Expression of glutamate decarboxylase from *Lactobacillus* sp. OPK-3 in *Bacillus subtilis* enhances GABA production

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Abstract

To express a foreign glutamate decarboxylase (GAD) in *Bacillus* host system, a recombinant DNA (pLip/GAD) was constructed by ligating the GAD gene from *Lactobacillus* sp. OPK-3 into *Escherichia coli-Bacillus* shuttle vector pLip. The pLip/GAD construct was then transformed into *B. subtilis*. The transformed *Bacillus* strain with the pLip/GAD constructed had higher GAD activity than untransformed *Bacillus* counterpart. When the strains were cultured in LB medium containing 1% monosodium glutamate (MSG), the levels of GABA produced by the transformed and untransformed *B. subtilis* were 220 mg/L and 46 mg/L, respectively. Under 3% MSG conditions, the levels of GABA produced by the transformed and untransformed strains were 401 mg/L and 49 mg/L, respectively. In agreement with these observations, the transformed *Bacillus* strain maintained its normal growth rate despite high MSG concentrations. Thus, by introducing foreign GAD gene, *Bacillus* strains has been genetically engineered to produce high levels of GABA from MSG.

Reference

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