

(126)

Investigation of Spatial Distribution Patterns of Environmental Toxicants in Major Reservoirs, Anuradhapura, Sri Lanka

Botheju W.S.M. *, Dayananda M.D.N.R., Perera W.P.R.T., Liyanage J.A.

Department of Chemistry, Faculty of Science, University of Kelaniya, Kelaniya, Sri Lanka
**2017_botheju@kln.ac.lk*

Abstract

Reservoirs facilitate all requirements of water and act as sinks for toxicants in catchment areas. Those toxicants which are carried out by runoff can be accumulated in bottom sediments and can be released into adjacent water columns with environmental changes. Long term exposure to environmental toxicants in those waters will result adverse health impacts such as chronic kidney failures. Therefore, this study was carried out to investigate the distribution of environmental toxicants; Cadmium (Cd), Lead (Pb), Arsenic (As), Calcium (Ca) and Magnesium (Mg) in Kalawewa and Tissawewa in Anuradhapura district. Fifteen water samples were collected from each reservoir and Cd, Pb, As, Ca and Mg concentrations were analysed by inductively coupled plasma mass spectrometry (ICP-MS). Total hardness values were calculated based on Ca and Mg contents for each sample. Analysed heavy metals and total hardness values were interpolated using ArcMap 10.2.2 software and the contribution of Ca and Mg levels to the hardness were determined. Cd concentrations were ranged from 0.00001 µg/L to 0.04593 µg/L and from 0.00001 µg/L to 0.16246 µg/L in Kalawewa and Tissawewa respectively. Pb concentrations of Kalawewa and Tissawewa ranged from 0.21548 µg/L to 1.77810 µg/L and from 0.00164 µg/L to 18.07452 µg/L respectively. According to the results, As content of Kalawewa ranged from 0.20183 µg/L to 2.70808 µg/L while As content of Tissawewa ranged from 0.00321 µg/L to 3.14488 µg/L. All most all of the sample values for total hardness (TH) were exceeding SLS standards, (250 mg/L). Mg was the major affected factor to the hardness. The highest TH of Kalawewa was 1040 mg/L and the lowest was 396 mg/L. The highest and the lowest TH for Tissawewa were 440 mg/L and 147 mg/L respectively. Based on results, nephrotoxic heavy metal concentrations were higher in centers of the particular water bodies than shallow water columns but not exceeding SLS standards. Usage of proper filtration methods when utilising those water for drinking purposes can be recommended.

Keywords: Environmental toxicants, Hardness, Reservoirs, Spatial distribution