



Comparative assessment of dahi (yogurt) collected from different areas of Bangladesh

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ABSTRACT

The study was conducted to determine the quality of dahi (yogurt) of three districts viz Bogra, Tangail, and Mymensingh of Bangladesh. For this total of thirty six dahi samples were collected from twelve renowned dahi or sweetmeat producers of the fore mentioned districts (Four sample were from each district and three replications were made for each sample). All the samples when analysed for their physical (organoleptic) and microbiological quality exhibited wide variation. The overall acceptability of the product varied with an average score of 74.01 (SD±5.36). The count of total viable organisms and coliform were in the range of $4-356.66 \times 10^6$, $0-45 \times 10$ CFU/gm respectively. Sample average grand mean for Gram positive rods content was 38.11% with a standard deviation (SD) of ±15.63. However, from the result of all parameters, dahi of Bogra was the best followed that dahi of Mymensingh and Tangail. The 2nd and 3rd position were adorned by dahi of Mymensingh and Tangail respectively. But from the hygienic point of view Tangail was in 2nd and Mymensingh 3rd in position. A wide range of variation of different parameters was noticed within dahi of different districts. Sweetmeat makers were suggested not to adulterate milk during dahi preparation and also to follow strict hygienic conditions in order to get good quality.

INTRODUCTION

Dahi or yogurt is a fermented milk product practically free from alcohol and made with specific culture of *Streptococcus salivarius* sub sp. *Thermophilus* and *Lactobacillus delbruekii* sub sp. *bulgaricus* (Kon, 1959). Most yogurts contain these two cultures; however, additional lactic acid bacteria such as *L. acidophilus*, *L. helveticus*, *L. lactis* and *Bifidobacterium sp.* are often utilized in dietetic or therapeutic yogurts. (Tamime and Robinson, 1988). Yogurt is beneficial for health, valued for controlling the growth of bacteria and incurring intestinal disease like constipation, diarrhoea and dysentery (Shahani and Chandan, 1979). Anti-carcinogenic effect of yogurt has also been demonstrated by Shaham (1980). Yogurt is effective in lowering the blood cholesterol (Mann and Sperry, 1974). Arsenic poisoning may be cured by taking yogurt (The Bangladesh Observer, Dhaka, August, 1997). Dahi is one of the popular milk products in Bangladesh and the prospect of higher production of dahi or dahi like products is brighter in the country.

The nutritive value of dahi differs by its mode of preparation. If it is made of whole milk it contains near about 85 -88% water, 5-8% fat, 3.2-3.4% protein, 4.6-5.2% lactose, 0.7-0.75% ash, 0.12-0.14% calcium, 0.09-0.11% phosphorus and with an acidity percentage ranges from 0.5-1.1. But in case of dahi prepared from skimmed milk it contains water, fat, protein, lactose, ash, calcium, phosphorus and % acidity within a range of 90-91%, 0.05-0.10%, 3.3-3.5%, 4.70-5.30%, 0.70-0.75%, 0.12-0.14%, 0.09-0.11% and 0.5-1.1 respectively (Laxminarayana, and Shankar, 1980).

Although yogurt and dahi both are cultured or fermented dairy products still there are little differences between those. Yogurt is prepared by using the starter organisms *Streptococcus thermophilus* and *Lactobacillus bulgaricus* in a proportion of 1:1, whereas dahi is prepared by using mixed culture of *Streptococcus lactis*, *Lactobacillus bulgaricus*, *Streptococcus thermophilus*, *Streptococcus citrophilus*, *Lactobacillus plantarum* etc. Higher temperature

(45°-50°C) and shorter (3-4 h) incubation period is required for yogurt making. On the other hand, lower temperature (37°-42°C) and long incubation period (8-15 h) is required for dahi preparation. Comparatively curd of yogurt is soft while that of dahi is reverse.

