Establishing the Baseline Total Bacterial Count for Cows' Milk in Sri Lanka and its Application in Determining Bulk Milk Contamination

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The Total Bacterial Count (TBC) or the standard plate count refers to the number of viable bacteria present in a milk sample. TBC is used as the official regulatory test to determine bacterial population in milk and the acceptable TBC for raw cow milk is <30,000/ml. It is a criterion that determines the purchase price of milk, a crucial factor to increase consumer confidence and a valuable measure for keeping quality and shelf life. However, this standardisation is not applicable to developing countries where codes of hygienic practices are different compared to developed countries. Therefore, it is important to establish a local standard for the benefit of both farmer and consumer. Bacterial contamination is possible due to shedding of organisms within the udder and via environment. Cows with mastitis contribute to high TBC and often shed more than 10,000,000/ml. Milk from subclinical (SM) and chronic mastitic (CM) cows accidentally gets mixed with bulk milk and causes milk to be rejected imposing reduced profit to dairymen. The present study was designed to determine TBC of milk from healthy cows and to determine the contribution made to high TBC by mastitic milk.

A total of 386 cattle farms were evaluated covering 29 veterinary ranges from Kandy (15), Nuwara Eliya (8) and Matale (6) districts. A cross sectional study was carried out to investigate the randomly selected farms where 696 cows were screened for SM and CM using California Mastitis Test (CMT). Systematic sampling was done to collect milk initially from CMT negative healthy cows (n_1 = 80). All CMT positive cows were sampled to obtain TBC (n_2 = 206).

The estimated mean TBC of CMT negative milk was 11,946 cfu/ml, with the 95% confidence interval (CI) being 9271 - 14,627cfu/ml. Mean TBCs of SM and CM milk were 1.419×10^8 cfu/ml (95% CI: $1.41 \times 10^8 \pm 0.99 \times 10^8$) and 1.651×10^8 cfu/ml (95% CI: $1.65 \times 10^8 \pm 1.26 \times 10^8$), respectively. To compare the effect of adding CMT positive milk, TBCs were calculated as the average of natural logarithm. 95% CI for CMT-negative milk, SM and CM were 3.75 ± 0.14, 6.72 ± 0.36 and 7.02 ± 0.54, correspondingly. Hence, there is a considerable effect of mixing mastitic milk with bulk milk in terms of keeping quality, shelf life and public health. In conclusion, to minimise the above quality and safety issues, farmers should be educated on early detection tests of SM and CM, thereby preventing rejection of their milk at collecting centres.