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Aerobic granules cultivated with simultaneous feeding/draw mode and low-strength wastewater: performance and bacterial community analysis

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Abstract

Sequence batch reactors (SBR) with simultaneous feeding/draw mode and low-strength wastewater were used for the cultivation of aerobic granules, and analysis of bacterial community diversity were conducted. Results revealed that the ratio of chemical oxygen demand/total nitrogen removal amount for R1 with real wastewater and R2 with synthetic wastewater decreased from 9.9 to 8.7 and, 29.9 to 21.1, respectively, when volumetric exchange ratio (VER) decreased from 90% (stage □) to 50% (stage □), indicating that organic matter in real and low-strength wastewater was fully utilized with lower VER by denitrifying bacteria. Relative abundances of the genus *Dechloromonas*, *Pseudomonas*, *Bacillus* in R1, which are responsible for denitrifying phosphorus removal, were much higher than that in R2, accounting for the high efficiency of nitrogen and phosphorus removal from real wastewater with low influent C/N ratio of 3.6 on average. These results provide useful information for improving wastewater treatment efficiency in the future.

Keywords: Aerobic granular sludge, low-strength wastewater, volumetric exchange ratio, bacterial community analysis, nutrients removal

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