



**Daffodil**  
*International*  
**University**

**An Internship Report**  
**On**

**Quality Control Assurance & Production of Dairy Products**  
**At**

**Dhaka Dairy Plant (Milk-vita)**  
**Milk-vita road, Mirpur section-7, Dhaka**

**Submitted To:**  
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**Date of Submission: 22<sup>Dec</sup>, 2018**

## LETTER OF TRANSMITTAL

*Date: 22 December, 2018*

*Professor Dr. Md. Bellal Hossain*

*Head*

*Department of Nutrition & Food Engineering, Daffodil International University.*

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

*Dear Sir,*

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

*I have prepared this report based on the acquired taste knowledge during my internship period in Dhaka Dairy Plant (Milk-vita). It is great achievement to work under your active supervision. This report is based on Quality control & Production of Dairy Products. I have got the opportunity to work in Dhaka Dairy Plant (Milk-vita) in “Quality Control and Production Department” for sixty days, under the supervision of Dr. Khondokar Aminul Islam, Additional General Manager of Dhaka Dairy Plant.*

*This is the first times this project gave me both academic and practical exposures. First of all I have gained knowledge about the organizational culture of a prominent consumer product producing organization of the country. Secondly, the project gave me the opportunity 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*

*Debasish Roy*

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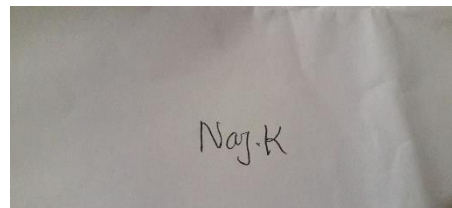
## CERTIFICATE OF APPROVAL

*I am pleased to certify that the internship report on production & quality control of dairy products conducted by Debasish Roy, bearing respectively ID No: 151-34-356 of the department of Nutrition and Food Engineering has been approved for presentation and defense.*

*I am pleased to hereby certify that the data and finding presented in the report are the authentic work of Debasish Roy. I strongly recommended the report presented by Debasish Roy for further academic recommendations and defense/viva-voice. Debasish Roy 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**  
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Finally I wish to express immense gratitude & humbly convey my heart-felt respect to Managing Director.

## **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 gives me lot of knowledge about milk and milk products practically.

This report has been presented based on my observation and experience gathered from the company. The organization has many divisions and department but I got the opportunity to work in production department and quality control department. This report mentions about both raw and processed milk and milk products qualities and processing knowledge.

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.

Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) provide facilities for internship opportunity for students there. Major objective of this report is to identify quality milk and milk products.

It also concern for developing the production and quality of dairy products. Customer's choice are very important to Bangladesh Milk Producers Co-operative Union Limited (BMPCUL).

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. This research's result that found is much considerable.

<b>Chapter No.</b>	<b>Contents</b>	<b>Page No.</b>
	Title page/Cover Page	<b>I</b>
	Letter of Transmittal	<b>ii</b>
	Certificate of Approval	<b>iii</b>
	Acknowledgement	<b>iv</b>
	Summary	<b>v</b>
<b>Chapter One</b>	<b>Introduction</b>	<b>1-4</b>
1.1	Definition of Milk	2
1.2	Origin of the Report	3
1.3	Objective of the study	3-4
1.4	Scope of the study	4
1.5	Methodology	4
1.6	Limitations of the report	4
<b>Chapter Two</b>	<b>Overview of The Organization</b>	<b>5-7</b>
2.1	Historical background of the company	6
2.2	Objective of the company	7
2.3	Products & Services	7
<b>Chapter Three</b>	<b>Design of the Study</b>	<b>8-9</b>
3.1	Study of area	9
3.2	Laboratory	9
3.3	Production	9
<b>Chapter Four</b>	<b>Processing Section</b>	<b>10-17</b>
4.1	Pasteurized milk	11-12
4.2	Chocolate milk	13
4.3	Ice-cream	14

4.4	Laban a Yoghurt Drink	15
4.5	Sweet Yoghurt	15
4.6	Sour Yoghurt	16
4.7	Rash-Malai	17
<b>Chapter Five</b>	<b>Physical &amp; Bio-chemical Test of Milk &amp; Milk Products</b>	<b>18-28</b>
5.1	Platform Test	19
5.2	Fat Test	19-20
5.3	CLR Test	20-21
5.4	Peroxidase Test	21-22
5.5	Soda Test	22-23
5.6	Salt Test	23-24
5.7	Sugar Test	24-25
5.8	Clot-on-boiling Test	25
5.9	Micro-biological Test	26-27
5.10	C.I.P	28
<b>Chapter Six</b>	<b>Results and Discussion</b>	<b>29-31</b>
6.1 to 6.5	Alcohol test, Fat test, CLR, Peroxidase test and Soda test	30
6.6 to 6.10	Salt test, Sugar test, Clot-on-boiling test, Microbiological test, C.I.P	31
<b>Chapter seven</b>	<b>Conclusion and reference</b>	<b>32-33</b>
	<b>Conclusion</b>	<b>33</b>
	<b>Reference</b>	<b>33</b>

# **CHAPTER –ONE** **INTRODUCTION**



## Introduction

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.

