



An Internship Report

On

**QUALITY CONTROL & PRODUCTION OF DAIRY PRODUCTS**

At

Dhaka Dairy Plant (Milk-vita)

**Submitted To:**

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**Date of Submission: 20 December, 2018**

## Letter of Transmittal

Date: 20/ 12 /2018

Professor Dr. Md. Bellal Hossain  
Head  
Department of Nutrition & Food Engineering  
Daffodil International University.

**Subject:** Submission of an internship report on Quality Control & Production of Dairy Products.

Dear Sir,

I the student of Department of Nutrition and Food Engineering, Daffodil International University have successfully completed our internship report. I am submitting my internship report on “**MILK VITA.**” as part of the credit requirement for B. Sc. Degree to be awarded by Daffodil International University. It is a great pleasure and honor for me to have the opportunity to submit Internship report on **Quality Control & Production of Dairy Products** as a part of the B.Sc in Nutrition & Food Engineering (NFE) program curriculum.

I, therefore, request and expect that, you will appreciate us with any sort of recommendation & valued suggestion & will cordially receive this report for your kind assessment.

Sincerely Yours,

Nafisa Tamanna

ID: 151-34-343

Department of Nutrition and Food Engineering

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## ACKNOWLEDGEMENT

At first I would like to express our heart-felt thanks to Almighty ALLAH for his kind blessing for complete of the Industrial Training successfully as well as industrial attachment.

I would like to express our deepest appreciation, sincerest gratuity to my respected Teacher **Prof. Dr. Md Bellal Hossain**, Head, Department of Nutrition & Food Engineering, Daffodil International University for his scholastic guidance, constructive criticism, painstaking help constant inspiration and advice from the very beginning till the completion of this work for giving us the opportunity to accomplish the attachment.

Also thanks to our **Supervisor Teacher Ms Najia Kamrul**, Lecturer, Department of Nutrition & Food Engineering, Daffodil International University without his help it would not have been possible to complete the training report successfully and valuable guidance, suggestion, encouragement and constructive criticism throughout the Industrial training.

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

I would also like to give thanks to my seniors, juniors and my classmates and colleagues of Dhaka dairy plant for their help, advice, and suggestions, inspiration and support.

It's a great pleasure to express our satisfaction to The **Milk Vita** Authority for their sincere and cordial co-operation and we are very much indebted to **Rehena Rahman**, Deputy General Manager (Quality control) of Dhaka Dairy Plant (Milk-Vita) for his permission to carry out this internship in his organization.

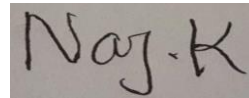
Special thanks to **Shahariar Fardous Bhuyan, Senior Officer, (Quality Control)** and **Md. Abdur Rahaman, Senior Officer, (Quality Control) in Dhaka Dairy Plant**. Our training would never been completed without there convenient helps and supports.

The encouragement as a continued source of inspiration provided by our parents is fully appreciated.

## CERTIFICATE OF APPROVAL

I am pleased to certify that the internship report on production & quality control of dairy products conducted by **Nafisa Tamanna**, bearing respectively **ID No: 151-34-343** of the department of Nutrition and Food Engineering has been approved for presentation and defense/viva-voce.

I am pleased to hereby certify that the data and finding presented in the report are the authentic work of **Nafisa Tamanna**. I strongly recommended the report presented by **Nafisa Tamanna** for further academic recommendations and defense/viva-voce. **Nafisa Tamanna** bears a strong moral character and a very pleasant personality. It has indeed a great pleasure working with him. I wish him all success in life.



.....  
**Professor Dr. Md. Bellal Hossain**

Head

Department of Nutrition & Food Engineering

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## **EXECUTIVE SUMMARY**

Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) which is known as Milk-vita is a leading government organization for milk & milk products provider in Bangladesh. This report is prepared on my two-month practical experience at BMPCUL. This Internship program gave me lot of knowledge about milk and milk products practically.

Now-a-days a number of milk producer companies are available in Bangladesh. Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) or Milk-vita is one of them. Their purpose is to serve good products to consumer.

Milk-vita collect milk from local village or market by co-operative union. Before collecting them milk-vita test the quality of milk by their local experts. Then they transport collected milk to their all milk processed plant. But before sending them they chilled their collected milk for ensuring quality of milk.

Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) or Milk-vita serve pure products than any other milk-producer company. Their purpose is to consumer satisfaction.

Bangladesh Government & Bangladesh Milk Producers Co-operative Union Limited works together for this company. It ensure quality products for consumers. It promise to serve pure and quality products to the consumers.

