

Sensory Evaluation of Murrah Buffalo Milk Dahi Prepared by Using Different Heat Treatments and Incubation Conditions

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ABSTRACT

In the present investigation attempts were made to standardize the methods to improve sensory quality of dahi made from Murrah buffalo milk for its production under ordinary condition by giving different heat treatments and incubation conditions and by employing suitable lactic cultures. The buffalo milk dahi maximum scoring was recorded at 8.41, 7.18, 8.32, 8.37 and 8.39 respectively for general appearance, aroma, consistency, body and overall acceptability under the boiling treatment.

Within the incubation treatments, the incubation at room temperature for 10 hours was rated as the highest with the values at 7.99, 6.96, 7.92, 7.85 and 7.88 for the respective parameters. From the organoleptic and overall acceptability point of view boiling coupled with incubation at room temperature for 10 hours seemed to be very favorable to result into the dahi of desired attributes.

Key words: dahi, heat treatment, incubation condition, Murrah buffalo, sensory quality.

I. INTRODUCTION

Dahi is a fermented product of milk used in this country since times immemorial as an article of diet, refreshing beverage, as an intermediary in the preparation of shrikhand, butter and ghee. It has an extensive use in the Ayurvedic System of Medicine (Dutt et. al., 1872). The use of dahi and buttermilk in the feeding of children not only for treatment of common intestinal or other diseases but also for general improvement of their health. Due to variations in the manufacturing techniques, nature of milk, treatment of milk, concentration of starter, time and temperature of incubation and environmental conditions, there is no uniformity in the quality of market dahi (Iya and Lakshminarayana, 1952). This is the main reason that the dahi failed to achieve a much commercial status in India. In some areas dahi production is highly specialized and a product of good quality with the desirable attributes such as smooth texture, sweet or mild taste and pleasant aroma are obtained. One such technique is that the use of good quality dahi containing proper combination of acid and flavour producing bacteria as starter. The purpose of the study is to prepare a good quality dahi by giving simple heat treatments and incubation conditions to dahi prepared from Murrah buffalo milk.

II. MATERIALS AND METHODS

In the present investigation attempts were made to standardize the methods to improve sensory quality of dahi for its production under ordinary conditions by giving different heat treatments and incubation conditions to the Murrah buffalo milk dahi. The whole, fresh and clean buffalo milk was collected from Dairy farm, Naigaon (Bz.) during the course of investigation.

Heat treatments : HT1 – boiling of milk for 10 min., HT2 – steaming of milk at 85°C for 20 min. and HT3 – pasteurization of milk at 63°C for 30 min.

Incubation conditions : I1 – incubation at room temperature for 10 hrs., I2 – incubation at 37°C for 10 hrs. and I3 – incubation at 37°C for 12 hrs.

Fresh dahi samples were subjected to sensory evaluation . The samples were evaluated by a fixed panel of five judges for the appearance, flavour, consistency, body and overall acceptability. The scoring was done as per the 9 point hedonic scale developed by the Quarter Master 'Food and Container Institute, USA.

III. RESULTS

Table No. 1 Effect of different heat treatments and incubations on sensory score recorded for Murrah buffalo milk dahi

Treatments	Average score for				
	General appearance	Aroma	Cosistency	Body	Overall acceptability
HT1	8.41	7.18	8.32	8.37	8.39
HT2	7.85	6.84	7.89	7.83	7.84
HT3	7.22	6.64	7.23	6.83	7.11
S.E.±	0.05	0.10	0.05	0.06	0.09
C.D. at 5%	0.14	0.27	0.16	0.18	0.26
I1	7.99	6.96	7.92	7.85	7.88
I2	7.76	6.90	7.85	7.72	7.79
I3	7.72	6.80	7.66	7.46	7.67
S.E. ±	0.05	0.10	0.05	0.06	0.09
C.D. at 5%	0.14	0.27	0.16	0.18	0.26

General appearance:

It may be noted from Table No. 1 that the heat treatment and incubation conditions also contributed significantly to the sensory attributes of dahi samples. It may be gauged from the data presented that significant differences existed within the treatment so father general appearance of dahi sample was concerned. The values range between 7.22 to 8.41 respectively in case of HT3 and HT1, the highest being with HT1. As for the incubation condition it is notable that the treatment I1 was significantly superior over I2, the value being at 7.99 with regards to I3 which was at par with I2 (7.72 and 7.76).

