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一株具有ACC脱氨酶活性固氮菌的筛选与鉴定

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Screening and identification of a nitrogen fixing bacteria with 1-aminocyclopropane-1-carboxylate deaminase activity

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摘要 ACC（1-aminocyclopropane-1-carboxylate, 1-氨基环丙烷-1-羧酸）脱氨酶是近年来发现的许多植物促生细菌（Plant growth promoting bacteria, PGPB）共有的一个特征性酶，很多具有ACC脱氨酶活性的细菌能够增强植物抗逆性，缓解干旱、淹水、盐碱、高温、病虫害等对植物的危害。因此，ACC脱氨酶阳性细菌的筛选和研究对促进农业生产具有重要意义。本文从大量样品中分离、筛选到1株ACC脱氨酶阳性固氮菌，编号为7037，该菌株ACC脱氨酶活性为α-丁酮酸2.530 μmol /(h•mg)，protein，固氮酶活性为C2H410.068 nmol /(h•mg), protein；具有较为广泛的碳源利用能力和很强的环境适应能力,被鉴定为节杆菌属（Arthrobacter sp.）的一个种。盆栽试验显示，小白菜接种7037菌株比对照组鲜重增加了139%，差异极显著。该菌株可望进一步研究开发成为微生物肥料的生产菌种。

关键词： 生物固氮 ACC脱氨酶 植物抗逆性 植物促生细菌

Abstract: ACC (1-aminocyclopropane-1-carboxylate) deaminase is a common characteristic enzyme in plant growth promoting bacteria (PGPB) in rencent years. Many ACC deaminase positive bacteria have the ability to increase plant resistences against envionmental stresses like drought, flood, salinity and high temperature, therefore, screening and investigation on the ACC deaminase positive bacteria are importment for agriculture. In this work, one strain designed as 7037 was screened. The results show that the ACC deaminase activity of the strain is 2.530 μmol/(h•mg) protein and the nitrogenase activity is C2H4 10.068 nmol /(h•mg)protein. The strain 7037 shows a relative extensive utilization for caobon sources and strong environmental adaptability, and is identified as Arthrobacter sp. The pot trial shows that the fresh weight of Chinese cabbage inoculated with the strain 7037 is increased by 139% compared with the no inoculation control. The strain 7037 is possible to be further developed as an excellent strain for microbial fertilizer production.

Keywords: biological nitrogen fixation ACC deaminase plant stress resistance PGPB

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