

INTERNSHIP REPORT

Joyita Das Jui

Department of Nutrition and Food Engineering

Daffodil International University



Daffodil
International
University

**An Internship Report On
Production and Quality Control Assurance of Dhaka
Dairy Plant (Milkvita)**

Submitted by

Joyita Das Jui

ID: 171-34-632

Department of Nutrition & Food Engineering
Daffodil International University.

Submitted to

Dr. Sheikh Mahatabuddin

Head

Department of Nutrition & Food Engineering
Daffodil International University.

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LETTER OF TRANSMITTAL

Date: 05.08.2021

To
Dr. Sheikh Mahatabuddin,
Head
Department of Nutrition and Food Engineering (NFE)
Daffodil International University

Subject: Submission of an internship report on Production and Quality Control Assurance of Dhaka Dairy Plant (Milk vita).

Dear Sir,

It is a great pleasure and honor for me to have the opportunity to submit Internship report on Production and Quality Control of food industry as a part of the Nutrition & Food Engineering (NFE) program curriculum.

I have prepared this report based on the gained knowledge during my internship period at DHAKA DAIRY PLANT (MILKVITA). It is great achievement to work under your active supervision. This report is based the Production & Quality control of Milk vita. I have got the opportunity to work at DHAKA DAIRY PLANT (MILKVITA) for 60 days, under the supervision of Dr. Khandaker Md. Aminul Islam, AGM, Dhaka Dairy Plant (Milk vita).

First of all, I have obtained knowledge about the organizational culture of a leading consumer product producing organization of the country. Secondly, the project gave me the scope to develop a network with the corporate environment.

I therefore, would like to place this report to your judgment and suggestion. Your kind advice will encourage me to perform better planning in future.

Sincerely Yours,

Joyita Das Jui

ID: 171-34-632

Department of Nutrition and Food Engineering
Daffodil International University.

CERTIFICATE OF APPROVAL

We are pleased to certify that the internship report on **Production and Quality Control Assurance of Dhaka Dairy Plant (Milk vita)** driven by **Joyita Das Jui** bearing ID **171-34-632** of the department of Nutrition and Food Engineering has been approved for presentation and defense/viva-voice.

We are pleased to hereby certify that the data and finding presented in the report are the sterling work of Joyita Das Jui. We recommended the report presented by Joyita Das Jui for further academic recommendations and defense/viva voce. Joyita Das Jui bears a strong moral character and a very pleasant personality. It has indeed a great pleasure working with her. We wish her all success in life.



.....
Dr. Sheikh Mahatabuddin

Head

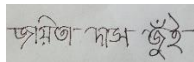
Department of Nutrition & Food Engineering

Faculty of Allied Health Science

Daffodil International University.

DECLARATION

This Treatise entitled “**Production and Quality Control Assurance of Dhaka Dairy Plant (Milk vita)**” is being submitted to the Department of Nutrition and Food Engineering, Faculty of Allied Health Sciences, Daffodil International University, Dhaka-1207, Bangladesh as a part of partial fullness of the requirements for the degree of Bachelor of Science in Nutrition of Food Engineering. No part of this work referred to in the Thesis has been submitted in support of an application for another degree or qualification of this or any other University or other Institute of learning.



.....
Submitted by

Joyita Das Jui

ID: 171-34-632

Department of Nutrition & food Engineering

Daffodil International University



.....
Supervised by:

Prof. Dr. Md. Bellal Hossain

Associate Dean and Professor

Faculty of Allied Health Science

Daffodil International University

Dhaka-1207, Bangladesh.

ACKNOWLEDGEMENT

In the preparation of this report, I would like to acknowledge the encouragement and assistance give to me by a number of people. At first, I would like to express my gratitude to my creator for enabling me the strength and opportunity to complete the report in time successfully. I am obliged to each and every people who are involved with me in every phase of my life.

I am thankful to my parents without whom I cannot be here. Without the support of my parents, I could not be able to achieve my objectives and goals.

My Deep gratitude and sincere thanks to the honorable Dean, Faculty of Allied Health Science, **Professor Dr. Ahmed Ismail Mustafa** for his kind cooperation and to accept this Degree.

