

Phytoremediation of domestic wastewaters in free water surface constructed wetlands using *Azolla pinnata*

ABSTRACT

Two constructed wetlands, one with *Azolla pinnata* plant (CW1) and the other without (CW2) for treating domestic wastewaters were developed. Fifteen water parameters which include: Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD₅), Chemical Oxygen Demand (COD), Total Suspended Solid (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Ammoniacal Nitrogen (NH₃N), Turbidity, pH, Electrical Conductivity (EC), Iron (Fe), Magnesium (Mg), Manganese (Mn), and heavy metals such as Lead (Pb) and Zinc (Zn) were analyzed using standard laboratory procedures. The experiments were conducted in two (dry and wet) seasons simultaneously. Results showed considerable reductions in all parameters and metals including Zn in CW1 compared with CW2 in the two seasons considered while Pb and Mn were not detected throughout the study. Zn concentration levels reduced significantly in both seasons just as removal efficiencies of 70.03% and 64.51% were recorded for CW1 while 35.17% and 33.45% were recorded for CW2 in both seasons. There were no significant differences in the removal efficiencies of Fe in both seasons as 99.55%, 59.09%, 88.89%, and 53.56% were recorded in CW1 and CW2 respectively. *Azolla pinnata* has proved effective in domestic wastewater phytoremediation studies.

Keyword: *Azolla pinnata*; Constructed wetlands; Phytoremediation; Removal efficiency; Wastewater