



Performance of an anaerobic baffled reactor with an aerobic chamber treating low-strength wastewater

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ABSTRACT

The objective of this study was to evaluate the performance of an anaerobic baffled reactor (ABR) with an aerobic chamber (AC) in the treatment of domestic wastewater with a low organic load (0.10 ± 0.02 to 0.51 ± 0.10 kg COD·m⁻³·d⁻¹). The entire system consisted of three anaerobic chambers (C1, C2, C3), one aerobic chamber (AC) and one laminar settling tank (LST), operated for 30 weeks (203 d) with different total hydraulic retention times (HRT) of 33, 22, 16.5, and 8.25 h. During the operation of the system, the values of COD of the influent varied between 105 and 381 mg·L⁻¹ and the effluent varied between 12 and 147 mg·L⁻¹, with average concentrations of 214 ± 63 mg·L⁻¹ in the influent and 48 ± 25 mg·L⁻¹ in the effluent. Considering the entire system (ABR + AC + LST), the values of total removal efficiency for COD varied between 49 and 92%, with an average removal of $78 \pm 9\%$. No accumulation of volatile fatty acids (VFA) was found, as the VFA concentration remained between 32 and 76 mg HAc·L⁻¹ at the influent and between 21 and 53 mg HAc·L⁻¹ at C3. Bio molecular analyses showed a great variety of bacterial communities established in all phases of monitoring and low archaeal community diversity. The combined configuration (ABR + AC) has shown great potential for the treatment of domestic wastewater, thereby being considered as a promising alternative for decentralized treatment.

Keywords: Anaerobic baffled reactor; Aerobic chamber; Volatile fatty acids; PCR/DGGE

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