

研究论文

不同施肥处理与地膜覆盖对土壤微生物群落功能多样性的影响

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摘要 微生物多样性是表征土壤质量变化的敏感指标。应用Biolog技术探讨了不同施肥处理与地膜覆盖对土壤微生物功能多样性的影响, 从微生物功能多样性的角度评价施肥与地膜覆盖对土壤质量的影响。试验结果表明: 裸地条件下, 肥料合理配施可以增强微生物对碳源的利用程度(AWCD), 显著增加微生物功能多样性(Shannon指数)。地膜覆盖和施肥的交互作用降低了微生物对碳源的利用率, 降低微生物的丰富度, 改变其均匀度。土壤微生物碳源利用的聚类和主成分分析表明, 各施肥处理在碳源的利用上存在较大差异, 覆膜加剧了各处理之间的分异程度。糖类和氨基酸类碳源是微生物利用的主要碳源。土壤微生物对碳源利用受到土壤pH、速效钾的显著影响。此外, 有机碳、速效氮含量和土壤碳氮比与土壤微生物群落功能多样性密切相关。

关键词 [施肥](#); [地膜覆盖](#); [群落功能多样性](#); [碳源](#)

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Effects of different fertilization and plastic-mulching on functional diversity of soil microbial community

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Abstract Soil managements such as fertilization and plastic-film mulching can affect soil quality, whilst biology diversity is a sensitive indicator of it. The paper deals with the effect of long-term fertilization and mulching on the functional diversity of soil microbial community using Biolog technique. The main results showed that the reasonable fertilization in uncovered soil could increase the utilization ability of communities for carbon (AWCD) and improve the functional diversity (Shannon Index). There was a remarkable reciprocation between plastic-film mulching and fertilization, which led to the decreases of utilization rate for carbon sources and richness of microbe and the changes of its evenness. Principal component analysis (PCA) and cluster analyses of substrate reactions were analyzed after 48h of incubation. The results indicated that there were different carbon substrate utilization patterns among different treatments and plastic-film mulching increased the variance. Carbohydrates and Amino acids were the main carbon resources of microbe utilization and mainly affected by pH and available K in soil. Organic carbon, available N and C/N in soil also had a closed relationship to the microbial functional diversity.

Key words [fertilization](#) _ [film mulching](#) _ [community functional diversity](#) _ [carbon source](#)

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