Reuse of PAC and alum sludge (RPAS) process: pretreatment to reduce membrane fouling

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Received 15 August 2013; Accepted 4 November 2013

\textbf{ABSTRACT}

In this study, a novel reuse of powdered activated carbon (PAC) and alum sludge (RPAS) process to reduce membrane fouling for drinking water treatment was evaluated by laboratory-scale experiments. As compared to coagulation, PAC combined with coagulation and reuse of alum sludge processes, RPAS process performed better in controlling trans-membrane pressure increase and reducing membrane resistances in both short-term and long-term periodical filtration. Removals of turbidity, DOC, UV_{254}, BDOC and THMFP were 93.8, 37.3, 41.1, 83.0 and 57.9\% on average by RPAS pretreatment, respectively. The results of fractionation of organic matters indicated that hydrophobic acids and hydrophilic matters were efficiently removed, while organic matters with the molecular weight (MW) more than 3 kDa was well removed with a removal efficiency of 50.4\%, and that of MW less than 1 kDa were reduced by 32.6\% by RPAS pretreatment, which could be attributed to the integration of PAC adsorption and the enhanced coagulation of alum sludge.

\textit{Keywords:} Membrane fouling; Pretreatment; Reuse; Alum sludge; PAC; Organic matters

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