DEVELOPMENT OF A CHEDDAR CHEESE USING BIOLOGICAL PRESERVATIVES AS SUBSTITUTES FOR CHEMICAL PRESERVATIVES

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Cheddar ranks as one of the most popular hard cheeses in the world. Chemical preservatives are widely used to prevent spoilage of Cheddar cheese during storage. However, chemical preservatives may cause adverse effects on human health. Therefore, present study was conducted to develop Cheddar cheese, using biological preservatives as substitutes for chemical preservatives. Nisin, lysozyme and lactic acid bacteria (a blend of *Lactococcus lactis* subsp. *lactis*, *Lactococcus lactis* subsp. *cremoris* and *Streptococcus thermophilus*) were used as biological preservatives while $NaNO_3$ was used as a chemical preservative. The trial and error method was used to develop the basic Cheddar cheese formula. Treatments were arranged in Completely Randomized Design with three replicates. Physico-chemical properties of cheese such as pH, titratable acidity, texture, moisture and dry matter were measured during five weeks of storage at 16 °C. Sensory properties of cheese were evaluated with the help of untrained sensory panel using a ranking test. Total lactic acid bacteria, yeast and mould and coliform counts were also determined. The nisin incorporated samples were rated as the best treatment for all the evaluated sensory characteristics: colour, flavour, texture, odor and overall acceptability. Cheese samples with different preservatives were not significantly different *($p>0.05$)* with respect to protein, fat and ash content. Lactic acid bacteria incorporated cheese samples demonstrated the highest titratable acidity values (2.64±0.14-3.14±0.03%) compared to all other samples throughout the storage. Total lactic acid bacteria counts of nisin incorporated samples were 8.59±0.01 log cfu/g at the end of five weeks of storage. No coliform counts were observed in any sample and according to the Sri Lanka Standards yeast and mould counts were within the acceptable limits for five weeks. Therefore, biological preservative such as nisin could be used to preserve the Cheddar cheese effectively without affecting the sensory qualities.

Keywords: Biological preservatives, Cheddar cheese, Lactic acid bacteria, Nisin