Desalination and Water Treatment
www.deswater.com

doi: 10.5004/dwt.2021.27878

244 (2021) 194–200
December

Ozone assisted photolysis process in reduction of selected micropollutants from nanofiltration retentate

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Received 2 August 2021; Accepted 28 September 2021

ABSTRACT

In the presented study, the efficiency of the ozone-assisted photocatalysis (UV/O_3) in the reduction of 7 organic micropollutants (MPs) concentrated in the retentate after nanofiltration (NF) was investigated. The following micropollutants were investigated: 4-nonylphenol (4-NP), 4-tert-octylphenol (4-OP), alachlor (AC), anthracene (ANT), bis(2-ethylhexyl) phthalate (DEHP), heptachlor (HC) and heptachlor epoxide (HCE). The membrane process was carried out in a nanofiltration pilot system using a FilmTec NF90 membrane. The NF concentrate was collected in a batch reactor where the UV/O_3 process was carried out. NF process leads to complete permeate purification. On the other hand, three MPs (AC, HCE and DEHP) were 10-fold concentrated in the retentate. UV/O_3 process effectiveness was in the range of 16% to 98%. Only DEHP and phenolic compounds derivatives were determined during photocatalysis.

Keywords: Nanofiltration; Photocatalysis; Micropollutants; Retentate; Ozone

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