

Variation of Mesophilic and Thermophilic Spore Counts in UHT Processing of Full Cream Milk

A.W.D.T. Seneviratne¹, A. Weerakoon² and D.C. Mudannayake¹

¹*Department of Animal Science, Uva Wellassa University, Badulla, Sri Lanka*

²*Cargills Quality Dairies (Pvt) Ltd, Ilukhena Road, Gaspe, Banduragoda, Sri Lanka*

Demand for the UHT treated milk has been largely increased in the Sri Lankan market in the recent past. Quality deterioration of UHT products will degrade the brand reputation and make health risks for the consumers. Thus, the present study was focused to determine mesophilic (MP) and thermophilic (TP) spore count variation pattern in UHT processing of full cream milk and to identify contamination points in the processing line. Seven control points in the processing line were identified; (milk receiving bowsers, milk line just after thermizing, silos-6-12 h after storage, processing line-just after pasteurizing the mix, mix storage tanks (MST)-1h after pasteurized mix stored, balance tank-before UHT treatment, final product-soon after UHT treatment) and 16 milk samples from each point were collected in triplicates. Spore counts were evaluated by heating to 100°C for 10 minutes and subsequent culturing on plate count agar followed by incubation at 55°C for 2 days for TP spore counts and at 35°C for MP spore counts. Vegetative cell counts and spore counts were evaluated during 4 months of ambient temperature storage at 30 days interval. Swab samples and clean-in-place final rinse samples were collected from 7 control points and analyzed for *Coliforms* and total plate count. Significantly higher MP and TP spore counts were observed as $9.00 \pm 8.79 \times 10^2$ cfu/mL and $1.09 \pm 1.01 \times 10^2$ cfu/mL, respectively in MST after pasteurization. This may be due to the heat stress at the pasteurization process which may have induced the spore formation by bacteria. Significantly lower MP and TP counts were observed in the final product (1.70 ± 5.30 cfu/mL and $3.34 \pm 17.9 \times 10^2$ cfu/mL, respectively). In conclusion, there is a requirement to initiate good agricultural practices to reduce bacterial load coming from the farm level and to initiate good manufacturing practices to reduce the cross contamination during processing.

Keywords: Mesophilic spores, Thermophilic spores, UHT processing