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Survival kinetics of probiotic *Lactobacillus acidophilus* and *Bifidobacterium longum* in buffalo curd during storage at refrigeration temperature

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Probiotic bacteria of the genera *Lactobacillus* and *Bifidobacterium* have been claimed to provide several health benefits including prevention of cancer, reduction of blood cholesterol level, improvement of lactose digestion and inhibition of tumor formation. Adequate numbers of viable cells, known as "therapeutic minimum" (10^6 CFU/g), needs to be consumed regularly for the transfer of the probiotic effect to consumers. The viability of probiotic organisms in fermented milk products such as yoghurt, sour cream, cheese *etc.* has been adequately researched. However, the viability of these organisms in buffalo curd has not adequately been researched. The objectives of the present study were to determine the survival kinetics of probiotic lactobacilli and bifdobacteria in buffalo curd during storage at refrigeration temperature (4 ± 2 ^oC) and to determine the effects of pH/titratable acidity, redox potential (E_h) and dissolved oxygen on the viability of probiotic organisms. The survival kinetics of *Lactobacillus acidophilus* URCC500 (University of Ruhuna Culture Collection) and *Bifidobacterium longum* URCC600 (University of Ruhuna Culture Collection) in buffalo curd were determined. *L. acidophilus* and *B. longum* were aseptically introduced to the fermenting mix to obtain a final population level of 10^8 CFU/ml of each organism. The viable counts of *L. acidophilus* and *B. longum* in buffalo curd were determined everyday during the storage period of seven days at refrigeration temperature (4 ± 2 ^oC). The pH, titratable acidity, redox potential (E_h) and dissolved oxygen (DO) were also determined during storage of buffalo curd. *B. longum* rapidly lost its viability and went below the therapeutic minimum population level of 10^6 CFU/g by the third day of storage. The rapid loss of bifidobacterial viability coincided with the rapid decrease in pH below 4.3. The dissolved oxygen content increased from 3 to 5 ppm during the seven day storage period whereas E_h also increased from +125 mV to +230 mV. The increasing dissolved oxygen content and E_h observed in the present study may also have contributed to the rapid demise of probiotic organisms in buffalo curd, especially bifidobacteria which is highly susceptible to oxygen toxicity. The combination of low pH and increasing titratable acidity would result in increasing levels of undissociated acid, which is more harmful to microorganisms and is clearly a factor in the decreasing population of probiotic bacteria, especially lactobacilli, towards the end of the storage period of buffalo curd. Of the two organisms, *L. acidophilus* appeared to be a better probiotic bacterial species that can be used to produce probiotic buffalo curd. It can be concluded that probiotic buffalo curd can be successfully produced with incorporated lactobacilli and bifidobacteria. The sooner the probiotic buffalo curd is consumed, the higher is the chance that consumers ingest a sufficient load (>10^6 CFU/g) of probiotic organisms.

Keywords: Probiotic bacteria, health benefits, Lactobacillus, Bifidobacterium, buffalo curd