

A REPORT ON QUALITY EVALUATION OF DAHI COLLECTED FROM BOGURA SADAR



A PRODUCTION REPORT SUBMITTED BY

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Abstract

The research work was carried out to evaluate the physical, chemical and microbiological qualities of dahi collected from Bogura sadar areas. For this reason, dahi samples were collected from five dahi shops in Bogura sadar areas (Maharam Ali dahi, Rofatdahi ,Akboria dahi, Asia dahi and Gaurgopal dahi).To evaluate the quality physical,chemical and microbiological tests were conducted at the Dairy science laboratory of the Department of Dairy and Poultry Science, Chittagong Veterinary And Animal sciences University, during the period of January,2020.The overall physical score of the samples were determined by a panel of expert judges.The best scores for the physical parameters were found in asia dahi and lowest observed in gourgopal dahi. In case of chemical parameters, pH value and fat content of asiadahi was higher than the other collected dahi samples. In microbiological analysis total viable count, coliform count and yeast/mold count were performed. Significant differences were found in case of total viable count among all samples. There were no coliforms and yeast and molds counts observed in the collected samples that indicates good hygienic dahi preparation procedure in all samples. According to the observed results (physical ,chemical and microbiological) it could be advocated that Asia dahi were superior in quality among other collected samples on the basis of physical, chemical and microbiological qualities.

***Key words:* Dahi, Bogura, Physical analysis, Chemical analysis, Microbial analysis.**

Chapter-I

INTRODUCTION

Bangladesh is an over populated, rural and agrarian country in the world. Livestock has been an important component of the mixed farming system practiced in Bangladesh for centuries. There are about 23.94 million cattle, 1.478 million buffalo, 3.401 million sheep, 25.931 million goat, in Bangladesh .livestock provide milk, meat and other essential things . Milk is very nutritious and perhaps an indispensable food for human being .

Now milk is converted to various milk products. dahi or yoghurt is one of them. Dahi is a well known delicious fermented milk products that is consumed in large amounts in Bangladesh. In Bangladesh it becomes more popular day by day. In India, 9% of the total milk produced is used for the preparation of dahi. Dahi is prepared almost all districts of Bangladesh. About 4% of the total milk produced in Bangladesh is used for the preparation of dahi. In Bogura there is a number of sweets shops that produce dahi. There are some renowned also who produce tasteful dahi. Two types of dahi are available in local markets, sweetened/mistidahi and sour dahi and both are made by traditional method. Especially sweet dahi is one of the most popular milk products of Bangladesh. Sweetened dahi has a characteristic brown color, a cooked and caramelized flavor and a firm body, artificial color, suger, caramel and gur are also added during production .Probiotics are livemicro-organisms thought to be beneficialto the host organism. Probiotics are defined as live microorganisms which when administered in adequate amounts confer a health benefit on the host (WHO, 2001). Lactic acid bacteria(LAB) and bifido bacteria are the most common types of microbes usedas probiotics; but certain yeasts andbacilli may also be used. Probioticsare commonly consumed as part offermented foods with specially addedactive live cultures, such as in dahi oras dietary supplements. At the beginning of the 20th century, Elis Metchink off showed that the consumption of yoghurt (fermented milk) products resulted in sound health and enhanced life span of Bulgarian peasants (Metchinkoff, 2013). These probiotic organisms are considered to be having prevention against gastrointestinal infections; by adherence to host cells, to exclude or reduce pathogenic bacteria and to produce acids, hydrogen peroxide and bacteriocins antagonistic to the growth of

pathogens, and this ultimately reinforces the body's natural defense mechanisms (Klein et al., 1998). It has been reported that consumption of functional foods containing probiotic lactic acid have been shown to exert protective against infections of a wide variety of enter pathogens such as *Salmonella typhimurium*, *Listeria monocytogenes*, *E. coli* etc (Gill HS et al., 1990).

In Bogura, most of the producers are used earthenware for setting dahi to firmness rather than glass bottles/plastic cups. Earthenware is assisting to absorb and evaporate a little amount of moisture from the dahi resulted more firmness.

The introduction of fermented milk products such as cheeses and yogurts in to the diet of man is thought to date back to the dawn of the civilization (Mckinley, 2005). Consumption of fermented-milk products is associated with several types of human health benefits partly because of their content of lactic acid bacteria.

