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**DESIGN OF HOUSEHOLD WASTEWATER PHYTOREMEDIATION SYSTEM UTILIZING  
WATER LETTUCE (*Pistia stratiotes*) and WATER HYACINTH (*Eichhornia crassipes*)**

A Project Study Report

Presented to:

The Faculty of the Department of Chemical Engineering  
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by

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UTILIZING WATER LETTUCE (*PISTIA STRATIOTES*) AND WATER HYACINTH (*EICHHORNIA  
CRASSIPES*)**

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**ABSTRACT**

This experimental study aimed to develop a household wastewater phytoremediation system using *Pistia stratiotes* and *Eichhornia crassipes* as natural purifiers. The surfactant removal efficiency from household wastewater was determined in the study. A pilot design was conducted on a household approach to provide baseline data for the actual design. Wastewater was collected in three replicates through random sampling on days 1, 3, and 6 from the constructed wastewater phytoremediation system. Results showed that mean surfactant concentration of 0.001mg/L for both *P. stratiotes* and *E. crassipes*, pH (7.1 and 6.5), BOD (9 mg/L and 10 mg/L), oil and grease (2 mg/L and 3 mg/L) levels decreased while DO (9 mg/L and 9 mg/L) levels increased after six days of treatment. A dependent t-test for the pre- and post-test for both plants revealed a significant difference in the pH, BOD, oil and grease, and surfactant levels at 0.05 significance level. After three days, surfactant removal efficiency was 84.825% and 95.420% for *P. stratiotes* and *E. crassipes*, respectively. After six days, removal efficiency for both setups was 99.939%. Using ANOVA and Bonferroni Post-Hoc Analysis, there was a significant difference in the amount of surfactants when compared to DAO-2016-08, with p-values of *P. stratiotes* =  $9.387 \times 10^{-6}$  and *E. crassipes* =  $1.112 \times 10^{-5}$ . The designed household wastewater treatment system was proven to be effective as the parameters tested were set within DAO-2016-08 at Day 6 of the treatment in both setups.