My report is based on quality control and production of dairy products of BMPCUL. The first part of the report contains information of the organization itself. The second part of the report contains the raw milk test and quality parameters. The third part of the report contains production of dairy products. The last part contains the concluding part.



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# CHAPTER-1

## INTRODUCTION

### Introduction

Industrial Internship is an essential part of 4-years B.Sc. in Nutrition and Food Engineering course of **Daffodil International University**. I had the opportunity to perform the Industrial Internship with **Milk Vita**. During 1 months long attachment. It also provides us sufficient practical knowledge about production management, Productivity evaluation, work study, efficiency, industrial management, production planning & control, production cost analysis, inventory management, purchasing, utility & maintenance of machinery and their operation techniques etc. the above mentioned cannot be achieved successfully by means of theoretical knowledge only. This is why it should be accomplished with practical knowledge in which it is based on industrial attachment makes us reliable to be accustomed with the industrial atmosphere & improve courage & inspiration to take self-responsibility.

The industrial attachment is the process which builds understanding skill and attitude of the performer, which improves his knowledge in productivity and services. Industrial attachment help us to be familiar with the technical support of modern machinery.

I have prepared this report as required in completion of my attachment course in regarding guideline given by the college authority which will lead to a strong guideline & milestone for our future carrier.



## 1.1 Definition of Milk

Milk is a lacteal secretion obtained from healthy cows 15 days before and 5 days after calving containing 3.5% fat and not less than 3.5% fat and 8.5% SNF ( solid not Fat).

Milk is an ideal food for all kinds of mammals. Milk comes from mammary glands of mammals. Normally raw milk of cow & goat found in local market but processed milk are found in grocery shop as packaged milk.

It is the primary source of nutrition for young mammals before they are able to digest other foods. Milk is also defined as lacteal secretion free from colostrum. Milk is obtained from healthy cows 5 days after and 15 days before parturition.

## 1.2 Milk Composition

| Name For 100 %       | Amount |
|----------------------|--------|
| Water                | 87.7%  |
| Mineral, Vitamin     | 7%     |
| Lactose Carbohydrate | 4.9%   |
| Fat                  | 3.4%   |
| Protein              | 3.3%   |
| Casein               | 82%    |
| Whey                 | 18%    |
| SNF                  | 8.5%   |

### **1.3 Origin of the Report**

Internship program is an obvious requirement for the student of NFE to complete graduation. Daffodil International University & Department of Nutrition and food Engineering provide Internship opportunity for students in different company and different sectors. Its main purpose is to educate the students with practical experience and real work place. Its gives an opportunity to the students to get closer to job seekers. In this program students get chance to use their theoretical knowledge in real work place.

**The study and internship program have following purposes:**

- To come out from textbooks and learn about real world.
- To know and experience the application of quality control assurance & production of dairy product.
- To be aware of the negative impact on the human body, environment as well as economy.
- To learn about competency and efficiency of real work environment.
- To help students to express dependability, initiative, and professionalism and tasks they are assigned.
- To get closer contact with job seekers.
- To fulfill the requirement of NFE Program.
- To compare the real scenario with the lessons learned in DIU.
- To know about Milk-vita.
- To learn about production and quality control of dairy products.

### **1.4 Vision**

1. Our Mission is to gain self-sufficiency in the dairy sector within 2025.
2. To fulfill the nutritional demand.

3. The activities of milk vita is contributing a bondage between the rural and urban areas by way of marketing the rural products to city dwellers and on the other hand.

## **1.5 Objective of the Study**

Objective of this study is divided into two types.

- General Objective.
- Specific Objective.

### **General Objective:**

- The main objective of this study is to learn production and quality control of milk & milk products.
- To fulfil the Bachelor of Nutrition & Food Engineering degree requirement of Faculty of Allied Health Science of Daffodil International University.

### **Specific Objective:**

More specifically this study contains following aspects:

- To focus on the hygienic production and quality control of Dhaka Dairy Plant (Milk-vita).
- To have an idea of activities Bangladesh Milk Producers Co-operative Union Limited (BMPCUL).
- To know different activities of this organization.
- To give an overview of Bangladesh Milk Producers Co-operative Union Limited (BMPCUL).

## **1.6 Methodology**

### **Sources of Data**

Both primary and secondary data are used to prepare this report. The collection of these two types of data is shown respectively.

### **Collection of Primary Data**

Primary Data are mainly collected from the practical experience and queries from the employees as well as the member of Milk Vita. Thus, the primary data such as information regarding the overview of Milk Vita, interest rates and charges, credit operation performance measurement in lending, credit policies, loan agreement.