Nutritive value of quality dahi is comparable in the same way as that of milk. It has been demonstrated that acid milk is somewhat easily digestible than normal milk. For some individuals, dahi has a definite therapeutic value, especially who usually suffer from stomach and intestinal disorders. Based on the assumption that the acid fermenting bacteria and lactose of milk are able to create conditions in the intestinal tract which are unfavorable for the growth of putrefactive bacteria and thereby prevents the formation of gas and a condition known as 'auto-intoxication'. Yogurt is also effective in lowering the blood cholesterol level (Mann and Spoelry, 1974).

The nutritive value of milk and milk products depend upon their cleanliness, purity and wholesomeness. Milk products having those characteristics are of great consumer's demand. In Bangladesh about 4-5% of the total milk produced is used for preparation of dahi. But they lack uniformity from place to place. Although, fermented milk products are safer foods i.e. disease producing organisms cannot survive there in high acidity, still if contamination occurs then in most cases yeasts and moulds and sometimes coliform organisms can grow. If this is so, then the consumers i.e. in broader sense the whole nation is likely to be affected from food poisoning or any other abnormalities rather than having proper nutrition. That is why; a desirable standard for the manufacture of dahi should be established according to the average consumers of Bangladesh.

Information is very scanty on the quality of dahi produced by small scale producers throughout the country or by some established renowned sweetmeat makers (eg. Allauddin, Bonoful etc.) or large scale dairy enterprises (eg. Milk-Vita). From 1970 till today only 4 experiments so far have been done to know the quality of starter culture or dahi (sweetened or fruit) in Bangladesh. Whereas in developed countries, as well as in many

developing countries, sufficient research works have already been done to know the quality of dahi produced under various conditions prevailing in their respective environments. So, extensive research work in this field is still necessary to know the quality of dahi in the country and to set recommendations for manufacturing quality dahi. Keeping in mind the overall discussions, an attempt was made to conduct this research work with the following objectives:

- i) To assess the dahi of different districts of Bangladesh in terms of physical, and microbiological quality.
- ii) To demonstrate and enumerate the total viable count and specific group of microorganisms present in dahi.
- iii) To make a comparative study between the different types of dahi collected from different districts of Bangladesh.
- iv) To inform consumers about the quality of dahi purchased from different districts of Bangladesh.

MATERIALS AND METHODS

Experimental design

The entire study was divided into two parts. The first part included the microbiological examination and analysis, which was done by isolation and identification of various bacteria (Total Viable Count, Total Coliform Count Etc.). The second part included the physical and organoleptical tests. The total data obtained from the both types of analysis were analysed statistically.

Sample collection

To perform this study, renowned twelve dahi of three different districts (Bogra, Mymensingh and Tangail) of Bangladesh were chosen. Four samples from different manufacture were taken from each district in triplicate form. A total of 12 samples from each district were collected at a time. About 250gm of dahi from each sample was packed in sterile plastic pots and were kept in refrigerator at 4° C for further experiment. Samples were taken as fresh as possible by taking strict hygienic measures. The samples were transport carefully at the same day of collection to the laboratory of Department of Microbiology and Hygiene, Faculty

of Veterinary Science, Bangladesh Agricultural University, Mymensingh.

Physical test of sample

For sensory evaluation of the collected samples physical tests were performed. The smell and taste, body and consistency, colour and texture and thereby the overall of physical score of the samples were done by a panel of expert judges.

Microbiological test of samples

Determination of Total Viable Count, Coliform Count and Microscopic examination of the collected samples were done by standard methods describe elsewhere. The total viable count was calculated according to ISO (1995). Total coliform count was performed by counting colonies in MA plate. Suspected colony from Nutrient agar were stained using Gram's stain as described by Merchant and Packer (1967). Gram positive cocci and Gram positive rod shape organism were recorded.

