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POTENTIAL OF AEROBIC STABILIZATION IN DRASTIC SLUDGE REDUCTION: A FULL-SCALE EXPERIMENT

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Abstract

The management of sewage sludge is a recognized and pressing issue. Traditional and innovative sludge minimization processes are applied at full-scale or are at the research stage. However, the processes traditionally applied in wastewater treatment plants (WWTP), at times, have a not fully exploited potential due to a lack of process optimization. Therefore, careful monitoring, coupled with functionality checks and experimental tests, can provide useful indications for maximizing the performance of the treatment units already in place. In this work a full-scale experimental campaign was set up in a recently renewed WWTP, to investigate the potential of aerobic sludge stabilization in reducing the volume of sludge produced and, consequently, the management costs. Operating data were collected and analysed. Two tests were conducted in a stabilization tank, varying the dissolved oxygen (DO) concentration (1 mg/L and > 3 mg/L). The energy consumption was monitored. A model of the volatile suspended solids removal was built, and results were ultimately compared after homogenization. The reduction of volatile suspended solids was 60% and 44%, respectively. The reduction of the quantity of sludge obtained in the two tests was 38% and 29%, respectively. Improved sludge stabilisation rather than sludge reduction was achieved by pushing aerobic stabilisation. The modelled sludge reduction after 2 weeks of treatment would have been 12% and 15% under the tested conditions, respectively. It resulted that, for contact times up to 2 weeks, the DO concentration had not a relevant influence on the sludge stabilization, while consuming more energy.

Key words: aerobic stabilisation, dewaterability, dissolved oxygen, optimization, sludge minimization

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