

Performance of a crossflow membrane bioreactor (CF-MBR) when treating refinery wastewater

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Desalination 191 (1-3), pp. 16-26, 2006

Abstract: The use of a crossflow membrane bioreactor (CF-MBR) in treating wastewater discharged by a petroleum refinery was investigated. The performance of the CF-MBR process was evaluated at MLSS concentrations of 5000 and 3000 mg/l. The process performance was measured in terms of the hydraulic efficiency as well as the COD removal efficiency. A laboratory-scale experimental set-up comprised mainly of tubular ceramic membranes, aeration tank, and circulation pump was used throughout the investigation. The results of the investigation showed that a COD removal efficiency of more than 93% was obtained at both MLSS values. The study also showed that hydraulic retention time did not have a significant effect on the system's performance. The relationship between permeate flux and crossflow velocity was found to be best described by a power relationship ($J = kV^n$) where constants k and n were affected by MLSS concentration. The cleaning mechanism investigation showed that cleaning the membrane with an acidic detergent, Superclean, with a pH value of about 1.5, produced the best results. © 2006.