Data analysis

Data obtained from collected samples were analysed statistically using completely randomized design (CRD) with two factors in MSTAT programme. The differences among location means were compared by Duncan's Multiple Range Test (DMRT) (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

Since, Bangladesh Standard Testing Institute (BSTI) has no recommended standards for dahi manufacturing, hence, for standards, the recommendation of Board of Indian Standard (BIS) (1980) was taken into consideration as the product has similar specifications except for the addition of sweetening agent. According to BIS (1980) specifications, dahi should have titratable acidity of not more than 0.7 per cent lactic acid and should not contain more than 10 coliforms/g and 100 yeast and moulds/g of dahi.

Physical parameters

Smell and taste

Results pertaining to the average smell and taste score with their standard deviations for dahi of Bogra (A), Mymensingh (B), Tangail (C) were 39.06 ± 1.748 , 34.87 ± 2.195 , 35.74 ± 2.667 , respectively (Table 1). Significant differences ($P < 0.05$) differences were observed among those mean values i.e. location to location variation were highly significant in respect of smell and taste score for dahi samples (Table 4). Mean value for smell and taste score was highest in case of dahi from Bogra (39.06 ± 1.748) and lowest for dahi from Mymensingh (34.87 ± 2.195). There were wider variation among the sample means in respect of smell and taste score, within a range of 32.63 to 41.00 for sample B4 and A, respectively (Table 1). The variation in smell and taste score of dahi among different districts and in the same district could be attributed to different types of milk, start cultures, and manufacturing process employed.

Ranganadham and Gupta (1987) evaluated the sensory characteristics of dahi and yogurt. Good-quality dahi should have a mild acidic flavour and a weak-gel temperature. Rangappa and Achaya (1974) reported that milk stored too long before seeding often gives rise to broken curd of poor taste. Karnad (1939) working on aroma-producing organisms in Indian curd, has found *Streptococcus diacetylaramaticus* to be responsible for the richest flavour. Pette and Lolkema (1950) attributed all of the yogurt aroma and most of the flavour development to *Lactobacillus bulgaricus*. Srinivasan and Banerjee (1946) found that boiling milk for 10 minutes, or evaporating it at the boiling point to reduction in volume by 5% yields curd of vary in texture and pleasant aroma.

Body and consistency

The mean body and consistency scores for A, B and C sources were 24.43 ± 0.849 , 23.29 ± 1.093 and 19.78 ± 1.711 respectively (Table 1). Statistically significant differences ($P < 0.05$) were found among those locations or sources in respect of body and consistency score (Table 4). The mean value of body and consistency was highest in Bogra (24.43 ± 0.849) and lowest (19.78 ± 1.711) for Mymensingh dahi (Table 1). There were wide variation among the sample means in respect of body and consistency with in a range of 18.07 to

25.47 for the sample of C₄ and A₃ respectively (Table 1). The variation in body and consistency score of dahi among different districts and in the same district could be attributed to different starter cultures, total solids content additives and manufacturing process employed.

Shukla et al. (1986) found that use of gelatin at 0.2-0.3% level not only improved the quality of yogurt but also control the problem of whey off. Pelte and Lolkema (1951a) advocated heat treatment of milk from 80°C to 90°C for 10 minutes could bring maximum firmness of body. Pette and Lolkema (1950b) attracted *Streptococcus thermophilus* to improve the body of yogurt by reducing the viscosity characteristic of milk cultures of *Lactobacillus bulgaricus*.

Colour and texture

The mean value for colour and texture of A, B and C sources were 15.64 ± 0.647, 14.87 ± 0.694 and 14.29 ± 1.375 respectively (Table 1). Statistically no significant differences were found among those mean values in respect of colour and texture (Table 4). The mean value for colour and texture was highest for Bogra (A) dahi (15.64 ± 0.647) and lowest for Tangail (C) dahi (14.29 ± 1.375). Sample means were within the range of 13.00 to 16.57 for C₄ and A₃ samples respectively (Table 1). The variation for colour and texture score of dahi could be attributed to different factors, like-starts culture characteristic, total solids content, type of milk, additives, manufacturing process etc.

