

ABSTRACT:

The influence of air bubble flow rate (ABFR), hydraulic retention time (HRT), mixed liquor suspended solid (MLSS) concentration, and pH on the performances of modified polyvinylidene fluoride (PVDF) was investigated in submerged membrane ultrafiltration (SMUF). The refinery wastewater process was conducted using an experimental set-up consisted of an SMUF reservoir, a circulation pump, and an aerator. For SMUF, operated at vacuum pressure, deposition and accumulation of suspended solids on membrane surface were prohibited with continuous aeration. The process performance was measured in terms of the membrane water flux and chemical oxygen demand (COD) removal efficiency. The air bubbles flow rate was controlled at 1.2-3.0mL/min while HRT was manipulated in the range of 120-300min. MLSS and pH solution were controlled at 4.5g/L and 6.5, respectively. Results from response surface methodology (RSM) have demonstrated the improvement in water flux and COD removal, achieving 145.7L/m²h and 90.8%, respectively. By using pH at 6.50, the optimized conditions achieved for refinery wastewater treatment were 2.25mL/min, 276.93min, 4.50g/L for ABFR, HRT and MLSS concentration, respectively.