**Fouling study in submerged PVDF ultrafiltration for refinery produced wastewater treatment: Effect of suspended solids concentration and aeration**

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**Abstract :** Fouling behavior for modified polyvinylidene fluoride (PVDF) hollow fibers fouled with suspended solid matter was investigated. This study describes the effect of aeration to prevent the membrane fouling. Hollow fiber membranes were spun by a dry-jet wet phase inversion spinning process. Addition of lithium chloride (LiCl.H2O) and titanium dioxide (TiO2) nanoparticles concentration in the spinning dope improved the hydrophilicity, average pore size, porosity, surface roughness, and resulted in increasing the fouling resistance of membrane, which confirmed by water permeation. Distinctive changes were observed in membrane characteristics in terms of ionizable functional groups, membrane structural, wettability, and roughness measurement. Fouling characteristics of synthetic refinery wastewater with mixed liquor suspended solid (MLSS) of 3 g/L and 4.5 g/L were assessed by filtering the feed water using submerged PVDF membrane with varied air bubbles flow rate (1.2, 2.4, and 3.0 mL/min). Response surface methodology (RSM) was used to odetermine the optimal operating conditions for refinery produced wastewater treatment. Results showed that the flux, flux reduction coefficient and suspended solids removal were 138.397 L/m2h, 18.3%, and 99.8%, respectively. Meanwhile, the optimum operating conditions were MLSS of 3.0 g/L and air bubbble flow rate at 2.4 mL/min.

**Keywords**: Submerged ultrafiltration; Fouling; Suspended solids; Aeration; Refinery produced wastewater.