

Evaluation of the Effects of Fermentation of Buffalo Curd and Acidity on Survival Kinetics of *Listeria monocytogenes*

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Abstract

Listeria monocytogenes, a food-borne pathogen often found in milk and milk products, causes listeriosis in pregnant women, newborns, elderly and immunosuppressed people. There have been reports on survival of *Listeria* in various milk products in the world, but comparable studies on the survival of *Listeria* in buffalo curd have not been reported. Therefore, the present study investigated the effects of fermenting buffalo milk and acidity on survival kinetics of *L. monocytogenes*. *L. monocytogenes* FSTLC2 and lactic acid starter cultures were aseptically introduced to boiled and cooled buffalo milk (fat 6%, protein 4%) and the mix was allowed to ferment at ambient temperature (26 ± 2 °C) for 18 h. The *Listeria* count on Modified Oxford Agar (MOX; Oxoid Ltd.), lactic acid bacteria count on MRS Agar (Oxoid Ltd.), pH and titratable acidity were determined in the beginning and at 2 h intervals during fermentation. The effect of pH/acidity on *Listeria* was determined by introducing *Listeria* to buffalo milk with pH values (pH 4.0, 4.5, 5.0, 5.5) adjusted using 88% lactic acid (BDH Chemicals) and enumerating *Listeria* on MOX Agar at 12 h intervals for 96 h. It was observed in the present study that *Listeria* count decreased over time and after 16 h of fermentation of buffalo milk at ambient temperature, *Listeria* cannot be detected on MOX Agar. The pH value decreased from 6.8 to 4.1 and titratable acidity (lactic acid %) increased from 0% to 1.2 % during fermentation. Fermentation appeared to be an effective preservation technique in eliminating *Listeria* in buffalo curd. The pH value of 5.5 appeared to be the critical pH for inactivation of *Listeria* as no growth of *Listeria* was observed below pH 5.5. The total inactivation of *Listeria* in buffalo milk appeared to be due to lowering of pH coupled with increasing titratable acidity as well as action of bacteriocins, especially Nisin, produced by lactic acid bacteria during fermentation. It can be concluded that fermentation is an effective tool in inactivating *Listeria* in buffalo milk.

Keywords: acidity, buffalo curd, fermentation, inactivation, *Listeria monocytogenes*