



Performance of biofilm reactor systems for the treatment of oil and gas offshore produced water

Ferreira, Ana Rita; Chhetri, Ravi K.; S. Urbina, Diego F.; Ntynez, Alexandros G.B.; Chrysochoidis, Vasileios; Valverde Pérez, Borja; Andersen, Henrik R.

Publication date:
2022

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Ferreira, A. R., Chhetri, R. K., S. Urbina, D. F., Ntynez, A. G. B., Chrysochoidis, V., Valverde Pérez, B., & Andersen, H. R. (2022). *Performance of biofilm reactor systems for the treatment of oil and gas offshore produced water*. Abstract from Danish Offshore Technology Conference 2022, Kolding, Denmark.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Performance of biofilm reactor systems for the treatment of oil and gas offshore produced water

Ana Rita Ferreira, Ravi K Chhetri, Diego F S Urbina, Alexandros G B Ntynez, Vasileios Chrysochoidis, Borja Valverde-Pérez, Henrik R Andersen

Effective treatment of offshore produced water prior to its release into the environment would remove most of the pollution of marine ecosystems related to oil production. Biofilm reactors represent a potential solution, which can deliver efficient and stable toxicity removal. In this research work treatment performance for produced water by moving bed biofilm reactor (MBBR) and membrane-aerated biofilm reactor (MABR) were investigated in laboratorial scale. These systems used salt-adapted biofilm inside each reactor attached either on moving carriers (MBBR) or onto an aeration membrane (MABR). Batch experiments were carried out with produced water from different oil fields in the North Sea with distinct characteristics such as high organic content, toxicity and salinity. Both bioreactor types could remove a large fraction (up to 80%) of organic content including toxic and persistent chemicals as well as whole water toxicity as measured by bioassays. Both reactor types had similar degradation kinetics for total organic matter measured as COD (1st order reaction) with a fast removal within the first 2-3 hours of treatment. After 8 hours of treatment, no significant further removal could be observed. The obtained results highlight the potential of biological treatment, which apparently can be directly cost competitive to produced water reinjecting (geologically challenging in part of the Danish North Sea).

This research received a grant from the Produced Water Management research program at DTU Offshore and received support from TotalEnergies E&P Denmark.

