



## **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**

**Prof. Dr. Md. Bellal Hossain**

**Head**

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**Submitted by**

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**Date of Submission: 18<sup>th</sup> December, 2018**

# LETTER OF TRANSMITTAL

**Date: 18th 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,

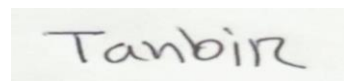
It is a great pleasure and honor for me to have the opportunity to submit Internship report on **Quality Control Assurance & Production of Dairy Products** as a part of the Nutrition & Food Engineering (NFE) program curriculum.

I have prepared this report based on the acquired test knowledge during my internship period in Dhaka Dairy Plant (Milk-vita). It is a 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 time 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 internship 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 the future.

Sincerely Yours



A.N.M. Tanbirur Rahman

ID: 151-34-349

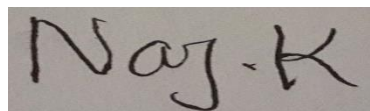
Department of Nutrition & Food Engineering

Daffodil International University

## CERTIFICATE OF APPROVAL

I am pleased to certify that the internship report on production & quality control of dairy products conducted by **A.N.M. Tanbirur Rahman**, bearing respectively **ID No: 151-34-349** of the Department of Nutrition and Food Engineering has been approved for presentation and defense/viva-voice.

I am pleased to hereby certify that the data and finding presented in the report are the authentic work of **A.N.M. Tanbirur Rahman**. I strongly recommended the report presented by **A.N.M. Tanbirur Rahman**, for further academic recommendations and defense/viva-voice. , 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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Daffodil International University

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**Ms. Najia Kamrul**

Lecturer

Department of Nutrition & Food Engineering

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## ACKNOWLEDGEMENT

In the preparation of this report .I would like to acknowledge the encouragement and assistance Give to me by a number of people. First of all I express my deep gratitude and thanks to the almighty Allah for his infinite that allowed me to complete this report as a part of the NFE program. A lot of effort and study have been involved in preparing this report reality. The success and final outcome of this project required a lot of guidance and assistance from many people and I am extremely advantaged to have got this all along the completion of my project.

I am grateful to my parents without whom I can't be here .Without the support of my parents, I could not be able to achieve my objective and goals.

My Deep gratitude and sincere thanks to Honorable dean, **Professor Dr. Ahmed Ismail Mostafa** Faculty of Allied of Health Science, daffodil international university for his kind cooperation and to accept this Degree.

I respect and thank **Prof. Dr. Bellal Hossain** head of department of nutrition and food engineering daffodil international university for providing me an opportunity to do the internship work in Milk vita and giving us all support and guidance which made me complete the project duly.

I also deep gratitude to our internship guide **Ms. Najia Kamrul** lecturer department of nutrition and food engineering daffodil international university. Who took keen interest on my project work and guided us all along, till the completion of our project work by providing all the necessary information for developing a good system.

I also grateful to all the other **NFE Faculty Member** for their grate help during university life.

I would not forget to remember my seniors, juniors, and my classmates and colleagues of Dhaka dairy plant for their help, advice and suggestions, inspiration and support.

I also thankful to **Dr. Khondokar Aminul Islam** Additional general manager of Dhaka Dairy plant milk-vita. For his permission to carry out this internship in his organization.

Finally I heartily thank our internal project guide managing director of Milk-vita for his guidance and suggestions during this project work.

# SUMMARY

Bangladesh milk procedures co-operative union limited (BMPCUL) which is known as milk-vita. The dairy sector of the country is one of the major agricultural industries. Bangladesh government and Bangladesh Milk Producers' Co-operative Union Limited (BMPCUL) is works together for this company. It promises to serve pure and quality products to the consumers. the basic general objective is to afford inputs to farmers at low cost and to reduce the income gap between rich and the poor. In the tune, it has been acknowledged 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). It's also concern for developing the production and quality of a dairy product.

