Functional Expression of Latobacillus paracasei Glutamate Decarboxylase for Synthesis of Gamma Amino Butyric Acid

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Gamma-Amino butyric acid (GABA) has several physiological functions in humans. In addition, many fields such as a food, medicine and Bio-Plastic have rose as application sites for GABA. Even though Lactobacillus paracasei is well known microbial as a high level of GABA producer, GABA production using fermentation is very cost ineffective since high concentration of GABA cannot be easily achieved. We analyzed glutamate decarboxylase (GAD), which catalyzes the decarboxylation of L-glutamate to GABA. Synthesized GAD encoding gene based on the genome information of Lactobacillus paracasei was successfully expressed in E. coli and purified through metal affinity column. The molecular weight of the purified GAD was estimated to be 54 kDa by SDS-PAGE. The GAD enzyme had optimal activity at 50 ℃ at pH 5.0 and showed a low Km value and higher activity at low pH compared with other GADs from other lactic acid bacteria species.