

## Developing organic fouling indices of microfiltration and nanofiltration membranes for wastewater reclamation

Kangmin Chon<sup>a</sup>, Sungyun Lee<sup>a</sup>, Kyongmi Chon<sup>a</sup>, Ahamad Altaf Hussain<sup>b</sup>, Jaeweon Cho<sup>a\*</sup>

<sup>a</sup>*Department of Environmental Science and Engineering, NOM National Research Laboratory (NRL), Gwangju Institute of Science and Technology (GIST), 261 Cheomdan-gwagiro, Buk-gu, Gwangju 500-712, Korea  
Tel. +82 (62) 970-2449; Fax +82 (62) 970-2434; email: imonmyway@gist.ac.kr*

<sup>b</sup>*Water Research and Development Center, Doosan Heavy Industries & Construction, Sh. Zayed Road, Office 6-112, Bldg. No. 6, Gold & Diamond Park, P.O. Box. 282350 Dubai, UAE  
Tel. +971 (4) 347-7051; Fax +971 (4) 347-7142; email: altaf.hussain@doosan.com*

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### ABSTRACT

Wastewater reclamation processes, including membrane bioreactor (MBR) and nanofiltration (NF) membrane, have been built, and those processes were independently operated, under recycling conditions, to compare the performances, with respect to contaminants removal and fouling minimization. The hydrophilic fractions of organic matter were more effectively removed than the hydrophobic fraction through the system due to microbial activities in the MBR, as measured using three dimensional fluorescence excitation and emission spectra. Furthermore, levels of nitrogen compounds, micropollutants, metals, and metalloid were substantially reduced by the applied MBR and NF system. These observations were in good agreement with patterns in molecular weight distributions and fluorescence spectra. The major components of membrane fouling in the system for wastewater reclamation were the hydrophilic fractions; high-performance size-exclusion chromatography, fluorescence and infrared spectra, and XAD 8/4 resins revealed that the hydrophilic fractions (non-humic substances), comprising of protein-like substances and saccharide groups, are responsible for serious membrane fouling in the tested system for wastewater reclamation.

*Keywords:* Wastewater reclamation; Fouling index; Membrane bioreactor; Nanofiltration

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\* Corresponding author.