

**EFFICIENCY OF CONSTRUCTED FILTERS IN REMOVING HEAVY METALS
(Cd, Cu, Pb and Zn) FROM CHEMICAL WASTEWATER**

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ABSTRACT

Efficiency of Constructed Filters in Removing Heavy Metals (Cd, Cu, Pb and Zn) from Chemical Wastewater

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The presence of heavy metals at elevated concentrations is a major concern due to its toxic effects to aquatic organisms, plants and humans. Untreated wastewaters from chemistry laboratories could be the key source of heavy metal contamination if not properly processed before disposal to the environment. In this study, the efficiency of the constructed filter, made up of plant-based materials, in removing heavy metals (Cd, Cu, Pb and Zn) from chemical wastewater was determined. Characterization of the untreated and treated chemical wastewaters was also performed using different water quality parameters such as temperature, pH, TDS, TSS, COD, heavy metals and toxicity. Results show that the untreated chemical wastewater contains high concentrations of Zn, Cu, Pb and Cd which did not pass the Department of Environment and Natural Resources (DENR) standards and considered harmful when released to the environment. The physico-chemical characteristics, such as TSS and TDS, of the untreated wastewater also did not pass the standards set by DENR except for pH, temperature and COD. The quality of the treated wastewater failed to pass the DENR standards for TSS and TDS thus the constructed filter was not efficient in improving the said physico-chemical characteristics of the wastewater. Rice hull was efficient in removing Zn, Cu and Pb. Bagasse was efficient in removing Pb and saw dust was efficient in removing Cu. The constructed filter was able to significantly reduce the concentrations of heavy metals from 18-L chemical wastewater. The removal efficiency was not significantly different from the 9-L volume treatment. Pb concentration was within the DENR standards after treatment while Zn, Cu and Cd concentrations were above the requirement. The initial concentration of the metal in wastewater greatly affects the removal efficiency of the constructed filter. Furthermore, the constructed filter was able to minimize the toxicity of the chemical wastewater. These findings could be of significance in the design of the treatment facility that could address the problem of heavy metal pollution.