

Quality Evaluation of Dahi available in Chittagong Metropolitan Area, Bangladesh.



Submitted by:

Salma Chowdhury

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A production report submitted as per approved style and content by

Signature of Author

(Salma Chowdhury)

Roll No: 12/102

Reg. No: 00728

Internship ID: D-48,

Session: 2011-2012

Signature of Supervisor

(Dr. A. K. M. Humayun Kober)

Professor and Head

Department of Dairy and Poultry
Science.

Chittagong Veterinary and Animal
Sciences University.

Chittagong Veterinary and Animal Sciences University

Khulshi, Chittagong-4225, Bangladesh.

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List of abbreviations

Bo= Bonoful

Mo= Modhuban

Hw= Highway

GO= Gousia

J.N= J.N. food

Fp= Food plaza

TVC= Total viable count

TCC= Total coliform count

Cfu= Colony forming unit

SPC agar= Standard Plate Count agar

VRB agar=Violet Red Bile agar

Acidity %= Acidity percentage

ABSTRACT

A market study was carried out to evaluate and compare the quality of seven brands of curd available in the local markets of Chittagong metropolitan area, Bangladesh. These samples were collected randomly & analyzed for physio-chemical and microbiological properties. Physio-chemical analysis like smell, taste, body and consistency, color, texture and acidity. Microbial analysis was also performed to check the total viable count of bacteria and total coliform count of dahi. The organoleptic analysis showed that, the highest mean value of total score found in Bonoful brand(91 ± 0.5) and the lowest mean value found in J.N foods brand(75.26 ± 1.5). In most of the cases, Bonoful and Highway brand obtained the highest marks in score card but in case of chemical test, the highest acidity percentage obtained by Bonoful (0.95 ± 0.04), the lowest acidity percentage found in case of Gousia brand (0.65 ± 0.02). The acidity percentage of Bonoful brand exceed the standard level of acidity of dahi which might be due to uncontrolled incubation, postproduction handling and prolonging storage. Microbial analysis of dahi showed that, the highest total viable count of bacteria found in case of Highway brand ($4.88\pm 0.21\times 10^7$) CFU/ml and lowest value found in case of J.N foods ($2.0\pm 0.5\times 10^7$) CFU/ml and highest coliform count per ml. was found (55 ± 1.52) in Banoful dahi and lowest coliform count per ml. was found (6 ± 2.08) in case of Gousia sweetmeat shop made dahi. From this experiment, it was found that dahi available in Chittagong city is not maintained the proper quality. 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, chemical and microbiological quality.

Keyword: Dahi, properties, microbial analysis, quality.

CHAPTER 1: INTRODUCTION

Dahi is a fermented dairy product by lactic acid fermentation of milk by using starter culture of bacteria (Hayaloglu *et al.*, 2007). From the time immemorial it is being used for its nutritive and therapeutic values (Aneja *et al.*, 2002). The starter culture used in dahi are not definite and that's why the quality of dahi varies according to the culture uses for the preparation of dahi. Dahi is mostly prepared by using mixed culture of *Streptococcus lactis*, *Lactobacillus bulgaricus*, *Streptococcus thermophilus*, *Streptococcus citrophilus*, *Lactobacillus plantarum* etc (Islam *et al.*, 2017). But the lactic acid bacteria are the main microbial agent to produce this fermented milk product locally (Dewan and Tamang, 2007). The bacteria have probiotic properties which makes the dahi more desirable to the people. It improves appetite by stimulating B and T cells of macrophages by lactic acid bacteria (Meydani and Ha, 2000; Sinha and Sinha, 2000). It's have the ability to control the growth of undesirable bacteria and incurring intestinal disease like constipation, diarrhoea and dysentery (Shahani and Chandan. 1979). It's also have anti-carcinogenic effect (Shaham, 1980) and lowering the blood cholesterol level of human. (Mann and Sperry, 1974). Beside the therapeutic value of dahi, it is also unique in case of nutritive value. It contains all the nutrients present in milk except a little variation in lactose content. Lactose content of dahi is about 30% (per cent) lower than milk as because some portion of lactose is fermented for the formation of lactic acid (Akter *et al.*, 2010). In Bangladesh, the popularity of dahi increasing day by day as a good item of sweet. About 4% of the total milk produced in Bangladesh is used for the preparation of dahi (Mustafa, 1997). In India, about 7% of the total milk produced is converted to dahi whereas, it is 4% in Pakistan (Chakraborty, 1998). Mainly two types of dahi are available in local markets here, sweetened / misti dahi (sugar added) and sour dahi and both are prepared by a traditional method using previously made dahi (starter). Dahi is mainly prepared by two method: traditional and standardized method. In Bangladesh, household dahi is prepared by heating the milk at boiling temperature until volume is reduced up to 15-20% and 8-10% sugar added (sweetened dahi), cooled down to body temperature, inoculated 2-3% starter and poured into earthenware and kept for curd formation overnight by wrapping woolen cloth or straw or jute bag to maintain warmth. In the shops, the method is more or less the same and dahi is usually set in suitable containers (earthenware/ glass bottles/plastic cups) of the required capacity (Dey *et al.*, 2011). But the quality of dahi in local market varies from from the shop to shop as there is no well described standard for dahi. Sometimes, use of poor quality milk, unhygienic practices associated with the process involved and the use of wild type strain of starter culture,

