



## Techno-economical approach of GAC and microfiltration as a coagulant-free pre-treatment of seawater desalination

Matan Beery<sup>a</sup>, Ji Jung Lee<sup>b</sup>, Byung Soo Oh<sup>b</sup>, Joon Ha Kim<sup>b,\*</sup>, Jens-Uwe Repke<sup>c</sup>

<sup>a</sup>Chair of Process Dynamics and Operation, Berlin Institute of Technology (TU-Berlin), Strasse des 17. Juni 135, Berlin, Germany

<sup>b</sup>Department of Environmental Science and Engineering, Gwangju Institute of Science and Technology (GIST), Gwangju, 500-712, Korea  
Tel. +82-62-970-3277; Fax: +82-62-970-2434; email: joonkim@gist.ac.kr

<sup>c</sup>Institute of Thermal, Environmental and Natural Products Process Engineering, TU Bergakademie Freiberg, Leipziger Strasse 28, 09596 Freiberg, Germany

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### ABSTRACT

Membrane filtration is lately becoming a popular process for the pre-treatment of seawater in reverse osmosis (SWRO) desalination. The common practiced method of controlling membrane fouling and reducing the treatment costs usually involves a short coagulation step prior to the membrane filtration. In this work, a study of the feasibility of a coagulation free microfiltration (MF) as pre-treatment for SWRO desalination from a technical, economical and environmental point of view was performed. The experimental part included filtration of seawater from the Yellow Sea in Korea both with and without granular activated carbon (GAC) pre-treatment using a laboratory scale MF plant and different constant fluxes in outside-in dead-end mode. The results show that a coagulant and GAC free, stand-alone microfiltration using low fluxes and intense chemical cleanings is technically possible. When compared to a state of the art coagulation-MF, such a process could be economically and environmentally favourable when accounting for the lower energy demand and the relinquishment of the sludge treatment system.

*Keywords:* SWRO pre-treatment; Microfiltration; GAC; Coagulation; Yellow Sea; Sludge treatment

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\*Corresponding author.