EFFECT OF MICROBIAL CONTAMINATION AND STORAGE CONDITIONS ON THE SHELF LIFE OF STRAWBERRY-FLAVORED DRINKING YOGURT AT MILCO DAIRY COMPANY, SRI LANKA

Rathnayake U.G.D.S[1], Goonasekara I.D.[2], Sooriyaarachchi S.U.[2] and Weerasinghe W.P.C.G.[1]*

[1]Department of Urban Bioresources, Faculty of Urban and Aquatic Bioresources, University of Sri Jayewardenepura, Sri Lanka

[2]Department of Indigenous Medical Resources, Faculty of Indigenous Health Sciences and Technology, Gampaha Wickramarachchi University of Indigenous Medicine, Sri Lanka

[*]Corresponding author: gayaniweerasinghe@sjp.ac.lk

Microbial contamination and improper storage conditions can adversely affect the shelf life, safety, and quality of drinking yogurt. This study investigated the effect of microbial contamination and storage conditions on the shelf life of strawberry-flavored drinking yogurt produced at MILCO Dairy Company, Sri Lanka. Samples were collected from raw milk (A), silo (pasteurized milk) (B), T2/T3 tank samples (C), unpasteurized mixture (D), just after pasteurization (E), after culture addition(F), farm tank sample (G) of the processing line in four sampling time slots (8.00-10.00 a.m.,(a) 10.30 a.m.-12.30 p.m.,(b) 1.00-3.00 p.m.,(c) and 3.30-5.30 p.m.(d)) and analyzed for Total Colony Count (TCC), pH, titratable acidity, and bacterial identification using gram staining and biochemical techniques. Shelf-life studies were conducted by storing the final product at 2°C, 6°C, and 10°C for 13 days. Data were statistically analyzed using IBM SPSS V.23. According to the results, the processing stage significantly affected microbial contamination ($p < 0.001$), while sampling time had no significant effect ($p > 0.05$). The highest microbial load was observed in raw milk, whereas microbial counts decreased markedly after pasteurization and fermentation. Increased microbial counts were observed in the later stage of the processing line (farm tank), indicating possible post-pasteurization contamination. Storage temperature and storage duration significantly influenced microbial growth ($p > 0.05$), with higher temperatures accelerating spoilage. Bacteria that remained in the filling stage of drinking yogurt were growing during storage conditions. Those remaining bacteria were identified and further confirmed as *Lactobacillus bulgaricus*, *Lactobacillus casei*, *Streptococcus thermophilus*, *Bacillus cereus*, *Staphylococcus spp*., *Staphylococcus epidermidis, Streptococcus spp., Streptococcus lactis, Brucella spp.,* and *Acinetobacter calcoaceticus*. Thus, a suitable update to the processing line was essential to destroy these bacteria and to avoid secondary contamination of the product. Further, following proper storage conditions throughout the value chain can minimize bacterial growth and thereby increase the shelf life of drinking yogurt. Thus, this study highlights the importance of strict hygiene practices and maintaining storage temperatures (2–4°C) to improve the microbiological safety and extend the shelf life of drinking yogurt.

Keywords: bacterial identification, dairy processing, fermentation, post-pasteurization contamination, spoilage microorganisms, storage temperature, Total Colony Count (TCC)