

能源和环境工程

## 强化反硝化除磷对A<sup>2</sup>O工艺微生物种群变化的影响

吴昌永, 彭永臻, 王淑莹, 任南琪, 万春黎

哈尔滨工业大学市政环境工程学院城市水资源与水环境国家重点实验室; 北京工业大学北京市水质科学与水环境恢复工程重点实验室

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摘要

强化A<sup>2</sup>O工艺中的反硝化除磷比例, 是提高该工艺处理低C/N比污水时脱氮除磷效率的有效途径。采用52.5 L的A<sup>2</sup>O反应器处理实际生活污水, 研究了系统在不同的反硝化除磷比例情况下微生物的种群变化及关系。试验结果表明, 随着水质条件及运行状态的改变, 系统反硝化除磷的比例也在变化, 同时微生物种群结构表现为一种动态的演替过程, 工艺条件与微生物的种群结构具有很强的映射关系。测序结果表明, 具有传统除磷功能的 *Acinetobacter* 在系统反硝化除磷得到强化的时候会逐渐被淘汰, 而Uncultured *Chlorobi* bacterium会逐渐得到增殖, 可能是系统中具有反硝化除磷功能的微生物。

关键词

[污水处理](#) [脱氮除磷](#) [DGGE](#) [微生物种群演替](#)

分类号

## Effect of enhancing denitrifying phosphorus removal on microbial population variation in A<sup>2</sup>O process

WU Changyong, PENG Yongzhen, WANG Shuying, REN Nanqi, WAN Chunli

### Abstract

Enhanced denitrifying phosphorus removal in anaerobic-anoxic/oxic (A<sup>2</sup>O) process is an effective way to increase the removal efficiency of nitrogen and phosphorus when treating low C/N ratio domestic wastewater. In this study, a 52.5L pilot-scale reactor, based on plug-flow A<sup>2</sup>O configuration, was used to treat domestic wastewater. In addition, the microbial population variation was investigated by polymerase chain reaction-denaturing gradient gel electrophoresis (PCR-DGGE). The results showed that the microbial community structure and dominant bacteria changed with the variation of wastewater quality and operating parameters. The dynamic change of microbial population was consistent with the variation of operation. Sequence results of DGGE bands showed that the dominant bacterial community in the system was *Proteobacteria*. *Acinetobacter* may be responsible for the traditional biological phosphorus removal in the system, but it disappeared gradually with the enhancement of denitrifying phosphorus removal. Uncultured *Chlorobi* bacterium increased with the enhancement of denitrifying phosphorus removal and it might be the major denitrifying phosphate accumulating organisms (DPAOs) in the system.

### Key words

[wastewater treatment](#) [biological nitrogen and phosphorus removal](#) [DGGE](#) [microbial population variation](#)

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