Short Communication

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PII: S0960-8524(17)32235-6
DOI: https://doi.org/10.1016/j.biortech.2017.12.090
Reference: BITE 19345

To appear in: *Bioresource Technology*

Received Date: 4 November 2017
Revised Date: 26 December 2017
Accepted Date: 27 December 2017

Please cite this article as: Zahedi, S., Romero-Güiza, M., Icaran, P., Yuan, Z., Pijuan, M., Optimization of free nitrous acid pre-treatment on waste activated sludge, *Bioresource Technology* (2017), doi: https://doi.org/10.1016/j.biortech.2017.12.090

Optimization of free nitrous acid pre-treatment on waste activated sludge

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Abstract

The effectiveness of the Free Nitrous Acid (FNA) sludge treatment was tested in the range from 0 to 3.0 mg N-HNO2/L with acidified and neutral pH. 4 h pre-treatment times were used and the specific methane production (SMP) investigated. Results show that between 50-100 mg/L of N-NO_2-/L disappeared during the FNA pre-treatment, reducing its effectiveness. A minimum level of nitrite (174 mg N-NO_2^-/L tested in this study), independently of pH/FNA, was necessary to assure the presence of the chemical throughout the duration of the pre-treatment. Sludge viability was compromised while WAS solubilization and SMP were enhanced with nitrite concentrations of 174 mg N-NO_2^-/L or higher, even at low FNA levels (<0.15 mg N-HNO_2/L). Results show that acidified pH is not needed to enhance methane production, making the pretreatment more economically and environmentally attractive.

Keywords: anaerobic digestion; free-nitrous acid pre-treatment; nitrite; methane production, waste activated sludge, sludge biodegradability.