



Effect of pH and MWCO on textile effluents ultrafiltration by tubular ceramic membranes

Sergio Barredo-Damas^{a,*}, María Isabel Alcaina-Miranda^a, María Isabel Iborra-Clar^a, José Antonio Mendoza-Roca^a, Matteo Gemma^b

^a*Departamento de Ingeniería Química y Nuclear, Universidad Politécnica de Valencia, Camino de Vera s/n, 46022 Valencia, Spain
Tel. +34963879633; email: serbarda@isiryum.upv.es*

^b*Dipartimento di Idraulica, Trasporti e Strade, Università degli Studi di Roma "Sapienza" Via Eudossiana 18, 00184 Roma, Italy*

Received 31 May 2010; Accepted 25 July 2010

ABSTRACT

Textile industries are considered as one of the most polluting among all the industrial sectors. Therefore, the disposal of textile effluents without the appropriate treatment entails high environmental risks. Moreover, and due to water shortage situations, industries are becoming aware of the need for investing in innovative treatment technologies for water reclamation, such as membrane filtration. This work studies the performance of three commercial ceramic ultrafiltration membranes treating raw effluents from a textile mill. The effect of both pH and molecular weight cut-off (MWCO) on membrane performance was determined while working on concentration mode. Results showed a noticeable influence of both pH and MWCO on process performance. The best results were obtained for the lowest pH tested (8). At higher pH values, higher fouling rates were achieved. On the other hand, higher fluxes were obtained as MWCO was increased but simultaneously, higher rates of membrane fouling were also observed. Permeate flux rate decreased as the feed solution was concentrated. However, this drop was more noticeable for the lower VRF values. The best overall results were obtained for the 50 kDa membrane operating at pH 8. TOC and COD removals up to 67% and 80%, respectively, were reached at these conditions. In the same way, nearly complete color and turbidity removals were achieved for all the membranes and operating conditions studied. Regarding these results, the combined process of MF/UF has been proven to be a feasible pre-treatment in order to reduce wastewater volume and produce a permeate of enough quality to be used as influent in the NF/RO stage.

Keywords: Ceramic membranes; Textile wastewater; Ultrafiltration; Water reclamation

*Corresponding author.