I am deeply indebted to my supervisor **Prof. Dr. Md Bellal Hossain**, Associate Dean of Faculty of Allied Health Science, Daffodil International University for give such an opportunity to gain practical knowledge.

I would like to disclose my impassioned thanks to **NFE Faculty members** for their unnumbered inspiration and encouragement during the student life.

I also thankful to **Shahriar Ferdhous Bhuyan**, Senior Officer, Quality Control, Dhaka Dairy Plant (Milk-vita) and **Md. Abdur Rahman**, Senior Officer, Quality Control, Dhaka Dairy Plant (milk-vita) for their cooperation during my internship program at Milk-Vita.

Finally, I wish to express immense gratitude & humbly convey my heart-felt respect to **Dr. Khondokar Md. Aminul Islam**, Additional General Manager of Dhaka Dairy Plant (Milk-vita) for his permission to carry out this internship in his organization.

EXECUTIVE SUMMARY

Bangladesh Milk Producer's Co- Operative Union Limited (BMPCUL) trade name is known as Milk-Vita. It is the leading Government Organization for milk and milk products in Bangladesh. I have prepared this report from my two months internship experience at BMPCUL. This internship program has helped me to learn a lot of valuable information about milk and dairy products.

I have compiled this report based on my perception and experiences gathered from the company. This company has many departments but I got the opportunity to work in production and quality control room department. This report mentions about both raw and processed milk and qualities and processing knowledge.

Bangladesh Milk Producer's Co- Operative Union Limited and Bangladesh Government are works together for this company. They ensure good quality products for the consumers. And they promise to give adulterated free products and quality products to the customers. Their general objective is to carry the input of farmers at low cost and reduce the income gap between rich and poor. Customer's demand is very important to Bangladesh Milk Producer's Co- operative Union Limited.

My report is categorized based on quality control and dairy production of BMPCUL. First part of the report contains letter approval and executive summary. Second part of the report contains information of the company itself. Third part of the report contains product manufacturing process. Four part of the report contains quality parameters and raw milk test. Five part of the report contains result and discussion. And the last part of the report contains conclusion.

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Chapter

Two

About Milk Vita

- Introduction
- History
- Objective of the company
- Products List

Introduction

Bangladesh Milk producers Co – employable Union Limited (BMPCUL) which is known as Milk vita is a primary government relationship for milk and milk things provider in Bangladesh. Milk vita has 70 percent market share of liquid milk in Bangladesh. Milk is an important component of human diet. Children must have it for growth and health. Adults require it for health and invalids as well as old people must have it to prolong their longevity. At present there are many milk manufacturing companies in Bangladesh. Bangladesh Milk Producers Co- operative Union Limited (BMPCUL) or Milk vita is one of them. Their main objective is to improve the socio – economic status of small, marginal, landless dairy farmers in Bangladesh through production, processing, and marketing of milk and dairy products. In addition, milk and dairy products are hygienically tested in the laboratory before marketing. So, that they can give good quality product service to customer. Milk vita always serve adulterated free products compared to others. Their main motivation is purchaser fulfillment. They don't search for more advantages like others.



History

In 1946, Late M. Mukhlesur Rahman Pioneer of dairying in Bangladesh a dairy plant was established at Lahirimohanpur, Pabna (Presently Sirajganj) their target was to send milk or dairy product to Calcutta (India) as rail communication with it was easy. After separation in 1952, the dairy company bought the Eastern milk products limited, a private company from the original owner. The first Milk Producer's Co- operative Union was formed in 1965 under the name of Eastern Milk producer's Co- operative Union Limited (EMPCUL). Since then, the dairy plant has been operating under the name of Eastern Milk Producers Co- operative Union Limited (EMPCUL).

But the Bangladesh government took it under its controls in 1973. The government of Bangladesh changed the name of the company after taking it under their supervision. Then in 1977 Milk vita was given as the brand name of the company.

Bangladesh Milk Producer's Co- operative Union Limited (EMPCUL) set up their plants in different places such as Tekerhat, Baghabarighat, Mirpur- 7. And gradually increase the number of their plants. Very soon Bangladesh Milk Producer's Co- operative Union will start supplying raw milk to the whole world.

Their main office is located in Tejgaon industrial area of Dhaka which is called Dugdha Bhaban. At present they are number one in the dairy industry of Bangladesh for their quality.

