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Long-term Stability and Nutrient Removal Efficiency of Aerobic Granules at Low Organic Loads

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Abstract

The feasibility of application of aerobic granular sludge cultivated with high organic loads for biological nutrient removal (BNR) from low-strength wastewater was studied. Granules obtained with high-strength (COD=1400 mg/L) wastewater were fed with medium (COD=700 mg/L) and then low-strength (COD=400 mg/L) wastewater. The granules rapidly acclimated to the medium-strength wastewater. However, feeding with low-strength wastewater reduced the F/M ratio from 0.4 to 0.2 gCOD/gVSS.d and granules disintegration occurred. Re-granulation was obtained after poor settling biomass was washed out and the F/M ratio reached 0.4 gCOD/gVSS.d. Disintegration of granules coincided with the decrease in extracellular polymeric substances (EPS) content and protein-to-carbohydrate ratio and re-granulation was assisted with the increase in EPS and protein-to-carbohydrate ratio. The results indicated that cultivation of aerobic granules with

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