Aroma:

Significant differences existed within the treatments particularly HT1 and HT2, the HT1 being the highest at 7.18. The treatments HT2 and HT3 were statistically non-significant. The incubation conditions had no

significant effect on the average scoring of dahi as could be seen from the same column, the highest value being associated with I1 at 6.96.

Consistency:

The consistency character of dahi also exhibited significant differences in relation to the heat processing offered to milk prior to dahi formation, the range of scoring being within 7.23 to 8.32. The highest value was associated with HT1 (8.32). As for the incubation conditions significant differences existed between I2 and I3, the lowest being at 7.66. The numerically highest value was at 7.92 in relation with I1.

Body:

The body character of dahi also contributed significantly to the sensory attributes in relation to the type of heat treatment offered to milk during dahi formation. The values occurred in the range of 6.83 to 8.37, the highest being with HT1 (8.37). The incubation conditions also contributed significantly in case of I2 which was at 7.72. Numerically higher value of 7.85 was related with I1.

Overall acceptability:

The overall acceptability of dahi samples narrated significant differences that occurred within the range of 7.11 to 8.39, the highest being with HT1. The incubation conditions contributed non significantly to the organoleptic scores in the opinion of judges, numerically greater value being at 7.88 in case of I1.

IV. DISCUSSION

As explained under result in the Table No. 1, it is important to understand that the organoleptic qualities of dahi samples were greatly affected with the type of heat treatments offered to milk prior to its formation.

General appearance :

The corresponding values for buffalo milk dahi were in the range of 8.41 to 7.22 for HT1 and HT2 respectively. Here it may be understood also, that the dahi has been an indigenous dairy product and the concept of this product has been fixed in the minds of the consumers and so also it must have with the judges. The results may be simplified with the words that pasteurization heat treatment offered to milk resulted in a dahi which had lesser appeal for the general appearance as compared to the one obtained with boiling heat treatment.

Shrestha (1978) recorded scores for general appearance in the range of 8.0 to 8.2 for the buffalo milk dahi prepared with various cultures. **Davadyakar (1982)** noted the score for the same as 7.50 to 7.57 for the dahi samples having different total solids concentration. In case of buffalo milk a thicker and hard type of curd in the finished product form having compact texture might have been resulted. This might be explained as the causes for the specific scores offered for general appearance. As for the incubation conditions, it may be understood that the differences were statistically non-significant. Highest values were recorded for I1 at 7.99 for the incubation in buffalo milk dahi samples. It may be added further that the incubation at room temperature for 10 hours could also be regarded as a favourable condition for the growth of dahi microflora in absence of the incubators which may not be available in common Indian household. As is experienced the product may be of fairly acceptable quality so far as the general appearance is concerned.

Aroma :

From Table No. 1, aroma character was also governed by the type of heat treatment offered to the milk and statistically significant differences existed within the treatments. The scores ranged between 6.64 to 7.18 in buffalo milk dahi. The highest values were associated with HT1.

Shrestha (1978) recorded scores for aroma ranging between 6.6 to 7.6 for buffalo milk dahi. Whereas **Davadayakar (1982)** noted lower score i.e. 6.47 for the dahi samples in reference to total solid concentration. Aroma character of dahi has been the key parameter to contribute towards the acceptability of the product. In other words aroma is the only indicator to guide the very nature of the type of fermentation. The higher values associated with HT1 i.e. boiling condition offered to milk may be looked upon as the key factor that might have contributed to the aroma parameter of this product. Besides the fermentation changes, it may also be added that the typical changes induced inside the milk as a result of specific heat treatment may also be the contributing agent. The lowest scores for aroma were associated with the pasteurized milk dahi which could be analysed and understood in this light. As regards the incubation conditions it may be evidenced from the data that non significant differences occurred within the treatments. Numerically, higher values were scored for I1 i.e. 6.96.

Consistency :

From Table No. 1 consistency of dahi was changed significantly with the type of heat treatment offered to milk. Significantly, higher score at 8.32 were offered to HT1 for The buffalo milk dahi. The lowest values being at 7.23 in case of HT3 in buffalo milk dahi samples.