storage dahi 1-2 day at room temperature give rise to poor grade dahi. This types of low grade dahi have only six to twelve hour self-life (Younus *et al.*,2002), after that period, it becomes unhealthy for human consumption due to growth of undesirable bacteria occurs. So, it is necessary to use of quality milk, follow standardized method to increase the self-life of dahi. But most of the dahi manufacturing company doesn't follow the rules. So, there are found a wide variation among the physical, chemical and microbial qualities of dahi from region to region, shop to shop. In some cases the dahi doesn't contain the proper amount of microorganism for probiotic action in human. But the most of the people take dahi as a probiotic food item for their beneficial activity in health. Some dahi prepared company doesn't maintain the proper hygiene during preparation of dahi. Moreover, information is very scanty on the quality of dahi produced by small scale producers throughout the country as well as established renowned sweetmeat makers or large scale dairy enterprises (Islam *et al.*, 2017).

So, the study was conducted with a view to:

1. To evaluate the quality of available brand dahi in local market of Chittagong city.
2. To make a comparative study between the different brands of dahi.

CHAPTER 2: MATERIALS AND METHODS

1. Site and period of experiment :

The experiment was conducted at the Dairy Science Laboratory of the Sciences University, Chittagong during the period of 19 November, 2017 to 30 December, 2017.

2. Study area:

Chittagong metropolitan area is located in the south-eastern part of Bangladesh, consists of 41 wards. There are lot of local brand market of sweet available at Chittagong city who sells dahi as a sweet item.

3. Sample Collection:

A total of 21 samples were collected from different 7 brand such as Banoful, Food plaza, Modhuban, Gousia, J.N.food, Highway, Jenuine during the study period .Samples were collected from different shop of Chittagong metropolitan area and transferred to the laboratory as quickly as possible by taken sample in a sterile container separately and placed in a polyethylene bag during transportation to the laboratory.

4. Physical test :

All dahi samples were judged by sensory and organoleptic test such as smell and taste, body and consistency, color and texture and there by the overall of physical score of the samples were given by a panel of expert judges.

5. Chemical analysis:

- **Acidity percentage:** Acidity percentage was determined by the method described by Aggarwala & Sharma (1961).The titratable acidity was measured by titrating 9gm of the diluted curd samples with 0.1 N sodium hydroxide until the substance reached a faint pink color corresponding to the end point of the phenolphthalein which is used 2-3 drops during titration as indicator The amount of 0.1 N NaOH used was noted and then the titratable acidity was calculated by using formula.

6. Microbial analysis:

- **Total viable count:** Total viable count of bacteria was determined by standard plate count method by using pour plate technique. For each sample one gram of homogenized sample was dissolved in previously sterilized 9 ml of distilled water. Then serial dilution was done from

10^{-1} to 10^{-10} . One ml aliquot each of 10^{-7} dilution was placed on three petridishes and then pour on SPC(standard plate count) agar media on it and mix ,then allowed it sometimes for solidifications. After that, incubated for 48 hours at 32 degreeC. The colonies were enumerated by using colony counter (Model-STUART, SC-5) and counted the number of total viable bacterial colonies. and expressed as CFU /ml of sample.