This report I prepared on my one-month practical experience at BMPCUL. This Internship program gives me a lot of knowledge about milk and milk products practically. This report has been presented based on my observation and knowledge gathered from the company. The organization has many divisions and department but I got the opportunity to work in the production department and quality control department. This report mentions both raw and processed milk and milk products qualities and processing knowledge.

My report is based on quality control and production of dairy products of BMPCUL. The first part of the report covers information of the organization. The second part of the report contains the raw milk test and quality factors. The third part of the report covers production of dairy products. The last part contains the concluding part. This research's result that found is much considerable.

## Contents:

Chapter no.	Contents	Page no.
	Title page/Cover Page	I
	Letter of Transmittal	Ii
	Certificate of Approval	Iii
	Acknowledgement	Iv
	Summary	V
<b>Chapter One</b>	<b>Introduction</b>	<b>1-5</b>
1.1	Definition of Milk	2
1.2	Origin of the Report	2-3
1.3	Objective of the study	3-4
1.4	Scope of the study	4
1.5	Methodology	4-5
1.6	Limitations of the report	5
<b>Chapter Two</b>	<b>Overview of The Organization</b>	<b>6-8</b>
2.1	Historical background of the company	7
2.2	Objective of the company	7-7
2.3	Products & Services	8
<b>Chapter Three</b>	<b>Design of the Study</b>	<b>9-10</b>
3.1	<b>Study of area</b>	<b>10</b>
3.2	Laboratory	10
3.3	Production	10
<b>Chapter Four</b>	<b>Processing Section</b>	<b>11-25</b>
4.1	Pasteurized Milk	12-15
4.2	Chocolate Milk	16-17
4.3	Ice-cream	18-19
4.4	Sweet Yoghurt & Sour Yoghurt	19-21
4.4.1	Sweet Yoghurt Manufacturing Process	19-20
4.4.2	Sour Yoghurt manufacturing process	20-21

4.5	LABAN A Yoghurt Drink	22
4.6	Matha A Yoghurt Drink	23
4.7	Rash-malai	24-25
<b>Chapter Five</b>	<b>Quality Control Section</b>	<b>26-36</b>
5.1	Quality control check of raw milk such as	27
5.2	Quality control check of final products	27
5.3	C.I.P	27-28
5.4	Platform test	28
5.5	Fat test	29-30
5.6	CLR test	30-31
5.7	Peroxidase test	31-32
5.8	Soda Test	32
5.9	Salt test	33
5.10	Sugar Test	33-34
5.11	Microbiological /Bacteriological test	34-36
<b>Chapter Six</b>	<b>Results &amp; Discussion</b>	<b>37-39</b>
6.1	Alcohol Test	38
6.2	Fat Test	38
6.3	CLR Test	38
6.4	Peroxidase Test	38
6.5	Soda Test	<b>38</b>
6.6	Salt Test	39
6.7	Sugar Test	39
6.8	Clot-on-Boiling Test	39
6.9	Microbiological Test	39
6.10	C.I.P	39
<b>Chapter Seven</b>	<b>Conclusion</b>	<b>40-41</b>
7.1	Conclusion	41
7.2	Reference	41



# **CHAPTER-ONE**



## **Introduction:**

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

Now a day number of companies produce process milk are available in Bangladesh. Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) or Milk-vita is one of them. Milk-vita collects milk from the local village or market by a co-operative union. Before collecting them milk-vita test the quality of milk by their local experts and test milk. After that pasteurization of milk then they transport collected milk to their all milk processed plant and transport is refrigeration system or cooling system. This system should be reliable for a required time enough to ensure the required temperature. Otherwise, the milk collected can be wasted. The truck is subjected to several times of traveling from the collection spot to the processing plant. But before sending them they chilled their collected milk for ensuring the quality of milk.

