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Analysis of Heavy Metal Accumulation by Soil and Vegetation of Wetlands in Colombo Area

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Abstract

Wetlands are an indispensable component in ecosystems. The health of the wetlands is portrayed by the health of plants and soil in the wetland. Pollution of wetlands is a huge problem because the pollutants usually contain a high concentration of heavy metals and other hazardous chemicals. Wetlands can be polluted directly or indirectly via the water bodies that wetlands are interconnected with. Furthermore, wetlands act as sponges and harbor heavy metals within the wetlands. The purpose of the present study was to analyze the accumulation of heavy metals in soil and terrestrial plant species at the wetlands in the Colombo area: Kotte, Madinnagoda, Heen Ela, Diyasar Park, and Gothatuwa. The content of 10 heavy metals (Cr, As, Cd, Ni, Pb, Cu, Zn, 57Fe, 56Fe, and Mn) in soil and abundant terrestrial plant species in 15 locations of five different vegetation types of wetlands were analyzed. Moreover, the linkage between the above five wetlands was also determined. There are five types of vegetation considered in the above wetlands: herb-dominated low vegetation, herb-dominated high vegetation, Annona woodlands, mixed woodlands, and highland vegetation (Strategy, 2015) associated with wetlands. Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) was utilized to determine the heavy metal contents in each sample. Data analysis was done using SPSS software (IBM SPSS statistics version 21) and Minitab 16 for windows. Microsoft Excel 2010 was used for graphical representation of data. Results indicated that the plant, *Syzygium caryophyllatum*, had a higher ability to accumulate heavy metals than the other plant species studied. Relatively, the more contaminated areas were Madinnagoda, Heen Ela and Kotte and the less contaminated area was Diyasar Park. Moreover, Fe accumulation was higher than the others and Cd accumulation was lower than the others in all the wetlands. The present study indicated that the wetlands were slightly polluted by heavy metals with the detected levels of below the maximum permitted levels by WHO. (Chiroma T. M et al., 2014) However, further studies are warranted as environmental pollution is ongoing. The output of the evaluations also insists efforts to conserve the environment, manage agriculture, and shape the environmental policies and regulations.

Keywords: *Wetlands, Soil and terrestrial abundant plants, Heavy metals, Garbage dumping, ICP-MS*