

Abstract :

HEAVY METAL CONTAMINATION OF WATER IN NEGOMBO LAGOON AND INTERCONNECTED WATER SOURCES

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Abstract

Water quality in natural lagoons that are located within close proximity to human settlements is generally at contamination risk due to increasing anthropogenic activities. The Negombo lagoon situated in the Gampaha District in Sri Lanka is a lagoonal estuary. It receives surface water runoff mainly from Dandugamoya, Ja-ela, Hamilton and Dutch canals. During the recent past, it has been noted by several researches that there is increasing evidence in anthropogenic activities in Negombo lagoon and surrounding areas. The present study was carried out to assess the contamination levels of heavy metals of water in the Negombo lagoon and interconnected water sources. Sampling was carried out in 19 locations; 6 in the Negombo lagoon and 13 from the interconnected sources (5 samples from Hamilton canal, 2 samples each from Dutch canal, Dandugamoya and Ja-Ela and one sample each from Kelani estuary and Ocean-Negombo). The data collection was conducted during relatively wet (May) and relatively dry (September) months in 2013. Water samples were analysed in the laboratory as per the standards methods of American Public Health Association (APHA manual) by using the Atomic Absorption Spectrophotometer. The tests were carried out to detect heavy metals: cadmium (Cd), chromium (Cr), copper (Cu), Lead (Pb), manganese (Mn), and zinc (Zn) in water. Data analysis was accomplished using ArcGIS (version 9.3) software package along with Microsoft Excel. Standards for inland water and drinking water of Sri Lanka were used to determine the threshold levels of heavy metals. The results show that concentrations of Cr, Cu, Mn and Zn of all water bodies were below the threshold level of human consumption and quality standards for inland waters in Sri Lanka. The Cd and Pb levels of water in Negombo lagoon and Hamilton canal were comparatively high. Furthermore the Cd and Pb levels of Dandugamoya, Ja-ela and Dutch canals were below the maximum permissible levels in both relatively wet and relatively dry periods. Concentration of Cd and Pb in Negombo lagoon and Hamilton canal showed seasonal oscillation with the rainfall. Both the parameters demonstrate a negative relationship with precipitation. Comparatively a high Cd and Pb concentrations was observed during the dry period. In conclusion, the Cd and Pb levels were high in the lagoon and Hamilton canal while the concentration of Cd and Pb were below the threshold level in Dandugamoya, Ja-ela and Dutch canal waters. The findings were important as the study indicates the spatial and seasonal variations of presence of heavy metals in the lagoonal water and which probably links to anthropogenic activities.

Keywords : Heavy metals, water quality, lagoon, anthropogenic influence, Sri Lanka