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. They don't looking for more benefits like others.

### 1.1 Definition of Milk

Milk is a translucent white liquid substance which is produced by mammary glands of mammals. 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.



**Figure: 1.1-** Milk

### 1.2 Origin of the Report

Internship program is a graduation requirement for NFE students. Daffodil International University & Department of NFE provide Internship opportunity for students in different company and different sectors. Its main purpose is to give the student knowledge about practical experience and real work place. It gives an opportunity to student to get closer to job seekers. Main challenge for an intern student is to use theoretical concepts in real life experience.

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

- ❖ To come out from textbooks and learn about real world
- ❖ To learn about competency and efficiency of real work environment
- ❖ To help students to express dependability, initiative, and professionalism.
- ❖ 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
- ❖ To learn Different types of dairy products

This report is the result of two months long internship program conducted in Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) is prepared as a requirement for the completion of the NFE program of Daffodil International University. As a result I need to submit this report based on the “Quality control Assurance and Production of Dairy Products at BMPCUL.

**1.3 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).

### **1.4 Scope of the study**

Through extensive discussion this report has been prepared. The main intention of this study is the Production and Quality Control of Milk & Dairy Products compositional standard and quality and processing of dairy products by the Dairy products Producers Company. The report covers details about the Production and Quality Control of Dairy Products under Hygienic Condition. However I got an opportunity to work in both Production & Quality Control Assurance Department.

### **1.5 Methodology**

A systematic procedure is required for the preparation of the final report. Methodology starts from selection of topic, data source, interpreted results in a systematic manner and key points are to be found out. The overall process of methodology are as follows:

#### **Selection of the topic:**

The selection of the topic for any research is very important. It depends on gained knowledge and on-practical experience from the assigned organization.

#### **Source of data:**

Essential data can be collected from both primary and secondary source.

#### **Primary Source of data:**

- ❖ Primary data collected from the practical work
- ❖ Data collected from employee.

#### **Secondary Source of data:**

- ❖ From official and officers of the organization
- ❖ From newspaper, journal, articles etc.
- ❖ Different websites related to dairy science.
- ❖ From manuals and files of the organization.

#### **Tools Used:**

Some arithmetic, graphical tools are used in this report for analyzing the data and to classify different types of data.

### **1.6 Limitation of the report:**

Every report has some limitation so my report have also some limitation. These are given below:

- ❖ Due to some limitation some information, especially from ultimate employees could not be collected
- ❖ Due to some rules and regulation they did not give me some information because that is against their policy
- ❖ All of them was not filled up the feedback properly which cause insufficient of data
- ❖ Due to insufficient time they was unable to give me many information.

**CHAPTER-TWO**  
**OVERVIEW OF THE ORGANIZATION**

## **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 purchased this dairy company in 1952 from the 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**

Bangladesh Government started Bangladesh Milk Producers Co-operative Union Limited (EMPCUL) earlier to drive away the poverty among rural people. Other objectives are given Below-

- ❖ To promote production and improve nutrition & quality.
- ❖ To develop local farmers condition.
- ❖ To ensure adulteration free final product.
- ❖ To increase quantity and quality products for consumers.
- ❖ To ensure customers satisfaction.
- ❖ To increase purchasing power
- ❖ To increase popularity
- ❖ To create new employment opportunity.
- ❖ To keep business morality.

## **2.3 Products and Services:**

- ❖ Pasteurized milk
- ❖ Chocolate milk
- ❖ Laban
- ❖ Sweet Yoghurt
- ❖ Sour Yoghurt
- ❖ Rosh-malai
- ❖ Chocolate Ice-cream
- ❖ Vanilla Cup Ice-cream

**CHAPTER-THREE**  
**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

### **3.2 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-FOUR**  
**PROCESSING SECTION**

## 4.1 PASTEURIZED MILK

### Processing steps:

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°C
4. Storage milk is recombined with skim milk or full cream milk for maintaining fat Percentage (3.5%) according to BSTI standard.
5. Then these recombined milk is pasteurized at 80 to 85°C for 15 seconds
6. If raw milk have higher fat percentage then skim milk is added to make balance
7. If raw milk have less fat percentage then full cream milk is added to make balance 7



**Figure: 4.1** Milk Pasteurizer

8. Pasteurized milk is homogenized by milk homogenizer



**Figure: 4.2** Milk Homogenizer

9. Then cooling them at 4°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: 4.3** Milk Packaging Machine

12. In the packaging area milk is packaged in different amount such as 250ml, 500ml, 1Litre etc.



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

13. Wrong pasteurized packaged milk is taken away from packaging area and follow the procedure again

14. Well pasteurized packaged milk is stored at 0 to 4°C

## 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. SMP- 12kg
2. FCMP-30kg
3. Sugar- 33kg
4. Stabilizer- 0.60kg
5. Cocoa powder- 2.80kg
6. Color- 0.032kg
7. Water- 321.568kg

### **Processing steps:**

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

#### **Processing steps:**

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 LABAN A YOGHURT DRINK**

It is a dairy product which is also known as yoghurt drink. It found all over the world but specially in South-Asian country. Milk-vita provide 80% yoghurt in their Laban.

