

Accepted Manuscript

Title: Treatment of Synthetic Hypersaline Produced Water
Employing Electrocoagulation-Membrane Bioreactor
(EC-MBR) Process and Halophilic Bacteria

Authors: Muhammad H. Al-Malack, Waleed K. Al-Nowaiser

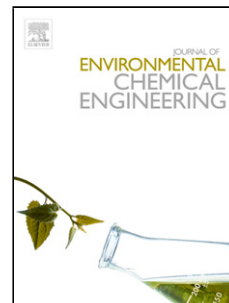
PII: S2213-3437(18)30170-2
DOI: <https://doi.org/10.1016/j.jece.2018.03.049>
Reference: JECE 2290

To appear in:

Received date: 8-1-2018
Revised date: 23-2-2018
Accepted date: 25-3-2018

Please cite this article as: { <https://doi.org/>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



**Treatment of Synthetic Hypersaline Produced Water Employing
Electrocoagulation-Membrane Bioreactor (EC-MBR) Process and Halophilic
Bacteria**

Muhammad H. Al-Malack^{1*} and Waleed K. Al-Nowaiser²

¹Civil and Environmental Engineering Department, King Fahd University of Petroleum & Minerals, Box 1150, Dhahran 31261, Saudi Arabia (mhmalack@kfupm.edu.sa); ²Civil Engineering Department, Jubail University College, P. O. Box 10074, Jubail Industrial City 31961, Saudi Arabia (nowaiserw@gmail.com)

Abstract

Treatment of hypersaline oilfield produced water using a combined electrocoagulation-membrane bioreactor (EC-MBR) process was investigated using synthetic produced water. The electrocoagulation (EC) experiments were conducted using two electrodes (steel and aluminum) at different current densities and contact times. The investigation results showed that aluminum electrode had better performance in terms of COD and turbidity removal efficiencies. The combined EC-MBR investigation was performed using aluminum electrodes, an immersed membrane and oil concentrations of 100, 150 and 200 mg/L. Permeate flux of the membrane unit was set at a constant value of 12 L/m².hr. The results of the combined EC-MBR showed that the transmembrane pressure (TMP) did not exceed 4 psi and membrane fouling was not encountered throughout the experimental period, which was mainly attributed to use of the EC process that resulted in forming agglomerated particles. Moreover, at the end of the three stages, MLVSS concentrations were 7255, 7692 and 8255 mg/L, while bacterial counts were 4430, 3880 and 3230 CFU, respectively, which indicated the inconsistency between MLVSS and bacterial growth. Furthermore, chemical oxygen demand (COD) and oil and grease (O&G) removal efficiencies were found to decrease from 97 to 91% and 95 to 80%, respectively, when influent oil concentrations were increased from 100 to 200 mg/L. Particle size distributions showed mean values of 15.63, 15.96 and 22.72 μm for stages 1, 2 and 3, respectively.

Keywords: Oily Water; Immersed Membrane; Reactive Electrodes; Oil & Grease; COD; Particle Size.

*Corresponding Author

Download English Version:

<https://daneshyari.com/en/article/6664043>

Download Persian Version:

<https://daneshyari.com/article/6664043>

[Daneshyari.com](https://daneshyari.com)