



Improving pollutant removal and membrane performance via pre-treatment with a specific formulation of polysilicato-iron

Thuy Tran*, Manh Hoang, Tuan Duong, Brian Bolto

CSIRO Materials Science & Engineering, Private Bag 33, Clayton South MDC, VIC 3169, Australia
Tel. +61-3-95452046; Fax: +61-3-95441128; email: Thuy.Tran@csiro.au

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ABSTRACT

The effectiveness of a specific formulation of polysilicato-iron coagulant, designated as AS1, in removing pollutants from raw water and in mitigating membrane fouling during subsequent microfiltration tests has been investigated using two water sources from South Australia (Happy Valley and Myponga). The results showed that for both water sources, AS1 was as effective as ferric chloride in removing organic matter (60–65% removal), but better than alum (45–55% removal). AS1 pretreatments produced large flocs, which settled more efficiently, resulting in pretreated waters with much lower turbidity (0.12–0.15 NTU), compared to ferric chloride and alum pretreatments (0.35–2.53 NTU). The turbidity of alum-pretreated waters had values similar or even higher than those of corresponding raw waters. Under the current experimental conditions, ferric chloride and alum pretreatments of both water sources gave rise to significant decreases in flux during microfiltration. This is attributed to the small flocs generated by these pretreatments which could deposit on the membrane surface and/or penetrate and block the membrane pores. In contrast, AS1 pretreatments resulted in a relative flux of unity for Happy Valley water, and of 0.8 for Myponga water, whereas the corresponding ferric chloride and alum pretreatments resulted in lower relative flux values ranging from 0.4 to 0.7. The better performance of AS1 in controlling membrane fouling is attributed in part to the much diminished effects of the pore blocking mechanism.

Keywords: Microfiltration; Water treatment; Membrane; Fouling; Coagulant; Polysilicato-iron

*Corresponding author.