

Modeling and membrane resistance analysis of stainless steel membrane in alkali wastewater recovery processing

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Received 8 October 2009; Accepted in revised form 26 January 2010

ABSTRACT

A semi-empirical cross-flow ultrafiltration (UF) model of stainless steel membrane that can predict permeate flux as a function of treatment time with alkali wastewater in chitin production was studied. A tubular stainless steel membrane supplied by Hyflux® (Singapore) was employed. Alkali wastewater from chitin deproteination process with 3.4% NaOH (W/W) and 1.7% protein and its hydrolysate was used as the feed liquid. The permeate flux of the pure water was performed under different conditions and the membrane resistance was obtained, and the growth models were developed and analyzed. The resistance that leads to the flux decline was measured, and the model predictions were compared with the experimental data obtained from pilot plant operation. Results showed that the growth model could be used to predict the flux decline of SSM very well, and the correlation coefficient was determined as 0.9892.

Keywords: Stainless steel membrane; Flux decline; Growth curve model; Membrane fouling; Membrane resistance

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