

Piyada Bamrungna 2009: Production of Fermented Soymilk Powder Containing Lactic Acid Bacteria by Spray Drying. Master of Science (Biotechnology), Major Field: Biotechnology, Department of Biotechnology. Thesis Advisor: Associate Professor Penkhae Wanchaitanawong, Ph.D. 84 pages.

The objective of this study was to develop a probiotic soymilk powder by spray drying. Three strains of lactic acid bacteria, *L. acidophilus* TISTR 1338, *L. casei* subsp. *tolerans* TISTR 1341 and *L. plantarum* P49 was evaluated for their tolerance to gastrointestinal tract conditions. During exposure to simulated gastric juice the viable cell of all test strains decreased dramatically to 2 log CFU/ml after 30 min and an undetectable level after 60 min. The strains showed high tolerance to simulated bile juice with the viable cell number remained constant after 240 min incubation. During fermentation of soymilk by the strains, *L. plantarum* P49 was found to increase calcium solubility and exploit raffinose and stachyose more efficiently than other strains. Furthermore, effect of sugar (glucose, galactose and sucrose) on calcium solubility and oligosaccharide reduction in soymilk fermented by *L. plantarum* P49 was evaluated. Dramatic increase in soluble calcium was obtained in the fermented soymilk with sucrose addition, 2.5-fold compared to the control. Moreover, the addition of sugar was found to enhance the reduction of raffinose and stachyose. Survival of all test strains after spray drying and during a 6-month period of storage was examined. After spray drying, *L. casei* subsp. *tolerans* TISTR 1341 showed a highest survival percentage of 107.69 %. A significantly ($p<0.05$) higher percent of survival was also noted when the spray-dried fermented milk in sealed aluminum foil bag was stored at 4 °C than 30 °C. During storage at 4 °C for 6 months, the viability of all samples was quite stable with viable cell of 10^8 - 10^9 CFU/g. While, the viable cell of the strains after 4 months of storage at 30 °C was not detectable. Finally, spray-dried cell encapsulated with soymilk exhibited high tolerant to gastric and bile juices. This finding suggested that fermented soymilk powder containing lactic acid bacteria could be used as a dietary adjunct.

Student's signature

Thesis Advisor's signature