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NOTE

Effect of Different Levels of Fat, Concentration of Milk and Sugar Levels on the Cost of Production of Rabri Prepared 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 concentrations of milk at 3, 3.5 and 4 folds and three sugar levels of 6, 7 and 8% were used. As regards the cost of production of rabri 5% fat, 3 folds concentrations with 8% sugar level gave lowest cost of rabri/kg (Rs 65.05/kg).

Key words : Cost of production, Rabri.

India has attained the highest milk production in the world. To maintain this level and further increase in milk production, expansion in the milk marketing structure is the need of the time. The increase in milk production and low cost advantage have attracted the multinationals and other private entrepreneurs to establish milk plants in the country. India represents one of the world's largest and fastest growing markets for milk and milk products due to increasing disposal income of Rs 250 million and strengthening middle class family.

Rabri is creamy white to caramelized in color, possesses viscous body containing several layers of clotted cream with a chewy texture. It has a pleasant caramelized flavor. Rabri is an excellent source of milk protein, fat and quick energy giving sucrose. At present, rabri is a specialized product of Halwais. Its manufacture is confined to the unorganized sector. Its traditional method of production is labor and energy-intensive. The product profile varies from region to region. Standardization of the traditional process in terms of manufacturing techniques, sensory profiles and compositional and physico-chemical attributes are necessary for attaining a product of uniform standard and assured quality.

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 per cent fat by using Pearson square

Table 1. Effect of different fat levels (A), degree of concentration of milk (B) and sugar level (C) on the cost of production of rabri.

	B_1	B_2	B_3	C_1	C_2	C_3	Mean
A_1	65.49	72.74	79.69	73.30	72.63	71.99	72.64
A_2	67.97	75.55	82.81	76.19	75.43	74.71	75.44
A_3	70.43	78.37	85.94	79.08	78.24	77.42	78.24
B_1				68.48	67.97	67.45	67.96
B_2				76.30	75.54	74.83	75.55
B_3				83.80	82.79	81.95	82.84
Mean	67.96	75.55	82.81	76.19	75.43	74.72	75.44
		A	B	C	A×B	A×C	B×C
SE		0.011	0.011	0.008	0.0143	0.0143	0.14
CD at 5%		0.023	0.023	0.023	0.040	0.040	0.040

Table 2. Mean cost of production of rabri as affected by different treatment combinations of ABC.

	B_1			B_2			B_3	
	C_1	C_2	C_3	C_1	C_2	C_3	C_1	C_2	C_3
A_1	65.92	65.50	65.05	73.41	72.72	72.10	80.58	79.67	78.82
A_2	68.49	67.97	67.47	76.30	75.54	74.83	83.80	82.79	81.85
A_3	71.03	70.44	69.89	79.19	78.36	77.57	87.03	85.92	84.89

method (1). Sugar purchased from the market was used as sweetening agent.

Rabri production involves several steps. First of all the milk was standardized at desired fat level (2). Thereafter it was strained to remove visible dusts and dirt through muslin cloth. In this method, *rabri* was prepared by slow heating of 2 kg of milk in a stainless steel container (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 was reduced to about one-third of its original volume, good quality of 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 then immersed in the mixture, heated for short duration and allowed to cool at room temperature and finally kept in the refrigerator.

For calculating the cost per kg of rabri, the rates of Bhadwari buffalo milk, cane sugar, heating medium, labor charges, packaging materials and miscellaneous charges were taken into account. The rate of milk was considered at prevailing rates of milk in the University (buffalo milk Rs 16.00 per kg, 7% fat, Rs 15.00 per kg, 6% fat and Rs 14.00 per kg, 5% fat). The rate of cane sugar (Rs 20.00 per kg), heating medium charges (Rs 2.25 per h), labor charges (Rs 60.00 per day), packaging materials (Rs. 2.00 per bag and miscellaneous charges (Rs 1.50) were taken into account.

The comparisons of different combinations with respect to the cost of production (Rs kg) of rabri are presented in Table 1. The highest cost of production (Rs 78.25/kg) was in rabri made with 7% fat in milk (D_3) and lowest (Rs 72.64/kg) in 5% fat (A_1). These values differed significantly. The maximum cost of production (Rs 82.81/kg) was noted in 4 folds of concentrations of milk (B_3), while minimum cost of production (Rs 67.98/kg) in B_1 samples. Cost of production of rabri was affected significantly by different sugar levels. The maximum (Rs 76.19/g) and minimum (Rs 74.71/g) costs of production were noted in C_1 and C_3 samples, respectively. The fat levels, concentrations of milk and sugar levels also influenced the cost of production of rabri. The maximum cost (Rs. 87.03/kg) was noted in $A_3B_3C_1$ samples, while minimum (Rs 65.05/kg) in $A_1B_1C_3$ samples.

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