

## Accumulation of heavy metals and polyaromatic hydrocarbons in water, sediment and fish in Bolgoda Lake, Sri Lanka

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Bolgoda Lake is an important wetland ecosystem with high biodiversity and socio-economic value including fisheries. However, the lake has been increasingly polluted with contaminants from industrial, automobile, and domestic sources of waste since the recent past. Heavy metals and polyaromatic hydrocarbons (PAHs) have been used extensively to determine the urban pollution impacts on the aquatic environment. Consuming contaminated fish may cause serious health risks in the local community. Therefore, this study focused on assessing the accumulation of heavy metal (loid)s and PAHs in selected food fish species, water and sediment of this aquatic ecosystem. Total of 07 heavy metals (As, Cd, Cr, Cu, Hg, Pb, and Zn) and 16 PAHs designated as 'priority pollutants' by United States Environmental Protection Agency (USEPA) were analysed for two edible fish species *Mystus gullio* and *Mugil cephalus* (n=30), water and sediment samples from 05 sampling locations for three months period in south-west monsoon in 2018. The metal (loid) levels were analysed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) and PAHs were analysed using Gas Chromatography–Mass Spectrometry (GC-MS). According to the results, none of the PAHs were detected in analysed water (Limits of Quantitation, LOQ<0.001 mg/L), sediment (LOQ<0.001 mg/kg) and fish tissue (LOQ<0.001 mg/kg) samples. Zn (mean±SD: 0.55±0.96 mg/L) and Cu (0.04±0.03 mg/L) were detected in 40% of the analyzed water samples and mean levels were within the standard limits according to Ambient Water Quality Regulations, No. 01 of 2019 for aquatic life. However, As (LOQ <0.02 mg/L), Cd (<0.005 mg/L), Cr (<0.01 mg/L), Pb (<0.04 mg/L) and Hg (<0.001 mg/L) were not detected in any of these analyzed water samples. Metal (loid)s namely Cr (15.0±6.5), Cu (7.5±4.8), Pb (8.3±4.5) and Zn (29.9±18.1) mg/kg were detected in sediment samples and the current levels were found to be less than that of the previous studies conducted in 2007 and 2013 in Bolgoda Lake. Hg (0.12±0.05), Cu (1.38±0.60), and Zn (34.17±57.40) mg/kg were detected in fish tissues and was below than both the maximum standard limits defined by European Union No. 1881/2006 and fish product export regulation No.1528/7, 2007. Overall results of the study revealed that although Bolgoda Lake was subjected to heavy metal pollution, the level of contamination in food fish, water and sediment had not yet been reached to a harmful level for aquatic organisms and human consumption. Maintenance of relevant quality standards of effluent water released into the lake and continuous investigations on metal pollution could possibly protect this sensitive aquatic ecosystem from further degradation.

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