

Thesis Title                    The Efficiency of Aquatic Plant Systems for  
   Domestic Wastewater Treatment

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#### ABSTRACT

This research was conducted to study the efficiency of aquatic plant systems for domestic wastewater treatment. The Water Hyacinth (Eichhornia crassipes), Water Lily (Nymphaea spp.) and Cattail Plants (Typha spp.) were used in both isolation and combination systems. The designed HRT were 10, 15 and 20 days in each system.

The results indicated that the efficiency of the water hyacinth system for TSS removal was highest at 94.95 % in 10-days HRT, BOD removal was highest at 89.42 % in 20-days HRT, TP removal was highest at 97.93 % and 97.94 % in 15-days HRT and 20-days HRT with no statistically significant difference at 95 %. The efficiency of the water lily system for TSS removal was highest at 86.85 % in 15-days HRT, BOD removal was highest at 81.75 % in 20-days HRT, TP removal was highest at 97.25 % in 20-days HRT. The efficiency of the cattail plants system for TSS removal was highest at 91.25 % in 10-days HRT, BOD removal was

highest at 89.81 % in 10-days HRT, TP removal was highest at 98.71 % in 20-days HRT. The efficiency of the combined system for TSS removal was highest at 93.38 % and 92.58 % in 10-days HRT and 15-days HRT with no statistically significant difference at 95 %, BOD removal was highest of 81.56 % in 15-days HRT, TP removal was highest at 97.31 % in 20-days HRT.

The results also indicated that within the HRT of 10 days, the highest TSS removal efficiency belonged to the water hyacinth system (94.95 %), the highest BOD removal efficiency belonged to the cattail plants system (89.81 %) and the highest TP removal efficiency belonged to the water hyacinth system (93.96 %). Within the HRT of 15 days, the highest TSS removal efficiency still belonged to the water hyacinth system as well as the combined system (92.14 % and 92.58 % respectively with no statistically significant difference at 95 %), the BOD removal efficiency of the four systems was between 78.00 % and 79.81 % with no statistically significant difference at 95 %. The highest TP removal efficiency belonged to the water hyacinth system (97.93 %). Within the HRT of 20 days, the highest TSS removal efficiency, again, belonged to the water hyacinth system (93.56 %), the highest BOD removal efficiency belonged to the water hyacinth system (89.42 %), the highest TP removal efficiency belonged to the water hyacinth system and the cattail system (97.94 % and 98.71 % respectively with no statistically significant difference at 95 %).

For the TKN removal, efficiency of all designed HRT's was nearly 100 % due to the fact that TKN value of effluent was undetectable because of concentration of influent was low (ranged from 0.24 to 4.34 mg/L).

The potential of applying selected aquatic plants in a larger scale ; the highest TSS removal efficiency belonged to the water hyacinth system (ranged from 92.14 % to 94.95 %), the highest BOD removal efficiency belonged to the cattail plant system (ranged from 79.81 % to 89.81 %), the TP removal efficiency of all selected plants had high values (ranged from 88.48 % to 97.94 %) and the TKN removal efficiency of all selected plants was nearly 100 % (concentration of influent ranged from 0.24 mg/L to 4.34 mg/L).