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Evaluation of Water Quality and Heavy Metal Pollution in Selected Wetlands in Colombo District

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Abstract

Wetland ecosystem in Colombo District is facing increasing heavy metal accumulation, posing risks to the environment and human health. The present study aimed to assess the quality in the water and concentrations of heavy metals in the water of five wetlands located in the Colombo District, namely Kotte, Madinnagoda, Heen Ela, Diyasaru Park, and Gothatuwa.The research involved collecting water from different locations within these wetlands during rain free period in 2023. The concentrations of heavy metals were analyzed using Inductive Couple Plasma-Mass Spectrometry (ICP-MS). Physio-chemical parameters of the water, including pH, temperature, electrical conductivity (EC), salinity, dissolved oxygen (DO), and total dissolved solids (TDS), were measured. The pH levels of water ranged from (6.20±0.00) and (7.23±0.06), all within safe limits of 6.0-8.5.DO levels varied between (0.03±0.00mg/L) and (8.43±0.06 mg/L) were not within the recommended level of 6.5- 8 mg/L in all the wetland except Diyasaru Park. Salinity levels across the wetland locations ranged from (0.10±0.01%) and (0.31±0.00%) at all wetlands were above the maximum limit of 0.60%. EC levels were between (187.67±1.53 µS/cm) and (642.33±2.52 µS/cm), below the maximum limit of 400 µS/cm at all locations except at Gothatuwa and Madinnagoda. TDS varied from between (110.80±0.72mg/l) and (311.50±0.76mg/l), met the maximum limits of 300 mg/except of Madinnagoda wetland. Water samples collected from the wetlands showed an accumulation of heavy metals. Metal accumulation varied among wetland locations. The Fe concentrations were consistently higher than those of other heavy metals across all wetland locations. The concentrations of Fe ranged from (0.2367±0.0042 mg/l) to (0.9262±0.0041 mg/l), Ni ranged from (0.0414±0.001 mg/l) to (0.1024±0.0016 mg/l), and Pb ranged from (0.0056±0.0002 mg/l) to (1.2948±0.004 mg/l), with all three frequently exceeded the established drinking water standards. These findings raise concerns about the potential health risks associated with heavy metal contamination in the Colombo wetland ecosystems.

Keywords: *Heavy metals, Wetland ecosystems, Water quality, Physio-chemical parameters, Human health*