Objective of the company

The milk Union will have the following objectives to improve the socio-economic status of small, marginal and landless dairy farmers in Bangladesh through the processing and marketing of milk and dairy products

- ☐ To arrange for the supply and sale of liquid milk by purchasing it from the primary societies or other institutions and processing it in the factories of the milk union so that the interests of the member societies are not harmed.
- ☐ Encourage dairy farmers to produce green grass, other agricultural products, vegetables and fruits.
- ☐ Establishment and management of artificial insemination sub-centers for the development of cattle breeds as well as purchase, sale and distribution of cattle for primary members.
- ☐ Providing good quality products for consumers



Products List

Pasteurized Liquid Milk

Skimmed Milk Powder

Full Cream Milk Powder

Chocolate Flavored Milk

Ghee

Butter

Labang

Matha

Rosomalai

Pera Sandesh

Sweet Yogurt

Sour Yogurt

Toned Milk

Chapter

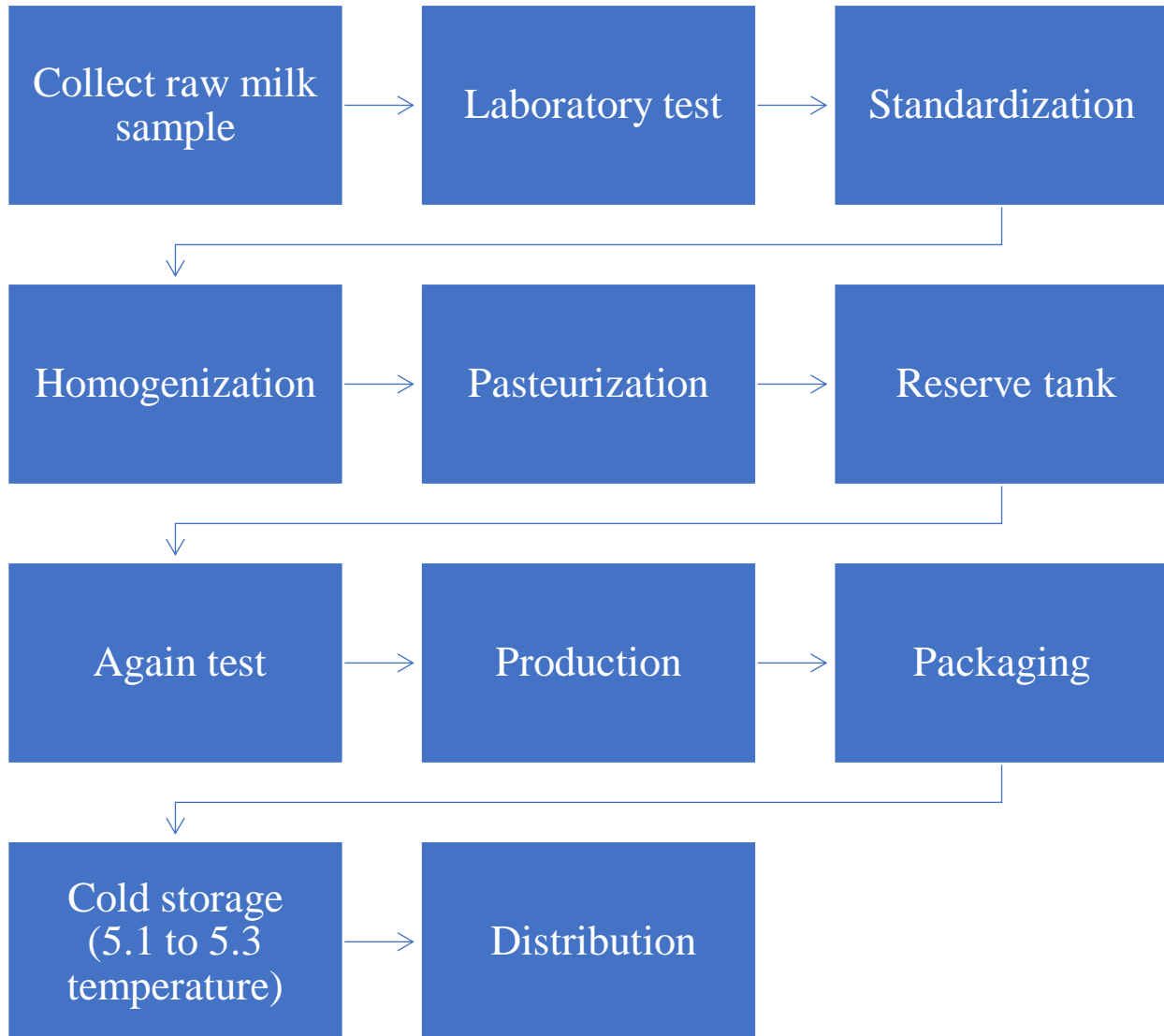
Three

Product Manufacturing Process

- Milk Pasteurization
- Chocolate Flavored Milk
- Labang
- Matha
- Sweet Yogurt
- Sour Yogurt

Milk Pasteurization

Flow chart of Milk Pasteurization Process



Processing step:

- a. Firstly, raw milk is collected and kept in a reserve tank at 4°C.
- b. Then some of the milk is tested. The standardization process begins with the fat percentage in the test.
- c. Skim milk or full cream milk powder is mixed with the milk in the reserve tank to keep the fat percentage (3.5%) as per the BSTI standard.
- d. If the fat percentage is high in raw milk add skim milk to balance. And if the fat percentage is less in raw milk add full cream milk powder to balance.
- e. The combined milk is homogenized through the homogenizer.
- f. After homogenization the milk goes into the pasteurizer tank. Pasteurized at 80 -- 85°C for 15 sec.
- g. The pasteurization milk is cooled at 4°C. And cooled milk is stored in four storage vat.
- h. After that, cooled milk is taken from storage for packaging. Packaging is done in different quantities such as 250 ml, 500ml, 1 liter etc.
- i. If they somehow get pasteurize milk defective, they throw it away. The pasteurization process starts anew.
- j. Proper pasteurized packaged milk is stored at 0 to 4°C.



Fig: Milk Pasteurize

