

Treatment of synthetic textile wastewater by combined chemical coagulation/membrane processes

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ABSTRACT

Industrial textile generates large volumes of effluents which are heavily loaded with pollutants, turbidity and are highly concentrated in salts and color. A significant improvement in effluent quality is required before it is discharged into the environment. In the present work, performances of a combined process using chemical coagulation, ultrafiltration and nanofiltration were investigated in treating synthetic textile wastewater containing reactive dyes (Blue S-GLD 150 dyes) and different salt concentration. The efficiency of the combined process was evaluated in terms of effluent decolorization and turbidity removal. Experimental results showed that the optimal dose of coagulant using aluminium sulphate was 1 g/L obtained at pH = 7. The decrease of the effluent salinity improved the treated water quality by increasing the removal of color and turbidity. To explain the effect of the salinity on the optimal coagulant dose, the zeta potential was used as a control parameter. When ultrafiltration (UF) or nanofiltration (NF) were used in post treatment to coagulation-flocculation, the stabilized permeate flux was higher for UF. It remained constant until a volumetric reduction factor (VRF) reaching 4 for NF and 6 for UF at 25 L/h.m² and 122 L/h.m² respectively. The retention of color and salt were higher for NF than for UF. These results were similar for real and model effluent.

Keywords: Textile wastewater; Chemical coagulation; Ultrafiltration; Nanofiltration; Color removal; Pre-treated effluent

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