

Protein content of Dahi affected by type of milk, starter culture, incubation temperature and incubation period

NARENDRA KUMAR, M.L. BHASKAR¹ AND MAHENDRA VIKRAM SHAHI

Dept. of A. H. and Dairying, B.R.D. P.G. College Deoria

Abstract

*The studies on “Protein content of Dahi affected by type of milk, starter culture, incubation temperature and incubation period” was carried out in the dept. of A.H. & Dairying, C.S. Azad University of Agriculture and Technology, Kanpur. Five types of milk (Sahiwal cow milk, Sahiwal X Jersey cross bred cow milk and Sahiwal X Frisian Cross-bred cow, Bhadawari buffalo and Murrah buffalo), two types of starter culture (*S. lactic* and *S. diacetylactis*) with three incubation level (1%, 2% and 3%), three incubation temperatures (25°C, 30°C and 37°C) and three incubation period (8h, 10h and 12h) were used for the preparation of Dahi. The Protein content of Dahi was affected significantly by the combined effect of different types of milk, starter culture with level of incubation, incubation temperature and incubation period. Our investigation indicated that the combination of Murrah buffalo milk, *S.lactis* starter culture with 1% inoculum, 25°C incubation temperature and 8h incubation period contained maximum protein content (3.63%) in Dahi and found to be the most suitable for obtaining higher protein content in the product, while the minimum protein content (1.63%) was noted in case of Dahi prepared from the combination of Sahiwal X Jersey cross-bred cow milk, *S. diacetylactis* starter culture with 3% inoculum, 37°C incubation temperature and 12h incubation period.*

Kew words : Cow, Protein, periods, temperature, starter culture

Introduction

Use of Dahi was much prevalent since Vedic times and its quotation and reference occurs in our ancient scriptures like Vedas, upnishads and various hymns. Dahi which came into existence probably as a means of preserving milk was used by Aryans in their daily diet as it checked putrefactive changes and added to an acidic, refreshing taste. Their keen observations helped in recognition of dahi's distinctive nutritional and therapeutic properties. Kumar *et al.* (2019). There are two types of Dahi have been designated in recent times based on the type of starter culture used for their preparation. These are sweet Dahi and Sour Dahi. Standardized milk, pasteurized milk or boiled milk may be used for its preparation. Method for the preparation of Dahi either conventional or standardized require about 10 to 16 h of incubation,

due to variable temperature and starter cultures used. The atmospheric temperature in tropical countries like India is most favourable for the growth of micro-organism which bring about spoilage of milk in few hours. The longer incubation period for the preparation of Dahi may favour the growth of several undesirable micro-organisms in Dahi such as staphylococci, coliforms, yeasts and moulds and spore formers. (Garg, 1988, Katara and Lawani, 1991).

The development of Dahi production technology will definitely boost the large scale manufacture and distribution of quality fermented milks in the country. Hence, there is need for improving the quality and therapeutic properties of Dahi under Indian conditions. Production of Dahi on a small scale either in the consumer household or in the sweet meat maker's shop in urban area involves inoculation with Dahi portion of unknown merits and always contaminated with undesirable micro-organisms. The

¹Dept. of A.H. & Dairying, R.B.S. College, Bichpuri, Agra (U.P.)
Email- m.l.bhaskar1959@gmail.com

inoculated milk is then allowed to set undisturbed overnight.

Because of the popularity and widely consumption of Dahi and lack of knowledge of various technological aspects for dairy production, a perusal of concerned literature indicates that types of milk, types of starter culture, amount of starter culture, incubation temperature and incubation period are the most important technological aspects for the production of desirable quality of Dahi which is the main object of our investigation.

1. Effect of type of milk on the protein content of Dahi.
2. Effect of type of starter culture on the protein content of Dahi.
3. Effect of incubation temperature and incubation period on protein content of Dahi.

Materials and Methods

This investigation was conducted at Dairy farm of C.S.A University of Agri. & Technology, Kanpur. The samples of milk collected in the morning milking for the Dahi making from Sahiwal cow, Sahiwal X Jersey cross-bred cow, Sahiwal X Frisian Cross-bred cows, Bhadawari buffalo and Murrah buffalo. Five samples of each cows and buffaloes were collected from individual milch animals for Dahi making. Freeze dried pure culture namely *S. lactis* and *S. diacetylactis* with 1%, 2% and 3% inoculum were used for Dahi making. Incubation temperature were 25°C, 30°C and 37°C with 8 h, 10 h and 12 h incubation period were adopted. Preparation of sample for analysis was done as per the method prescribed in hand book food analysis (Part-XI), 1981. Before sampling milk was warmed upto about 38°C. It was then mixed thoroughly by pouring into a clean vessel until a homogenous mixture was obtained. The milk was later on cooled down to 15-20°C. Three litres of raw milk of same breed of cows or buffaloes was boiled for 3 to 5 minutes and cooled to 40°C. The milk was divided into three batches in sterilized containers. Each batch was incubated with inoculums at the rate of 1%, 2% and 3% of starter culture and distributed 100 ml capacity into plastic cups which were free from any contamination.

