

Cork processing wastewater treatment/valorisation by nanofiltration

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ABSTRACT

Nanofiltration process for the treatment/valorisation of cork processing wastewaters was studied. A DS-5 DK 20/40 (GE Water Technologies) nanofiltration membrane/module was used, having 2.09 m² of surface area. Hydraulic permeability was determined with pure water and the result was 5.2 L.h⁻¹.m⁻².bar⁻¹. The membrane presents a rejection of 51% and 99% for NaCl and MgSO₄ salts, respectively. Two different types of regimes were used in the wastewaters filtration process, total recycling mode and concentration mode. The first filtration regime showed that the most favourable working transmembrane pressure was 7 bar working at 25°C. For the concentration mode experiments it was observed a 30% decline of the permeate fluxes when a volumetric concentration factor of 5 was reached. The permeate COD, BOD₅, colour and TOC rejection values remained well above the 90% value, which allows, therefore, the concentration of organic matter (namely the tannin fraction) in the concentrate stream that can be further used by other industries. The permeate characterization showed that it cannot be directly discharged to the environment as it does not fulfil the values of the Portuguese discharge legislation. However, the permeate stream can be recycled to the process (boiling tanks) as it presents no colour and low TOC (<60 ppm) or if wastewater discharge is envisaged we have observed that the permeate biodegradability is higher than 0.5, which renders conventional wastewater treatments feasible.

Keywords: Cork processing wastewater; Nanofiltration; Recycling; Effluent valorisation

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