

Influence of hydraulic residence time on the performances of an aerobic granular biomass based system for treating municipal wastewater at demonstrative scale

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ABSTRACT

The paper reports the results of an experimental investigation aimed at confirming at demonstrative scale the performances obtained, at laboratory scale, of an innovative aerobic granular biomass based periodic system (SBBGR) for treating municipal wastewater. A demonstrative SBBGR plant (i.e., a submerged biofilter that operates in a “fill and draw” mode) was built thanks to the financial support of the EU Life programme (PERBIOF project). The results show that after the generation of granular biomass during the start-up period, the SBBGR system was able to remove 80–90% of COD, total suspended solids and TKN in primary effluent from a municipal wastewater treatment plant, independently of the hydraulic residence time investigated (i.e., from 12 down to 3 h). The process was characterised by a very high sludge age value ($\theta_c \approx 150$ d) that led to a biomass concentration as high as 35–40 g TSS/L_{bed} and a sludge production much lower than that commonly reported for conventional treatment plants.

Keywords: Aerobic granulation at demonstrative scale; SBBGR system; Municipal wastewater treatment; Sludge production

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