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WASTEWATER USING PALM OIL SHELL ASH AS ADSORBENT. THESIS  
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The objective of this study was to determine the Chemical Oxygen Demand (COD), Suspended Solid (SS), and Oil and Grease (O&G) removal efficiency from gas station wastewater by using palm oil shell ash as adsorbent. The experiments were done by packing palm oil shell ash in an adsorption column with the heights of 30 and 50 cm, and then applying continuous downflow wastewater from the column with hydraulic loadings of 4.0 and 6.0 m<sup>3</sup>/m<sup>2</sup>/day. The experiments were carried out until the headloss reached 90 cm. The observation of the influent and effluent from the column-adsorption system in terms of COD, SS, and O&G was made and recorded.

Results indicated that the ranges of removal efficiency of COD, SS and O&G were 60.34-67.16%, 75.21-84.21% and 67.66-84.07%, respectively. The operating time ranged from 60 to 92 hours. When considering the hydraulic loading at 4.0 m<sup>3</sup>/m<sup>2</sup>/day, the SS and O&G removal efficiency was significantly greater than that at 6.0 m<sup>3</sup>/m<sup>2</sup>/day. However, the COD removal efficiency was not significantly different. The COD, SS and O&G removal efficiency at the packing adsorbent height of 50 cm was greater than that at 30 cm.

The optimum operating conditions for this study were the hydraulic loading of 4.0 m<sup>3</sup>/m<sup>2</sup>/day and the packing adsorbent height of 50 cm. These conditions yielded the removal efficiencies of COD, SS, and O&G of 67.16%, 84.21%, and 84.07%, respectively with 80 hours of operating time.