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Effect of different factors on flavour and aroma of Dahi

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Abstract

The investigation was carried out in the department of Animal Husbandry and Dairying, C.S. Azad University of Agriculture and Technology, Kanpur to know the effect of different factors on flavour and aroma of Dahi and found that it was influenced significantly by the combined effect of different types of milk, starter cultures with inoculation levels, incubation temperatures and incubation periods. The highest score (8.86) was noted in case of Dahi prepared from the combination of Sahiwal X Frisian cross-bred cow milk, S. lactis starter culture with 3% inoculum, 30^{0}C incubation temperature and 8h incubation period, which was categorized as excellent quality ,liked extremely and found to be the most suitable for obtaining better quality product, while the lowest score (6.25) was noted in case of Dahi prepared by the combination of Sahiwal cow milk, S. diacetilactis starter culture with 1% inoculum, 25^{0}C incubation temperature and 8h incubation periods.

Key words: Buffalo, cow, flavour, periods and temperature

Introduction

Dahi is an indigenous Indian fermented milk product known for its stimulating taste, palatability and curative values (Madan Lal *et al*., 1980) also called as 'curd'. It is yoghurt like product made in India and neighboring countries. It is an indispensable item of our Indian diet and is quite analogous to yoghurt. Its use was much prevalent since Vedic times and 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. Kumar *et al*. 2019, recognize Dahi as distinctive nutritional and therapeutic properties. According to Bureau of Indian Standards (1980), Dahi is a product obtained by lactic fermentation of cow or buff alo milk or mixed milk through the action of single or mixed strains of lactic acid bacteria or by lactic acid fermentation accompanied by alcoholic fermentation by yeast.

It is evident that large quantity of milk is consumed as Dahi. However, Dahi has failed to achieve a much converted commercial status due to very obvious reasons. Due to variation of manufacturing techniques, type of milk, treatment of milk, concentration of starter, time and temperature of incubation and environment conditions. There is no much uniformity in quality of market Dahi. This is the main reason that the Dahi failed to achieve a much commercial status in India.

Indian curd, known as Dahi is one of the oldest Indian fermented milk products (Sarkar, 2008) and is consumed by large section of the population throughout country, either as a part of the daily diet, or as a refreshing beverage (Caballero *et al* 2003). Dahi is a semisolid sourish food formed by the process of lactic acid fermentation by some of the micro-organism involved in the preparation of Dahi. The product has been prepared in every household of the country by back slopping i.e. mixing a small amount of already fermented curd to the boiled and cooled milk (Selvan and Bharath, 2018). The development of Dahi production technology will definitely boost the large scale manufacture and distribution of quality fermented milks in the country.

Aim of the Study

1. Study the effect of type of milk on the flavour and aroma of Dahi.
2. Study the effect of different type of starter culture on the flavour and aroma of Dahi.
3. Study the effect of different incubation temperature and periods on the flavour and aroma of Dahi.

Materials and Methods

The study was carry out at dairy farm of C.S.A. University of Agri. & Technology, Kanpur. The milk samples for evaluate the flavour and aroma of Dahi

were collected in the morning milking of milch cow. Sahiwal (A_1), Sahiwal x Jursey (A_2), Sahiwal x Frisian (A_3), Bhadawari Buffalo (A_4) and Murrah buffalo (A_5). 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 cups were used for Dahi making during the study. Freeze dried pure culture namely S. lactis with 1% inoculum (B_1), S. lactis with 2% inoculum (B_2), S. lactis with 3% inoculum (B_3), S. diacetilactis with 1% inoculum (B_4), S. diacetilactis with 2% inoculum (B_5) and S. diacetilactis with 3% inoculum (B_6) were used for Dahi making. Three incubation temperature 25^{0}C (C_1), 30^{0}C (C_2) and 37^{0}C (C_3) with three incubation periods 8h (D_1), 10h (D_2) and 12h (D_3) were adopted. Preparation of samples for study was done as per the method prescribed in hand book of food analysis (Part-XI), 1981. Before sampling, milk was warmed up to about 38^{0}C. It was then mixed thoroughly by pouring into a clean vessel until a homogenous mixture was obtained. The milk was later on cool down to 15-20^{0}C. Three liters of raw milk of same breed of cow and buffalo was boiled for 3 to 5 minute and cooled to 40^{0}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^{0}C for 8, 10 and 12 hours accordingly. After the prescribed duration the samples were transferred into refrigerator maintained at 4^{0}C till the further testing. The same process was followed in case of 30^{0}C and 37^{0}C incubation temperatures. Dahi samples (100ml) were served for judging to panel comprising of five most experienced members from the department of A. H & Dairying for its score evaluation by nine point hedonic scale (Moroney, 1975). The score of different Judges were compiled and average score was estimated for each attribute of samples as detailed given below:

Quality Grade Description and Score

1. Excellent -More than 8 2. Very good-7 to 8,
3. Good- 6 to 7 4. Fair - 5 to 6 and
5. Poor- Less than 5

Acceptability of the product

1. Liked extremely -9 2. Liked Very much -8
3. Liked Moderately -7 4. Liked Slightly -6
5. Neither liked nor-5 disliked, 6. Disliked moderately -4
7. Disliked slightly -3 8. Disliked very much-2
9. Disliked extremely -1

Results and Discussion

The flavour and aroma is the most important quality attribute. A pleasant sweetish aroma and a mild clean acid taste are desirable characteristics of Dahi Table 1). It should be free from any off flavour. The flavour and aroma of Dahi was affected significantly at 0.1% level of significance.

