Desalination and Water Treatment
www.deswater.com

34 (2011) 141–149
October

1944-3994/1944-3986 © 2011 Desalination Publications. All rights reserved
doi: 10/5004/dwt.2011.2882

Performance evaluation of microfiltration with electrocoagulation and chemical coagulation pretreatment

G. Sharma, H.K Shon*, R. Aryal, S. Phuntsho

School of Civil and Environmental Engineering, University of Technology, Sydney (UTS), P.O. Box 123, Broadway, NSW 2007, Australia
Tel. +61 2 9514 2629; Fax: +61 2 9514 2633; email: hkshon@eng.uts.edu.au

Received 3 September 2010; Accepted 3 January 2011

ABSTRACT

One of the significant parameters to be considered for evaluating the process and economic viability of crosssflow microfiltration (MF) is flux stability. The MF economics are dependent on the flux decay through the membrane caused by membrane fouling. This work aims to evaluate the performance of MF by electro and chemical coagulation as pretreatments. The performance of MF was found to be sensitive to pH of feed solution, coagulant dosing and generation time. Acrylonitrile butadiene styrene (ABS) MF membrane of pore size 0.4 μm was used in this study. Without pretreatment normalised flux declined by 94% after 160 min of MF operation using model wastewater. However with pretreatments, the MF flux was significantly improved. The optimum performance for MF with both electro and chemical coagulation pretreatments occurred at isoelectric point where the highest removal of organic and turbidity was observed. With chemical coagulation under optimum conditions (30 mg/l alum dose and pH 6.5), MF did not experience any flux decline. MF performed better with chemical coagulation compared to electrocoagulation (EC). Also organic matter removal was found to be more for chemical coagulation than for EC.

Keywords: Pretreatment; Crossflow; Electrocoagulation; Flux decline; Microfiltration; Zeta potential

*Corresponding author.

Presented at the AMS6/IMSTEC10, The 6th conference of the Aseanian Membrane Society in conjunction with the 7th International Membrane Science and Technology Conference, Sydney Australia, November 22–26, 2010