Hill (1931) found that the card tension of skim milk was higher than that of corresponding whole milk. It has been reported by Theophilus et al. (1934) that the curd tension of yogurt is reduced by homogenization. Ranganadham and Gupta (1987) evaluated the sensory characteristics of dahi and yogurt. Good-quality dahi should have a creamy-white to creamy-yellow colour. Sarkar et al. (1996) conducted experiments on 20 misti dahi samples obtained from various markets-in West Bengal. The samples were analysed for their organoleptic, chemical and microbiological quality. The authors reported that there was a wide variation in the scores for colour and appearance. According to the result of Pette and Lolkema (1951) a weak curd is most likely to result if the

total solids content of milk are low or if a significant amount of milk is from cows early in the lactation cycle.

Overall physical score

No significant variations ($P > 0.05$) were found in terms of overall physical scores of dahi of different districts (Table 4). For overall mean values of the samples dahi from different districts dahi Bogra scored highest (79.13 ± 2.457) followed by Mymensingh (73.08 ± 0.650), and that of Tangail (69.83 ± 5.144) (Table 1).

Salih et al. (1987) studied on the hygienic quality and nutritive status of market yogurt, in Baghdad. One hundred samples of yogurt produced in 4 dairy plants and sold in Baghdad were examined. Enterococci were detected in 63% of the samples, coliforms in 34% *Escherichia coli* in 23% and Staphylococci in 43%. Physical scores were 10 in 85% of samples. Sarkar et al. (1996) conducted experiments on 20 dahi samples obtained from various markets-in West Bengal. The samples were analysed for their organoleptic, chemical and microbiological quality. The authors reported that there was a wide variation in the scores for colour and appearance. Flavour, body and texture, taste of misti dahi and the overall acceptability of the product also varied with an average score of 6.98.

Microbiological parameters

Gram positive rods

The percentage of Gram positive rods content for Moharram ali Dahi Ghar (A₁), Quality sweets (A₂), Akboria Grand Hote (A₃), Dahi Ghar (A₄), Mamoni (B₁), Krishna cabin (B₂), Kamal Ronjit market (B₃), Jebbar (B₄), Rupa Dahi Ghar (C₁), Jibon Dahi & Sweetmeat Shop (C₂), Mistimukh (C₃) and Anando Misti Ghor (C₄) made dahi samples were 59.33 ± 1.15, 48.66 ± 3.51, 55.33 ± 2.51, 44.66 ± 3.05, 47.66 ± 2.51, 42.33 ± 3.51, 42.66 ± 2.08, 46.0 ± 2.0, 22.0 ± 2.0, 16.0 ± 3.0, 17.33 ± 3.05, 15.33 ± 2.52, and respectively (Table 2). There was significant difference ($p < 0.001$) with different sources of dahi samples (Table 5). Highest and lowest rod type bacteria were found in dahi of Moharram ali Dahi Ghar and Anando Misti Ghor. Sample average grand mean for gram

positive rods content was 38.11% with a standard deviation (SD) of ± 15.63 (Table 2). Hassan (1970) analysed some plain dahi sample and found that the gram positive rods bacteria was about 26%. But in our experiment more gram positive rods type bacteria was observed.

Baisya and Bose (1975) stated that the final flavour of dahi is highly dependent upon the nature of inoculating culture in India. It was reported that majority of the rods and cocci in yogurt are *Lactobacillus bulgaricus* and *Streptococcus thermophilus* respectively (Braquart, 1981). Proper ratio 9 of rods and cocci are generally important for preparing culture dairy products to ensure better quality (Devil et al. 1971 and Driessen et al. 1982).