- Face to face conversation with the officers
- Face to face conversation with the members
- Disbursements process in center room
- Area Office work

### **Collection of Secondary Data**

Data regarding the credit operation and others of the Milk Vita were collected from secondary sources like:

- Branch activities of practical orientation
- Various publications on Milk Vita
- Annual report of Milk Vita
- Milk vita different Report
- Milk vita Files
- Website

## 1.7 Limitation of the report

- **Time limitation:** To complete the study time was limited by two months. It was really very short time to know about an organization like Milk Vita.
- **Inadequate Data:** The unwillingness of the busy key persons, necessary data collection became hard.
- **Lack of Record:** Large scale research was not possible due to constrains and restrictions posed by the organization. Unavailability of sufficient written documents as required making a comprehensive study. In many cases up to date information was not available.
- **Lack of Experiences:** Lack experiences have acted as constraints in the way of meticulous. exploration of the topic. Being the temporary member of the organization, it is not possible on my part to express some of the sensitive issues.
- **Connectivity with Study:** The study may not give exact result as it is a study of our learning process.
- **Restriction of Collection of Information:** Again for formalities constraints allowance was restricted. That's why information shortage occurred.
- **Political unrest:** The present political condition of our country wasn't so good which creates hindrance on the way of preparing the assignment.

# **CHAPTER-2**

## **ORGANIZATION PROFILE**

## 2.1 Historical Background of the Company

Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) known by its brand name Milk-vita was first introduced when Bangladesh wasn't born. It starts its journey in 1946 at Lahirimohonpur, Pabna (Presently Sirajgong). It was established to send milk products to Calcutta market.

After partition a private company named Eastern milk products Limited purchase this dairy company in 1952 from original owner. In 1965 the first milk producer's co-operative union was formed as named Eastern Milk Producers Co-operative Union Limited (EMPCUL). After that dairy plants were run by Eastern Milk Producers Co-operative Union Limited (EMPCUL).

In 1973 Bangladesh government has taken it under their supervision. The name of the organization was changed when Bangladesh Government became the owner of the company.

In 1977 a brand name of the company was fixed as Milk-vita. Bangladesh Milk Producers Co-operative Union Limited (EMPCUL) established different plants in Baghabarighat (Bogra), Tekerhat (Madaripur) Mirpur-7 (Dhaka).

Earlier Bangladesh Milk Producers Co-operative Union Limited (EMPCUL) has started its journey to supply raw milk countrywide. Then it started to supply different dairy products.

The Head office of this organization named "Dugdha Bhaban" is at Dhaka. At present it is one of the top ranked dairy industry in Bangladesh based on quality.

**2.2 Objective of the Company:** The Milk Vita is one of the big organizations of our economy. So my tried our best to force the role of Milk Vita in the economic development of Bangladesh. My special focus was on the analysis of the Overall Performance of Milk Vita. So I tried to make an analysis view of that state. My additional focus was on the problem of the corporate social responsibility of the company and our objective was to find out the solution of this problem.

- To present an over view Milk Vita.
- To find out the objective of Milk Vita.

- Analyzing the position in milk production of Bangladesh.
- To examine the formation of Milk Vita.
- To identify the service they provide.
- To find out their existing and future programs.
- To identify the problems with their management.
- Evaluate the contribution in overall economic development.

### **2.3 Products and Services**

- Pasteurized milk
- Chocolate milk
- Butter
- Ghee
- Laban
- Sweet Yoghurt
- Sour Yoghurt
- Rosh-malai
- Chocolate Ice-cream
- Vanilla Cup Ice-cream
- Powder milk



# **CHAPTER-3**

## **DESIGN OF THE STUDY**

### **3.1 Study Area**

Study area divided into 2 areas. Such as

1. Laboratory
2. Production

### **3.2 Laboratory**

A laboratory is essential for quality check of different ingredients and final products. It also ensure safety of consumers. It also works for development of any products. Different types of operational test occurred in the laboratory, some of them given below as example-

- Platform test/ Alcohol test
- CLR test
- Fat test
- Organoleptic test

### **3.3 Production**

Production area is that where fresh raw ingredients (milk) are processed for further processing. Production area also divided into different groups, such as-

- Mixing area
- Processing area
- Packaging area
- Storage area

Different Production plant is used for different types of products production. But sometimes same plant can be used for many products.

# **CHAPTER-4**

## **METHODOOGY**

## 4.1 PASTEURIZED MILK

### Procedure:

1. Raw milk is collected from farm and from co-operative union office.
2. Collected raw milk is passed through platform test and others adulteration test.
3. Then passed milk is chilled in a storage vat at 4<sup>0</sup>C.
4. Storage milk is recombined with skim milk or full cream milk for maintaining fat percentage (3.5%) according to BSTI standard.
5. If raw milk have higher fat percentage then skim milk is added to make balance.