### **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.

### **1.2 Origin of the Report**

Daffodil International University & Department of Nutrition and Food Engineering provide an Internship opportunity for students in a different company and different sectors. The internship program is a graduation requirement for Nutrition and Food Engineering students. Its main purpose is to give the student knowledge about practical experience and real work place. It gives an opportunity to the 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 has the following purposes:**

1. To Find my Future Employer, and think what work prefer for me.
2. To come out from textbooks and learn about the real world.
3. To help students to express dependability, initiative, and professionalism and tasks they are assigned
4. To fulfill the requirement of NFE Program
5. To compare the real scenario with the lessons learned in DIU
6. To know about Milk-vita how to they work.
7. To learn about production and quality control of dairy products in milk vita
8. To learn Different types of dairy products.
9. To Find my role-models
10. To Test-Drive my knowledge and skills.
11. To Strengthen my CV
12. To create a network.
13. To the Experience of my lifetime.

This report is the result of one month's long internship program directed 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**

The objective study is divided into two types.

- General Objective.
- Specific Objective.

#### **General Objective:**

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

## **Specific Objective:**

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

## **1.4 Scope of the study**

Over widespread discussion, this report has been prepared. The main objective 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 the Production & Quality Control Assurance Department.

## **1.5. Methodology**

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

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

The topic selection for any research is very important. It depends on expanded knowledge and on-practical skill from the assigned organization.so carefully select the topic because it will help knowledge gain.

### **Source of data:**

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

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

- Primary data collected from the practical work
- Data collected from the 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 mathematics, 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 have some limitation so my report has 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 data
- Due to insufficient time, they were unable to give me 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. Late M. Mukhlesur Rahman Pioneer of Dairying in Bangladesh a Dairy Plant was established at Lahirimohanpur, Pabna (presently Sirajgong) it starts its journey in 1946.this time milk product easy to send Kolkata market for the railway system. In 1952 after divided, the original owner of Eastern milk Products Limited a private company buying this dairy company. The first milk producers' at Lahirimohanpur Government patronization over the plant. Co-operative was formed in 1965, under the name Eastern Milk Producers' Co-operative Union Limited (EMPCUL).In 1973 under their supervision, Bangladesh government has taken it. When Bangladesh government owner of the company the change of the company named. In 1977 a brand name of the company was fixed as Milk-vita. the poverty alleviation The Father of nation Bangobandhu Sheikh Mujibur Rahman to enhance the milk production for this country. 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 ensure customers satisfaction.
- To develop local farmers condition
- To ensure adulteration free final product.
- To increase quantity and quality products for consumers.
- To increase purchasing power
  
- To increase popularity

- To create a new employment opportunity.
- To keep business morality.

### 2.3 Products and Services:

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



# **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 as we know essential for quality check of different ingredients and final products .ensure quality of the product. It also ensures the safety of consumers. It also works for the development of any products .quality test, adulteration test. Different types of operational test occurred in the laboratory, some of them given below an example-

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

### **3.2Production**

The production area is that where fresh raw ingredients (milk) are processed for further processing.

