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Assessment of Heavy Metals in Compost Produced from Invasive Water Hyacinth (*Eichhornia crassipes*) in Moragoda Canal, Galle, Sri Lanka

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Abstract

Most of the wetlands in Sri Lanka have been affected by the water hyacinth (*Eichhornia crassipes*) which is an alien invasive aquatic weed species. Aquatic weeds have been extensively used to produce compost to address these problems encountered. However, accumulation of heavy metals can be occurred during the phytoremediation process. In this context, this study was carried out with the objectives to manage water hyacinth in Moragoda canal, Galle, while producing compost and to assess the heavy metals in the produced compost. The weeds were collected from the canal which primarily serves for flood control. Heavy metal concentration was determined in separated parts of leaf, stem and roots before making compost. The separated parts were air dried and grounded into powdered form to make them for metal analysis. The other parts were composed by aerobic digestion. Water samples taken from 3 sites namely, Beligaha, Samagiwattha, Magalle, and plant parts and compost were analysed for Cu, Cd, Pb, Zn, Ni, Fe, and As by using inductively coupled plasma optical emission spectrometer (ICP). Finally, the obtained results were compared with the indices of the Sri Lanka Standards (SLS) to examine the harmful effects on human as well as the environment. The results showed that the average Cu content in leaf, stem, root samples and compost samples were 2.49 ± 0.64 mg/kg, 2.56 ± 0.74 mg/kg, 9.83 ± 0.21 mg/kg and 9.75 ± 0.02 mg/kg respectively. The Zn content in leaf, stem, root samples and compost samples were 13.89 ± 0.61 mg/kg, 18.21 ± 3.49 mg/kg, 10.22 ± 1.07 mg/kg and 21.65 ± 0.19 mg/kg. The As content in leaf, stem, root samples and compost samples were 0.148 ± 0.02 mg/kg, 0.088 ± 0.002 mg/kg, 0.702 ± 0.21 mg/kg and 0.53 ± 0.07 mg/kg respectively. In this study, Fe was observed to be the highest occurring metal in water hyacinth. However, according to the results it was revealed that the heavy metals of the produced compost except Fe, did not exceed the permissible limits of SLS standards for compost. Although the canal was polluted by anthropogenic activities, heavy metal parameters detected in canal water did not exceed the permissible limits. Results indicated that the produced compost using water hyacinth in Moragoda canal was within the standard levels of heavy metals.

Key words: *Compost, heavy metals, permissible limits, water hyacinth, weeds*

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