

能源和环境工程

河渠特定生态岸坡基质酶活性及细菌种群的动态特征

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摘要

采用多孔混凝土预制球构建河渠特定岸坡生态系统, 对坡面基质中的微生物量、3种酶活性和5种类群细菌数量进行了跟踪测量。结果表明, 特定生态坡面上水位变动区即挺水植物生长区的微生物学性能指标明显优于草本植被生长区和淹没区; 生态岸坡基质微生物量及各种酶活性不同月份存在显著性差异, 脱氢酶、脲酶、纤维素酶在6月、9月时表现了较高的酶活性, 并且显著高于3月和12月; 微生物量在6月时达到最高值, 坡面上的空间特征与酶活性分布特征较为一致, 都具有明显的根际效应; 细菌总数及5种功能性细菌类群的数量在6月和9月达到高峰, 其时空分布规律与酶活性具有一致性。

关键词

[岸坡特定生态系统](#) [多孔混凝土](#) [酶活性](#) [细菌种群](#) [动态特征](#)

分类号

Dynamic characteristics of substrate enzyme activities and bacteria species groups in special riverine ecosystem

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Abstract

The dynamic characteristics of enzyme activities and bacteria species groups in the substrate of stream banks have been studied through the construction of a special riverine ecosystem, in which the ecological embankments are made up of prefabricated spherical bricks with porous concrete. The microbial biomass, three kinds of bio-enzymes and five types of bacteria species groups in the substrate of ecological embankments were scouted. Results showed that there are significant distribution differences ($p < 0.05$) in the microbial biomass and bio-enzyme activities in the ecological embankments. The activities of dehydrogenase, urease and cellulase are significantly higher in June and September than those in March and December, and the activities of these bio-enzymes in aquatic plants district of the ecological embankments are also higher than those of other places. Microbial biomass appears a peak in June, and its spatial characteristic is similar with the enzyme activities, which all have an accumulated ecological effect on the hydrophyte rhizosphere. The performance indexes of microorganism in the water level fluctuation zone are all superior to those in other places. Aerobic bacteria (cellulose decomposing bacteria, ammonifying bacteria, nitrosation bacteria and nitrobacteria) and anaerobic bacteria (denitrifying bacteria) have the same distribution in the ecological embankments, the quantity of bacterium also appears a peak in June and September, and the dynamic characteristics of each type of bacteria in the special riverine ecosystem are consistent with the biomass and bio-enzyme activities.

Key words

[special riverine ecosystem](#) [porous concrete](#) [enzyme activity](#) [bacteria species groups](#) [dynamic characteristic](#)

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