CFU/ml =No. of colonies (Mean) x Dilution factor.

- **Coliform count:** Coliform count was determined by the methods described in the "Standard Methods for examination of Dairy Products" by APHA (1967) using VRB (Violet Red Bile agar). 1gm of sample were measured and then dissolved it in 9ml previously sterilized distill water and then serial dilution was done. Diluted sample was poured on petridish and the pour the agar media on it and allowed it for solidification. Then incubate it at 32degreeC for 24hours. Then counted the coliform bacteria if growth was observed.

7. Statistical analysis:

The data obtained were imported, stored and coded according to recorded information in the data sheet using the Microsoft Excel – 2010 program and then exported to STATA 14.2 (STATA Corporation, 4905, Lakeway River, College Station, Texas 77845, USA) for statistical analysis. A descriptive statistics was performed for chemical and microbial parameters according to different samples.

CHAPTER 3: RESULTS AND DISCUSSIONS

Table 3.1:

Organoleptic score of dahi samples collected from different sources:

Parameter	Types of dahi						
	Bo	Mo	Hw	Go	Ge	J.N	Fp
Smell and taste (50)	47.2 ±0.25	45.8 ±0.25	47.56 ±0.40	46.03 ±0.25	46±0.7 6	39.16 ±1.04	38.33 ±1.52
Body and consistency (30)	27.3 ±0.51	26.5 ±0.5	26.5 ± 0.5	25.1±1. 04	25.3±0 .76	24.1±0.76	26.03 ±0.45
Color and texture (20)	16.5 ±0.5	16.43± 0.40	16.5±0 .6	16.83 ±0.76	17.5 ± 0.5	12±0.5	12.83 ±0.76
Total score	91±0.5	88.73 ±0.6	90.5±0 .6	87.96 ±1.2	88.8 ±0.75	75.26±1.5	77.19 ±1.3

*value expressed as mean value ±standard deviations

Bo=Bonoful, *Mo*=Modhuban, *Hw*=Highway, *GO*= Gousia, *J.N*= J.N. foods , *Fp*= Food plaza.

It has been observed that the quality or integrity of a particular food sample can be determined by evaluating its sensory characteristic (USDA, 2001). Organoleptic score table 3.1 shows that the highest value of total score found in Bonoful brand(91±0.5) and the lowest value found in J.N foods brand(75.26±1.5). Starter culture, incubation temperature, processing conditions (e.g., heat treatment, homogenization) and compositional properties of the milk base and also many other factors affect the flavor, taste, texture of dahi (Shaker *et al.*, 2001).

Smell and taste:

In case of smell and taste the highest mean value obtained by highway dahi (47.56 ± 0.40) and lowest mean value obtained by Food plaza (38.33 ± 1.52). The mean value of others in case of smell and taste are Bonoful (47.2 ± 0.25), Modhuban (45.8 ± 0.25), Gousia (46.03 ± 0.25), Genuine (46 ± 0.76), J.N. foods (39.16 ± 1.04). (Ara *et al*, 2015) found that addition of 10% jack fruit juice with dahi, smell and taste score was 41.44 ± 0.05 , which was agreed with the present findings of (Rangappa and Achaya, 1974) reported that milk stored too long before seeding often gives rise to broken curd of poor taste .

Body and consistency:

In case of body and consistency score card showed that the highest mean value obtained by Bonoful (27.3 ± 0.51) and lowest mean value obtained by J.N.foods (24.1 ± 0.76). The mean value of others brand for body and consistency are Modhuban (26.5 ± 0.5), Highway (26.5 ± 0.5), Gousia (25.1 ± 1.04), Genuine (25.3 ± 0.76), Food plaza (26.03 ± 0.45). 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 dahi culture among different sources could be attributed to different starter cultures, total solids content 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 dahi but also control the problem of whey off. Pette and Lolkema (1951) advocated heat treatment of milk from 80°C to 90°C for 10 minutes could bring maximum firmness of body. According to (Pette and Lolkema, 1951), a weak curd may be due to the total solids content of milk are low or if a significant amount of milk is from cows early in the lactation cycle.

