

Evaluation of wastewater reuse in commercial laundries: a pilot field study

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ABSTRACT

The commercial laundry industry is a vastly important yet gravely underestimated business area. In the last decades, the evolving chemical restrictions, sustainability-based regulations, and safety standards have strongly affected the commercial laundry sector, especially with environmental consideration rising in demand, that is, wastewater treatment and recycling. This paper addresses a growing need in cost-effective engineering, as well as the application, of wastewater recycling technologies for commercial laundries. This study started from the manufacturing of polypropylene capillary membranes using a combination of polyetherpolyamide (PEBAX[®]) and titanium dioxide nano-sized particles (nano-TiO₂) for subsequent “flow coating” modification of membrane surfaces. In the next step, the material characteristics of the polymeric membranes were investigated at lab and pre-industrial scales using scanning electron microscopy/energy-dispersive X-ray spectroscopy, contact angle measurements, and defined filtration experiments. The examination of the wastewater reuse potential of novel membranes on a pre-industrial scale was carried out in a field study in a commercial laundry. The treated water has been monitored, for example, by conductometry and surface tension measurements. This study defines the reuse potential of laundry wastewater by using modified polymeric membranes, while at the same time evaluating the critical parameters of this wastewater recycling process in commercial laundries.

Keywords: Wastewater recycling; Polymeric membrane; Commercial laundries; Reuse potential

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