

Membrane separation process for the treatment and reuse of bath dye effluents

Z. Badani^{a,b*}, C. Cabassud^a, H. Ait-Amar^b

^aUniversité de Toulouse; INSA, UPS, INP; LISBP, 135 Avenue de Rangueil, F-31077 Toulouse, France
INRA, UMR792 Ingénierie des Systèmes Biologiques et des Procédés, F-31400 Toulouse, France
CNRS, UMR5504, F-31400 Toulouse, France

email: cabassud@insa-toulouse.fr, algérie.z_badani@yahoo.fr

^bUniversité des Sciences et de la Technologie Houari-Boumediène, Lab, De Génie des Procédés et Environnement, F.G.M.G.P.
B.P.32, El Alia, 16111, Algiers, Algeria
email: aitamarh@yahoo.com

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ABSTRACT

The main purpose of this work is to study the effect of sodium chloride concentration on the removal by nanofiltration of anionic dyes in synthetic colored wastewaters and to characterise some main performances and properties of nanofiltration membranes of different properties. Membranes Sepa DK and NF90 were used for the study and were operated at constant transmembrane pressure. The anionic dyes, Direct Red 80 (1373 g/mol) and Acid Orange G (452 g/mol), were used at a fixed dye concentration for different salt concentrations. Results indicated that effects of pH, concentrations of salt have a role on the permeate flux and dye retention for single and mixed salt dye solution. An interesting result is that retention of Orange G is enhanced and becomes high (96%) in the presence of salt. NF 90 shows a better salt rejection than Sepa DK, for the same salt and dye concentrations. The Orange G retention increases when the pH decreases from 9 to 3. For NF90, Orange G retention is about 98%, whatever the pH. NF90 achieves the higher salt retention than Sepa DK, however, a great loss in the permeate fluxes is observed as the concentration of NaCl increased.

Keywords: Nanofiltration membrane; Dye removal; Water reuse; Mineral salt

* Corresponding author.