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Experimental test for high saline wastewater treatment in a submerged membrane bioreactor

Jin Li[a*], Deshuang Yu[b], Dan Wang[a]

[a]*State Key Laboratory of Environmental Aquatic Chemistry, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, P.O. Box 2871, Beijing100085, PR China*
Tel./Fax: +8613426070577; email: ljin0532@126.com
[b]*School of Chemical and Environmental Engineering, Qingdao University, Qingdao 266071, PR China*

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ABSTRACT

A submerged membrane bioreactor was used to treat wastewater containing 50% seawater with the conditions as follows: chemical oxygen demand (COD) was 300–2600 mg/L, ammonium-N was 50–300 mg/L, pH was 6.0–9.0, mixed liquor suspended solids (MLSS) was 7,000 mg/L, dissolved oxygen (DO) was 2–4 mg/L, temperature was 20–25°C. The results showed that both COD and ammonium-N removal efficiencies could reach 90% with the optimal conditions as follows: organic loading rates and ammonium-N loading rates were less than 3.2 kg COD m^{-3} d^{-1} and 0.35 kg N m^{-3} d^{-1}, respectively, pH value was between 7.5 and 8.5, hydraulic retention time (HRT) was more than 12 h. Membrane fouling was aggravated because the viscosity of high saline wastewater was higher than that of fresh water. The trans-membrane pressure (TMP) increased from 5 to 44 kPa during first 180 days but dropped dramatically to 8 kPa after the chemical and physical cleaning, and the filtration capacity of the membrane was almost recovered normally.

Keywords: **A** submerged membrane bioreactor; Organic loading rates; Ammonium-N loading rates; pH; HRT; Membrane fouling

*Corresponding author