Chocolate Flavored Milk

Ingredient:

- Full cream milk powder
- Skim milk powder
- Sugar
- Coco-powder
- Color
- Stabilizer
- Water

Processing steps:

- a. Hot water around 60°C and all ingredients are given in mixing vat.
- b. All the materials are full cream milk powder, skim milk powder, sugar, chocolate flavor, cocoa-powder, color and some water are provided. All ingredients are blended together in vat mixing at 80°C.
- c. Then all mixing things are given in homogenizer.
- d. After that, the mixing is given for pasteurized at 81°C for 15 secs and then chilled water is given to cool it. It helps to destroy any bacteria in the mixture.
- e. Transfer to storage vat. Then go to the packaging machine from there.
- f. Ready for distribution after packaging is finished.



Fig: Chocolate Flavored Milk

Labang

Ingredients:

- Sour yogurt
- Sugar
- Salt
- Treated water
- Xyanthen Gum



Procedure:

- a. Firstly, they collect yogurt from yogurt section.
- b. All the ingredients are given in the mixing machine e.g., sour yogurt, sugar, salt and water and the mixing process begins.
- c. Then xyanthen gum is given in the mixer. (Xyanthen gum acts as a thickening agent)
- d. All the ingredients are mixed together in the mixing machine for about an hour. After mixing Labang is ready.
- e. Labang is then filled into smaller and large bottles according to 250ml and 500ml.
- f. After filling the bottles, it is well sealed and labeled.
- g. Then the bottles are kept in the box. Then they are taken to the cold storage room.
- h. Then the boxes kept in the storage room are sent for distribution.

Matha

Ingredients:

- Sour yogurt
- Water
- Sugar
- Bit salt
- Salt
- Xyanthen Gum



Processing steps:

- Firstly, the sour yogurt is collected and given to the mixer machine.
- Other ingredients are given in the mixing machine such as sugar, water, salt, bit salt, and xyanthen gum.
- After all the ingredients are given the mixture is mixed in the machine for about an hour.
- At the end of packaging, Matha is made, then prepare for packaging.
- After filling the matha bottle, the bottle is well sealed and labeled.
- The sealed bottles are taken to the freezing room for storage.
- It is taken out of the storage room before distribution and places in cartoons or boxes and wrap.
- At the end of wrapping is given for distribution.

