

Fouling of Regenerated Ultrafiltration Membrane in Treatment of Oily Wastewater of Palm Oil Refinery

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Abstract : Oily wastewater in Malaysian refinery has become a big issue of water and environment pollution to be solved urgently. The results of an experimental study on separation of oily wastewaters are presented. The characteristic of filtration behavior of commercial polymer ultrafiltration (UF) membranes was evaluated in the treatment of oily wastewater from palm oil refinery. The performance of different molecular weight cut off 5kDa and 10kDa regenerated cellulose membrane were evaluated and compared and the fouling behavior were analyzed by scanning electron microscopy (SEM). The effect of pressure (0.5, 1.0, 1.5, 2.0, 2.5 bar) and sample concentration (100%, 75%, 50%, 25%) on fouling of 5kDa and 10kDa membrane were evaluated. The characteristic of the sample solutions were analyzed for turbidity, total dissolved solid (TDS), total suspended solid (TSS), BOD, and COD. The results showed that the best fit to experimental data corresponds to the cake layer formation followed by the intermediate blocking for the experimental conditions tested. A more detailed analysis of the fouling mechanisms was studied by dividing the filtration curves into different regions corresponding to the different fouling mechanisms. Intermediate blocking and cake layer formation or combinations of them were found to occur during the UF experiments depending on the operating conditions.

Keywords : fouling, oily wastewater, regenerated cellulose, ultrafiltration

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