Desalination and Water Treatment
www.deswater.com

41 (2012) 186–194
March

doi: 10.1080/19443994.2012.664713

Taylor & Francis
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Modeling and dynamic analysis of a membrane bioreactor with backwash scheduling

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Received 17 July 2011; Accepted 15 January 2012

ABSTRACT

A dynamic model, based on mass transport and reaction rate laws of biomass and substrate for a membrane bioreactor (MBR), was successfully developed. Furthermore, an empirical model for flux prediction was used. Key kinetic model parameters were estimated via non-linear fitting of the model predictions to experimental data obtained from current and previous works. The performance of the MBR was evaluated with different vacuum-to-backwash time ratio. Permeate flux dynamics were shown to be sensitive to the backwash scheduling scenario. The proposed model will enable optimization of MBR operation in an attempt to minimize membrane fouling.

Keywords: MBR; Biomass; Sludge; Dynamic; TMP; Fouling

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