

研究报告

化感水稻根际微生物类群及酶活性变化

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摘要 以化感水稻PI312777 (PI) 和非化感水稻Lemont (LE) 为材料, 分别测定不同水稻叶龄期 (3~7叶期) 根际微生物区系变化及根际土壤酶活性. 结果表明, 化感水稻明显影响土壤根际微生物类群及相关酶活性. 化感水稻PI根际细菌、放线菌、固氮菌的数量高于非化感水稻LE, 增幅分别在11.2%~28.3%、40%~78.6%和111.5%~173.9%之间, 而真菌数量低于非化感水稻LE, 最高仅为其值的25.5%, 说明化感水稻PI对绝大多数细菌、放线菌、固氮菌生长有促进作用, 对一些真菌生长有抑制作用. 进一步分析表明, 化感水稻PI对氨化细菌、亚硝酸细菌、硝酸细菌、好气性固氮菌、好气性纤维素分解菌、硫化细菌的生长具有促进作用, 其中以氨化细菌、好气性固氮菌的更为明显, 最低增幅分别为53.7%和57.6%; 而对反硫化细菌、反硝化细菌生长有抑制作用, 其值最高分别为非化感水稻的54.2%和50.6%. 此外, 化感水稻PI根系分泌物对脲酶、磷酸酶、蔗糖酶的活性具有促进作用, 而对过氧化氢酶则呈抑制作用.

关键词 [水稻](#) [化感作用](#) [土壤微生物](#) [土壤酶活性](#)

分类号

Effects of allelopathic rice on rhizosphere microbial flora and enzyme activity

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Abstract

This paper studied the dynamics of microbial flora and enzyme activity in the rhizosphere of allelopathic rice PI312777 (PI) and non allelopathic rice Lemont (LE) at the growth stage of 3~7 leaves. The results showed that in the rhizosphere of PI, the amounts of bacteria, actinomycetes and azotobacter were 11.2% ~28.3%, 40%~78.6% and 111.5%~173.9%, respectively, while that of fungi was lower, with the maximum being 25.5% of that in the rhizosphere of LE, suggesting that allelopathic rice PI promoted the growth of bacteria, actinomycetes and azotobacter, but inhibited that of fungi. Further analysis on the physiological groups of microbial flora showed that PI favored the growth of ammonifier, aerobic azotobacter, aerobic cellulose- decomposer, sulphate- reducer, nitrite- bacteria and nitrate- bacteria, among which, ammonifier and aerobic azotobacter increased by 53.7% and 57.6%, respectively, while inhibited the growth of desulphate bacteria and denitrifyier. Moreover, PI increased the activities of urease, phosphatase and sucrase, but decreased the catalase activity in its rhizosphere.

Key words [Rice](#) [Allelopathy](#) [Soil microbe](#) [Soil enzyme activity](#)

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