Tubular nanofiltration of highly concentrated C.I. Acid Black 210 dye

Abstract

Tubular nanofiltration membrane performance to treat water for reuse was carried out by choosing C.I. Acid Black 210 dye as a model dye. It has been shown that increasing pH causes reduction in irreversible fouling factor (IFF) and the dye removal is also affected by solution pH. The total organic carbon removal for pH 4, pH 7, pH 8 and pH 10 is 97.9, 92.3, 94.5 and 94.6%, respectively. The conductivity removal for pH 4, pH 7, pH 8 and pH 10 is 85.1, 88.3, 87.8 and 90.7% respectively. The increase in the initial dye concentration causes rapid increase in fouling until 100 mg/l. Then the fouling increases gradually as it reaches a maximum IFF around 13%. This study also shows that the colour of permeate changes from colourless to light greenish/yellowish (initial concentration of 2,000 and 4,000 mg/l) as the initial dye concentration increases. The conductivity removal was also reduced as the initial dye concentration increased due to screening of the Donnan effect with the presence of salt.