

Natural and modified zeolite utilization in submerged membrane reactor for potable water treatment

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ABSTRACT

In this study, zeolite addition as a pretreatment step in a submerged membrane system was investigated. The effect of natural and modified zeolite, modified zeolite concentration, particle size fractionation of modified zeolite and feed organic matter concentrations as well as turbidity were studied with synthetic solutions. Additionally, experiments were performed to evaluate the effect of modified zeolite concentration and combination of zeolite and FeCl_3 with natural raw water. It was found that natural zeolite should be modified prior to use for improving the performance as a pretreatment in the submerged membrane system. Also, it was observed that smaller particle sizes of zeolite improved the performance further. In contrast to turbidity, zeolite and organic matter concentrations have a considerable effect on membrane performance. Natural raw water caused nearly two-fold increase in the vacuum pressure in comparison to the synthetic water. However, addition of FeCl_3 in the presence of modified zeolite compensated the high pressure increasing in the permeate line with raw water.

Keywords: Zeolite (clinoptilolite); Surface modification; Submerged membrane system; Ferric chloride; Organic matter removal

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