Color and texture:

In case of color and texture, the highest mean value obtained by Genuine (17.5 ± 0.5) and lowest mean value obtained by J.N foods (12 ± 0.5). The other brand score Bonoful (16.5 ± 0.5), Modhuban (16.43 ± 0.40), Highway (16.5 ± 0.6), Gousia (16.83 ± 0.76), food plaza (12 ± 0.5) in this case. Improving the textural quality of dahi such as firmness, viscosity, and creaminess, functional ingredients provide health benefits (Drake *et al*., 2000). These additional properties may affect consumer acceptability and preference (Fox, 2001).

However, it was also observed that some dahi brands were not significantly different from each other. Color, texture and thickness of dahi are important quality characteristics, but the flavor and taste of the product is generally considered the

most critical and important indicator of consumer acceptance (Olugbuyiro and Oseh, 2011). As it had been earlier stated by (Olugbuyiro and Oseh, 2011) that low score in average overall acceptability is a function of flavor, taste and smell, the results obtained from this research conform to this statement.

Table 3.2:

Chemical quality assessment of curd collected from different sources:

Parameter	Types of dahi						
	Bo	Mo	Hw	Go	Ge	J.N	Fp
Acidity %	0.95 ±0.04	0.90±0.02	0.76 ±0.03	0.65±0.02	0.75±0.01	0.85±0.02	0.89±0.05

*value expressed as mean value ±standard deviations

Bo=Bonoful, Mo=Modhuban, Hw=Highway, GO=Gousia, J.N=J.N. food , Fp=Food plaza.

Acidity test:

Acidity of different brand dahi varies. In this case ,the highest acidity obtained by Bonoful(0.95±0.04),the lowest acidity found in case of Gousia brand(0.65±0.02).The mean value of others are Modhuban (0.90±0.02), highway (0.76±0.03),Genuine (0.75±0.01),J.N foods (0.85±0.02),Food plaza(0.89±0.05). The highest acidity of sample Bonoful and modhuban might be due to uncontrolled incubation, postproduction handling and prolonging storage while sample Gousia brand dahi might be produced under controlled incubation and controlled storage temperature to controlled incubation & post production handling & at 4 degreeC. Alam (2014) found that acidity of dahi was 0.7% which agrees with the present findings. The result of 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%.

Table 3.3:

Microbiological quality of curd collected from different sources:

Parameter	Types of dahi						
	Bo	Mo	Hw	Go	Ge	J.N	Fp
TVC (CFU/ml) $\times 10^7$	2.8 \pm 0.2	2.6 \pm 0.25	4.88 \pm 0.21	4.2 \pm 0.25	3.2 \pm 0.20	2.0 \pm 0.5	2.1 \pm 0.26
TCC (CFU/ml)	55 \pm 1.52	9 \pm 3.05	7 \pm 1.15	6 \pm 2.08	25 \pm 2.51	9 \pm 2	11 \pm 3.05

*value expressed as mean value \pm standard deviations

Bo= Bonoful, Mo= Modhuban, Hw= Highway, Go= Gousia, J.N= J.N. foods , Fp= Food plaza.

TVC= Total viable count, TCC=Total coliform count.

Total viable count:

The highest total viable count of bacteria found in case of Highway brand (4.88 \pm 0.21 $\times 10^7$)CFU/ml and lowest value found in case of J.N foods(2.0 \pm 0.5 $\times 10^7$)CFU/ml. The variation in total viable count in different curd samples might be due to undefined starter culture in improper ratio and amount. It also contains heterogeneous mixture of lactic acid bacteria so; as a result Total Viable Count in dahi samples varies (Allai *et al.*, 2015)

According to (Hasan *et al.*, 2016) the dahi sample of Chittagong region contains 1.72 $\times 10^7$ cfu/ml total viable count which supports the findings of this study. The highest total viable count/ml was recorded for Highway brand dahi sample which indicates that it contains more favorable condition for growth of microbes. Bacteria might have got more nutrients from commercial starch powder, and most probably less hygienic measure was taken during manufacturing.

