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Determination of the survival kinetics of probiotic bifidobacteria and lactobacilli in a commercial brand of bio-yoghurt in Sri Lanka

V S Jayamanne* and K C Dissanayaka
Department of Food Science & Technology, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya

Probiotics are live microorganisms which, when administered in adequate amounts, confer health benefits such as reduction of lactose intolerance, prevention of diarrhoeal diseases and protection from some forms of cancer. It has been reported that probiotic products should carry >10^6 CFU/g of probiotic organisms at the time of consumption to have the reported health benefits. However, maintenance of the viability of probiotic bacteria in bio-yoghurts during storage at refrigeration temperature remains a problem as these organisms rapidly lose their viability. Even though many studies on the survival kinetics of probiotic bacteria in developed countries have been reported, no comparable studies are reported from Sri Lanka. Therefore, this study mainly focused on determination of survival kinetics of lactobacilli and bifidobacteria in a commercial brand of bio-yoghurt produced and marketed in Sri Lanka.

At the moment only one manufacturer produces bio-yoghurts in commercial scale in Sri Lanka and the present study was carried out as a collaborative study with the said manufacturer. Bio-yoghurt samples were obtained from the factory at the time of manufacture, stored at chill temperature (4±2 ^oC) for a period of six weeks and probiotic (*Lactobacillus acidophilus* and bifidobacteria) and yoghurt bacteria (*Streptococcus thermophilus* and *Lactobacillus bulgaricus*) were enumerated at weekly intervals. Titratable acidity and pH were also determined at weekly intervals during the storage period. Bifidobacteria and *L. acidophilus* populations were 10^6 CFU/g and 10^7 CFU/g, respectively at the time of purchase and showed a constant decline in numbers during storage. The usual maximum shelf-life of the particular bio-yoghurt is 28 days, but the earlier the product is consumed the better its therapeutic properties, as on expiry low viable cells of bifidobacteria (10^2 CFU/g) and *L. acidophilus* (10^4 CFU/g) were observed. The factors that appeared to affect the viability of bifidobacteria and *L. acidophilus* in bio-yoghurts were pH and titratable acidity, storage temperature and antagonistic effects exerted by yoghurt bacteria. Bifidobacteria showed a faster rate of death compared to *L. acidophilus*. The observed decrease in probiotic bacterial population coincided with the increase in titratable acidity and decrease in pH of bio-yoghurts. Presence of *L. bulgaricus* appeared to affect the viability of probiotic organisms possibly due to the production of hydrogen peroxide. It can be concluded that the sooner the product is consumed the higher the chances to ingest a sufficient load of probiotic bacteria in the gut.

*vsjayamanne@fst.ruh.ac.lk Tel: 041-2292813