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Treatment of combined bleaching effluent by membrane filtration technology for system closure in paper industry

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ABSTRACT

This study has been carried out for the treatment of combined bleaching effluent of an Indian pulp and paper mill. The chlorination, extraction, Hypo-1 and Hypo-2 (CEHH) sequence is being used for the bleaching of hardwood pulp in the mill. Effluent was treated by the ultrafiltration (UF), nanofiltration (NF) and reverse osmosis (RO). Thin film composite spiral-wound modules, having crass flow membranes made-up by polysulphone and polyamide were used in the study. Three initial inlet pressures were 6.8 bar, 10.3 bar and 13.7 bar for UF and NF. For RO initial inlet pressures of 10.3 bar, 13.7 bar and 17.2 bar, were taken in different trials. Retentate of each experiment was recycled back to the feed and retreated till the inlet pressure increased up to the maximum cut-of pressure for each membrane. Ultrafiltration permeate was fed to the nanofiltration, and permeate of nanofiltration was again fed to the reverse osmosis. Variations in transmembrane pressure (TMP) and permeate flux were assessed. Pollutants removal and fouling indexes were obtained for each membrane at each initial inlet pressure.

Keywords: Membrane filtration; Bleaching plant effluent; Paper industry; Closed water circuits

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