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## **Influence of elevated Zn (II) on Anammox system: microbial variation and zinc tolerance**

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**Abstracts:** Nitrogen removal by anaerobic ammonium oxidation (Anammox) has attracted increasing attention in nowadays. An Anammox biofilter was subjected to a continuous loading of elevated Zn (II). The influence of Zn (II) on the nitrogen removal, microbial community and biofilm property was investigated in the condition of 23-26 °C and 3.5 h HRT. The nitrogen removal greatly decreased to 0.054 from the initial 0.502 kg m<sup>-3</sup> d<sup>-1</sup>, with the Zn (II) addition. Anaerobic ammonia-oxidizing bacteria (AAOB) had self-adaption to Zn (II) in 1-10 mg L<sup>-1</sup> and was significantly enhanced after long-term acclimatization, while the suppression threshold was 20 mg L<sup>-1</sup>. Soluble microbial products (SMP) increased correspondingly with Zn (II), while extracellular polymeric substance (EPS) climbed up initially and then decreased. Anammox biofilm performed the highest zinc adsorption as 158.27 mg g<sup>-1</sup> SS in biofilm. High Zn (II) improved the microbial diversity and lowered the *Candidatus Kuenenia* abundance to 1.38% from 20.89%.

**Key words:** Nitrogen removal; Anaerobic ammonium oxidation (Anammox); Zn (II); Anaerobic ammonia-oxidizing bacteria (AAOB); Microbial community

### **1 Introduction**

Heavy metal is an important, emerging environmental and human health issue in

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