

转*Bt*基因水稻根际土壤微生物多样性的磷脂脂肪酸 (PLFAs) 表征刘微¹, 王树涛², 陈英旭³, 吴伟祥^{3**}, 王璟⁴¹河北大学化学与环境科学学院| 河北保定 071002; ²河北农业大学资源与环境科学学院| 河北保定 071001; ³浙江大学环境与资源学院| 杭州 310029| ⁴石家庄市园林局, 石家庄 050021Microbial diversity in rhizosphere soil of transgenic *Bt* rice based on the characterization of phospholipids fatty acids.LIU Wei¹, WANG Shu-tao², CHEN Ying-xu³, WU Wei-xiang³, WANG Jing⁴¹College of Chemistry & Environmental Science, University of Hebei, Baoding 071002, Hebei, China| ²College of Resources and Environment Science, Agricultural University of Hebei, Baoding 071001, Hebei, China| ³College of Environmental and Resource Science, Zhejiang University, Hangzhou 310029, China| ⁴Shijiazhuang City Bureau of Parks and Woods, Shijiazhuang 050021, China

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摘要

以亲本水稻为对照, 应用¹³C脉冲标记和磷脂脂肪酸技术, 分析转*Bt*基因对水稻根际微生物多样性的影响. 结果表明: 转*Bt*基因水稻与亲本水稻根际均以饱和脂肪酸和支链脂肪酸为主, 单不饱和脂肪酸次之, 多不饱和脂肪酸最少. 苗期、拔节期和抽穗期, 转*Bt*基因水稻根际革兰氏阳性菌 (G⁺) 代表性磷脂脂肪酸含量显著低于亲本水稻; 革兰氏阴性菌 (G⁻) 代表性磷脂脂肪酸含量显著高于亲本水稻. 水稻各生育期, 转*Bt*基因未对水稻根际土壤真菌、放线菌磷脂脂肪酸含量造成显著影响, 且转*Bt*基因水稻与亲本水稻根际微生物磷脂脂肪酸¹³C含量无显著性差异. 表明外源*Bt*基因插入仅对水稻根际微生物多样性造成短暂影响, 不具有持续性.

关键词: 转*Bt*基因水稻 ¹³C标记 磷脂脂肪酸 根际土壤微生物

Abstract:

Taking non-transgenic parental rice as the control, and by using ¹³C pulse-chase labeling method coupled with phospholipid fatty acid (PLFA) analysis, this paper studied the effects of transgenic *Bt* rice on the microbial diversity in rhizosphere soil. The results showed that in the rhizosphere soils of transgenic *Bt* rice and its non-transgenic parent, saturated PLFAs and branched PLFAs were the main, followed by monounsaturated PLFAs, and polyunsaturated PLFAs. A significantly lower amount of Gram-positive bacterial PLFAs and a higher amount of Gram-negative bacterial PLFAs were observed in the rhizosphere soil of transgenic *Bt* rice at its seedling, booting, and heading stages, as compared with the control. In the whole growth period of rice, transgenic *Bt* gene had no significant effects on the fungal and actinomycete PLFAs in rhizosphere soil, and no significant difference was observed in the rhizosphere soil ¹³C-PLFA content between transgenic *Bt* rice and its non-transgenic parent. These findings indicated that the insertion of exogenous cry1Ab gene into rice only had temporary effects on the microbial community composition in the rhizosphere soil of rice.

Key words: transgenic *Bt* rice ¹³C labeling PLFA rhizosphere soil microbial community

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[1] 郑佳, 张良, 沈才洪, 张宿义, 金扬, 赵金松, 周荣清. 浓香型白酒窖池微生物群落结构特征[J]. 应用生态学报, 2011, 22(04): 1020-1026.

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