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Physiological responses of three plant species exposed to excess ammonia in constructed wetland

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ABSTRACT

Constructed wetlands were widely used for the treatment of effluents rich in ammonia, but wetland plants might be affected under high ammonia concentration. Experiments were conducted to assess the effect of increased ammonia concentration on wetland plants, by examining the changes of chlorophyll content and antioxidant systems in *Typha angustifolia, Scirpus validus* and *Zizania latifolia*. Results showed that ammonia levels in excess of 100 mg·L^{-1} significantly reduced total chlorophyll content for *T. angustifolia*, and levels up to 400 mg·L^{-1} similarly reduced total chlorophyll content for *S. validus*. No significant decrease of total chlorophyll content for *Z. latifolia* were observed. When ammonia levels were up to 100, 200 and 300 mg·L^{-1}, it could generate oxidative stress in *T. angustifolia, S. validus and Z. latifolia respectively, expressed through an elevated malondialdehyde (MDA) content and the enhancement of superoxide dismutase (SOD), catalase (CAT), peroxidase (POD) activities. It was suggested that excess ammonia in wastewater could affect the physiological responses of wetland plants, by inhibiting photosynthesis and inducing oxidative stress. And* Z. latifolia showed a higher tolerance to ammonia than *T. angustifolia* and *S. validus*.

Keywords: Constructed wetland; *Typha angustifolia*; *Scirpus validus*; *Zizania latifolia*; Ammonia tolerance

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