Humphreys and Plunkett (1969) emphasized that the quality of dahi including consistency was governed by the selection of milk, standardization, heat treatment, fermentation and setting of curd. **Garg and Jain (1980)** contended that milk standardized to 4% fat gave maximum hardness to the curd. The consistency of dahi may be regarded as the sum total of the desirable fermentation changes brought about during the process of dahi formation. The trend noticed here has been quite conspicuous through the higher values recorded with HT1. This may be attributed to the fact as noticed and explained under the parameters of chemical composition namely moisture and total solids. Boiling conditions at HT1 might have caused the evaporation of moisture that had enhanced total solids level. These might have resulted consequently in a thicker consistency of fermented product. The heat denaturation changes i.e. coagulation of serum proteins and shifting of serum casein to induce the coagulation as explained elsewhere also had been very additive factors to the effect the consistency of the product.

Yu and Hwang (1981) observed that addition of lactose, fat and especially solids not fat increased the viscosity of dahi. As may be expected the incubation conditions differed non significantly with regard to consistency character of dahi. The highest scores were associated with I1 recorded at 7.92 in case of buffalo milk dahi samples. It may be exerted that the incubation at room conditions also could bring about desirable changes during the fermentation of dahi. The higher temperatures associated with I2 and I3 i.e. 37°C have had lesser chance to confer their implications on the resultant product due to the shorter incubation period.

Body :

The body of the final product obtained under different heat treated sample of buffalo milk dahi exhibited no significant differences. Numerically the highest values were scored for 8.37 for dahi samples. As regards the HT3 i.e. pasteurization treatment, it may be understood that buffalo milk had total solids occurred in the range 15.74 to 16.18 % inherently. As such the body characters of dahi are greatly influenced by the total solids content in the original milk or the processed milk which in turn is used for inoculation. The heat treatments offered seemed to be at par with each other to cause any effective changes. The higher score offered for HT1 are again the indication of the evaporation changes brought about at boiling conditions and subsequent desirable body characters in the final product. **Shrestha (1978)** recorded score for body of dahi prepared from buffalo milk as 7.0 to 7.8 prepared with different starter cultures. As regards the incubation temperatures it

may be registered that the treatment differed significantly, the highest being at 7.85 for buffalo milk dahi samples. The incubation at I2 and I3 recorded the changes brought about by the growth and development of thermophilic strain. It may be stressed that the incubation period being restricted to 12 hours no drastic significant changes were brought about.

Overall acceptability :

The overall acceptability significantly influenced with the type of heat treatment offered in case of buffalo milk dahi. The treatment HT1 was noted to be the higher at 8.39 .

Shrestha (1978) observed average scores of 7.05 to 7.80 for buffalo milk dahi. While **Davadayakar (1982)** recorded the score for the same as 6.28 to 7.21 with increasing total solids concentration in dahi.

The results obtained could be resolved further with an explanation that the boiling conditions offered to the milk greatly enhanced the desirable changes in the parameters like aroma, consistency and body characteristics that subsequently contributed to the higher overall acceptability of this product .It may be concluded therefore, from the consumer acceptability point of view and also from the market quality that the treatment HT1 i.e. boiling for 10 min may be a very worthwhile condition to induce the establishment growth and development of desirable microflora which may result subsequently into as acceptable quality product. The incubation conditions contributed non significantly to the acceptability of the final dahi product which may be noticed from the values recorded. Numerically higher values occurring at 7.88 and 7.79 with I1 and I2 respectively could be looked upon and the plus points for both these incubation temperature i.e. room condition for 10 hours and 37°C for 10 hours from overall acceptability and market / consumer point of view.

V. SUMMARY AND CONCLUSION

As for the buffalo milk dahi maximum scoring was recorded at 8.41, 7.18, 8.32, 8.37 and 8.39 respectively for general appearance, aroma, consistency, body and overall acceptability under the boiling treatment. Within the incubation treatments, the incubation at room temperature for 10 hours was rated as the highest with the values at 7.99, 6.96, 7.92, 7.85 and 7.88 for the respective parameter.

From the organoleptic and overall acceptability point of view boiling coupled with incubation at room temperature for 10 hours seemed to be very favourable to result into the dahi of desired attributes.

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