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Short Communication

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Determination of the optimal aeration for nitrogen removal in biochar-amended aerated vertical flow constructed wetlands

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Abstract

Nitrogen removal in vertical flow constructed wetlands (VFCWs) is still a key problem especially for treating low C/N wastewaters. In this study, nitrogen removal and nitrous oxide (N₂O) emission in biochar-amended aerated VFCWs were evaluated under the varying intermittent aeration (different aeration times and aeration rates). The results indicated that the optimal aeration time and rate were 2 h d⁻¹ and 0.6 L min⁻¹, which could create alternant of aerobic and anaerobic conditions for the simultaneous nitrification and denitrification in VFCWs. Much higher removal efficiency of COD (95.9%), NH₄⁺-N (96.6%), and TN (74.7%) was achieved under the optimal conditions, and moderate N₂O emission (282 µg·m⁻²·h⁻¹) was observed simultaneously. The results can be used to select the optimal aeration in the further design and application of biochar-amended aerated CW treatments.

Keywords: Biochar; Constructed wetlands; Intermittent aeration; Nitrogen removal; Nitrous oxide

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