**Figure: 4.1** Milk Pasteurizer

8. Pasteurized milk is homogenized by milk homogenizer.
9. Then cooling them at 4<sup>0</sup>C.
10. Then cooled milk is stored in storage vat (4 vat).
11. Then cooled milk is taken in the packaging machine from storage vat.



**Figure: 4.2** Milk Homogenizer source



**Figure: 4.3** Milk Packaging Machine



**Figure: 4.4** Packaged Milk (1Litre Packet)

## 4.2 CHOCOLATE MILK

Chocolate milk is one of the dairy product of milk-vita. It is popular among the children.



**Figure: 4.5** Chocolate Milk

### **Ingredients/Recipe: (For 400kg)**

1. Skim milk powder (SMP)- 12kg
2. Full cream milk powder (FCMP)-30kg
3. Sugar- 33kg
4. Stabilizer- 0.60kg
5. Cocoa powder- 2.80kg
6. Color- 0.032kg
7. Water- 321.568kg

### Procedure:

1. Approximately at 60<sup>0</sup>C hot water is added into the blending/mixing vat.
2. Then sugar, full cream milk powder (FCMP), skim milk powder (SMP), stabilizer, chocolate flavor, cocoa powder, color and finally remaining water are added. At 80<sup>0</sup>C the mixing operation is blended.
3. Through a continuous heating process the mixture is pasteurized.
4. Pasteurized the mixture at 81<sup>0</sup>C for 15 seconds and subsequently cooled by the chilled water which helps to destroy pathogenic bacteria present in the mixture.
5. Later homogenize the mixture
6. Then they transferred into instant storage vat from where chocolate milk is taken into the packaging machine.
7. Then chocolate milk is packaged by foil paper.
8. Milk is packaged in different amounts such as- 250ml, 500ml.
9. Then packaged milk is stored in the storage room at 4<sup>0</sup>C temperature.

### 4.3 ICE-CREAM



**Figure: 4.6** Vanilla cup Ice-cream



**Figure: 4.7** Choc-bar Ice-cream

### Ingredients/Recipe: (For 100kg)

1. Sugar-16%
2. Butter-8%
3. Stabilizer-0.5%
4. FCMP- 13.5%
5. Flavor- 0.21%
6. SMP- 1.1% 7. Water- All the rest

**Procedure:**

1. Approximately at 60<sup>0</sup>C hot water is added into the blending/mixing vat.
2. Then sugar, full cream milk powder (FCMP), skim milk powder (SMP), stabilizer, chocolate flavor, cocoa powder, color and finally remaining water are added. At 80<sup>0</sup>C the mixing operation is blended.
3. Through a continuous heating process the mixture is pasteurized.
4. Pasteurized the mixture at 81<sup>0</sup>C for 15 seconds and subsequently cooled by the chilled water which helps to destroy pathogenic bacteria present in the mixture.
5. Later homogenize the mixture.
6. After the homogenization the mix is cooled down to 4<sup>0</sup>C. This process is known as aging.
7. Aging is done at 5<sup>0</sup>C and for 3 to 24 hours.
8. Then overrun is done. Overrun is defined as increase in volume by adding air.
9. Then fill them in the ice-cream container.
10. Then freezing them in at freezing temperature of -5<sup>0</sup>C.
11. Then ice-cream is kept for hardening for 1 hour at -20<sup>0</sup>C where semi-solid become solid ice-cream at hardening room.
12. After hardening ice-cream is kept in the storage room where temperature maintained -4 to -20.



#### **4.4 LABANG: (YOGHURT DRINK)**

Milk-vita provide 80% yoghurt in their Labang.

##### **Ingredients:**

1. Yoghurt
2. Salt
3. Stabilizer
4. Sugar

##### **Ingredients for 154.518 liter**

1. Sour yogurt/Sour curd-128.232 kg
2. Sugar-10% (12.823 Kg)
3. Salt-0.7% (0.897)
4. Treated Water-17% (21.799 kg)
5. Propagated Culture-2%
6. Xyanthen Gum-0.03%

##### **Procedure:**

1. For making Labang, at first yoghurt is poured into the mixer machine.
2. Then Bit salt and sugar are added into the yoghurt.
3. Then stabilizer is used in the mixer.
4. After Adding the stabilizer in the mixer operator started the mixer machine and mixed it properly for an hour with heat.
5. Well mixed mixer is ready to pour as Labang into the packaging bottle or jar.
6. Poured bottles are sealed and labeled them nicely.
7. After labelling bottles are stored in the freezing room for 24hours.

