4.00 to 5.95 for Cr, from 0.10 to 0.55 for Cd. In Cat fish the heavy metal concentration in body region [μg/g- (dw)] ranges from 0.05 to 10.90 for Pb, from 3.75 to 8.35 for Cu, from 2.20 to 5.30 for Cr, from 0.05 to 0.45 for Cd. Results revealed that the levels of heavy metals in both fish species exceed the maximum permissible levels for human consumption.