Gram positive cocci

On microscopic examination Gram positive cocci contained for Moharram ali Dahi Ghar (A₁), Quality sweets (A₂), Akboria Grand Hotel (A₃), Dahi Ghar (A₄), Mamoni (B₁), Krishna cabin (B₂), Kamal Ronjit market (B₃), Jebbar (B₄), Rupa Dahi Ghar (C₁), Jibon Dahi & Sweetmeat Shop (C₂), Mistimukh (C₃) and Anando Misti Ghor (C₄) made dahi samples were 37.33 ± 2.08 , 47.66 ± 2.51 , 41.00 ± 3.60 , 50.33 ± 1.52 , 26.33 ± 4.72 , 57.66 , 41 ± 2.51 , 48.66 ± 3.51 , 65.66 ± 5.13 , 80.66 ± 4.04 , 83.33 ± 3.05 and 70.33 ± 4.51 respectively (Table 2). There was significant difference ($P < 0.001$)

among these samples (Table 5). Highest and lowest cocci type bacteria were found in Kamal Ronjit market and Krishna cabin market of dahi samples. Persic (1991) showed that cocci and rods ratio in the yogurt sample ranged from 1:1 to 1:27. From another study Mustafa (1997) also found nearly similar result. But the result of the present study (Table 2) nearly agrees with findings of Persic (1991) and Mustafa (1997).

From the results of microbiological examinations also, it is obvious that there were wide variation among the dahi of different districts where Moharram ali Dahi Ghar of Bogra was superior to dahi of different districts. However, the 2nd and 3rd position was be adorned by dahi of Tangail and Mymensingh respectively from hygienic point of view. Here, although the average coliforms count for the samples of Mymensingh was higher than that of Tangail.

Total viable count

Result revealed that there was wide variation in average TVC for dahi at different districts (Table 3). Average highest ($8.04 \times 10^6/g$) TVC was found for dahi samples of Bogra (A) district, while that was lowest (6.83×10^6) for Tangail (C) samples. There was significant differences ($P < 0.001$) among those dahi samples of different district for TVC (Table 5).

Table 1

Physical characteristics dahi collected from different location of Bangladesh Average Smell and Taste score for samples of collected dahi.

Source or Location	Physical parameter score ((Mean \pm SD)			
	Smell and Taste score	Body and Consistency	Colour and texture	Overall physical test
Bogra (A)	39.60 ± 1.748	24.43 ± 0.849	15.64 ± 10.647	79.13 ± 2.457
Mymensingh (B)	34.87 ± 2.195	23.29 ± 1.093	14.87 ± 0.694	73.08 ± 3.650
Tangail (C)	35.74 ± 2.666	19.78 ± 1.711	14.29 ± 1.375	69.83 ± 5.144
Variation	32.63-41.0	18.07-25.48	13.00-16.57	64.90-81.07

SD= Standard Deviation

Table 2
Average gram positive rod percentage for samples of market dahi.

Name of district	Name of Sweetmeat shop	Average gram positive rod \pm SD	Average gram positive cocci \pm SD
Bogra	Moharram Ali Dahi Ghar	59.33 \pm 1.15	37.33 \pm 2.08
	Quality Sweets	48.66 \pm 3.51	47.66 \pm 2.51
	Akboria Grand Hotel	55.33 \pm 2.51	41.0 \pm 3.66
	Dahi Ghar	44.66 \pm 3.05	52.0 \pm 2.0
Mymensingh	Mamoni	47.66 \pm 2.51	50.33 \pm 1.52
	Krishna Cabin	42.33 \pm 3.51	26.33 \pm 4.72
	Kamal Ronjit Market	42.66 \pm 2.08	57.66 \pm 2.51
	Jebbar	46.0 \pm 2.0	48.66 \pm 3.51
Tangail	Rupa Dahi Ghar	22.0 \pm 2.0	65.66 \pm 5.13
	Jibon Dahi & Sweetmeat Shop	16.0 \pm 3.0	80.66 \pm 4.04
	Mistimukh	17.33 \pm 3.05	83.33 \pm 3.05
	Anando Misti Ghor	15.33 \pm 2.52	70.33 \pm 4.51

