Can strict water reuse standards be the drive for the wider implementation of MBR technology?

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ABSTRACT

Membrane bioreactors (MBRs) are currently considered a mature technology for municipal wastewater treatment with many full scale applications worldwide. The drive for the wider implementation of MBR technology can be the increasingly stringent legislation concerning the reuse or discharge of the treated effluent. In this work it is shown that the strict limits recently adopted by Greece concerning reclaimed water reuse can be consistently met when MBR technology and suitable disinfection are applied. MBR permeate met the Greek limit of 5 FC/100 mL for 80% of samples and 50 FC/100 mL for 95% of samples required for unrestricted irrigation when a chlorination dosage of 10 mg min/L was applied and an ultra-violet (UV) radiation dosage of 10 mW s/cm². On the contrary, secondary effluent from the activated sludge process could not satisfy the given limits even at a chlorination dosage of 600 mg min/L and a UV radiation dosage of 120 mW s/cm². Tertiary effluent (treated by the activated sludge process and conventional filtration) required a chlorination dosage of 100 mg min/L and a UV radiation dosage of 45 mW s/cm² to satisfy the same limits. Therefore, the dosage of UV radiation and chlorine required to meet the microbiological limits for unrestricted irrigation were much lower for MBR permeate than for conventional tertiary effluents.

Keywords: Membrane bioreactors; Water reuse; Chlorination; UV radiation; Disinfection

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