

一株具有固氮功能的烟草根际微生物的鉴定及其初步效应

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Identification and effect of a nitrogen-fixing bacterium in flue-cured tobacco rhizosphere

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摘要

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摘要 应用16S rDNA序列分析构建系统发育树, 结合生理指标、生化反应, 对分离自烤烟根际的固氮菌株N05进行了分类鉴定, 并通过小区试验探讨其对烤烟生产的效应。结果表明, 自生固氮菌N05属于产碱菌属(Alcaligenes), 粪产碱菌(Alcaligenes faecalis)。将固氮菌N05制成菌肥, 烤烟移栽时施入(30 kg/hm²)同时施用80%的氮肥(B+80% N), 与全量施用氮肥(FN)相比, B+80% N烤烟根际固氮菌的数量平均提高3.6倍, 放线菌的数量显著降低; 圆顶期烤烟根际土壤中除Mg元素的有效性略有降低外, P、K、Ca、Cu、Zn、Fe和Mn等元素的有效性均有不同程度的提高, 提高幅度在2.51%~46.08%。烤烟杀青样中N的平均含量也高于FN。在减施氮肥的情况下, 应用固氮菌肥可提高烤烟根际固氮菌数量和矿质元素的有效性。

关键词: 烤烟 固氮菌 16S rDNA 矿质元素

Abstract: The Azotobacter N05 isolated from flue-cured tobacco rhizosphere is identified as Alcaligenes sp, likely Alcaligenes faecalis, by using the phylogenetic tree constructed from 16S rRNA gene sequences, its physiological indexes and biochemical reactions. To our knowledge, this is the first report on azotobacter Alcaligenes faecalis in flue-cured tobacco rhizosphere. Applying to transplanted flue-cured tobacco, the numbers of azotobacter under the combination of N05 azotobacter fertilizer (30 kg/ha) and 80% N dosage of the full fertilizer amount (B+80% N) are 3.6 times of those of the full N fertilizer (FN) treatment, while the numbers of actinomyces under the combination treatment are significantly decreased. In addition, compared to the FN, the soil available contents of P, K, Ca, Cu, Zn, Fe, and Mn in tobacco rhizosphere at the tobacco topping stage under the B +80% N are increased by 2.51% – 46.08%. The average contents of N in de-enzyme tobacco leaves at different growth stages under the B +80% N are higher than those under the FN. These results indicate that the amount of azotobacter and availability of mineral elements are enhanced by using azotobacter fertilizer in flue-cured tobacco production when N dosage is reduced moderately.

Keywords: flue-cured tobacco azotobacter 16S rDNA mineral element

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