



Foulant and chemical cleaning analysis of ultrafiltration membrane used in landfill leachate treatment

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ABSTRACT

Odayeri leachate treatment plant has a capacity of 2,400 m³ leachate/d, and it has a full-scale membrane bioreactor (MBR) system with an external ultrafiltration (UF) membrane. A foulant analysis was conducted to the UF membrane after three years of operation by using inductively coupled plasma (ICP), total organic carbon (TOC), scanning electron microscope, energy-dispersive spectroscopy and Fourier transform infrared spectroscopy analyses. Studies showed that there is a 3- μ m thick fouling layer, which consists of complex inorganic and organic interactions on the membrane surface. Following the analysis, the membranes were chemically cleaned to find an effective cleaning method for improving the membrane performance. Acidic, alkaline and oxidative solutions were used separately or in sequence. In summary, for the removing of foulants from the membrane surface, the application of an effective chemical cleaning strategy is very important. Using acidic, alkaline or oxidative solutions separately was not an effective way to remove foulants from the membrane surface. Even in the combined use, the sequence of the chemicals was important. It was found that correct sequence should be using first the alkaline and then the acidic solution or using first the oxidative and then the acidic solution to obtain an effective cleaning for UF membranes used in MBR for treating landfill leachate.

Keywords: Leachate treatment; MBR; UF membrane fouling; Foulants; Chemical cleaning

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