Total coliform count:

Average highest Coliform count per ml. (55 \pm 1.52) was found in Banoful sweetmeat shop made dahi and lowest Coliform count per ml. (6 \pm 2.08) was found in Gousia

sweetmeat shop made dahi. The existence of Coliform bacteria is the indication of contamination in dahi samples. This might be result of the poor hygienic condition of the production period. The possible sources of contamination of product are uncleaned hands of manufacturers, poor quality of water used to clean earthen pots and exposure of the product to open air during setting of curd. The findings of this experiment partially support the findings of Islam (1999) and Alam (1999). Islam (1999) reported that Coliform count per ml. of laboratory made dahi was (144.02 to 400.66), log value (2.64 ± 2.05).



Fig: Weighing of agar powder



Fig: Mixing with distill water



Fig: Taking agar in screw capped bottle.



Fig: Autoclaving



Fig: SPC agar



Fig: VRB agar

Fig 1: Preparation of agar media



Fig: Taking inoculum of dahi sample



Fig: dilution blank



Fig: Taking diluted sample into petridish



Fig: Pouring of agar



Fig: waiting for solidification of agar



Fig: Incubation



Fig: Counting of TVC by colony counter

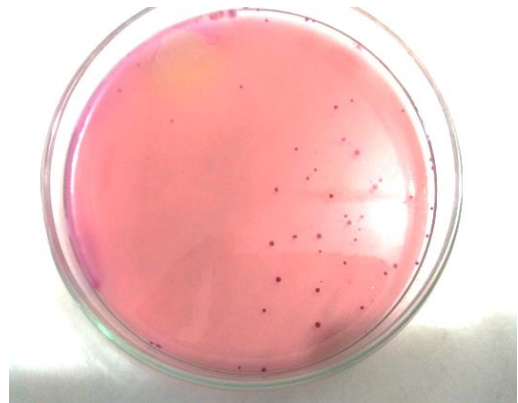


Fig: Coliform growth in VBR agar

Figure 2: Microbial analysis of dahi



Fig: Weighing of dahi



Fig: Diluting sample by adding distill water



Fig: Adding phenolphthalein indicator



Fig: Titration of dahi sample

Fig 3: Determination of acidity percentage of dahi

Limitations

Small sample size and short time period was the most significant limitations in this study. Few test were done only to evaluate the dahi sample.

Conclusion

Dahi available in Chittagong city is not maintained the proper quality. Products might be contaminated by poor quality milk, contaminated water and utensils; adulteration and high temperature during storage period. 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, chemical and microbiological quality. Also, Government should take proper step by the help of BSTI to increase the quality of dahi all over the Bangladesh.

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REFERENCES

1. Aggarwala, A.C. and Sharma, R.M., 1961. A laboratory manual of milk inspection printed in India by ZT Bandkwala at leaders press private limited, Bombay and Published by P: S. Jayusingue.
2. Akter, N., Nahar, A., Islam, M.N. and Al-Amin, M., 2010. Effects of different level of starter culture and sugar on manufacturing characteristics of Misti Dahi (Sweet Yoghurt). *J. Bangladesh Agril. Univ*, 8(2), pp.245-252.
3. Alam, K., 1999. Quality evaluation of dahi made from cow, goat and buffalo milk (Doctoral dissertation, MS Thesis, Department of Dairy Science, Bangladesh Agricultural University, Mymensingh).
4. Aneja, R.P., Mathur, B.N., Chandan, R.C. and Banerjee, A.K., 2002. Technology of indian milk products: handbook on process technology modernization for professionals, entrepreneurs and scientists. Dairy India Yearbook.
5. Ara, A., Uddin, J.M., Saha, S., Khan, M.H. and Baset, M.A., 2015. Intervention of fruit juice in yoghurt reparation. *J. Sci. Techno*, 11, pp.30-35.
6. Chakrabarty, M., 1998. A study on the preparation of dahi from whole milk of cow, buffalo and their different proportionate mixtures (Doctoral dissertation, MS Thesis, Department of Dairy Science, Bangladesh Agricultural University, Mymensingh).
7. Dewan, S. and Tamang, J.P., 2007. Dominant lactic acid bacteria and their technological properties isolated from the Himalayan ethnic fermented milk products. *Antonie van Leeuwenhoek*, 92(3), pp.343-352.
8. Dey, S., Iqbal, A., Ara, A. and Rashid, M.H., 2011. Evaluation of the quality of Dahi available in Sylhet Metropolitan City. *J. Bangladesh Agril. Univ*, 9(1), pp.79-83.
9. Drake, M.A., Chen, X.Q., Tamarapu, S. and Leenanon, B., 2000. Soy protein fortification affects sensory, chemical, and microbiological properties of dairy yogurts. *Journal of Food Science*, 65(7), pp.1244-1247.
10. Fox, P.F., 2001. Milk proteins as food ingredients. *International Journal of Dairy Technology*, 54(2), pp.41-55.
11. Harun-ur-Rashid, M. and Miyamoto, T., 2005. Quality evaluation of traditional fermented milk" Dahi" in Bangladesh. *Milk Science (Japan)*.
12. Islam, M.D.S., 1999. A comparative study on the quality of Laboratory prepared and Local Village Market Dahi. A MS Thesis, Dept. of Dairy Science, Bangladesh Agricultural University, Mymensingh
13. Islam, M., Fakir, M.A.H., Rahman, M.A. and Choudhury, K.A., 2017. Comparative assessment of Dahi (yogurt) collected from different areas of

