A review on cleaning of nanofiltration and reverse osmosis membranes used for water treatment

Zailiang Liu\textsuperscript{a,b}, Jiashun Cao\textsuperscript{a,*}, Chao Li\textsuperscript{a}, Hailing Meng\textsuperscript{b}

\textsuperscript{a}College of Environment, Hohai University, Nanjing 210098, China, Tel. +86-13956226092, email: liuzailiang2008@163.com (Z. Liu), Tel. +86-13605197619, email: caojiashun1964@163.com (J. Cao), Tel. +86-15380447099, email: lichao0609@163.com (C. Li)
\textsuperscript{b}School of Energy and Environment, “Water Purification and Utilization Technology of Biofilm Process” Engineering Research Center of Ministry of Education, Anhui University of Technology, Maanshan 243000, China, Tel. +86-13965618381, email: menghlahut@163.com (H. Meng)

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\textbf{A B S T R A C T}

Nanofiltration (NF) and reverse osmosis (RO) membranes are becoming more popular for water purification and reuse application because they are highly efficient, easy to operate and economical. Membrane cleaning is an essential step in maintaining the performance of the membrane for long-term operation because membrane fouling is inevitable. In the past decades, some novel cleaning methods and a great deal of research on high-pressure membranes cleaning have been published. However, a comprehensive review on membrane cleaning in NF and RO membranes is still lacking. This paper reviews the recent developments of membrane cleaning including physical cleaning, chemical cleaning, and biological/biochemical cleaning. The combined cleaning and sequential cleaning process with various chemicals or biological/biochemical agents are also reviewed. A brief conclusion with some recommendations and suggestions is presented at the end of the review.

\textit{Keywords:} Cleaning; Nanofiltration (NF); Reverse osmosis (RO); Water treatment