A FEASIBILITY ANALYSIS OF THE CONSTRUCTED WETLAND UNIT FOR DOMESTIC GREYWATER TREATMENT

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Constructed Wetlands(CW) are considered as a low-cost and eco-friendly wastewater treatment technology, which can be extended even up to the domestic level. This study was designed to assess the feasibility of pilot scale CW units on greywater treatment at domestic level. The CW units were constructed using plastic containers planted with three selected wetland plants; Vetiver (*Vetiveria zizanioides)*, Water spinach/*Kangkung* (*Ipomoea aquatic* L.), Lasia/*Kohila* (*Lasia spinosa* L.) and soil without amendments was served as a control. The experiment was conducted in greenhouse conditions. Synthesized domestic wastewater was fed into the CW units during 02 months of period at the rate of 2.025 mLs^{-1}. The Hydraulic Retention Time (HRT) was 4 hours. Biological Oxygen Demand (BOD_5), Total Dissolve Solids (TDS), pH, Electrical Conductivity (EC), PO_4^{-3}-P, NO_3^--N, NH_4^+-N, Cd, As and Pb were monitored in both influent and effluent in two weeks interval during eight weeks. The experiments were conducted in a Completely Randomized Design (CRD) with three replicates. According to the results, each wetland plant recorded an increasing pollutant (BOD_5, TDS, pH, EC, PO_4^{-3}-P, NO_3^--N, NH_4^+-N, and heavy metals) Removal Efficiencies (RE) throughout the monitoring period. Vetiver showed significantly ($p<0.05$) higher RE for BOD_5, PO_4^{-3}-P, NO_3^--N, NH_4^+-N by 46%, 71%, 83% and 89% respectively. However, Water spinach and Lasia showed significantly ($p<0.05$) higher RE for NO_3^--N and PO_4^{-3}-P by 77% and 68% respectively. Hence, it can be concluded that the pilot scale CW units are feasible technology for greywater treatment at domestic level with the combination of Vetiver, Water spinach and Lasia. However, it can be recommended to continue this study to obtain a firm conclusion.

Keywords: Constructed wetlands, Greywater treatment, Removal efficiencies, Wetland plants