



Effects of air sparging, cross flow velocity and pressure on permeation flux enhancement in industrial oily wastewater treatment using microfiltration

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ABSTRACT

Air sparging was used as a means to solve the problem of fouling and decline permeation flux in oily wastewater microfiltration (MF). The main objective of this research was to investigate the fouling reduction/removal in cross flow MF of industrial oily wastewater by using an air sparging. In this research, the outlet industrial oily wastewater from the API (American Petroleum Institute) separator unit of Tehran refinery was tested in cross flow with flat sheet MF membranes. The membrane module was operated vertically. Air and industrial oily wastewater were injected in co-current flow. Compared to without air sparging, the result shows that permeation flux increase of up to 170% in air sparging. Furthermore, the effects of various cross flow velocity (CFV) and transemembrane pressure (TMP) with air sparging flow rate have been investigated. Increasing CFV, TMP and air sparging flow rate increase the permeation flux. The best results were found in the air sparging flow rate of 40 ml/s, TMP of 3 bar and CFV of 1 m/s. In this condition air sparging showed greater efficiency in permeation flux enhancement. The result shows that these techniques could be a promising approach in order to overcome the problem.

Keywords: Industrial oily wastewater; Microfiltration; Membrane fouling; Cross flow filtration; Air sparging; Fouling control

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