Sweet Yogurt

Ingredients:

- Milk
- Sugar
- Culture

Processing steps:

- To make yogurt, first take the milk in a clean container.
- Then the milk continues to boil at a boiling temperature until the weight has been reduced by 40%.
- Then add 15% sugar to the milk and mix well
- The mixture is heated at 80°C.
- After heating, the container of mixture is removed from the heat and cooled.
- The mixer is cooled to 40% temperature. And culture is added to the mixture when it is almost cold.
- The mixture is poured into the pot according to the size the pot.
- Then the pot is kept in the fermented room for 6 hours to make curd.
- When the yogurt is formed, it is brought to the store room at a temperature at 4°C.
- After that, yogurt pots are well sealed and leveled.
- And is distributed



Fig: Sweet yogurt

Sour Yogurt

Ingredients:

- Whole milk
- Skim milk
- Culture

Processing steps:

- a. First take the milk in a clean container to make sour yogurt.
- b. Add skim milk to that container and boil at boiling temperature.
- c. The mixture is then cooled to a temperature at 40°C
- d. After that, culture is mixed in the mixture.
- e. The mixture is poured into the yogurt pot one by one, and kept in fermented room for 6 hours to form yogurt.
- f. When the sour yogurt is formed, it is brought to a temperature of 4°C and well-sealed and leveled.
- g. And is distributed through distributors.



Fig: Sour yogurt

Chapter

Four

Quality Control and Chemical, Microbial Test

- Alcohol Test
- Fat Test
- CLR Test
- COB Test
- C.I.P Test

Alcohol Test

- It also known as rapid alcohol test or platform test. This test is done with 68% ethanol. This test is done to understand the acidity in milk. The test is usually done by maintaining that ratio 1:1. Milk vita does not do that but maintains their own ratio of 2:1 Ethanol: Milk.

Apparatus:

- Test tube
- Pipette

Reagents:

- Ethanol

Procedure:

- First 2 ml of 68% ethanol and a little water are taken in a test tube through a pipette.
- The 1 ml milk is added to the test tube and the test tube is shaken for a while.
- Then see what happen to coagulation.
- If the milk is coagulated, then there is alcohol in the milk.
- If the milk is not coagulated, then there is no alcohol in the milk.

Fat Test

- The price of milk in the industry is determined by the amount of fat. So, in Milk vita they determine the price of milk by looking at the fat percentage in milk through fat test.

Apparatus:

- Centrifuge machine
- Butyrometer
- Pipette

Reagents:

- 85% Sulfuric acid
- 100% Amyl Alcohol

Procedure:

- First take 10 ml of sulfuric acid in the Butyrometer.
- After that, 10.75 ml sample milk is added into it and is given with 1 ml of Amyl Alcohol.
- A little water is also added to make the mixture well.
- Then stir the mixture for a while.
- After shaken the butyrometer, it is given to the centrifuge machine for 5 min at 60°C with 1120 RPM.
- Carefully use the centrifuge machine in time.

CLR Test

CLR means Corrected Lactometer Reading. It is known as specific gravity test or density test. Point 2 is taken for each mark in the lactometer. If the temperature is below 20°C, 0.2 is minus for every 1° C from lactometer reading. Similarly, if the temperature is more than 20° C, 0.2 is add for every 1° C with the lactometer reading. This test is usually done to acknowledge the density of milk. Generally specific gravity range of milk is between 1.026 to 1.028. But in Milk vita, the density value of milk works at 1.028.

Equipment and Apparatus:

- Lactometer jar
- Lactometer with Thermometer

Procedure:

- First take a clean lactometer and jar.
- Then takes the sample milk in the jar and puts the lactometer in it.
- After a while the lactometer reading and temperature are noticed for calculation.



Fig: Lactometer reading

COB Test

- COB means Clot on Boiling.

Apparatus:

- Test Tube
- Bunsen burner

Procedure:

- Firstly, take a clean test tube and takes sample milk in a test tube.
- Then puts this test tube into the Bunsen burner.
- Heat the test tube for 3-4 minutes. Then the test tube is removed from the heat.
- Then the precipitation condition is observed.

