Desalination and Water Treatment
www.deswater.com

36 (2011) 344–353
December

1944-3994/1944-3986
doi: 10.5004/dwt.2011.2524

The impact of natural organic matter seasonal variations in drinking water quality

Margarida Ribau Teixeira[a*], Luís Miguel Nunes[b]

[a]*CENSE, Center for Environmental and Sustainability Research, University of Algarve, Faculty of Sciences and Technology, building 7, Campus de Gambelas, 8005-139 Faro, Portugal. Tel.: +351289800900ext7235; email: mribau@ualg.pt*
[b]*CVRM, Geo-Systems Center, University of Algarve, Faculty of Sciences and Technology, Campus de Gambelas, 8005-139 Faro, Portugal*

ABSTRACT

Seasonal variations imply new challenges in operational control and engineering design for water treatment plants. The purpose of this study is to measure and compare the molecular weight (MW) of natural organic matter (NOM) in different seasons and drinking water stages by high-performance size-exclusion chromatography to better understand the impact of organic matter removal on the trihalomethanes present in drinking water. Ultraviolet absorbance at 254 nm, dissolved organic carbon and inorganic parameters are measured between June 2008 to July 2009 to provide additional information of MW and NOM in different water treatment stages. Results demonstrated that summer and spring are the seasons when waters have organic compounds of highest MW, when the highest removals of these compounds are obtained with the water treatment, but also with the highest concentrations of trihalomethanes in drinking water. Furthermore, waters from spring and especially summer are considered to exhibit predominantly organic character, whereas fall and winter waters are more influenced by their physical and chemical signature. Results also showed that trihalomethanes in drinking water are influenced by the quantity and also by the composition of NOM, which resulted in the proposal of a model relating the two. UV_{254} and organic matter molecular weight are considered as very good indicator parameters to measure overall water treatment efficiency.

Keywords: Natural organic matter; Molecular weight; Trihalomethanes; Seasonal variation; Water treatment

*Corresponding author