Two advanced biological approaches for sludge minimization from municipal wastewater treatment

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ABSTRACT

Two advanced biological solutions for sludge minimization in wastewater treatment are tested. The first solution, particularly suitable for new installations, is based on the application of the sequential batch biofilter granular reactor (SBBGR). The second one, mostly appropriate for existing plants, is the alternate cycles process applied in the sludge line (ACSL) of conventional activated sludge systems. The results of treating raw municipal wastewater show that the SBBGR system is able to reduce the quantity of sludge up to 80%. Furthermore, the produced excess sludge requires no longer stabilization compared with the usual aerobic/anaerobic one. As regards the ACSL process, the results obtained in the full scale have shown an observed sludge yield reduction up to 54% with an increase in the specific oxygen uptake rate up to 20 mgO2/gVSS/h. Finally, applying the ACSL process low specific consumption of energy is required.

Keywords: Bioreactors; Wastewater treatment; Growth kinetics; Optimization; Sequential batch biofilter granular reactor; Alternate cycles process in the sludge line