8. Then bottles are taken outside and make them dry.
9. Finally wrapping them in a cartoon or box.
10. Then stored them in the storage room.

#### **Benefits of Laban:**

1. Good for digestion
2. It also increase palatability.

### **4.5 SWEET YOGHURT**

#### **Ingredients/Recipe:**

1. Milk
2. Sugar
3. Culture

#### **Procedure:**

1. For sweet yoghurt at first milk is taken in a clean vessels
2. Milk is then boiled at boiling temperature until 40% is reduced by weight.
3. 15% sugar is added in it
4. The mixer is heated at 80<sup>0</sup>C.
5. Then heat is removed from the mixer and cooled it until 40<sup>0</sup>C temperature is present.
6. When mixer became cooled starter culture was added in it.
7. Then it was kept for 6hours to form curd.
8. When curd is formed it stored at 4<sup>0</sup>C temperature.
9. For curd formed mixer poured into the plastic container.
10. Then level the container and put them into the box.

10. Then stored them in the storage room at 4<sup>0</sup>C.

## 4.6 SOUR YOGHURT

It one of the dairy products of milk-vita. Sour yoghurt is used for cooking purposes especially for cooking roast.



**Figure:** Sour Yoghurt

### **Ingredients/Recipe:**

1. Whole milk
2. Skim milk
3. Culture

### **Procedure:**

1. For sour yoghurt at first milk is taken in a clean vessels.
2. Then skim milk is added into it.
3. Then the mixer is boiled at boiling temperature.
4. Then cool as soon as possible temperature should maintain between 40 to 45<sup>0</sup>C.
5. After that starter culture was added into it.
6. 4 hours is necessary to coagulate the mixer.
7. Before coagulation mixer is poured in plastic container of different sizes.
8. After coagulation sour yoghurt is formed.

9. Then Sour yoghurt is kept in the refrigerator.

**Benefits of using sour yoghurt:**

1. Increase the taste of food
2. Enhance the flavor of roast

**4.7 RASH-MALAI**

It used as sweet desserts in South-Asian country.

**Ingredients/Recipe:**

1. Curd
2. Flour
3. Baking powder
4. Green Cardamom
5. Syrup

**Procedure:**

1. For making rash-malai some baking powder and curd without water are mixed together to make dough.
2. Then a small amount of flour is used in the dough to make easier handle and to make desire shapes of sweet.
3. Then small sweet balls are kept in the pre-made syrup for few hours.
4. Then sweet balls are separated from the syrup.
5. On the other hand milk is heated until they become half by volume.
6. Half volume milk is added into sweet balls container.
7. A small amount of green cardamom is used for flavor.
8. Cool it for some time.

9. Cooled rash-malai is packed in 1kg box container.
10. After sealing the container, rash-malai is kept in the refrigerator.



**Fig: Rosh Malai**

#### **4.8 MATHA**

##### **Ingredients:**

5. Yoghurt
6. Salt
7. Stabilizer
8. Sugar

##### **Ingredients for 38.67 liter**

1. Sour Curd-29.592 kg
2. Water-25% (7.398 kg)
3. Sugar-7% (2.589 kg)
4. Salt-0.6% (0.221 kg)
5. Bit salt-0.075% (0.027 kg)
6. Prodated Culture-2%
7. Xyanthen Gum-0.03%

##### **Procedure:**

1. At first sour yogurt/sour curd is poured into the mixer machine.
2. Then sugar, salt and water added into the sour curd.
3. Then xyanthen gum is added into the mixer as a thickening agent.

4. After adding xyanthen gum, the mixer is mixed thought for about an hour.
5. After mixing the mixer is ready to package as labang.
6. Labang is packaged into packaging bottles.
7. After filling the bottle with labang into bottle is sealed and labeled properly.
8. The labeled bottle is stored in the freezing room for 24 hour.
9. After 24 hour is bottles are taken out from the freezing room and make them dry.
10. Then the bottles are wrapped in carton or box.
11. Then carton/ box is stored in the storage room for distribution.

# CHAPTER-5

## PHYSICAL & CHEMICAL TEST OF MILK VITA

### 5.1 ALCOHOL TEST

It also known as Platform test. For this test 68% ethanol is used. To determine acidity of milk alcohol test is occurred. Normally maintain the ratio of 1:1 but in milk-vita it done by maintaining the ratio of 2:1, ethanol: sample (milk).

