

## Fouling potential and cleaning characteristics of PVC ultrafiltration membrane during ultrafiltration of hydrophilic dissolved organic matter

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Received 31 November 2010; Accepted in revised form 27 March 2011

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### ABSTRACT

The hydrophilic fraction of dissolved organic matter was thought as the important foulant during drinking water treatment by membranes recently. Citric acid, polysucrose and oligopeptide were selected to represent the hydrophilic acid, neutral and base to investigate the fouling characteristics on a (modified polyvinylchloride) ultrafiltration membrane. Four kinds of cleaning methods, i.e., flushing, backwashing, flushing and backwashing and chemical cleaning with 0.5% NaOH were performed for the three hydrophilic dissolved organic matter fouled membranes to deal with the fouling mechanisms of the polyvinylchloride ultrafiltration membrane. Results showed that the citric acid may react with the membrane in pores to change the membrane properties so that the flux did not recover at all. The membrane fouling by polysucrose was mostly reversible due to the weak interaction between hydroxyl on polysucrose and carboxyl on membrane. The amino and carboxyl on the oligopeptide also reacted with the carboxyl on the membrane surface to form the stronger hydrogen bond to make the permeate flux partly recover after NaOH chemical cleaning. During ultrafiltration of the mixed hydrophilic dissolved organic matter solution composed of the three compounds, the membrane performances were always close to one of the three compounds, of which membrane flux was lowest.

*Keywords:* Ultrafiltration; Dissolved organic matter; Hydrophilic; Membrane fouling; Cleaning

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