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环境工程 生命科学

PCR-DGGE法分析温度对A^2/O系统硝化菌群结构的影响

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摘要 研究了温度对A^2/O装置中硝化细菌群落结构的影响，旨在为工艺改进及优化调控提供依据. 从A^2/O装置的泥水混合液中采集微生物样品并提取微生物总DNA，使用特定引物对从总DNA中扩增出目标DNA片段，然后对扩增的DNA片段进行DGGE，并对凝胶进行染色和条带统计分析，通过聚类分析构建不同温度下硝化菌群间的相似性关系. 结果表明，AOB菌在温度>25 ℃时，群落结构比较稳定，此时NH_4^+-N去除率高达95%以上；Nitrobacter菌在温度>20 ℃时，群落结构则比较稳定，NH_4^+-N去除率亦可达95%以上；Nitrospira群落结构发生变化较大，相比较而言，15～20 ℃时最稳定，NH_4^+-N去除率在75%～95%之间.

关键词 A^2/O； PCR-DGGE； 温度影响； 硝化细菌； 菌群结构

分类号

Application of PCR-DGGE to analyze the effect of temperatureon structure of nitrifying bacteria in A^2/O system (Chinese)

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Abstract

The effects of temperature on the structure of nitrifying bacteria in A^2/O system were studied for the purpose of technique improvements and system regulations. Total microbial DNA was extracted from samples which were collected from reactor, then target DNA fragments were amplified from the total DNA using specific bacterial primer. The target DNA were used for denaturing gradient gel electrophoresis(DGGE) analysis. Results indicated that the changes of temperature could affect the community structure and the Shannon diversity index of nitrifying bacteria. The structure of AOB community was stable when the temperature was higher than 25 ℃, the removal rate of NH_4^+-N was over 95% in this condition; The structure of Nitrobacter community was stable when the temperature was higher than 20 ℃, the removal rate of NH_4^+-N can reach 95% in this condition; The structure of Nitrospira community changed greatly when the temperature changed, comparatively speaking, the community structure was most stable when the temperature was between 15 ℃ to 20 ℃, the removal rate of NH_4^+-N was between 75% to 95% in this condition.

Key words

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