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AEROBIC SLUDGE GRANULATION FOR PARTIAL NITRIFICATION OF AMMONIA-RICH INORGANIC WASTEWATER

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Abstract

Partial nitrification for the biological nitrogen removal (BNR) via nitrite has recently gained interest for treating high-strength ammonium wastewater with low organic matter content. However, stability of partial nitrification is still a challenge in activated sludge system. In the present study, the technique of aerobic granulation was developed to produce granules for stable nitritation, treating ammonia-rich inorganic influent with 400 mg NH_4^+-N/L. The morphology, physical properties, bacterial community structure and partial nitrification performance of the sludge were characterized throughout the experiments. The results indicated that aerobic granules could be produced for partial nitrification through selective discharge of small and slow-settling sludge flocs. Sludge granulation help to achieve ammonium oxidation to the level of nitritation, or partial nitrification, other than to complete nitrification. Based on DNA-base molecular analysis, aerobic granulation resulted in an enrichment of AOB and a reduction of nitrite-oxidizing bacteria (NOB) in the granular sludge, which is highly favorable to a stable operation of partial nitrification.

Key words: aerobic granulation, biological wastewater treatment, inorganic wastewater, partial nitrification

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