

Acidity Content of Dahi Affected by Different Types of Milk, Starter Culture, Incubation Temperature and Incubation Periods



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Abstract

The investigation entitled "Acidity content of Dahi affected by different types of cow 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. Three types of milk (Sahiwal milk, Sahiwal X Jursey cross bred cow milk and Sahiwal X Frisian Cross-bred cow milk), two starter culture (S. lactic and S.diacedilactis) with three incubation level 1%, 2% and 3%, three incubation temperatures (25⁰C, 30⁰C and 37⁰C) and three incubation period (8h, 10h and 12h) were used for the preparation of Dahi. The effect of various factors on chemical quality of Dahi were examined on the basis of Acidity content. The titratable acidity of dahi was affected significantly by different types of milk, starter culture, incubation temperature and incubation period.

Keywords: Cow, Starter Culture, Temperature, Incubation Period, Acidity.
Introduction

Dahi (Sanskrit- Dadhi) is the most popular and oldest fermented milk product of our country, prepared and utilized in various forms in almost all homes. It is an indispensable item of our Indian diet and is quite analogous to yoghurt. Dahi is known by quit different names throughout the world as yoghurt in Turkey, Matzoon in Armenia, Leban or Leban - raib in Egypt - Arabia, Gioddu in Italy and Naja in Bulgaria. Fermented milks are consumed world-wide since immoral but are believed to have originated in the near East, perhaps the phoenician era, and spread through the central and Eastern Europe.

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 pultrifactive changes and added to an acidic, refreshing taste. Their keen observations helped in recognition of dahis distinctive nutritional and therapeutic properties.

In recent years, the production and use of fermented milk and acidophilus culture for preparation for treatment of intestinal disorder have gained great popularity in India as well as in America, Europe, Japan and other countries as well. In India, milk production is mostly in rural area while the consumption is in urban. Approximately 9.1 percent of the total annual production is utilized for Dahi making for direct consumption (Garg ; S.K. (1988). The milk of different species (Cow, buffalo, goat, ewes and Mares) has been fermented by the people of oriental and other countries to produce sour products as a necessity for presenting milk. There has been a phenomenal increase in the production and consumption of fermented milks in the developed countries of the world for use as nutritious and refreshing beverage or as therapeutic agent in the treatment of gastrointestinal deceases (Garg, 1988; Gandhi and Murlidhar Rao, 1989).

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. Therefore, in the light of all these facts, it would be interesting to study a project entitled " Acidity content of Dahi affected by different types of cow milk, starter culture, incubation temperature and incubation periods."

Aim of the Study

1. To study the effect of different type of milk on the chemical quality of Dahi.
2. To study the effect of different types of starter culture on the chemical quality of Dahi.
3. To study the effect of incubation temperature and incubation period on the chemical quality of Dahi.

Materials and Methods

Milk samples for assessing the level of acidity were collected in the morning milking of milch cow. Sahiwal (A₁), Sahiwal X Jursey (A₂), Sahiwal X Frisian (A₃) Bhadawari Buffalo (A₄) and Murrah buffalo (A₅) reared by dairy farm of C.S. Azad University of Agri. & Technology, Kanpur for Dahi making. Five samples of each cows and buffaloes were collected from individual milch animals for optimization of different compositional and processing parameters in order to produce the product. 100 ml capacity of plastic cups were used for Dahi making during the investigation. These were purchased from local market of Kanpur city. Freeze dried pure culture namely *S.lactis* with 1% inoculum (B₁), *S. lactis* with 2% inoculum (B₂), *S. lactis* with 3% inoculum (B₃), *S. diacetilactis* biovar with 1% inoculum (B₄), *S. diacetilactis* biovar with 2% inoculum (B₅) and *S. diacetilactis* biovar with 3% inoculum (B₆) were used for Dahi making. Incubation temperatures were 25°C, 30°C and 37°C (C₁, C₂ and C₃) with incubation period 8 hours, 10 hours and 12 hours (D₁, D₂ and D₃) were adopted. Preparation of samples for analysis was done as per the method prescribed in hand book of 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 cow was boiled for 3x to 5 minute and cooled to 40°C. The milk was divided into three batches in sterilized containers. Each batch was inoculated with inoculum at the rate of 1%, 2% or 3% of starter cultures and distributed 100 ml capacity into plastic cups which were free from any contamination. These plastic cups 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 samples 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 titratable acidity was determined by the method described in Hand book of Food Analysis, Part XI, (Sp: 18).

