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Short Communication

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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-NO₂⁻/L disappeared during the FNA pre-treatment, reducing its effectiveness. A minimum level of nitrite (174 mg N-NO₂⁻/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-NO₂⁻/L or higher, even at low FNA levels (<0.15 mg N-HNO₂/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.

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