



Pilot-scale anaerobic treatment of domestic wastewater in upflow anaerobic sludge bed and anaerobic baffled reactors at ambient temperatures

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ABSTRACT

The efficiencies of an upflow anaerobic sludge bed (UASB) reactor and an anaerobic baffled reactor (ABR) were compared for the treatment of domestic wastewater at ambient temperatures. Two pilot-scale anaerobic biological reactors were operated for about two years at ambient conditions at psychrophilic and/or sub-mesophilic temperatures. The average total chemical oxygen demand removal was 56 and 58% in the UASB reactor, whereas it was 41 and 50% in ABR, respectively, in summer and winter periods. The amount of methane gas production was between 0.05 and 0.18 m³CH₄/kg COD_{removed} in the UASB reactor, although no methane production was observed in the ABR. Temperature was not a limiting factor in anaerobic reactors that were operated at ambient conditions. Because of its higher efficiency, the UASB reactor was recommended over the ABR for the anaerobic treatment of domestic wastewater of the small community investigated within the scope of the study. However, anaerobic treatment of domestic wastewater is considered only as a pretreatment step, since it requires further removal of nutrients.

Keywords: Anaerobic treatment; Ambient temperature; Domestic wastewater; UASB reactor; Anaerobic baffled reactor; Organic matter removal

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