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Title

An Investigation of Physical Cleaning Operations for Fouling Attenuation of Hollow Fiber Membranes in Drinking Water Treatment

Abstract

A number of factorial design experiments were used to investigate the combined effect of the physical cleaning operations of air scouring, backwashing and relaxation on the reduction of fouling of a submerged hollow fiber membrane ultrafiltration system treating simulated source water. The ANOVA model for a factorial design experiment as well as linear regression were used to identify important operation effects and interactions that contributed to fouling reduction. Interaction plots were used to identify and explain the antagonistic and synergistic effects of operations and interactions between operations on fouling reduction. Overall, the combination of all three cleaning operations was found to be efficient in reducing fouling. Optimal regimes for fouling reduction based on the level of filtration flux were identified. Unified as well as flux based models were also developed for the prediction of fouling over time. However, further evaluation of the efficiency of these models is required.

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Supervisor

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