

SMALL SCALE CONSTRUCTED WETLAND UNITS FOR DOMESTIC GREYWATER TREATMENT

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Constructed wetlands (CWs) are widely used environmental friendly greywater treatment method. However, requirement of larger land area is a major limitation for its use. Small scale CW units can be the best option for domestic greywater treatment since it reserves limited land area. This study aimed to check the feasibility of using small scale CW units for domestic wastewater treatment. The CW units were constructed using plastic containers (55x30x30 cm). Eight treatments; in combination of selected wetland plants *Vetiver (Vetivria zizanioides)*, *Kangkung (Ipomoea aquatica)*, *Kohila (Lasia spinosa)* were tested and soil without amendments were served as a control. Wastewater were synthesized, similar to the domestic greywater and fed into CW units at the rate of 0.51 h^{-1} . Hydraulic retention time was 63 hours. Phosphate Phosphorous ($\text{PO}_4^{3-}\text{-P}$), Nitrate Nitrogen ($\text{NO}_3^- \text{-N}$), Ammonium Nitrogen ($\text{NH}_4^+ \text{-N}$), Total Dissolve Solids (TDS), pH, Electrical Conductivity (EC) and certain trace elements were monitored both in influent and effluent in two week intervals for two months. The experiment was conducted in a completely randomized design with three replicates. Results revealed that each combination of wetland plants recorded an increasing pollutant ($\text{NH}_4^+ \text{-N}$, $\text{NO}_3^- \text{-N}$, $\text{PO}_4^{3-}\text{-P}$, TDS, pH, EC and trace elements) removal efficiencies (REs) throughout the monitoring period. Plant combination of *Kangkung*, *Kohila* and *Vetiver* showed significantly ($p < 0.05$) higher performance in removal of $\text{NH}_4^+ \text{-N}$, $\text{NO}_3^- \text{-N}$, $\text{PO}_4^{3-}\text{-P}$ with the REs of 62%, 66% and 65% respectively. After the treatment process; in all treatments, trace elements, pH, EC and TDS of the effluents were ranged around the permissible level following the general standards for wastewater. The overall results conclude that small scale CW units are a viable technology for greywater treatment at domestic level with the combination of *Kangkung*, *Kohila* and *Vetiver*. Further studies are recommended for concrete conclusion.

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