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Enhanced retention of deammonification microorganisms for the treatment of psycrophilic anaerobic digestate

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Abstract

This study focused on the treatment of psychrophilic anaerobic digestate from pig slurry digestion through a single-stage Sequencing Batch Reactor (SBR) accomplishing the autotrophic nitrogen removal (ANR). In period 1, the combination of the high sludge retention time (>50 days) and the presence of significant concentrations of biodegradable organic carbon favoured the uncontrolled growth of the denitrifying bacteria (HDB) and the nitrite oxidizing bacteria (NOB), affecting negatively the deammonification (DAM) activity from 14-15 mgN/gMLVSS·h to only 2.2 mgN/gMLVSS·h. In Period 2, the sieving of the suspended biomass at 125 μm was evaluated to enhance the retention time of DAM microrganisms in granular sludge into the SBR. This strategy allowed the recovery of 60%