**SUBMERGED ULTRAFILTRATION FOR MINIMIZING ENERGY PROCESS OF**

**REFINERY WASTEWATER TREATMENT**

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**ABSTRACT**

Application of submerged ultrafiltration (UF) for industrial wastewater treatment is still in its infancy due to the significant variety in wastewater composition and high operational costs. Aim of this study was to investigate UF membrane morphology and performance for refinery produced wastewater treatment. Submerged UF bundle was equipped using PVDF hollow fibers, which were prepared via the phase inversion method by dispersing LiCl.H2O and TiO2 in the dope. Comparison of morphological and performance tests was conducted on prepared membranes in term of membrane wettability, tensile testing, roughness measurement, mean pore size and surface porosity. An experimental set-up comprised mainly of submerged UF reservoir, circulation pump and aerator were used throughout investigation at vacuum pressure. Fouling characteristics for fibers fouled with suspended solid matter was also investigated. Mixed liquor suspended solid (MLSS) of 3 g/L and 4.5 g/L were assessed by using submerged membrane with varied air bubble flow rates. Results showed effect of air flow rate of 2.4 ml/min increased flux, total suspended solids and sulfide removal of 148.82 L/m2h, 99.82 % and 89.2%, respectively due to increase of turbulence around fibers, which exerts shear stress to minimize particles deposited on membrane surface and available option to minimize energy process.

Keywords*:* submerged membrane, refinery wastewater, minimizing energy process, ultrafiltration.