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Xiaojing Zhang, Zhao Chen, Yongpeng Ma, Yue Zhou, Siyu Zhao, Lina Wang, Hanfei Zhai

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

Xiaojing Zhang*, Zhao Chen, Yongpeng Ma, Yue Zhou, Siyu Zhao, Lina Wang, Hanfei Zhai

Henan Collaborative Innovation Center of Environmental Pollution Control and Ecological Restoration, School of Material and Chemical Engineering, Zhengzhou University of Light Industry, Zhengzhou 450001, China

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 ℃ and 3.5 h HRT. The nitrogen removal greatly decreased to 0.054 from the initial 0.502 kg m^{-3} d^{-1}, with the Zn (II) addition. Anaerobic ammonia-oxidizing bacteria (AAOB) had self-adaption to Zn (II) in 1-10 mg L^{-1} and was significantly enhanced after long-term acclimatization, while the suppression threshold was 20 mg L^{-1}. 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^{-1} SS in biofilm. High Zn (II) improved the microbial diversity and lowered the *Candidatus Kuenenia* abuandance to 1.38% from 20.89%.

Key words: Nitrogen removal; Anaerobia 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

* Corresponding author.
E-mail addresses: zhangxiaojing@zzuli.edu.cn.