

NOTE

Effect of Different Levels of Fat Concentration of Milk, Sugar Levels and Storage Periods on the Microbiological Quality of Rabri Making from Bhadwari Buffalo Milk

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Abstract

The rabri was prepared from Bhadwari buffalo milk standardized to 5, 6 and 7% fat levels with three degrees of concentration of milk at 3, 3.5 and 4 folds. Three sugar levels 6, 7 and 8 % were used and the rabri was stored at 5 ± 1 C for 20 days. The effects of various factors on microbiological quality of rabri was analyzed. The contamination of coliform bacteria was not detected in all rabri samples and yeasts and moulds were not detected in fresh rabri samples. The presence of yeasts and moulds were found in stored rabri samples for longer period at 5 ± 1 C which was suitable temperature for the growth of these organisms. The SPC/g was found to be lower in fresh rabri samples while it was increased as periods of storage increased. Rabri samples were not found suitable after storage for 15 days.

Key words : Coliform, SPC, Yeast, Mould, Rabri.

Milk is a perishable food item and from time immemorial it has been converted into products in which heat, acid and rennet have been used. Most of the Indian dairy products are heat desiccated and in some, acid is also used. Heat desiccated products have a longer keeping quality than milk. From the vedic times, heat desiccated milk-products are used as like khoa, rabri and ghee. Conversion of milk to milk products is based on reducing the bulk and enhancing the keeping quality. Production and marketing of traditional milk sweets is mostly a small-scale and scattered affair confined to the Halwai (traditional sweets maker) shops in the local market. One reason for this is their short shelf-life. The keeping quality of milk is poor in liquid form. So, the heat processing and accompanying reduction in water activity result a substantial destruction of pathogenic and spoilage micro-organisms and inactivation of enzymes. Besides, desirable heat-induced, chemical interactions among milk constituents result in reduction of redox potential and water activity, thereby extending the product shelf-life under ambient temperatures of tropical climate (1—4).

Rabri is a concentrated, sweetened whole milk delicacy, containing several layers of clotted cream and skimmed off from slowly evaporating milk. Rabri

is in demand during festivals and other celebrations, specially in the northern and eastern parts of India.

Materials mainly included the ingredients required for optimization of compositional and processing parameters for sweetened rabri from Bhadwari buffalo milk. Bhadwari buffalo milk was obtained from the Dairy Farm of C. S. Azad University of Agriculture and Technology, Kanpur. The milk was standardized at 5, 6 and 7% fat by using Pearson square method (5). Sugar purchased from the market was used as sweetening agent.

Rabri production involves several steps. First the milk was standardized at desired fat level. Thereafter it was strained to remove visible dust and dirt through muslin cloth. In this method, rabri was prepared by slow heating of 2 kg of milk in a stainless steel karahi over an open fire to simmering temperature (85—90 C) and then maintained at this temperature by controlled heating. The milk was neither stirred nor allowed to boil. The surface of the milk was fanned to help the process of skin formation (malai). As soon as the volume of milk reduced to about one-third of its original volume, good quality ground sugar (desired level by weight of the original milk) was added to the concentrated milk and mixed properly. The layers of skin collected on the sides of the karahi were

Table 1. Effect of different fat levels (A), degree of concentration of milk (B), sugar levels (C) and storage periods (D) on the microbiological quality of rabri.

	Standard plate count per gram ($10^3/g$)	Yeast and mould counts per gram
A ₁ (5%)	30.03	25.91
A ₃ (6%)	30.69	24.67
A ₃ (7%)	30.83	22.36
B ₁ (3 folds)	31.04	36.98
B ₂ (3.5 folds)	30.72	24.29
B ₃ (4 folds)	30.27	21.67
C ₁ (6%)	32.72	30.22
C ₂ (7%)	30.16	24.84
C ₃ (8%)	29.15	27.84
D ₁ (0 day)	24.25	0.00
D ₂ (5 days)	26.82	8.74
D ₃ (10 days)	30.34	17.78
D ₄ (15 days)	33.70	32.30
D ₅ (20 days)	38.27	62.74

then immersed in the mixture, heated for short duration and allowed to cool at room temperature and finally kept in the refrigerator.

Preparation of dilution using all aseptic precautions 1 : 10 dilution of rabri sample was made in standard saline solution in a presterilized pestle and mortar. From the initial dilution subsequent decimal dilutions were made for plating.

Total bacterial count was done on Plate Count Agar medium using 1 : 100 and 1 : 1000 dilutions. The number of bacteria was calculated by multiplying the number of dilution with number of colonies counted (6). For yeast and moulds count 1 : 10 dilution of rabri suspension was transferred in duplicate sterilized petriplates. After incubation period the colonies made by yeast and moulds on the plates were counted with the help of colony counter (2).

For coliform count 1.10 dilution was transferred in duplicate sterilized petriplates ; 10 ml melted and cooled to 45 C violet red bile salt agar medium was poured in each petriplate. The inverted plates were placed in incubator maintained at 37 ± 1 C for 24 h. After incubation period, the colonies made by bacteria on the plates were counted with the help of colony counter (6).

Standard Plate Count/g. The maximum ($30.83 \times$

$10^3/g$) and minimum ($30.51 \times 10^3/g$) counts were noted in A₃ and A₁ samples, respectively. The maximum standard plate count ($31.04 \times 10^3/g$) and minimum ($30.27 \times 10^3/g$) were noted in B₁ and B₃ samples, respectively. The maximum standard plate count/g ($32.72 \times 10^3/g$) were found in the rabri made from 6% sugar (C₁), while 7 and 8% sugar levels showed significantly lower count compared to that of 6% sugar level. The bacterial counts increased with increase in storage periods. The maximum ($38.27 \times 10^3/g$) and minimum ($24.25 \times 10^3/g$) standard plate counts were noted at 20 days stored (D₅) and zero day storage period, respectively.

Coliform Count/g. The coliform bacterial contamination was found to be nil in all types of samples of rabri irrespective of treatments.

Yeasts and Moulds Count/g. The maximum (25.91/g) and minimum (22.36/g) yeasts and moulds count were noted in A₃ and A₁ samples, respectively. The maximum yeasts and moulds count (26.98/g) and minimum (21.67/g) were noted in B₁ and B₃ samples, respectively. The maximum yeasts and mould count (30.22/g) was in rabri made from 6% sugar (C₁), while 7 and 8% sugar levels showed significantly lower in respect of yeasts and moulds count compared to that of 6% sugar level. The maximum (62.74/g) and minimum (zero) yeast and mould was noted in 20 days stored (D₅) and fresh (D₁) samples, respectively.

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