- Bangladesh. *International Journal of Natural and Social Sciences*, 4(3), pp.17-25.
14. Joseph, A.O. and Olugbuyiro, E., 2011. Physico-chemical and sensory evaluation of market yogurt in Nigeria Pakistan. *Journal of Nutrition*, 10, pp.914-918.
 15. Mann, G.V. and Spoerry, A., 1974. Studies of a surfactant and cholesteremia in the Maasai. *The American Journal of Clinical Nutrition*, 27(5), pp.464-469.
 16. MANGASHETTI, L., Balasubramanyam, B.V., JAYARAJ RAO, K., GHOSH, B.C. and Kulkarni, S., 2003. Suitability of concentrated milk for dahi preparation. *Indian journal of dairy science*, 56(6), pp.359-362.
 17. Meydani, S.N. and Ha, W.K., 2000. Immunologic effects of yogurt-. *The American journal of clinical nutrition*, 71(4), pp.861-872.
 18. Mustafa, M.M.H., 1997. A study on the preparation of fruit dahi (yoghurt). Dept. of Dairy Set (Doctoral dissertation, MS Thesis, Bangladesh Agricultural University, Mymensingh).
 19. Pette, J.W. and Lolkema, H., 1951. Yoghurt IV: factors influencing the proportion of streptococci and lactobacilli in a yoghurt culture. *Netherlands Milk Dairy J.*, 4, p.14.
 20. Rangappa, K.S. and Achaya, K.T., 1974. *Indian dairy products*. Asia Publishing House.
 21. Shahani, K.M. and Chandan, R.C., 1979. Nutritional and Healthful Aspects of Cultured and Culture-Containing Dairy Foods¹. *Journal of Dairy Science*, 62(10), pp.1685-1694.
 22. Shaker, R.R., Abu-Jdayil, B., Jumah, R.Y. and Ibrahim, S.A., 2001. Rheological properties of set yogurt during gelation process: II. Impact of incubation temperature. *Milchwissenschaft*, 56(11), pp.622-625.
 23. Shukla, F.C., Jain, S.C. and Sandhu, K.S., 1986. Effect of stabilizers and additives on the diacetyl and volatile fatty acids contents of yoghurt. *Indian journal of dairy science*.
 24. Sinha, PR, 2000. Importance of good quality dahi in food. *Indian Dairyman* , 52 , pp. 45-47.
 25. Younus, S., Masud, T. and Aziz, T., 2002. Quality evaluation of market yoghurt/dahi. *Pakistan Journal of Nutrition*, 1(5), pp.226-230.

BIOGRAPHY

I am Salma Chowdhury, daughter of Shahjahan Chowdhury and Monoara Begum. I passed Secondary School Certificate examination in 2009 followed by Higher Secondary Certificate examination in 2011. Now I am an intern doctor under the Faculty of Veterinary Medicine in Chittagong Veterinary and Animal Sciences University. In future, I want to develop myself as a veterinary surgeon. I have immense interest to work in the field of Large and Small Animal Medicine.

Salma Chowdhury

Intern Doctor

Faculty of veterinary Medicine

Chittagong Veterinary and Animal Sciences University, Chittagong.

E-mail: salmacvasu94@gmail.com.