

## Efficiency of Manganese Removal by *Eichhornia crassipes* and *Pistia stratiotes* from Contaminated Water

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Metal pollution is a major problem of water sources used for drinking purposes. Among heavy metals, Manganese (Mn) is an essential trace element for the functioning of human, animal and plants but it leads to toxicity when it exceeds the standard level. *Phytoremediation* can be applied to remove heavy metals from aquatic environment. Floating aquatic macrophytes are used as an environmental friendly, efficient and cheap method. In present study two aquatic plant species, *Eichhornia crassipes* (Water Hyacinth) and *Pistia stratiotes* (Water Lettuce) were used to determine the efficiency of removing Manganese. Bioassays using Water Hyacinth and Water Lettuce were carried out with de-ionized water contaminated by three concentration series (20, 40, 60 mg L<sup>-1</sup>) of Manganese (II) for a period of 24 days. Three replicates were carried out for each series. Water samples were taken from each series at one day intervals and remaining manganese were analyzed using Atomic Absorption Spectrometry technique. Variations of pH and electrical conductivity of water were also measured at same interval by standard techniques. Data were statistically analyzed using SPSS16.0 package. Both *Eichhornia crassipes* and *Pistia stratiotes* showed the highest removal efficiency at the lowest concentration of Manganese (20 mg L<sup>-1</sup>). Average efficiency of manganese removal from water by *Eichhornia crassipes* and *Pistia stratiotes* were 67.61% and 80.04% respectively. Higher manganese removal efficiency was observed in *Pistia stratiotes* than *Eichhornia crassipes*. There was a significant difference ( $p < 0.05$ ) between absorbed manganese concentrations with the time in *Eichhornia crassipes*, but there was no significant difference ( $p > 0.05$ ) in *Pistia stratiotes*. The results of the study revealed that the both plants can be used to remove manganese from contaminated water. However, it is needed to conduct a pilot study for the water contaminated with manganese.

**Keywords:** *Eichhornia crassipes*, *Pistia stratiotes*, Manganese, Phytoremediation, Efficiency