SD= Standard Deviation

The present investigation partially supports the result of Sheikh et al. (1970), who found the TVC on milk agar at 30°C within a range of 22×10^6 to 365×10^6 /ml for samples of Dhaka district. Again, higher ($5-602 \times 10^6$ CFU/g) lactic acid bacterial count (which could be compared with TVC) in dahi samples from different districts of West Bengal was reported earlier by Sarkar et al. (1996). Variability in the lactic acid bacterial count of dahi (which occupies 90-99% of TVC of dahi) could be attributed to the type of milk (Katara and Levaria, 1991), total solids content of milk (Dave et al.1993), quality of milk, heat treatment of milk, incubation period (Baisya and Bose, 1975) type of starter culture (Baisya and Bose, 1975; Katara and Lavaria, 1991; Dave et al. 1993) and their incubation temperature (Ikonov and StefanovaKondratenko, 1970; Mohanan et al. 1984).

Coliform count

Results demonstrate that there were wide variations in average coliform counts per gram of

samples for dahi of different districts. Average highest (30.67×10^6 /g) coliform count/g was found for dahi samples of Mymensingh (B) district, while that was lowest (0.33 ± 0.650) for Bogra (A) samples (Table 3). The average coliform count/g/sample was $11.78 \text{ CFU} \pm 15.07$. There is significant differences ($P < 0.001$) among those dahi samples for coliform count. In earlier investigations for dahi samples of Calcutta market and different districts of West Bengal. Sarkar et al. (1996) found wider variation in *Escherichia coli* count than that of present investigation. Saad et al. (1987) assessed the microbiological quality of yogurt produced in Assiut city, Egypt. Forty random samples of yogurt were collected from Assiut city markets and the microbial flora analysed. Mean values of counts of coliform in samples were 5.28×10^3 . Indian Standard Institution (1973) and American Public Health Association (1967) set the standards for both coliforms and yeasts in yogurt at less than 10 colonies per ml. and in only one sample out of four.

Table 3
Distribution of counts for total viable microorganism in dahi samples obtain from different districts.

Source	Microorganism	Total viable count		
		No. of sample per counting range		
		10^6 -< 10^7 /g	10^7 -< 10^8 /g	10^8 -< 10^9 /g
Bogra	Total microorganism	-	12/6 (50%)	12/6 (50%)
	Coliform	12/9 (75%)	12/3 (25%)	-
Mymensingh	Total microorganism	-	12/6 (50%)	12/6 (50%)
	Coliform	-	-	12 (100%)
Tangail	Total microorganism	9 (75%)	6 (25%)	-
	Coliform	-	12 (100%)	-
Total	Total microorganism	36/9 (25%)	36/15 (41.67%)	36/12 (33.33%)
	Coliform	36/9 (25%)	36/15 (41.67%)	36/12 (33.33%)

Note: Percentage of samples corresponds to the range showed in parenthesis.

Table 4
Comparison of average score of various sensory or organoleptical properties of different dahi sample.

Physical parameters	Dahi of Bogra (A) M±SD	Dahi of Mymensingh (B) M±SD	Dahi of Tangail (C) M±SD	LSD	Level of significant
Smell and Taste(50)	39.60±1.748	34.87±2.195	35.74±2.666	1.871456	*
Body and Consistency(30)	24.43±0.849	23.29±1.093	19.78±1.711	2.43342	*
Colour and Texture(20)	15.64±0.647	14.87±0.694	14.29±1.375	2.388424	NS
Overall physical score(100)	79.13±2.457	73.08±3.650	69.83±5.144	7.549297	NS

M=mean; SD=Standard Deviation; *=Significant at 1% level (P<0.05); NS=Not significance

Table 5
Comparison of average microbiological status of different dahi sample.