C.I.P Test

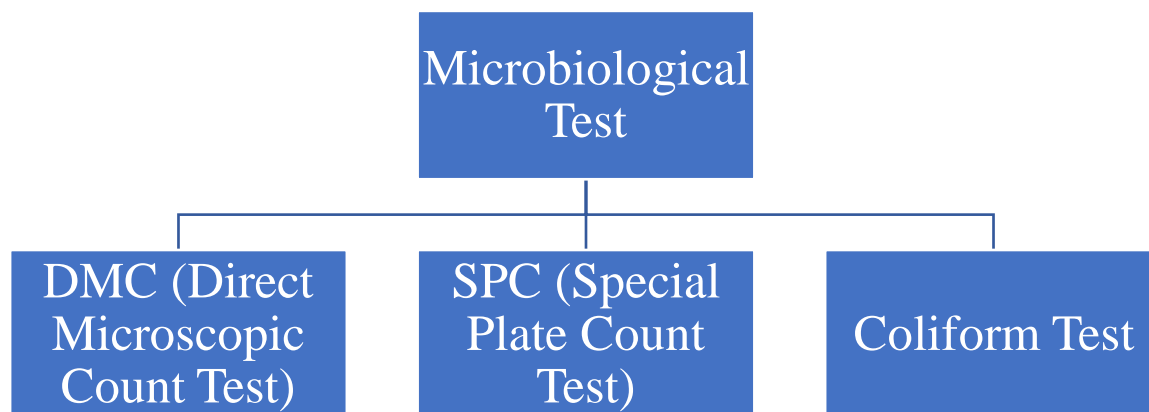
- CIP means cleaning in place. This is done because no pesticides or anything else can cause contamination. And **Costic Soda** is used as chemical for C.I.P.

Procedure:

- After the production is over, the pipe/ tanker/ vat is first cleaned with cold water for 10 minutes.
- Then again, all the pipe / tanker/ vat is cleaned with hot water for 10 minutes.
- For C.I.P, 0.5 to 2% amount of Costic Soda (Sodium Hydroxide) is mixed with water and cleaned again for 15 minutes.
- Then hot water is used again for 10 min to wash the Costic soda from the tanker/ pipe/ vat.
- Finally, a sample of C.I.P water is taken from tanker/ pipe/ vat for testing.
- Phenolphthalein is used as an indicator for water in the C.I.P test.
- If the water color is pink in the test, then the C.I.P test is positive.
- If the water color is no color in the test, then the C.I.P test is negative.

Microbiological Test

It is very important to do a microbiological test, because milk contains several types of bacteria. Both living and dead bacteria can be counted through this test. One of the most common bacteria is that E. Coli. If there is too much E. Coli bacterial count in milk, then eating it can cause dysentery. So, care must be taken so that the bacterial count of E. Coli does not exceed 10 CFU. And if the E. Coli bacterial count is high, then it must be understood that the production has been done in an unhealthy way. So, it is necessary to know both living and dead bacterial count through microbiological test. Microbiological test are 3 types –



Chapter

Five

Result & Discussion

- Alcohol Test
- Fat Test
- CLR Test
- COB Test
- C.I.P Test
- Microbiological Test

Alcohol Test:

Coagulation of Milk it means = Alcohol Positive (+)

No Coagulation of Milk it means = Alcohol Negative (-)

But most of the time in the alcohol test at Milk vita, the alcohol test comes out Negative. And if the alcohol test is positive, then all the milk is discarded.

Fat Test:

The standard value set by BSTI is 3.5%. But sometimes the value is 3.2 to 4% because there is a difference between each animal so each value comes. If less than 2% fat is found in the milk, then that milk is rejected. In Milk vita works with a standard fat value of 3.5%.

CLR Test or Specific gravity test:

Calculation:

$$\begin{aligned}\text{CLR} &= \text{LR} \pm 0.2 \text{ (per } ^\circ\text{c)} \\ &= 27.8 + 0.2 \\ &= 28\end{aligned}$$

$$\begin{aligned}\text{Specific Gravity} &= 1 + \frac{\text{CLR}}{1000} \\ &= 1.028\end{aligned}$$

Here,

Temperature = 21°c

LR = 27.8

CLR = ?

