

Encapsulation of probiotic *Bifidobacterium longum* for use in dairy products

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Fermented dairy products are set up as vehicle for delivering probiotics. The survival in the product and during passage through upper digestive tract is an important criterion for probiotics. Therefore the enhancement in the survival of probiotic bacteria in dairy products such as yogurt, ice cream and flavoured milk is an attractive feature as they will remain intact in the food until consumption. The acidity developed in the dairy products and the low acid environment in the gastrointestinal tract decline the viability of the probiotics before they reach their site of action. Encapsulation of bacteria is a suitable method to preserve them from such harsh conditions. This study was designed with an objective to encapsulate probiotic *Bifidobacterium longum* NCTC11818 strains with sodium alginate, resistant starch, sunflower oil and calcium chloride. The alginate, starch, bacterial cell mixture was drawn in a sterile syringe fitted with 21G needle and dropped in to the oil. 100 ml calcium chloride solution was added along the walls of the beaker to harden the beads. The beads were washed with calcium chloride with 5 % of glycerol and preserved in calcium chloride solution at 4 °C. Optimum viability was obtained with 18 g/L sodium alginate, 20 g/L resistant starch and 1M calcium chloride mixture. The survival of encapsulated *Bifidobacterium longum* expressed a decline for 1 log cycle while the non encapsulated bacterial viability declined for 2 log cycles over the fourteen days of storage. The encapsulation showed the retention of survival rate of encapsulated bacteria. Preserving the encapsulated beads at 4 °C did not show major decrease in survival over fourteen days of storage whereas the storage in frozen conditions at -20 °C led to 4 log cycle reduction within two days of storage. Further studies are required to improve the encapsulation technique to increase viability at freezing conditions.

Keywords: *Bifidobacterium longum*, Encapsulation, Probiotics