

Membrane Bioreactor versus Activated Sludge Process for Aerobic Wastewater Treatment and Recycling

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Abstract : Membrane bioreactor (MBR) systems are one of the most widely used wastewater treatment processes for various municipal and industrial waste streams. It is based on complex interactions between biological processes, filtration process and rheological properties of the liquid to be treated. Its complexity makes understanding system operation and optimization more difficult, and traditional methods based on experimental analysis are costly and time consuming. The present study was based on an external membrane bioreactor pilot scale with ceramic membranes compared to conventional activated sludge process (ASP) plant. Both systems received their influent from a domestic wastewater. The membrane bioreactor (MBR) produced an effluent with much better quality than ASP in terms of total suspended solids (TSS), organic matter such as biological oxygen demand (BOD) and chemical oxygen demand (COD), total Phosphorus and total Nitrogen. Other effluent quality parameters also indicate substantial differences between ASP and MBR. This study leads to conclude that in the case domestic wastewater, MBR treatment has excellent effluent quality. Hence, the replacement of the ASP by the MBRs may be justified on the basis of their improved removal of solids, nutrients, and micropollutants. Furthermore, in terms of reuse the great quality of the treated water allows it to be reused for irrigation.

Keywords : aerobic wastewater treatment, conventional activated sludge process, membrane bioreactor, reuse for irrigation

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