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A real trial of an innovative membrane bioreactor for saline sewage treatment

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ABSTRACT

We have recently developed non-woven membrane modules to be immersed in activated sludge bioreactor for treating saline sewage. To evaluate the feasibility and energy consumption of this technology, a pilot trial of up to 7 m^3/d was conducted over 270 d at the Hong Kong University of Science and Technology (HKUST). This paper reports part of the data obtained from this pilot trial. The pilot plant produced steady and good quality effluent. The average effluent total nitrogen (TN) was 7.7 mg N/L, total chemical oxygen demand (TCOD) 27 mg/L and total suspended solids (TSS) 15 mg/L, respectively. The maximum effective permeate flux was found to be up to 6 m^3/d, while the air-to-water volumetric ratio could be as low as 15. The transmembrane pressure (TMP) was maintained at 0.1 bar after each backwash with around 1% of the effluent. The backwash was conducted once in 48 h. The membrane modules worked well without clogging for 270 days until an accidental failure of power source, which lasted for 30 h without aeration and thus resulted in fouling of the coarse membrane. The tested mixed liquor suspended solids (MLSS) ranged from 2200 to 6000 mg/L without purposeful sludge withdrawal during this trial period. This study clearly demonstrated that the developed treatment technology offers competitive applications in sewage treatment in terms of low membrane and operational costs as well as long-lasting dynamic filter without clogging.

Keywords: Dynamic membrane filter; Low-cost MBR; Saline sewage treatment; Pilot trial

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