

## Heavy Metal Removal in Landfill Leachate Using Agricultural Waste Materials: A Case Study in Sri Lanka

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Heavy Metal Removal in Landfill Leachate Using Agricultural Waste Materials: A Case Study in Sri Lanka

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Abstract

Open dumping of Municipal Solid Waste (MSW) is a common practice and identified as a source of pollution for surface and groundwater resources in Sri Lanka. The objective of this study was to identify the heavy metals in leachate and soils in the vicinity of MSW dump site and to assess locally available agricultural waste materials to use as adsorbents to remediate heavy metals from polluted water. Coconut husk (CH) and saw dust (SD) was used as the adsorbents in the column and field experiments. The influent solutions were introduced from the bottom of the column using a submersible pump. Field experiment was carried out in the selected MSW landfill using concrete cylinders with 0.3 and 3 m in diameter and length, respectively. These were filled with CH and SD. Cadmium and Lead concentrations were measured in influent and effluent with time. Cadmium and Lead was found to be the most critical heavy metals in landfill leachate which possess quality rating scales of 620% and 108% based on the general standards for portable water. Removal efficiencies of both Cd and Pb by CH and SD were >85% at the beginning and decreased with time until the equilibrium is achieved in column experiment. In contrast, at the field, average removal efficiencies of them were >50% which could be due to the presence of other ions, and large particle size and variable concentration of heavy metal in the field. Hence, these agricultural wastes have potential to mitigate heavy metal pollution and more studies are needed to optimise the effective removal and to increase the efficiency of CH and SD.

Key words: coconut husk, dumping site, heavy metals, leachate, saw dust

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