In Milk vita, tested milk's CLR was 1.028 it means there was no water added. Milk vita always works with standard value CLR or Specific gravity 1.028 according to BSTI. Occasionally values vary from animal to animal.

COB test:

If there is precipitation in the milk in the test, then the milk is not acceptable for other processing.

If there is no precipitation in the milk in the test, then the milk is acceptable for other processing.

Milk vita does not have precipitation in milk most of the time in COB test.

CIP test:

Pink color it's means = CIP Positive (+)

No color it's means = CIP Negative (-)

Most of the time in Milk vita, the CIP test is negative. Except for 1 or 2 times.

Chapter

Six

Marketing Section & Conclusion

- Delivery System
- Collection System
- Collection Point
- Conclusion

Delivery System

Main office Tejgaon Dugdha Bhaban. All marketing work is done in Dhaka dairy plant. There are two managing managers in the marketing sector. They have two managers under them. One manager is in charge of Dhaka south city. Another manager is in charge of Dhaka North city. Milk is delivered all over Bangladesh. Demand is given by 6 pm. That demand is given to the factory. Then production is beginning. Those products are delivered at 2 am. And they are supplied to every zone between 6-6:30 am. There are supervisors in each zone, they receive all the products. Then zone supervisor supplies the products to the dweller. And if there is any problem, report it. Dweller delivers to all retailer, shoppers, again the zone supervisors go to the retail shoppers. They listen to the shoppers and make a list of whether the product is damaged or not or any other problems. Zone supervisors make a report of everything. That is given to the zone control officers. The zone supervisors keep an account of money and they give it to the account sector and they match it with their account.

Collection System

Established under the co-operative fold, the organization, popularly known as Milk vita, makes necessary efforts to fulfill the demand for milk and milk products of city dwellers by collecting milk from remote places of the country. Presently, Milk vita operates in six milk shed areas of the country via Tangail, Manikganj, Baghabarighat, Sreenagar, Rangpur and Tekerhat. It collects milk through networks established by its primary co-operative societies. BMPCUL is the central union of a total of 345 primary milk producer's co-operative societies and has a membership of about 40000 milk – producing farmer members. To become a member of a rural primary society farmers, have to own a milking cow and have to buy a share of TK 10.00 and pay 1.00 as admission fee. To maintain membership, a farmer has to supply at least 150 liters of milk year. Members supply milk to societies twice a day on cash payment with a preferential system of weekly basis matched on the market day of each area. The rate of the farmer's milk is decided on the basis of fat and solid non-fat (SNF) percentage. Milk collected from cooperative societies is transported to the nearest plant for preliminary processing.

Collection Point

Milk collected from Manikganj, Tangail, Sreenagar and Tekerhat areas is brought to Dhaka for the production of liquid milk, ice-cream, flavored milk, and sweet yogurt. Milk collected from Rangpur and Baghabarighat areas is processed at Bagabarighat dairy plant for powder milk, Ghee and Butter production. All products of the organization are marketed under the trade name of “Milk vita”

Conclusion

Through this internship program, I have learned a lot about the quality and production of milk and dairy products by hand. There is a lot to learn outside of books, I learned this by going to milk vita through this internship program. From the beginning raw milk collection to every production step and every test of quality and the end of CIP, I have observed everything myself. Through this internship, I have learned about the production of dairy products such as pasteurized milk, chocolate flavored milk, labang, matha, ice- cream, yogurt etc. And also, I have learned how to work while maintaining the quality of the product. They always try to give good service to the customers while maintaining the quality of the product. Milk vita conducts various type of physical, chemical, adulteration and microbiological tests to ensure the quality of the products such as Organoleptic test, Alcohol test, CLR test, Fat test, COB test, CIP test etc. Milk vita maintains hygiene and completes all tests in its own lab. Other processing is started or distributed after the milk and dairy products pass the lab tests. Testing is done routinely every day.

Last but not least, The Milk vita manager and every supervisor, the staff has treated me very nicely. They have helped a lot to know and learn from production to marketing. I am very happy to be able to do an internship at Milk vita. I hope the experience I have gained from Milk vita will be very helpful for my future career.

At the last line again, I would like to thanks the authority of the Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) for giving me the opportunity to do an internship.