These plastic cup were divided into three batches. Each batch was allowed to incubate at 25°C for 8, 10 and 12 hours accordingly. After the prescribed duration the sample were transferred into refrigerator maintained at 4°C till the further testing. The same

process was followed in case of 30°C and 37°C incubation temperatures. The protein content was determined by the procedure described in IS: 1479, (Part-II), 1961.

Results and Discussion

The Protein content of Dahi was affected significantly by different types of milk. During the investigation, it was observed that maximum protein content (2.90%) was recorded in case of Dahi prepared from Murrah buffalo milk, while the minimum protein content (2.47%) was recorded in Dahi prepared from Sahiwal X Jersey cross-bred cow milk. It can, therefore be concluded that murrah buffalo milk was found to be superior to obtain better results in comparison to other types of milk which used during the present experiment. In order to arrive at overall effect of cow and buffalo milk, it was observed that buffalo milk can produce better quality Dahi in comparison of cow milk. Our study further revealed that the protein content of Dahi was significantly affected by different starter cultures with inoculation levels. The maximum protein content (2.96%) was recorded in case of Dahi prepared by the use of *S. lactis* starter culture with 1% inoculum, while the minimum protein content (2.32%) recorded Dahi prepared from *S. diacetylactis* starter culture with 3% inoculum. Therefore, it can be concluded that *S. lactis* starter culture with 1% inoculum could be proved better in obtaining higher protein content in the product. The starter culture affected the protein content of the Dahi significantly.

It was also observed from the study that the protein content of Dahi was also affected significantly by different inoculation levels. It was concluded that the 1% inoculum can be used successfully for obtaining maximum protein content in Dahi as compared to 2% and 3% inoculum. It was further observed that protein content of Dahi decrease with the increase of inoculation level. It is also clear from our study that the protein content of Dahi was also affected significantly by different incubation temperatures. The average values of protein content were found 2.91%, 2.66% and 2.43% for 25°C, 30°C and 37°C incubation temperature respectively. It can, therefore, be concluded that 25°C incubation temperature could produce better quality Dahi in respect of protein content. It was further observed that the protein content of Dahi decrease with the increase of

Table 1: Protein content of Dahi affected by different types of milk (A), Starter culture (B), Incubation temperature (C) and incubation period

Factors	Protein percentage					S.E.	CD
A	A ₁	A ₂	A ₃	A ₄	A ₅	0.0007	0.0013
	2.5486	2.4768	2.5985	2.8194	2.9075		
A	Cow	-	-	Buffaloes	-	0.0004	0.0008
	2.5413	-	-	2.8635	-		
B	B ₁	B ₂	B ₃	B ₄	B ₅	-	-
	2.9662	2.8222	2.6450	2.7138	2.5600		
B	S ₁	-	-	S ₂	-	0.0004	0.0008
	2.8112	-	-	2.5343	-		
B	J ₁	-	J ₂	-	J ₃	0.0005	0.0010
	2.8400	-	2.6911	-	2.4871		
C	C ₁	-	C ₂	-	C ₃	0.0005	0.0010
	2.9192	-	2.6639	-	2.4341		
D	D ₁	-	D ₂	-	D ₃	0.0005	0.0010
	2.8856	-	2.6704	-	2.4566		

incubation temperature.

Our present investigation further indicated that the protein content of Dahi was also affected significantly by different incubation periods. The average values of protein content were 2.88%, 2.67% and 2.45% for 8h, 10h and 12h incubation periods, respectively. It can, therefore, be concluded that 8h incubation period could produce better quality Dahi in respect of protein content as compared with 10h and 12h incubation periods. It was further observed that the protein content of Dahi decrease with increase of incubation period.

References

Garg, S.K. (1988). Dahi a fermented indigenous milk product. *Indian Dairyman*, 40 (2) : 57-60.

Katara, R.V. and Lawania, G.S. (1991). Changes in Dahi prepared from cow, buffalo and goat milks. *Asian J. Dairy Res.* 10 (2) : 63-68.

Kumar, N; Sahi, M.V. and Bhaskar, M.L. (2019). Acidity content of Dahi affected by different types of milk, starter culture incubation temperature and incubation periods. *Shrikhla E.K. Shodhparak Vaicharik Patrika.* 6 (7) Part-I, March, 2019.

Samanta, A., Pradhan, S., Mandal, A., Patra, A., Roy, S., Mandal, S., Kar, S and Nandi, D.K. (2015). Effect of starter culture on development of Curd (Dahi) and their Antagonistic property against some enteric pathogen. *Indian J. Microbiol Res.*, 2(1) : 30-39.