Physical parameters	Dahi of Bogra(A) M±SD	Dahi of Mymensingh(B) M±SD	Dahi of Tangail (C) M±SD	LSD	Level of significant
Total viable count/g (10^6)	129.58±89.833 (8.04±0.319)	147.83±161.151 (7.85±0.657)	7.83±3.314 (6.83±0.184)	2.1738	**
Total coliform count/g(10^1)	0.33±0.650	30.67±9.954	4.33±2.996	1.7197	**

M=mean; SD=Standard Deviation; **=Significant at 1% level (P<0.001)

In this investigation only 41.67% of dahi samples tested confirmed to the BIS (1980) specifications, where 100% laboratory made and 75% of the collected market samples each from Bogra & Dhaka were within the standard range (<10/g) (Table 3). Presence of coliform organisms in dahi

samples indicate contamination during its production and handling and may pose public health problems. The possible source of contamination of the product are unclean hands of the manufacturers, contaminated starter cultures, poor quality milk powders for milk fortification,

poor quality water used to clean earthen pots and exposure of the product to open air during setting of curd. Contamination of dahi with mud pots) and poor quality milk solids used for milk fortification was reported (Singh, 1978). Incidence of coliform organisms in dahi can be checked by employing certain precautionary measures, viz, disinfection of hands of manufacturers and earthen pots with chlorinated water, using fresh batch of starter cultures after very few transfers, incubation of product at proper temperature in a closed container till it attains the desired acidity.

In Bangladesh the production of dahi takes place in a much disorganized way. Another cause, to be unfortunate, that there is no legal standard in respect of hygienic production, distribution and nutritional status of the product. Again, the people of our country, from illiterate to even many learned person, are not aware of the hygienic and nutritional condition of a product. As a result, due to lack of introduction and enforcement of legal standards of the product, the consumers of the country are being deprived of a wholesome product. Consequently, a general ill health of the public could be noticed which is potentially correlated with low standard of hygiene.

CONCLUSION

From the results of different parameters of this experiment, it is obvious that there were wide variation in the physical (sensory), microbiological status of dahi collected from different district of Bangladesh in respect of difference in the type of milk, type of starter culture, difference in temperature and duration of incubation, total solid contents of milk, extend of concentration of milk by heat treatment and storage and handling condition. To reduce the incidence of coliform bacteria (*E. coli*, *Acrobacter acrogeses*, yeast and mold in dohi strict hygienic practices should be maintained during preparation and handling of dahi and of course use of fresh batch of starter culture.

It may be stretch that a comprehensive research work is still required to set a standard for commercial production of dahi in Bangladesh to have uniformity and superiority in its organoleptic and microbiological quality.

