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转双价基因棉花对根际土壤酶活性和养分含量的影响

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Effects of Transgenic Double Gene Cotton on the Enzyme Activity and Nutrient Content in the Rhizosphere Soil

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摘要 在田间试验条件下，以3种转双价基因棉和常规棉石远321为研究对象，比较分析转双价基因棉和常规棉石远321根际土壤酶活性及养分的变化。结果表明，转双价*Cry*1Ac+*CpTI*基因棉sGK321与石远321根际土壤速效磷和铵态氮含量无显著差异，而硝态氮含量则显著高于石远321；转双价*Cry*1Ac+*Cry*2Ab基因棉（双*Bt*抗虫棉）速效磷和铵态氮含量均显著低于石远321，而硝态氮含量与石远321无显著差异；转双价*Cry*1Ac+*Epsps*基因棉（抗虫抗除草剂棉）速效磷和硝态氮含量均显著高于石远321，而铵态氮含量显著低于石远321。sGK321棉与石远321根际土壤脲酶、碱性磷酸酶和过氧化氢酶活性均无显著差异；双*Bt*抗虫棉土壤脲酶活性显著低于石远321，碱性磷酸酶和过氧化氢酶活性与石远321均无显著差异；抗虫抗除草剂棉与石远321土壤脲酶活性无显著差异，碱性磷酸酶活性显著高于石远321，而过氧化氢酶活性显著低于石远321。表明sGK321棉与石远321根际土壤养分（硝态氮除外）含量和酶活性无显著差异，而双*Bt*抗虫棉和抗虫抗除草剂棉所呈现的差异是因不同品种所致。

关键词： 转双价基因棉 根际土壤 土壤酶活性 土壤养分

Abstract： Through field experiment, the enzyme activity and nutrient content in the rhizosphere soil of transgenic cotton sGK321(*Cry*1Ac+*CPTI*), transgenic cotton with double insect-resistant genes(*Cry*1Ac+*Cry*2Ab), transgenic cotton with insect-resistant and herbicide-resistant genes(*Cry*1Ac+*Epsps*) and non-transgenic cotton were analyzed. The results showed that the available phosphorus and ammonium nitrogen in the rhizosphere soil had no significant difference between transgenic cotton sGK321 and non-transgenic cotton, while the nitrate nitrogen significantly higher than non-transgenic cotton. The available phosphorus and ammonium nitrogen of transgenic cotton with double insect-resistant genes were both significantly lower than non-transgenic cotton while the nitrate nitrogen showed no difference. The available phosphorus and nitrate nitrogen of transgenic cotton with insect-resistant and herbicide-resistant genes were both significantly higher than non-transgenic cotton, but nitrate nitrogen was significantly lower than non-transgenic cotton. The urease, alkaline phosphatase and catalase activities in the rhizosphere soil showed no significant difference between transgenic cotton sGK321 and non-transgenic cotton. Except that the urease was significantly lower than non-transgenic cotton, the alkaline phosphatase and catalase activities of the transgenic cotton with double insect-resistant genes showed no difference. For the transgenic cotton with insect-resistant and herbicide-resistant genes, the urease showed no significant difference compared with non-transgenic cotton, with the alkaline phosphatase significantly higher and the catalase activities significantly lower than non-transgenic cotton. The soil nutrient content(except nitrate nitrogen) and soil enzyme activity in the rhizosphere soil of transgenic double gene cotton sGK321 and non-transgenic cotton had no significant difference, but difference among transgenic cotton with double insect-resistant genes and transgenic cotton with insect-resistant and herbicide-resistant genes were mainly influenced by the cotton varieties.

Keywords： transgenic double gene cotton rhizosphere soil soil enzyme activity soil nutrient

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