Cloning and Characterization of the Sucrose Phosphorylase Gene from Bifidobacterium longum

KIM Mijin, KWON Taeyeon, JI Geun Eog[1], CHUNG Dae Kyun[2], LEE Hyong Joo[3] and LEE Jong-Hoon*

Department of Food Science and Biotechnology, Kyonggi University, Suwon 442-760, Korea. [1]Department of Food and Nutrition, Seoul National University, Seoul 151-742, Korea. [2]Department of Genetic Engineering, Kyunghee University, Suwon 449-701, Korea. [3]Department of Food Science and Technology, Seoul National University, Suwon 441-744, Korea.

The possibility of genetically manipulating bifidobacteria for metabolic activity is very promising, but few Bifidobacterium genes have been characterized and analyzed for their structure, organization, expression and regulation. Some researches of α-galactosidase from bifidobacteria were investigated to utilize for the production of a novel α-galacto-oligosaccharide by its transglycosidase activity and for the reduction of raffinose and stachyose in soymilk those are the cause of flatulence in humans. We intended the cloning of a novel α-linked oligosaccharide hydrolyzing enzyme from Bifidobacterium longum for the application as food grade. The EcoRI-digested genomic DNA of B. longum SJ32 was ligated with the plasmid vector pUC19 and transformed E.coli JM109. Five transformants were screened on an M9 plate containing raffinose and LB plate containing X-α-gal. As the result of α-galactosidase activity determination from 5 transformants, the transformant MJ1 showed the highest activity was selected for the genetic analysis. The recombinant plasmid obtained from strain MJ1 carried 8.7-kb DNA fragment was named pMJ1. Characterization of recombinant plasmid pMJ1 will be reported.