REFERENCES

- American Public Health Association (APHA) (1976). Standard Methods for the examination of dairy products (12th Ed.) American public health association. Inc. New York pp 34-62: 224-242.
- Baisya RK and Bose AN (1975). Role of inoculating organism on the physico-chemical changes of milk and on final curd (dahi) quality. Indian Journal of Dairy Science, 28(3): 179-183.
- BIS (1980). IS: 9617 Specification for dahi. Indian Standard Institution, Manak Bhavan, New Delhi.
- Bracquart P (1981). An agar medium for the differential enumeration of streptococcus thermophilus and lactobacillus bulgaricus in yogurt. Journal of Applied Bacteriology. 51:303.
- Dave RL, Dave JM and Sannabhadti SS (1993). Microbiological quality of some market and household dahi samples. Asian Journal of Dairy Research, 10(2): 111-114.
- Davis JG, Ashton TR and McCaskill M, Enumeration and viability of *L. bulgaricus* and *Streptococcus thermophilus* in yogurts, Dairy Industries, 36: 569, 1971.
- Driessan RM, Ubbeks J and Stadhouders J (1982). Continuous manufacture of yogurt, Biotechnology Bioengineering, 19:821.
- Gomez KA and Gomez AA (1984). Statistical Procedures for Agricultural Research. 2nd Edition, John Wiley and Sons, New York.
- Mann GV and Spoerry A (1974) Studies of a Surfactant and Cholesteremia in the Maasai. American Journal of Clinical Nutrition, 27: 464-469.
- Hill RL (1931). Market milk and related products by Sommer, H.H. Edison, Wisconsin.
- Indian Standard Institution (1973). Specification for fermented milk products. Indian Standard. Dairy Science Abstract 38:577.
- ISO (1995). Recommendation of the meeting of the subcommittee. International organization of standardization, on meat and meat products. ISO/TC-36/Sc-6. The Netherlands. 10-18.
- Karnad R (1939). Indian Journal Of Veterinary Science, 9:439.
- Katara RV and Lavaris GS (1991). Changes in dahi prepared from cow, buffalo and goat milk. Asian Journal of Dairy Science, 10:63-68.
- Kon SK (1959). FAO Nutritional studies, 17.
- Laxminarayana H and Shankar PA (1980). Fermented milk in human nutrition. Indian Dairyman, 32, 121-9.
- Merchant IA and RA Packer (1967). Veterinary Bacteriology and Virology. 7th Ed. The Iowa State University Press, Ames, Iowa, USA.
- Mustafa MM (1997) A study on the preparation of fruit Dahi (Yogurt), MS Thesis, Bangladesh

- Agricultural University, Mymensingh, Bangladesh.
- Persic D (1991). Evaluation of the quality of yogurt microflora. *Hrna Ishrana*, 32(4): 193.
- Pette JW and Lolkema H (1951a), Yogurt IV. Factors influencing the proportion of streptococci and lactobacilli in a yogurt culture. *Netherland Milk Dairy*, 5: 14-26.
- Pette JW and Lolkema H (1951b). Yogurt. V. Firmness and Separation of milk yogurt. *IBID*, 5:27-45.
- Pette JW and Lolkema H (1950c) Yogurt. III. Acid production and aroma formation in yogurt. *Netherland Milk Dairy* 4: 261-273.
- Ranganadham M and Gupta SK (1987). *Indian Dairyman*, 39 (10): 493.
- Rangappa KS and Achaya KT (1974). *Indian Dairy Products*. Mysore City, India: Asia Publishing House.
- Saad NM, Moustofa MK and Ahmed AAH (1987). Microbiological quality of yogurt produced in Assiut city. *Assuit Veterinary Medical Journal*, 19(37):87-91.
- Salih Y, McDowell LR, Hentges JF, Mason RM and Wilcox CJ (1987). Mineral content of milk, colostrum, and serum as affected by physiological state and mineral supplementation. *Journal of Dairy Science*, 70:608- 612.
- Sarkar S, Kuila RK and Misra AK (1996). Organoleptic, Microbiological and Chemical quality of misti dahi sold in different districts of West Bengal. *Indian Journal of Dairy Science*, 49 (1):54- 61.
- Shaham KM (1980). *Cultured Dairy Product Journal*, 15-21.
- Shahani KM and Chandan RC (1979). Nutritional and healthful aspects of cultured and culture-containing dairy foods. *Journal of Dairy Science*, 62(10):1685-94.
- Shukla FC, Jain SC and Sandhu KS (1986). Effect of stabilizers and additives on the diacetyl and volatile fatty acids contents of yogurt. *AGRIS*
- Singh RS (1978). Microflora of dahi container. *India Journal of Dairy Science*, 31:37
- Srinivasan MR and Banerjee BN (1946). Studies on the method of preparation of ghee. III sourcing process. *Indian Journal of Veterinary Science, Animal Husbandary*, 16: 72-85.
- Tamine and Robinson (1976). *Journal of Dairy Science Research*, 55. 281
- Theophilus DR, Hansen HC and Spencer MB (1934). *Journal of Dairy Science*, 17:519.