#### Apparatus:

- Test tube
- Pipette

#### Reagents:

➤ Ethanol

**Procedure:**

1. For platform test at first 2ml of 68% ethanol is taken into a test tube through a 5ml pipette.
2. Then 1ml milk is added into the test tube.
3. Shake the sample for some time.
4. And look for coagulation.
5. Coagulation of milk and stability of milk with the test tube's body is alcohol positive
6. No coagulation means alcohol negative.

## 5.2 FAT TEST

**Objective:**

- It is important for pricing the milk. Because price of milk is fixed by fat percentage

**Apparatus:**

- Butyrometer, knock-stop, & pin
- Centrifuge machine
- Pipette

**Reagents:**



- Sulfuric acid
- Amyl alcohol

**Procedure:**

1. 10ml of sulfuric acid is taken into butyrometer.
2. Then 10.75ml of sample milk is added into it.
3. Then 1ml amyl-alcohol is also added into the mixer.
4. Small amount of water has been added to adjust the mixer.
5. Knock-stop and pin used to lock the butyrometer.
6. Then the mixer is shaken for a while
7. After shaken the butyrometer it put in the centrifuge machine for 5mintues at 60<sup>0</sup>C with 1200RPM.



Figure: Centrifuge machine

8. After 5minutes fat percentage is measured by scale reading of butyrometer through open eyes.
9. Normally 3.5 is expected but it can be 3.2 to 4.2.
10. Need to be careful in time of using centrifuge machine.

### 5.3 DENSITY MEASUREMENT (CLR TEST)

Corrected Lactometer Reading (CLR) is known as specific gravity test or density test. If temperature is below 20<sup>0</sup>C then for per 1<sup>0</sup>C, 0.2 will have to be deducted from lactometer reading. Similarly if temperature is greater than 20<sup>0</sup>C then for per 1<sup>0</sup>C, 0.2 will have to be added with lactometer reading. To know the density of milk this test is used. Normally specific gravity range of milk is between 1.026 and 1.028.

#### Apparatus & Equipment:

- Lactometer with thermometer
- Lactometer jar



**Figure:** Lactometer with jar

#### Procedure:

1. At first a clean lactometer and jar is taken.
2. Then lactometer is put into the jar.
3. Tap water is poured on the jar to adjust the temperature.
4. After sometime lactometer reading and temperature are observed for calculation.
5. Then calculate the CLR.

#### Calculation:

$$\text{CLR} = \text{LR} \pm 0.2 \text{ (per } ^\circ\text{C)}$$

$$= 29 - 0.4$$

$$= 28.6$$

Here,

$$\text{Temperature} = 18^\circ\text{C}$$

$$\text{LR} = 29$$

$$\text{CLR} = ?$$

$$\text{Specific gravity} = 1 + \frac{\text{CLR}}{1000}$$

$$= 1.0286$$

## 5.4 PEROXIDASE TEST

### Objective:

To verify the effectiveness of pasteurization of milk peroxidase test is conducted.

### Apparatus & Equipment:

- Test tubes
- Pipette

### Reagents:

- NaOH
- H<sub>2</sub>O<sub>2</sub>
- P-phnyldiaminedihydrochloride

### Procedure:

1. At first 5ml milk is taken in a test tube.
2. 1 drop of Sodium Hydroxide is added in the test and shake it.
3. Then 1 drop of Hydrogen Peroxide is added and gently shake it.
4. 2 drops of paraphenylene diamine is added and the mixer is shaken for a few seconds.
5. Then wait 30 seconds for color change.

6. Appearance of blue color means peroxidase positive.

7. Appearance of white color means peroxidase negative.



**Figure:** Peroxidase negative (White color) & Positive (Blue color)

## 5.5 SODA TEST

### Apparatus & Equipment:

- Test tube
- Pipette

### Reagents:

- 100% Ethanol
- Rosalic acid

### Procedure:

1. At first 2ml of 100% alcohol is taken in a test tube.
2. 2ml of milk is added in it.
3. Then 2ml of rosalic acid is added in it.
4. Then observe the color.
5. Appearance of red rose or brownish or brick red color means soda positive.
6. Appearance of orange color means soda negative.



**Figure: Soda Positive**



**Figure: Soda Negative**

## 5.6 SALT TEST

People add salt to increase SNF of milk so determination of salt is conducted.

### Apparatus:

- Test tube
- Pipette
- Dropper

### Reagents:

- Silver Nitrate ( $\text{AgNO}_3$ )
- $\text{K}_2\text{CrO}_4$

### Procedure:

1. At first 2ml of Silver Nitrate is taken in a test tube.
2. 4 to 5 drops of  $\text{K}_2\text{CrO}_4$  is added in it.
3. Then 2ml of milk is added in it.
4. Appearance of yellow color means salt test positive.

