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Research Article

PHYSICO-CHEMICAL AND SENSORY EVALUATION OF PROBIOTIC DAIRY PRODUCTS

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ABSTRACT
Yoghurt means a coagulated milk product obtained from toned or skimmed milk, by Lactic acid fermentation through the action of *Lactobacillus delbruckii subsp. Bulgaricus and Streptococcus thermophillus.* Growth, in the consumption of fermented dairy products, particularly yoghurt and probiotic yoghurt, has been done to the health image they possess. In addition to good taste, fermented milks have good nutritional profile. They supply high quality proteins, are excellent source of calcium, phosphorus and potassium and contain significant quantities of several vitamins. Yoghurt being capable of restoring the normal lactic intestinal flora and inhibiting undesirable proteolytic organisms has been recommended for infant nutrition (Deodhar, 1984).
In present investigation the physico-chemical and sensory attributes of *dahi,* probiotic curd, probiotic fruit curd and yoghurt were studied. The appearance, texture, cut surface and setting of probiotic curd, probiotic fruit curd and yoghurt were observed to be pasty and tender, soft gel, mobile and firm respectively in comparison to *dahi* which was cloudy in appearance, soft in texture and loose in setting. The pH and acidity of curd/yoghurt samples varied from 3.4 to 4.0 and 1.0 to 1.52 per cent, respectively. The curd prepared from traditional starter culture had lowest sensory scores in comparison to cultured curds. However, the results were observed to be non significant in terms of color, body and overall acceptability.

Key Words: *Sensory, Curd, Lactobacillus, Milk, Yogurt*

INTRODUCTION
Yoghurt means a coagulated milk product obtained from toned or skimmed milk, by Lactic acid fermentation through the action of *Lactobacillus delbruckii subsp. Bulgaricus and Streptococcus thermophillus.* Growth, in the consumption of fermented dairy products, particularly yoghurt and probiotic yoghurt, has been done to the health image they possess. In addition to good taste, fermented milks have good nutritional profile. They supply high quality proteins, are excellent source of calcium, phosphorus and potassium and contain significant quantities of several vitamins. Yoghurt being capable of restoring the normal lactic intestinal flora and inhibiting undesirable proteolytic organisms has been recommended for infant nutrition (Deodhar, 1984).The present investigation was carried out to develop curd, yoghurt and probiotic yoghurt and to evaluate the prepared products for their physico-chemical characteristics.

MATERIALS AND METHODS
Raw Material
Milk, Skim milk powder and sugar were procured from the local market. The microbial cultures viz. *Lactobacillus acidophilus, Lactobacillus bulgaricus and Streptococcus thermophillus* were procured from the National Collection of Dairy Cultures (NCDC), the Division of Dairy Microbiology at the National Dairy Research Institute, Karnal**.**

Preparation of Curd/ Probiotic Fruit Curd/ Yoghurt

Milk was standardized to 3.5 to 4.0 percent fat. Skim milk powder and sugar were added to it at the rate of 2.0 percent and 7.0 percent, respectively. The mixture was prepared to 35-40 ^{0}C to dissolve the ingredients. It was then filtered through the muslin cloth. Milk was then heated to 70 ^{0} C and then two stage homogenized at 65^0 C. The homogenized milk was then pasteurized at 65^0 C. The homogenized milk was then pasteurized and cooled to 43^{0}C. Milk was then inoculated with the starter culture of *Lactobacillus acidophillus* at 1% (10^6 cells per ml) in care of probiotic curd and probiotic fruit curd. The *Streptococcus thermophillus and Lactobacillus bulgaricus (*1:1) were added in care of yoghurt. Inoculated milk was poured into cups and incubated at 42 ±1^{0}C for 3.5 hours. The cups containing yoghurt were immediately transferred to the refrigerator and stored at 4-7 ^{0} C. The prepared products were evaluated for their physico-chemical parameters viz. appearance, cutting, cut surface, pH and acidity. The prepared product was also subjected to organoleptic evaluation.

RESULTS AND DISCUSSION

The physical characteristics of curd/ yoghurt (Table 1) revealed that *dahi* prepared from the traditional starter culture had cloudy appearance, soft in texture and setting was observed to be loose, whereas probiotic curd /yoghurt had pasty and tender appearance, texture was soft gel, and setting was observed to be firm. The pH and acidity of probiotic curd and probiotic fruit curd and yoghurt were 4.00 and 1.0 percent; 3.50 and 1.0 percent and 3.80 and 1.30 percent respectively. Sarkar and Mishra (1997) and Marishrinivas *et al.,* (1997) support the results of present investigation.

Table 1: Physical characteristics of curd and yoghurt

Curd/ Yoghurt	Appearance	Texture	Flow	Setting
Curd (dahi)	Cloudy	Soft	Watery	Loose
Curd (*Lactobacillus acidophillus*)	Pasty &tender	Soft gel	Mobile	Firm
Fruit Curd (*Lactobacillus acidophillus)*	Pasty & tender	Soft gel	Mobile	Firm
Yoghurt(*Streptococcus thermophillus+Lactobacillus bulgaricus)*	Pasty & tender	Soft gel	Flowy	Firm

Table 2: Chemical characteristics of curd and yoghurt

Curd/ Yoghurt	pH	Acidity
Curd (dahi)	3.4	1.52
Curd (*Lactobacillus acidophillus*)	4	1
Fruit Curd (*Lactobacillus acidophillus)*	3.5	1
Yoghurt(*Streptococcus thermophillus+Lactobacillus bulgaricus)*	3.8	1.3

Table 3: Sensory evaluation of curd and yoghurt

Curd/ Yoghurt	Colour	Taste/ Flavour	Cut Surface	Texture	Overall Acceptability
Curd (dahi)	7.12	6.21	7.16	7.16	6.4
Curd(*Lactobacillus acidophillus*)	8.21	7.65	8.1	7.98	7.99
Fruit Curd(*Lactobacillus acidophillus*)	8.5	8.01	8.1	7.99	8.15
Yoghurt(*Streptococcus thermophillus+ Lactobacillus bulgaricus*)	8.3	7.59	8.1	7.98	7.99
CD(P≤ 0.05)	0.23	0.33	0.21	0.32	0.37

The sensory evaluation scores of curd / yoghurt (Table 3) revealed that the acceptability of *dahi* for taste (6.21), cut surface (5.11), texture (7.16) and overall acceptability (6.40) was observed to be lowered as compared to cultured curd samples. The probiotic fruit curd scores for taste (8.01), cut surface (8.10), and texture (7.99) and overall acceptability (8.15) were highest as compared to other curd samples. The sensory evaluation scores for curd prepared from Lactobacillus acidophilus and yoghurt were observed to be close to each other with respect to taste(7.65 and 7.59), cut surface(8.10 and 8.10), texture(7.98 and 7.98) and overall acceptability(7.99 and 7.99)respectively. Harishrinivas *et al.,* (1997) and Khedkar *et al.,* (1996) also reported acceptability quality of cultured curds and all these findings support the results of present investigation.

From the outcome of the study it can be concluded that probiotics play an important role in improving the acceptability quality of foods. These products have therapeutic value so consumption of probiotic products should be boosted among the people.

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