



## The filtration performance and efficiency of olive mill wastewater treatment by integrated membrane process

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### ABSTRACT

The effect of operating pressure on olive oil mill wastewater (OMW) purification and filtration efficiency was determined by the evaluation of the flux decline during volume reduction factor (VRF) experiment. One of the other effective factors is the rejection coefficients based on several parameters, which measure the global pollutant content of the OMW, namely chemical oxygen demand, UV absorbance at 254 nm, total phenols, color as well as conductivity. The integrated membrane system (UF-NF) was used in this study and OMW was pre-filtered by three steps tubular microfiltration modules with nominal pore size of 50, 5, and 0.2 micron in series mode and afterward a 35 kDa ultrafiltration membrane. Filtration experiments in concentration mode of the filtration (with recycling of the retentate stream) were performed in laboratory scale, by using three nanofiltration (NF) membranes. The fouling behavior analysis of the NF membranes was also performed by assessment of the flux recovery ratio and degree of the total flux loss ( $R_t$ ) during VRF experiments. The NF-270 had resulted higher permeate flux than other examined NF membranes, while both NF-90 and self-made NF rejection efficiencies were better than NF-270. On the other hand, the NF-90 had shown better results in comparison with the other NF membranes at high operating pressure. It was concluded that the increasing of the operating pressure enhanced the effects of fouling.

*Keywords:* Olive oil mill wastewater (OMW) treatment; Integrated membrane system; VRF experiments; COD removal; Total phenols rejection

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