Desalination and Water Treatment
www.deswater.com

34 (2011) 129–135
October

1944-3994/1944-3986
doi: 10/5004/dwt.2011.2861

Effect of addition of different additives on overall performance of bioflim-MBR (BF-MBR)

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Received 3 September 2010; Accepted 3 January 2011

ABSTRACT

The effectiveness of five additives, two iron based and two alum based coagulants and one modified cationic polymer was investigated in relation to reduction of fouling rates in biofilm-MBR. Additionally, the amount of colloidal organic matter in terms of soluble microbial products (SMP), dissolved organic carbon (DOC) and filtered chemical oxygen demand (FCOD) removal, retained by membrane was related to measured membrane fouling rates. Optimal dosage was defined based on maximum values of coefficient additive utilization (CAU). Iron chloride at higher chosen dosage showed that fouling could be reduced up to seven times, where for polymerized alum chloride it was measured reduction of about 3 times. The iron chloride coagulant performed better than iron chloride sulfate, in terms of fouling reduction. Higher basicity of polymerized inorganic coagulant did not result in improved membrane performance. Modified cationic polymer showed good potential in instantaneous fouling reduction, however continuous dosing strategy was found difficult to use without thorough monitoring of the system performance. Reduction in fouling rates relates better to reduction of $SMP_{carbohydrates}$, than to $SMP_{protein}$ and DOC. Also FCOD was seen as good potential fouling predictor parameter. Synergetic effect of high total phosphorus removal rates and reduced fouling rates give advantage of iron chloride coagulant over the others tested additives in this study.

Keywords: Biofilm MBR; Fouling control; Colloidal organic matter; Coagulation

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Presented at the AMS6/IMSTEC10, The 6th conference of the Aseanian Membrane Society in conjunction with the 7th International Membrane Science and Technology Conference, Sydney Australia, November 22–26, 2010