Accepted Manuscript

Key operating parameters affecting nitrogen removal rate in single-stage deammonification

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PII: S0045-6535(18)30901-9

DOI: 10.1016/j.chemosphere.2018.05.053

Reference: CHEM 21385

To appear in: *ECSN*

Received Date: 13 January 2018

Revised Date: 29 March 2018

Accepted Date: 8 May 2018

Please cite this article as: Choi, D., Cho, S., Jung, J., Key operating parameters affecting nitrogen removal rate in single-stage deammonification, *Chemosphere* (2018), doi: 10.1016/j.chemosphere.2018.05.053.

Key operating parameters affecting nitrogen removal rate in single-stage deammonification

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Highlights

Key operating strategies to maximize NRR in SBR were investigated

The SBR cycle should be divided into several sub-cycles based on substrate concentration

ANAMMOX activity rather than AOB should be considered as a control parameter for NRR

Granules larger than 100 ㎛ in the SBR increased the NRR

The feasibility of pH and ORP as substrate control factors to improve the NRR was verified

Abstract

The key operating parameters for improving the nitrogen removal rate (NRR) in a sequencing batch reactor (SBR) for deammonification were investigated. The major operating strategies were the coexistence between deammonification and denitrification with a carbon/nitrogen (C/N) ratio of 0.5 and the control of the number of sub-cycles based on substrate concentration for anaerobic ammonium oxidation (ANAMMOX) and ammonium oxidizing bacteria (AOB). In the study, denitrification with the addition of an organic source was beneficial for improving the NRR from 0.5 ± 0.01 kg N m^{-3} d^{-1} to 0.53 ± 0.01 kg N m^{-3} d^{-1} by removing the nitrate produced as a by-