

Accepted Manuscript

Fate and removal of selected antibiotics in an osmotic membrane bioreactor

Divya Shankari Srinivasa Raghavan, Guanglei Qiu, Yen-Peng Ting

PII: S1385-8947(17)31732-1
DOI: <https://doi.org/10.1016/j.cej.2017.10.026>
Reference: CEJ 17810

To appear in: *Chemical Engineering Journal*

Received Date: 11 August 2017
Revised Date: 5 October 2017
Accepted Date: 5 October 2017



Please cite this article as: D.S.S. Raghavan, G. Qiu, Y-P. Ting, Fate and removal of selected antibiotics in an osmotic membrane bioreactor, *Chemical Engineering Journal* (2017), doi: <https://doi.org/10.1016/j.cej.2017.10.026>

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.

Fate and removal of selected antibiotics in an osmotic membrane bioreactor

Divya Shankari Srinivasa Raghavan, Guanglei Qiu*, Yen-Peng Ting*

Department of Chemical and Biomolecular Engineering, National University of Singapore,
Singapore 117585

* Corresponding authors: Y.P. Ting (chetyp@nus.edu.sg); G. Qiu (glqiu@ntu.edu.sg)

Abstract

The fate and removal behavior of 12 antibiotics from 5 classes were investigated in an osmotic membrane bioreactor (OMBR), along with their effects on the system performance. High overall removal of all the antibiotics (77.7-99.8%) was observed, resulting from their rejection by the forward osmosis membrane (>90%). Biodegradation (ranging from 16.6% to 94.4%) was a significant removal pathway for all the antibiotics except ofloxacin, ciprofloxacin and roxithromycin. Sulfathiazole, enrofloxacin, and chlortetracycline showed the highest removal via biodegradation at 94.4%, 90.2% and 78.9% respectively, followed by trimethoprim (68.2%), lomefloxacin (57.1%) and norfloxacin (53.2%). Sorption contributed to varying extent to their removal (at 2.0-30.1%); the highest was observed for ofloxacin and roxithromycin. No evident change was observed in the pollutant removal performance of the bioreactor even after 40 days of continuous exposure to these antibiotics (at 500ng/L), with the overall TOC and $\text{NH}_4^+\text{-N}$ removal maintained >98% and >97%, respectively.

Keywords: Antibiotics; osmotic membrane bioreactor (OMBR); forward osmosis (FO); biodegradation; biosorption; membrane rejection

Download English Version:

<https://daneshyari.com/en/article/4762672>

Download Persian Version:

<https://daneshyari.com/article/4762672>

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