Results and Discussion

The titratable acidity of Dahi was affected significantly by different type of milk. The maximum 0.788% and the minimum 0.676% titratable acidity were recorded in case of Dahi prepared from Bhadawari buffalo milk and Sahiwal cow milk, respectively. Thus it was concluded that Bhadawari buffalo milk was found to be the most suitable for obtaining desirable acidity in Dahi. The overall buffalo milk showed 0.777% titratable acidity, while cow milk showed 0.684% titratable acidity. Thus, it can be concluded that buffalo milk was found to be most suitable for obtaining the desirable acidity in Dahi in comparison to cow milk.

Table 1.: Mean of Acidity content of Dahi as affected by different types of milk (A), Starter culture and their level (B), Incubation temperature (C) and incubation period (D).

Factor Level

A	A ₁	A ₂	A ₃	A ₄	A ₅		S.E.	CD
	0.6767	0.6992	0.6781	0.7881	0.7659		0.0008	0.0016
	Cow	--	--	Buffaloes	--	--	0.0005	0.0011
	0.6846	--	--	0.7770	--	--	--	--
B	B ₁	B ₂	B ₃	B ₄	B ₅	B ₆	--	--
	0.6214	0.6776	0.7704	0.6907	0.7412	0.8396	0.0009	0.0018
	S ₁	--	--	--	S ₂	--	0.0005	0.0010
	0.6898	--	--	--	0.7572	--	--	--
	J ₁	--	J ₂	--	J ₃	--	0.0006	0.0013
	0.6561	--	0.7094	--	0.8050	--	--	--
C	C ₁	--	C ₂	--	C ₃	--	0.0006	0.0013
	0.5470	--	0.7610	--	0.8968	--	--	--
D	D ₁	--	D ₂	--	D ₃	--	0.0006	0.0013
	0.5832	--	0.7316	--	0.8751	--	--	--

The titratable acidity of Dahi was affected significantly by different type of starter culture with inoculation level. The maximum 0.839% and the minimum 0.621% titratable acidity were recorded in case of Dahi prepared by the use of *S. diacetilactis* starter culture with 3% inoculum and *S. lactis* starter culture with 1% inoculum respectively. The overall effect of starter culture on titratable acidity of Dahi was that *S. diacetilactis* starter culture produced higher acidity (0.757%) in Dahi as compared to *S. lactis* starter culture which produced 0.689% acidity. Thus it was concluded that *S. diacetilactis* was found

to be the most suited to obtaining desirable acidity in Dahi.

The overall, effect of inoculation levels on titratable acidity of Dahi was that inoculation level affected the titratable acidity of Dahi, significantly. The average values were 0.65%, 0.70% and 0.80% for 1%, 2% and 3% inoculum, respectively. It can, therefore, be concluded that 2% inoculum was found to be most suitable for obtaining desirable acidity in Dahi. It was further concluded that the titratable acidity of Dahi increased with the increase of inoculation level.

The titratable acidity of Dahi was also affected significantly by different incubation temperature. The average titratable acidity was recorded as 0.547%, 0.761% and 0.896% for 25^oC, 30^oC and 37^oC incubation temperature, respectively. Therefore, it can be concluded that 30^oC incubation temperature was found to be the most suitable temperature for the production of desirable acidity in Dahi. It was further concluded that the titratable acidity of Dahi increase with the increase in incubation temperature.

Our investigation further revealed that the titratable acidity of Dahi was influenced significantly by different incubation period. The average values were 0.583%, 0.731% and 0.875% for 8h, 10h and 12h incubation period, respectively. Therefore, it can be concluded that 10h incubation period was found to be the most suitable to obtain the desirable acidity in Dahi. It was also noted that the titratable acidity of Dahi increase with the increase in incubation period. Similar results were also reported by Sharma and Jain, 1974 & 1975.

Conclusion

Thus it was concluded that the titratable acidity of Dahi was affected significantly by different type of milk, starter culture with inoculation levels, incubation temperature and incubation period. The maximum titratable acidity was recorded in case of Dahi prepared from the combination of Bhadawari buffalo milk, *S. diacetylactis* starter culture with 3% inoculum, 37^oC incubation temperature and 12h incubation period, while the minimum acidity was

recorded in case of Dahi prepared from the combination of Sahiwal cow milk, *S. lactis* starter culture with 1% inoculum, 25^oC incubation temperature and 8h incubation period. The maximum and the minimum values of titratable acidity of Dahi were not found suitable for the production of good quality Dahi and these values differed significantly.

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