The nutritive value of dahi depends upon their cleanliness, purity and wholesomeness. It has been also reported to exert a possible therapeutic effect by controlling bacterial growth and to cure such intestinal diseases as constipation, diarrhea, and dysentery, possibly because of its antibiotic effect.

The objectives of the present study was

- To monitor the physical ,chemical and microbial qualities of dahi produced by a traditional methods in bogura sadar dahi shops.



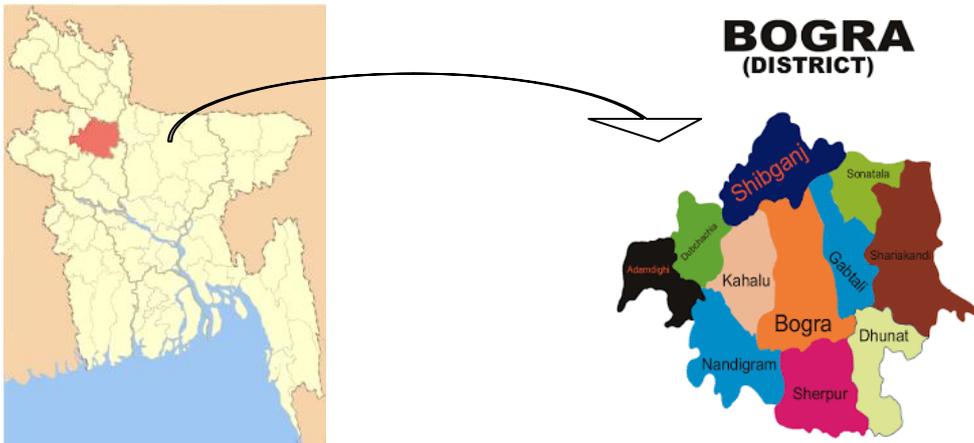
Figure1 sweetend dahi (misti dahi)

Chapter-II

MATERIALS AND METHODS

2.1 Description of study area

Bogra district is located in the northern part of Bangladesh, consists of 13 wards. There are lots of food shops with or without registration throughout the city.



2.2 Study period

The experiment was conducted at the Dairy science laboratory of the Department of Dairy and Poultry Science, Chittagong Veterinary And Animal sciences University, during the period of January, 2020.



2.3. Collection of dahi samples:

Five dahi samples were collected from Bogura sadar areas (Maharam Ali dahi ,Rofat dahi ,akboria dahi , asia dahi and gaurgopal dahi). Samples were collected from different food shop and transported the samples as soon as possible to Dairy Science Laboratory, CVASU for analysis. Each sample was taken in a sterile container separately and placed in a polyethylene bag during transportation to the laboratory employing standard conditions for sample collection.



PIC 1



PIC 2



PIC 3



PIC 4



PIC 5

PIC 1 (Akboria dahi)

PIC 2 (Asia dahi)

PIC 3 (Gaugopal dahi)

PIC 4 (Rofat dahi)

PIC 5 (Maharam Ali dahi)

2.4. Physical tests:

All dahi samples were judged to evaluate the smell and taste, body and consistency, color and texture. The overall of physical score of the samples were determined by a panel of expert judges.

2.5. Chemical tests:

The selected samples were tested for pH, moisture, total solids, fat, protein, sugar and ash. Fat was determined by the Gerber method, total solids and moisture content were determined by the oven drying method at 105°C for 24 hours and ash content was determined by AOAC procedure .protein was determined by the Kjeldahl method as per international dairy federation. pH value was measured by a pH meter and sugar values were obtained by deduction method.



Figure2 : different chemical test procedure of dahi

2.6. Microbiological tests:

Microbial parameters (viable bacteria, coliform count, yeast and mold counts) were determined by the standard plate count method. Plate count agar and potato dextrose agar were used for viable bacteria count .

