Desalination and Water Treatment
www.deswater.com

18 (2010) 1–11
June

1944-3994 / 1944-3986 © 2010 Desalination Publications. All rights reserved.
doi: 10.5004/dwt.2010.1225

Influence of temperature variations on the cake resistance and EPS of MBR mixed liquor fractions

José Antonio Gil[a]*, Leonardo Túa[b], Adriana C. Rueda[b], Manuel Rodríguez[b], Daniel Prats[b]

[a]*Department of Water Management, Section Sanitary Engineering, Delft University of Technology, PO Box 5048, 2600 GA Delft, The Netherlands*
Tel. +31 (15) 27 82258; Fax +31 (15) 27 84918; email: j.a.gillinares@tudelft.nl; josean.gil@ua.es
[b]*Water and Environmental Science Institute, University of Alicante, Ap 99. 03080 Alicante, Spain*
email: leonardotua@gmail.com, aruedacamargo@yahoo.es, manuel.rodriguez@ua.es, prats@ua.es

Received 4 June 2009; Accepted 14 February 2010

ABSTRACT

Few studies have been carried out to correlate the influence of temperature on the filterability of different mixed liquor fractions, i.e. suspended solids, colloidal matter and soluble organic matter. It is known that temperature has a big impact on the fl ux in microfi ltration processes. The aim of this research was to fi gure out the impact of temperatures in the range of 10°C–40°C on fouling, especially in terms of the release of particles and soluble microbial products (SMP). Results based on the contribution of each fraction, namely mixed liquor (>1 μm), supernatant (1 μm –1 nm) and soluble (<1 nm), to fouling, suggest that the colloids present in the supernatant are affected by temperature changes. Low and high temperatures result in defl occulation and formation/release processes respectively, resulting in a release of submicron particles and were observed due to retention changes. Similar values of the cake resistance for all the fractions and for the range of temperatures studied, indicate that all submicron/colloidal particles within the range 0.05–0.4 μm have a similar infl uence in terms of fouling. No correlation was found between the concentration of EPS and the cake resistance, which indicates that (an)other foulant(s) could contribute to the cake resistance. Finally, low retentions of both polysaccharides and proteins were observed at 40°C.

Keywords: Cake resistance; Extracellular polymeric substances (EPS); Membrane fouling; Temperature

* Corresponding author.