



## Influence of sludge rheological properties on the membrane fouling in submerged membrane bioreactor

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Received 3 September 2010; Accepted 3 January 2011

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### ABSTRACT

Rheological characterization is of crucial importance in sludge management both in terms of biomass dewatering and stabilization properties and in terms of design parameters for sludge handling operations. The mixed liquor suspended solid (MLSS) and coagulant concentration have a significant influence on biomass properties in biological wastewater treatment systems and in particular in membrane bioreactors (MBRs). In this work the rheological behavior of the biomass in a MBR operated under different MLSS was studied. The range of MLSS in the bench scale MBR was 3800 mg/l to 15200 mg/l. The rheological properties were measured over time and the apparent viscosity was correlated with the concentration of suspended solids under steady-state conditions. Furthermore, a correlation was obtained between sludge viscosity and permeate flux. Results showed that viscosity of activated sludge affects the membrane fouling tendency in an exponential relation between viscosity and fouling in the investigated range in membrane bioreactor. Also coagulants cause reduction of activated sludge viscosity and hence membrane fouling.

*Keywords:* Membrane bioreactor; Fouling; Viscosity; MLSS; Rheology; Activated sludge

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