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Studies on Feasibility of Reverse Osmosis (Membrane) Technology for Treatment of Tannery Wastewater

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ABSTRACT

Tanneries reusing wastewater by combination of conventional and advanced Reverse Osmosis (RO) treatment technologies were assessed for technical and economic viabilities. Conventional treatment methods such as neutralization, clari-flocculation and biological processes are followed to clean the effluents before feeding to RO membrane modules. The characteristics of untreated composite effluents such as pH, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS), and total chromium were in the range of 4.00-4.60, 680-3600 mg/L, 1698-7546 mg/L, 980-1480 mg/L, 4200-14500 mg/L, and 26.4-190 mg/L, respectively. Inorganic ions like Ca^{2+}, Na^{+}, Cl^{-} and SO_4^{2-} were found more in the wastewaters. Conventional treatments significantly removed the organic pollutants however failed to remove dissolved inorganic salts. Membrane technology removed the salts as well as remaining organic pollutants and the product water is reused in the process. The studied tanneries (5 numbers) have achieved 93-98%, 92-99% and 91-96% removal of TDS, sodium and chloride, respectively. Seventy to eighty five percentage of wastewater was recovered and recycled in the industrial processes. The rejects are subject to either solar evaporation system or Multiple Effect Evaporation (MEE) technology. The resulting salts are collected in polythene bags and disposed into scientifically managed secured land fill (SLF) site. The cost of wastewater treatment for operation and maintenances of RO including the pre-treatments (conventional methods) is INR 100-110 m-3.

KEYWORDS

Reverse Osmosis (RO), Membrane Technology, Recycling, Tannery Waste Water

Cite this paper

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