



Brackish water desalination using nanofiltration membranes in Morocco

A. Lhassani^{a,*}, H. Dach^{a,b}, Y.A. Boussouga^a

^aLaboratory of Applied Chemistry, Faculty of Science and Technology Fez, University Sidi Mohamed Ben Abdellah, P.O. Box 2202 Fez, Morocco, Tel. +212665743570, Fax +212535608214, email: abdelhadi.lhassani@usmba.ac.ma (A. Lhassani), boussouga.youssef@gmail.com (Y.A. Boussouga)

^bGroup Analysis and Processes, Angers University, GEPEA, CNRS 6144, 2 Bd. Lavoisier, 49045 Angers, France, email: hananedach@hotmail.com (H. Dach)

Received 18 February 2017; Accepted 15 July 2017

ABSTRACT

A competing membrane process to reverse osmosis (RO) for brackish water desalination in the near future is nanofiltration (NF). In this work, the possibility of producing drinking water from brackish groundwater (TDS ~ 4 g.L⁻¹) using nanofiltration process was investigated. Pilot scale testing was performed in TanTan city (south of Morocco) with a NF/RO pilot-skid system. The performance of commercialized NF membranes (NF90 and NE90) and low-pressure reverse osmosis (BW30) modules was evaluated in terms of water productivity, desalination efficiency and energy requirements. The membrane modules were tested under various operating conditions such as feed pressure and recovery rate. The results showed that NF90 and NE90 membranes are actually better efficient than LPRO since it highly reduced the salinity of Tan Tan brackish water (~ 88% rejection) at higher permeates fluxes, higher recovery rates and lower applied pressures. Surface properties investigation revealed that NE90 membrane is hydrophilic and negatively charged and then can have the best anti-fouling performance. This study confirms the potentialities of NF for brackish water desalination and proved that NF is technically and economically viable to cope with water scarcity and overcome the water deficit in Morocco.

Keywords: Brackish water; Desalination; Nanofiltration; Reverse osmosis

*Corresponding author.

Presented at the First International Symposium on Materials, Electrochemistry and Environment (CIMEE 2016), 22–24 September 2016, Tripoli, Lebanon