



Mechanisms, diagnosis, and monitoring of biofouling in membrane processes: a review

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ABSTRACT

Membrane systems have become one of the major technologies in water and wastewater treatment processes. In recent decades, membrane processes have made rapid progress owing to their advantageous properties over conventional systems. However, biofouling restricts their widespread application through irreversible deterioration of their structure, performance, and longevity. Any effort against biofouling either in the membrane synthesis step or in the process necessitates a well understanding of the underlying mechanisms causing this issue through employing various monitoring and diagnosis techniques. This paper mainly reviews the progress in the research and development of biofouling reduction in membrane processes. It first addresses the underlying biofouling mechanisms. Then, a critical overview of the state-of-the-art approaches in the membrane biofouling diagnosis and monitoring was provided to discuss the advantages and the limitations of the current techniques in the lab and large-scale applications. The last section of the review focuses on the future aspects. This paper could be served as a guide for the new entrants to the field of biofouling, as well as to the established researchers and academicians.

Keywords: Biofouling identification; Biofouling mechanisms; Biofouling monitoring; Membrane biofouling

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