5. Appearance of brown color or no color change means salt test negative.



**Figure:** Salt Positive

### 5.7 SUGAR TEST

Some dishonest peoples are intentionally add sugar in milk to increase the density of milk. So this test is conducted by quality control assurance department.

#### **Apparatus & Equipment:**

- Test tube
- Test tube holder
- Bunsen burner
- Pipette

#### **Reagents:**

- Resorcinol solution

#### **Procedure:**

1. At first 5ml of resorcinol solution is taken into a test tube.
2. Then 1ml of milk is taken into the test tube.
3. After milk became coagulate when it mix with resorcinol solution.
4. A holder is used to hold the test tube to put it into the Bunsen burners flam
5. Hold the test tube until boil.
6. Test tube is removed from the flam and cool it as soon as possible 7. Appearance of brick red color means sugar test positive.



**Figure:** Sugar Positive

8. Appearance of slightly red color means sugar test negative.
9. Sugar test positive milk are not acceptable.

## 5.8 CLOT-ON-BOILING TEST

### Apparatus:

- Test tube
- Water bath or Bunsen burner

### Procedure:

1. At first 2ml of milk is taken in a test tube.

2. Then test tube is put on a Bunsen burner or in a water bath.
3. Test tube is kept for 4 minutes then it is removed from there.
4. Rotate the test tube to look precipitation.

## **5.9 MICRO-BIOLOGICAL TEST**

### **Characteristic of Coliform:**

- Gram negative bacteria
- Group of bacteria
- Rod Shaped bacteria
- CO<sub>2</sub> Gas producer
- In Soil their production grows rapidly
- Acceptable range is 10/ml

### **Apparatus:**

- Bunsen burner
- Pipettes
- Dilution tubes
- Petri dishes
- Incubator
- Autoclave
- Refrigerator
- Spirit lamp

### **Reagents:**

- Sodium chloride
- Potassium chloride



- Calcium chloride
- Distilled water

**Medium:**

- Violet red bile agar
- Agar
- Yeast Extractor
- Bile Salts

**Procedure:**

1. At first a ringer solution is made by using water and salt (Such as sodium chloride, potassium chloride, calcium chloride etc.)
2. Then the solution is poured in the dilution tube.
3. The solution is heated until boil then heat is removed & let it be cooled.
4. A spirit lamp is used to sterilize pipettes every-time before using them to take sample into the petri dish.
5. 0.5ml milk is taken for coliform and for total count 1ml milk is taken into the ringer solution and shake it to dilute the solution.
6. 1ml of dilute solution is taken into another ringer solution and dilute it again.
7. After that 1ml is taken by a pipette and transferred it into petri dish.
8. Then red agar is transferred into the sample containing petri dish for coliform but transfer.

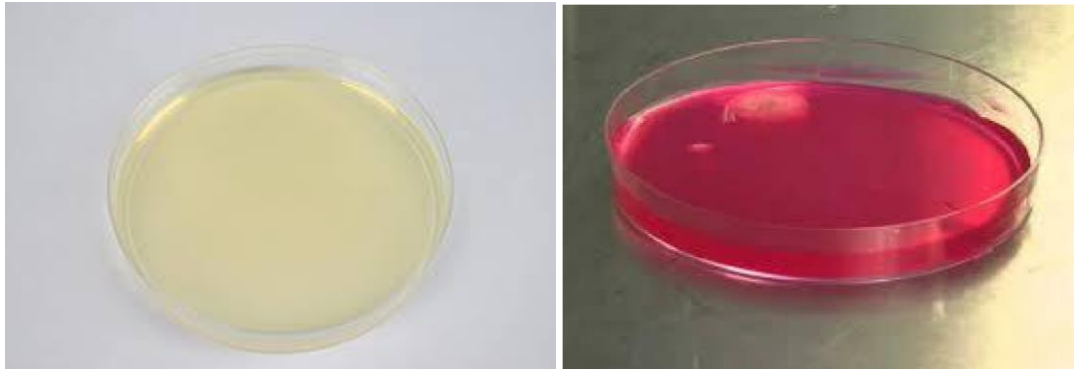


Figure: Yellow agar containing Petri -dish      Figure: Red agar Containing Petri -dish

9. Red agar is added 2 times for bacterial growth.
10. Then petri dishes are kept in an incubator at 40 to 42<sup>0</sup>C for 16 to 18 hours.
11. After incubation period bacteria is count through open eyes.
12. For total count petri dish is divided into 4 parts and count 1 parts and multiply with 4 and multiply the digit by 100 for calculation of existing bacteria in sample.
13. But for coliform, colony is counted.

