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IMPACT OF COD:N RATIO ON N₂O EMISSIONS DURING LIVESTOCK WASTEWATER TREATMENT VIA THE NITRITE PATHWAY

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Abstract

This study examines the impact of the chemical oxygen demand to nitrogen ratio (COD:N) on nitrous oxide (N₂O) emissions during N removal via a nitrite (NO₂⁻) pathway for synthetic livestock wastewater treatment. Based on typical cycle operations, 1.07 ± 0.07% of the incoming N load was emitted as N₂O at a COD:N ratio of 3:1. This was higher than the 0.83 ± 0.08% emitted at a COD:N ratio of 6:1. The low COD:N ratio in the synthetic livestock wastewater may thus cause increased N₂O emissions. Nitrous oxide was emitted during both aeration and non-aeration periods; however, N₂O emissions during aeration periods were much higher than during non-aeration periods. Low dissolved oxygen levels, high NO₂⁻-N concentrations and an intermittent aeration strategy were the primary factors encouraging N₂O emissions during synthetic livestock wastewater treatment via the NO₂⁻ pathway.

Key words: COD:N ratio, livestock wastewater, nitrite, nitrous oxide

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