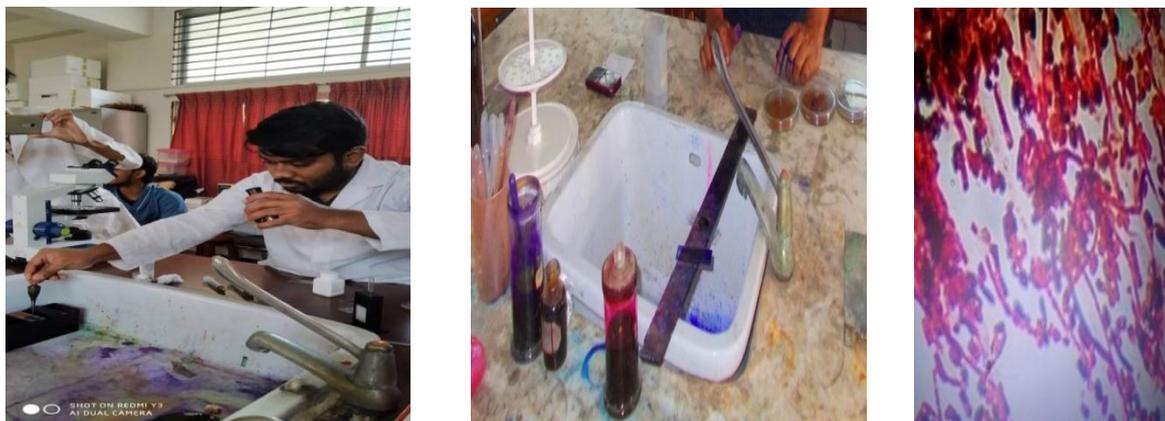


Figure3: microscopic examination of bacteria present in dahi sample

2.7. Statistical analysis:

Data obtained from the collected sample were analyzed statistically using STATA® version 9.2 (STATA corp., Texas, USA). Data management was done by MS Excel® programme.

Chapter- III

Results and Discussion

3.1. Physical tests:

Physical tests (smell and taste, body and consistency, color and texture and overall physical score) of dahi were done as per recommended protocol.

3.1.1. Smell and taste:

There was significant difference ($p < 0.01$) in case of smell and taste score of dahi samples. Highest score (45.33 ± 0.58) was found in Asia dahi, Bogura whereas the lowest value (37.66 ± 1.53) was observed in gaur gopal dahi sample.

3.1.2. Body and consistency:

There was significant difference ($p < 0.01$) in case of body and consistency score of all dahi samples. Highest body and consistency score was also found in Asia dahi whereas the lowest value was in Gaurgopal dahi. Mangashetti et al. (2003) found that, dahi produced from concentrated milk with 7.5% added sugar has smooth body and textural characteristics. The variation in body and consistency score of collected dahi sample may be due to different sources of starter culture, , total solids content and manufacturing process employed.

3.1.3. Color and texture:

There was significant difference ($p < 0.01$) present in case of the color and texture score of all samples. Highest color and texture was observed in Akboria dahi (17.77 ± 0.58) and the lowest value was observed in gaur gopal dahi (11.77 ± 0.58). Improving the textural quality of dahi including firmness, viscosity, and creaminess, functional ingredients provide health benefits (Drake et al., 2000). These additional properties may affect consumer acceptability and preference (Fox, 2001).

3.2. Chemical tests

The results of chemical analyses (pH value, acidity, total solids, fat, protein, ash) of dahi samples collected from study areas are shown in Table 1.

3.2.1. pH value

There was significant difference ($p < 0.01$) present in case of the pH value of collected dahi samples. Highest pH value (4.61 ± 0.06) was found in Asia dahi and the lowest value (4.12 ± 0.06) was observed of Rofatdahi. The result of present findings were agreed with the work of Kamruzzaman *et al.*, (2002) who reported that pH value of dahi samples at room temperature varied from 4.01 to 4.16.

3.2.2. Acidity

A significant difference ($p < 0.01$) was found in case of the acidity percentage of all samples. The highest acidity ($0.9 \pm 0.23\%$) was obtained in Gour gopal dahi and the lowest value ($0.63 \pm 0.10\%$) was that of obtained in Asia dahi. The reason for the higher acidity percentage in Gourgopaldahiis might be due to uncontrolled incubation, postproduction handling and prolonged storage.. On the other hand Asia dahi might follow controlled incubation time and temperature or maintained at low temperature after production. The present findings (average acidity 0.7%) nearly similar with the work of Rashid and Miyamoto (2005) who found that acidity of dahi was 0.6%.