Table 1: Means of flavour and aroma score of Dahi as affected by different types of milk (A), starter cultures and their levels (B), incubation temperatures (C) and incubation periods (D)

Factors							S.E.(d)	C.D.at 5%
				Levels and Means				
A	A_1	A_2	A_3	A_4	A_5			
	7.24	7.48	7.47	7.55	7.45		0.009	0.018
		Cows			Buffaloes			
	-	7.39	-	7.50	-	-	0.006	0.011
B	B_1	B_2	B_3	B_4	B_5	B_6		
	7.45	7.74	7.89	6.98	7.20	7.35	0.010	0.020
		S_1			S_2			
	-	7.70	-	7.18	-	-	0.006	0.011
	I_1		I_2		I_3			
	7.22	-	7.47	-	7.62	-	0.007	0.014
C	C_1		C_2		C_3			
	7.34	-	7.46	-	7.51	-	0.007	0.014
D	D_1		D_2		D_3			
	7.24	-	7.44	-	7.63	-	0.007	0.014

The means of flavour and aroma of Dahi as affected by different type of milk were found to be 7. 24, 7.48, 7.47, 7.55 and 7.45 for A_1, A_2, A_3, A_4 and A_5 milk respectively. It indicated that all the samples of Dahi were categorized as good quality and liked very much. The maximum (7.55) and minimum (7.24) liking were observed in case of Dahi prepared from Bhadawari buffalo milk (A_4) and Sahiwal cow milk (A_1) respectively. Overall, Dahi prepared from cow milk and buffalo milk was found to be 7.39 and 7.50 respectively. It indicates that these values were graded good quality and like very much and buffalo milk was found most suitable for Dahi making followed by cow milk. Statistically these values differed significantly in respect of flavour and aroma of Dahi.

The means of flavour and aroma of Dahi as affected by different starter culture with different inoculation levels were 7.45, 7.74, 7.89, 6.98, 7.20 and 7.35 for B_1, B_2, B_3, B_4, B_5 and B_6 starter cultures with inoculation levels, respectively. It indicates that all the samples of Dahi were graded very good quality and liked very much except the value 6.98 (B_4) which was graded good quality and liked moderately. The maximum (7.89) and the minimum (6.98) scores for likings were observed in case of Dahi prepared by the use of S. lactis starter culture with 3% inoculum (B_3) and S. diacetilactis starter culture with 1% inoculum (B_4) respectively.

Overall, Dahi prepared by the use of S. lactis starter culture (S_1) scored 7.70 which was categorized as good quality and liked very much, while Dahi prepared by the use of S. diacetilactis starter culture (S_2) scored 7.18 which was categorized as very good quality also and liked very much. Statistically there was significant difference between the mean values observed in case of S_1 and S_2 starter cultures. The average acceptability score for flavour and aroma of Dahi as affected by different inoculation levels were 7.22, 7.47 and 7.62 for 1% (I_1), 2% (I_2) and 3% (I_3) inoculum, respectively. It indicates that all the samples of Dahi were categorized good quality and liked very much. It was further observed that 3% inoculum (I_3) was found to be most suitable for Dahi preparation followed by I_2 and I_1 inoculum. The data differ significantly.

The average values for the effect of different incubation temperature on flavour and aroma of Dahi were 7.34, 7.46 and 7.51 for $25^0C(C_1)$, $30^0C(C_2)$ and $37^0C(C_3)$ respectively. It indicates that all the values were graded very good and liked very much. It was further observed that 37^0C incubation temperature (C_3) was found most suitable for Dahi making as compared to C_2 and C_1 incubation temperatures.

The average values for flavour and aroma of Dahi as affected by different incubation periods were found to be 7.24, 7.44 and 7.63 for 8 h (D_1), 10h (D_2) and 12h (D_3) respectively. It is clear from the data that all the samples of Dahi were graded very good and liked very much. It was further observed that 12h incubation period (D_3) was found most suitable for Dahi making in respect of flavour and aroma followed by D_2 and D_1 incubation periods. Duitschaever (1978) reported that in his study a 32% consumers gave preference for goat milk Dahi and 68% preferred cow milk Dahi. Dahi prepared from cow milk obtained the highest score followed by Dahi prepared from Buffalo and Goat milk.

Conclusion

It is concluded that flavour and aroma of Dahi prepared from different type of milk was influenced significantly by the combined effect of different types of milk, starter culture with inoculation level, incubation temperature and periods. The most suitable better quality of Dahi was obtained from Sahiwal K Frisian Cross-bred cow's milk, S. lactis acid starter culture with 3% inoculum, 30^0C incubation temperature and 8 hours incubation periods.

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