### 5.10 C.I.P

C.I.P (Cleaning-in-Place) is used to avoid contamination. Caustic soda is used as a chemical for C.I.P.

#### **Procedure:**

1. At first cold water is used to wash the pipe/vat/tanker for 10min.
2. After that hot water is used to wash the pipe/vat/tanker for 10min
3. Then sodium Hydroxide (caustic soda) as C.I.P chemical is used an amount of 0.5 to 2%/Vol of water to wash again for 15min.
4. Then hot water is used to clean the sodium hydroxide from pipe/vat/tanker for 10min.

5. Finally water from pipe/vat/tanker is taken as sample to test C.I.P.
6. Phenolphthalein indicator is used in water to test C.I.P.
7. Appearance of Pink color means C.I.P test positive.
8. Appearance of no color change means C.I.P negative.

# **CHAPTER-6**

## **RESULT AND DISCUSSION**

## **6.1 Alcohol Test**

Alcohol Positive (+) = Coagulation of milk

Alcohol Negative (-) = No coagulation of milk

In milk-vita we mostly found alcohol negative. Alcohol Positive milk must be rejected for further process.

## **6.2 Fat Test**

From the butyrometer reading fat percentage was calculated as 3.4.

Normally 3.5 is expected as standard but 3.2 to 4.2 also found in some animal's milk. But less than 2 % fat containing milk must be rejected.

## **6.3 CLR Test or Density Measurement**

In milk-vita Tested milk's specific gravity was 1.0286 which means no water was added in it.

Density or specific gravity of milk vary from animal to animal. Normal density or gravity of Cow milk range is between 1.028 – 1.030 and for Buffalo milk 1.030 to 1.032. Sugar and flour is added to increase the density of milk by dishonest people.

## **6.4 Peroxidase Test**

Peroxidase Positive (+) = Blue color

Peroxidase Negative (-) = White Color

In milk-vita we found peroxidase positive regularly. Peroxidase Positive milk must be rejected for further process.

## **6.5 Soda Test**

Soda Positive (+) = Red rose or Brick red color

Soda Negative (-) = Orange color

In milk-vita soda test was negative. To increase the foaming of milk soda is intentionally added by dishonest people. Soda Positive milk must be rejected.

## **6.6 Salt Test**

Salt Positive (+) = Yellow color

Salt Negative (-) = Brown color

Salt test was negative in milk-vita. Salt test positive milk is known as adulterated milk. So salt test positive milk must be rejected. Salt is added to milk to increase the SNF content of milk.

### **6.7 Sugar Test**

Sugar Positive (+) = Brick red color

Sugar Negative (-) = Slightly red color

In milk-vita Sugar test was negative all the time. Sugar positive milk is adulterated milk.

Sugar is added intentionally by dishonest people to increase the carbohydrate content of milk. It also added to increase the density of milk.

### **6.8 Clot-on-Boiling Test**

Generally above 0.22% of lactic acid in milk gives test positive. Such milk can't stand for heat treatment. So this kind of milk is not acceptable for processing or further heat treatment.

### **6.9 Microbiological Test**

Total bacterial count was 18thousand/ml.

30 to 35 thousand total bacterial count is acceptable.

Coliform count was 8/ml.

According to standard coliform count range should be less than 10/ml is acceptable.

Proper Pasteurization is necessary to kill these micro-organisms. It is essential to kill them because they are harmful for consumption. They can cause many disease in human.

### **6.10 C.I.P**

C.I.P Positive (+) = Pink color

C.I.P Negative (-) = No color

In milk vita C.I.P found negative regularly except 1time.

## **Conclusion**

The dairy sector of the country is one of the principal agricultural industry. Since the basic national objective is to provide inputs to farmers at low cost and to reduce the income gap between rich and the poor, the present Government is keen to undertake Programs in the light of the objectives outlined. In the tune, it has been recognized that some rural benefits are already flowing to a group of co-operatively organized small farmers through the Bangladesh Milk producers' Co-operative Union Limited (BMPCUL).

This internship program helped to learn lots of things about dairy products. It has covered both production and quality control site. It was a great opportunity to know about milk-vita and its regular works. The experienced of this program will be helpful for future. This experienced also helped to know about processing of some dairy products such as pasteurized milk, chocolate milk, ice-cream, Laban, yoghurt etc. It will be helpful in future to conduct adulteration test of dairy products. Adulteration test of milk such as soda test, salt test, sugar test etc have been learned there. This internship program helped to know about practical work at dairy industry.

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THE END