3.2.3. Total solids (TS) content

There was significant difference ($p < 0.01$) present in case of the total solids content of dahi samples. Total solids content of Asia dahi ($40.73 \pm 2.77\%$) sample was found higher than that of the other samples. The differences for the total solids content in different dahi samples may be due to different level of sugar content. Normally total solids content of yoghurt ranges from 17.11 to 21.80% (Muhammad *et al.*, 2005) which resembles the lowest value of this study samples.

3.3.4. Fat content

There was significant difference ($p < 0.01$) in case of the fat content for of collected dahi samples. Highest fat content was obtained in Asia dahi ($5.88 \pm 0.99\%$) and the lowest ($3.12 \pm 0.36\%$) obtained gourgopal dahi. The reasons for lower fat content may be due to use of skimmed milk or low fat content of milk that used for dahi production. The fat content of dahi samples observed in the study were agreed with the results observed by Rashid and Miyamoto (2005).

3.3.5. Protein content

There was significant difference ($p < 0.01$) present in case of the protein content of different dahi samples. The highest protein content was observed in Asia dahi ($3.62 \pm 0.20\%$) and the lowest observed in Rofat dahi ($3.11 \pm 0.10\%$). among the samples. The protein content of all dahi samples mentioned in the study were slightly lower than the protein content range 3.99-4.74% reported by Rashid and Miyamoto (2005).

3.3.6. Ash content

There was significant difference ($p < 0.01$) present in case of the ash content of collected dahi samples. of the highest ash content observed in Akboria and asiadahi (0.9 ± 0.02) and the lowest value was obtained in Mahram ali and Rofatdahi (0.88 ± 0.02). The ash content of all collected dahi samples in the study were agreed with the range 0.73-0.91% that found by Haj *et al.*, (2007) and (0.78-0.80%) found by Chandra *et al.*, (2013).

3.4. Microbial count

Total viable bacterial count, yeast and mould counts are shown in Table 2.

3.4.1. Total viable count

Statistical analysis showed no significant difference among the total viable bacterial counts of the collected dahi samples. The samples of maharamali and asiadahi had higher bacterial counts (67.33×10^4 cfu/ml and 55.33×10^4 cfu/ml respectively) than other samples. The observed variation of microbial count in collected samples might be due to the use of the undefined traditional culture, improper ratio and amount during dahi preparation.

3.4.2. Yeast and mould count

No yeast and mold was found in collected dahi samples. This indicated the optimum hygienic measures were maintained during dahi preparation. It might be possible to happen by traditional culture or contamination of postproduction and handling defect.

3.4.3. Coliform count

No coliform bacteria was found in any dahi samples. This indicates proper hygienic practices. The presence of coliform organisms in dahi samples indicate fecal contamination during its production, handling etc.

Table1. Chemical analysis of dahi samples collected from different sources.

Parameters	Maharam ali dahi	Rofat dahi	Akboia dahi	Asia dahi	Gaur gopal dahi
pH	4.16±0.03	4.12 ^b ±0.06	4.17±0.04	4.61 ^a ±0.06	4.13±0.06
Acidity%	0.74±0.02	0.77±0.10	0.69±0.02	0.63 ^b ±0.10	0.9 ^a ±0.23
Total solids%	32.97±0.63	35.76±0.76	36.65±0.57	40.73 ^a ±2.77	31.54 ^b ±0.76
Fat %	3.43±0.54	3.73±0.83	3.45±0.76	5.88 ^a ±0.99	3.12 ^b ±0.36
Protein%	3.59±0.20	3.11 ^b ±0.10	3.34±0.10	3.62 ^a ±0.20	3.15±0.10
Ash%	0.88 ^b ±0.02	0.88 ^b ±0.02	0.91 ^a ±0.02	0.91 ^a ±0.02	0.90±0.02

[****significant at 0.1% level, a: highest value, b: lowest value]

Table 2. Microbiological quality of dahi collected from different sources.

Parameters	Maharam ali dahi	Rofatdahi	Akboia dahi	Asia dahi	Gaur gopal dahi
Total viable count	67.33×10 ^{4a}	52.65×10 ⁴	42.33×10 ^{4b}	55.33×10 ⁴	47.33×10 ⁴
Coliform count	no	no	no	no	no
Yeast and mould count	no	no	no	no	no

[****significant at 0.1% level, a: highest value, b: lowest value]

Chapter- IV

CONCLUSION

The present experiment was conducted to evaluate the chemical and microbiological quality of dahi. According to the observed results (physical, chemical and microbiological) it could be advocated that Asia dahi were superior in quality among other collected samples on the basis of physical, chemical and microbiological qualities.

