

Development of GABA overproducing recombinant Escherichia coli by engineering of glutamate decarboxylase GABA transporter

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GABA, or gamma-Aminobutyric acid is a non-essential amino acid and a precursor of pyrrolidone, a monomer of nylon 4. GABA can be biosynthesized through the decarboxylation of L-glutamate by glutamate decarboxylase. In this study, the effects of glutamate decarboxylase (gadA, gadB), glutamate/GABA antiporter (gadC) and GABA aminotransferase (gabT) on GABA production were investigated in Escherichia coli. Glutamate decarboxylase was overexpressed alone or with the glutamate/GABA antiporter to enhance GABA synthesis. GABA aminotransferase, which redirects GABA into the TCA cycle, was knock-out mutated. When gadB and gadC were co-overexpressed in the gabT mutant strain, a final GABA concentration of 5.47 g/l was obtained from 10 g/l of monosodium glutamate (MSG), which corresponded to a GABA yield of 89.7%.

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