

Attribute of *Enterococcus* sp. CFR 3003 to combat gamma-aminobutyric acid (GABA) deficiency

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Lactic acid bacteria are found to withstand acid stress encountered in food and in GIT by expressing Glutamate decarboxylase (GAD, mediates decarboxylation of glutamate to GABA). GABA is a four carbon non-protein amino acid acting as a major inhibitory neurotransmitter in brain and is associated with several neurological disorders, including anxiety, depression and epilepsy. GABA production by free and calcium-alginate immobilized cells of *Enterococcus* sp. CFR 3003 were investigated for GABA production. Mass transfer experiments were performed to investigate external and internal mass transfer rates. The Damkohler modulus (Da) for external mass transfer effect was found to less than 1 (0.88), thus could be neglected. However, in the present study, effectiveness factor, $\eta_i < 1$ (0.627) and Thiele modulus, $\Phi > 0.3$ (1.06), indicating that the GABA production is considerably affected by intraparticle diffusion effects and was the found to be the principal rate-controlling step.

Protective effect of immobilization on cell survivability was tested under deleterious digestive environment, when challenged to salivary α -amylase, simulated gastric fluid and intestinal fluid. Viable cell counts of immobilized cells were significantly higher under simulated GI conditions than those observed with free cells and GABA productivity was found higher. The bead integrity was retained for nearly 16 h of transit through simulated GI conditions. A near complete dissolution leading to the release of cell into the simulated intestinal fluid was observed afterwards. The results clearly indicated that calcium-alginate cell loaded beads, with extended survival under digestive conditions could be used as an efficient delivery system for GABA producing probiotics.

Biography

Divyashri is pursuing her Ph.D. in the field of Probiotics, Prebiotics and Functional food, under the guidance of Dr. SG Prapulla, Chief Scientist at Fermentation Technology and Bioengineering department, CSIR-Central Food Technological Research Institute (CFTRI), Mysore 570 020, INDIA. She has obtained her Master of Technology in Industrial Biotechnology from Manipal Institute of Technology, Manipal University, and Manipal, INDIA. She joined as a research scholar in 2011 and still working for her doctoral program.

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