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## Fouling reduction in the membrane bioreactor using synthesized zeolite nano-adsorbents

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### Abstract

In this work, we synthesized two types of zeolite nano-adsorbents termed HZ1 and HZ2. For further improving the effluent quality and reduction of membrane fouling, these two synthesized zeolite nano-adsorbents were used in a membrane bioreactor (MBR). Particle size distribution (PSD), soluble microbial products (SMP), and extracellular polymeric substance (EPS) for sludge were measured. In addition Fourier-transform infrared spectroscopy (FTIR), excitation-emission matrix (EEM) fluorescence spectroscopy, gel permeation chromatography (GPC), and EPS analysis were performed for characterization the properties of the formed cake. The results showed that both HZ1 and HZ2 had better function in reducing the membrane fouling and decreased transmembrane pressure (TMP) by 47% and 66%, respectively. For both synthesized zeolite nano-adsorbents, the ratio of protein to polysaccharide in the sludge EPS was increased. GPC analysis also revealed that HZ2 zeolite nano-adsorbent exhibited better performance in small- molecular weight organic compound adsorption due to having high crystallinity and larger

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