##### **Ingredients:**

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

##### **Processing steps:**

1. For making Laban at first yoghurt is poured into the mixer machine
2. Then 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 Laban 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

##### **Processing steps:**

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.

## 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

### **Processing steps:**

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

##### **Processing steps:**

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



**CHAPTER FIVE**  
**PHYSICAL & BIO-CHEMICAL TEST**  
**OF MILK & MILK PRODUCTS**

## **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 sometime
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 10.45ml 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
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.



Figure: 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°C then for per 1°C, 0.2 will have to be deducted from lactometer reading. Similarly if temperature is greater than 20°C then for per 1°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. Then enough amount of milk is poured into the jar
4. To adjust the temperature flow tap water on the jar
5. After sometime lactometer reading and temperature are observed for calculation
6. Then calculate the CLR.

**Calculation:**

$$\begin{aligned}\text{CLR} &= \text{LR} \pm 0.2 \text{ (per } ^\circ\text{C)} \\ &= 29 - 0.4 \\ &= 28.6 \\ \text{CLR} &=?\end{aligned}$$

$$\begin{aligned}\text{Specific gravity} &= 1 + \frac{\text{CLR}}{1000} \\ &= 1.0286\end{aligned}$$

$$\begin{aligned}\text{Here,} \\ \text{Temperature} &= 18^\circ\text{C} \\ \text{LR} &= 29\end{aligned}$$

**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>
- Paraphenylenediamine

**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 paraphenylenediamine 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



**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



**Figure: Soda Positive**

6. Appearance of orange color means soda negative.



**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  $K_2CrO_4$  is added in it
3. Then 2ml of milk is added in it
4. Appearance of yellow color means salt test positive

**Figure:** Salt Positive

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

**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
8. Test tube is removed from the flam and cool it as soon as possible
9. Appearance of brick red color means sugar test positive Appearance of slightly red color means sugar test negative.
10. Sugar test positive milk are not acceptable



**Figure:** Sugar Positive

### **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**

It is important to know the bacterial count in milk and milk products. Because bacteria such as E. coli can cause contamination in milk. E. coli can cause disease in consumers if a high number of E. coli is present in milk. Range of total bacterial count is 30 to 35 thousand. E. coli cause dysentery. Coliform bacteria is another concern to count.

### **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

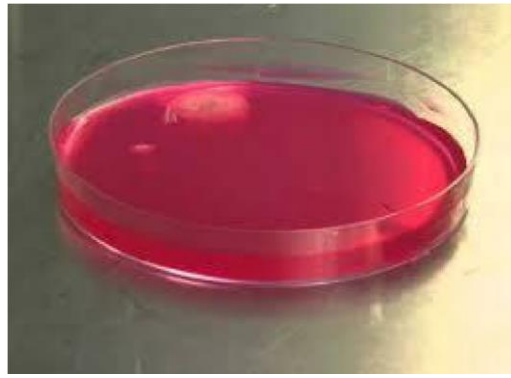


Figure: Red agar Containing Petri -Dish

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



**Figure: C.I.P Test positive**

# **CHAPTER 6**

## **RESULTS & 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.

**CHAPTER 7**  
**CONCLUSION AND REFERENCE**

## **Conclusion:**

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 fat test, soda test, salt test, sugar test etc. have been learned there. This internship program helped to know about practical work at dairy industry. It encouraged to develop dairy products. Helped to know about BSTI standards about dairy products. Finally it will be helpful for my future career.

## **Reference:**

1. Sarwar Inam AKM. "Effects of LC-PUFA (Long Chain Poly Unsaturated Fatty Acids) in Infancy", *Advances in Obesity, Weight Management & Control*, 2017
2. Habib, MA, MA Afroz, and AKFH Bhuiyan. "Lactation performance of Red Chittagong Cattle and effects of environmental factors", *Bangladesh Veterinarian*, 2010.
3. Susmita Kar, Md. Kapil Ahmed. "Knowledge, Attitude and Practice of Cervical Cancer Screening through Visual Inspection with Acetic Acid", *International Journal of Public Health Science (IJPHS)*, 2017

*The End*