A comprehensive research work is still required to determine the versatile qualities of traditional dahi market of Bogura district to have uniformity and superiority in its organoleptical, chemical and microbiological quality.

REFERENCES

- Adeyl FMM (1998). Studies on the physical chemical and microbiological quality of mistidahi of different districts of Bangladesh.M.S. Thesis, Dept. of Dairy Sci. Bangladesh Agricultural University, Mymensingh.
- Aggarwala AC, Sharma (1961). A Laboratory Manual of Milk Inspection.Bombay, Calcutta, New Delhi, India.
- Akin N, Rice P, Holdieh R (1995).The vacuum filtration of yoghurt.*Cul Dai Pro J*, 30(2), 2-4.
- Ali MDY (1998). A comparative study on the quality of dahi (yoghurt) available in Mymensingh town.M.S. Thesis, Dept. of Dairy Sci. Bangladesh Agricultural University, Mymensingh.
- American Public Health Association (APHA) (1907) .Standard Methods for the Examination of Dairy Products (12th Ed.).American Public Health Association. Inc. 1740 Broadway, New York. 34-62, 224-242.
- Association of Official Agricultural Chemists (AOAC) (1982).Official Methods of Analysis.(10th Ed). Washington D.C.
- Cardoso F, Iniguez C, Morgado R (1991). Effect of heat treatment on firmness of yoghurt made from bullalo milk. *Rev Cub de Ali Y Nut*, 5(2), 111-117
- Chakraborty M (1998). A study on the preparation of Dahi from whole milk of cow, buffalo and their different proportionate mixtures.M.S. thesis, Dept. of Dairy Sci. Bangladesh Agricultural University, Mymensingh.*Dairy Res*, 8(3), 105-168.
- Dastum NN (1956). Buffaloes Milk and MR products. National Dairy Res. Inst., Karnal, India. *Dai SciAbst*, 18, 968.

- EI-Samragy YA, Samragy El YA (1988).The manufacture of zabady form milk. *Milchwissensehaft*43(2), 92-94. .
- Ghosh J, Rajorhia GS (1987).Chemical, microbiological and sensory properties of mistidahi sold in Calcutta. *Asia J Dai Res*, 6(1), 11-16
- Hendricks H, Deonick G (1965). Bacteriological studies on the acid milk product "Bioghurt". *Dai SciAbst*, 26, 139.
- Islam MDS (1999).A comparative study on the quality of Laboratory prepared and Local Village Market dahi. M.S. Thesis, Dept. of Dairy Sci. Bangladesh Agricultural University, Mymensingh
- Mustafa MMH (1997). A study on the preparation of fruit dahi (yoghurt).Dept. of Dairy Set. M.S. Thesis, Bangladesh Agricultural University, Mymensingh.
- Park YW (1994). Nutrient and mineral composition on commercial US milk yoghurt.*Small Rumi Res*, 13(1), 63-70.
- Rahman SMR (1998). A study on the manufacture and shelf-life of jack fruit Dahi (Yoghurt).M.S. Thesis, Dept. of Dairy Sci. Bangladesh Agricultural Mymensingh.
- Ray HP, Srinivasan RA (1972). Use of microorganisms for production of indigenous fermented milk products (Sweetened dahi).*J Food Sci Tec*, 9, 62.
- Sarker S, Kuila RK, Misra AK (1996).Organoleptic, microbiological and chemical quality of mistidahi sold in different districts of West Bengal. *Ind J Dai Sci*, 49(1), 54-61.

BIOGRAPHY

I am Manik Chandra Das son of Ajit Chandra Das and Kalpona Rani Das. I passed Secondary School Certificate examination in 2011 (G.P.A-5.00) followed by Higher Secondary Certificate examination in 2013 (G.P.A-5.00). Now I am an intern veterinarian under the Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University. In the future I would like to work as a veterinary practitioner and do research on clinical animal diseases in Bangladesh.