

Membrane based technologies for wastewater treatment and reclamation in selected MENA countries

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Abstract

Membrane technology (MT) is advancing rapidly as a powerful tool to abate the looming water crisis and reduce quality degradation of water resources in the Mediterranean zone. Despite several national membrane research activities, the general trend in promotion of MT is not satisfying and requires further analysis. This article compiles and critically analyzes the current research efforts in the field of membrane technology in selected Mediterranean and North African countries (MENA). A total of 114 research papers published in peer-reviewed literature data from 1980 to 2007 and 25 lab and full-scale membrane based treatment plants in the MENA countries were used as the database for the analysis introduced in this paper. Initial results revealed few published scientific work (20% of total articles compiled), pilot-scale studies on membrane bioreactors (MBRs), challenges in the membrane R&D pertinent to process design, economy, optimization, membrane material and fouling. Advancing membrane technology research has particular relevance to the decision makers in facilitating investment allocations and choosing sustainable sanitation and demonstration projects for effluent reclamation and reuse.

Keywords: PROMEMBRANE, Wastewater treatment, Membrane bioreactor, Effluent reclamation, Arab MENA countries

1. Introduction

The complex dimensions of the Mediterranean freshwater resources, their fragility and their scarcity have been highlighted and received considerable attention as a primary priority issue politically, technically and scientifically. Membrane technology (MT), with its different applications in water treatment (desalination, potable water treatment, wastewater treatment and reuse) has proven to be a reliable technique to abate the water crisis in the Mediterranean region. During the last five years, this technology has received a lot of attention by researchers and manufacturers, resulting from an improvement of membrane materials and techniques, which provide higher fluxes, longer lifetime, partly improving the fouling and high costs. However, in spite of several national and international membrane research activities, the

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