Production area also divided into different groups, such as-

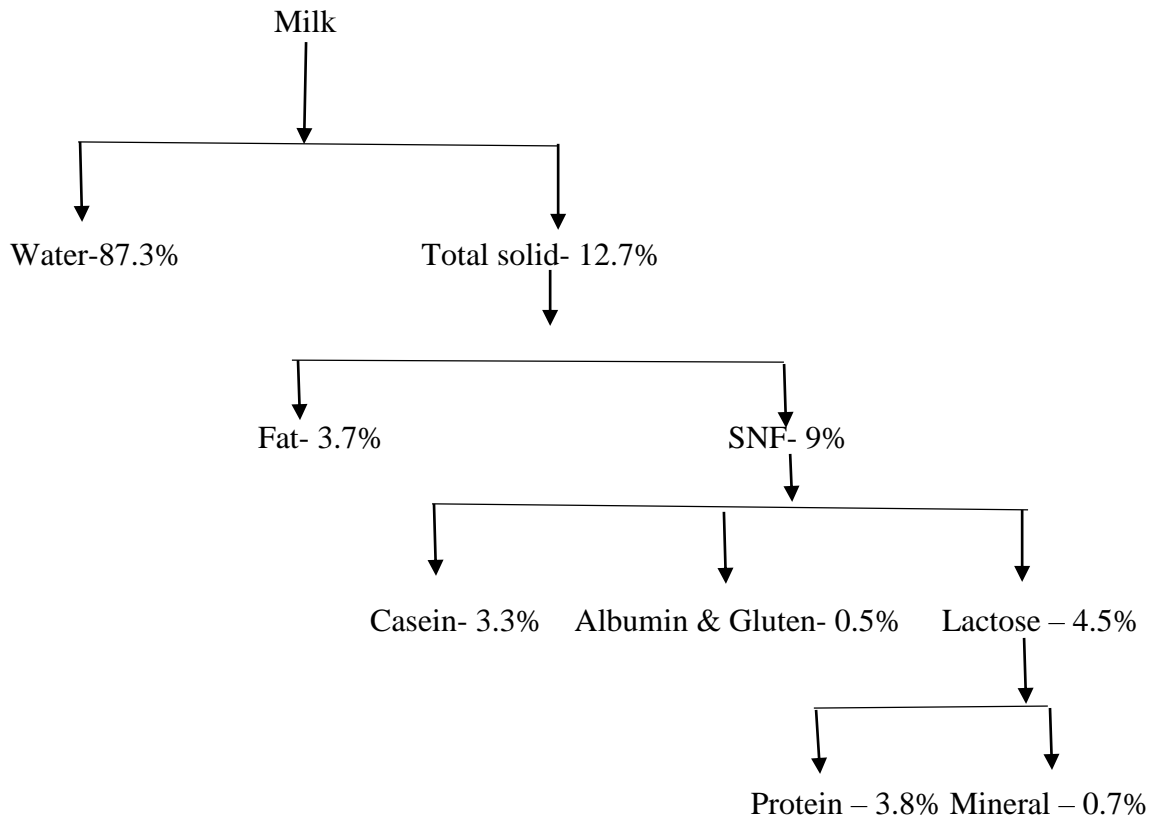
- Mixing area
- Processing area
- Packaging area
- Storage area

The different Production plant is used for different types of products produced. But sometimes the same plant can be used for many products.

# **CHAPTER-FOUR**

## **PROCESSING SECTION**

## Composition of milk



## 4.1 PASTEURIZED MILK

### Procedure:

1. At first Collected raw milk from a farm and it's from co-operative union office.
2. After collected raw milk it's passed through platform test and other adulteration tests.
3. After that milk chilled, then passed milk is chilled in a storage vat at 40°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.
6. If raw milk has less fat percentage then full cream milk is added to make balance.



Figure: 4.1 Milk Pasteurizer

7. Then these recombined milk is pasteurized, it's pasteurized by at 80 to 85°C for 15 seconds.



Figure: 4.2 Milk Homogenizer

8. Pasteurized milk is homogenized by milk homogenizer.

9. Then cooling them at 40°C .cooled milk is stored in storage vat (4 vat)
10. Then cooled milk is taken in the packaging machine.



Figure: 4.3 Milk Packaging Machine

11. In the packaging area, milk is packaged in a different amount such as 250ml, 500ml, and 1Litre Etc.



Figure: 4.4 Packaged Milk (1Litre Packet)

12. Be carefully if found any fault in pasteurized packaged milk then it is taken away from the packaging area and follow the procedure again.
13. Well packaged pasteurized milk is stored in the freezing room at 0 to 40°C.

## 4.2 Chocolate Milk:

Chocolate milk is milk with mix Cocoa powder and it's another dairy product made by milk-vita. It is popular in Bangladesh especially in among the children.

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

- SMP- 12kg
- FCMP-30kg
- Sugar- 33kg
- Stabilizer- 0.60kg
- Cocoa powder- 2.80kg
- Color- 0.032kg
- Water- 321.568kg

### Procedure:

1. at first, take some hot water (approximately 60°C) is added into the blending vat. Then full cream milk powder (FCMP), skim milk powder, (SMP), sugar, stabilizer and finally remaining water are added. Then mixing all ingredient, the mixing operation is blended at 80°C in the mixing vat so that the warm mix which dissolves them.
2. Then the mixture is pasteurized by a continuous heating process. The liquid mixture is heated in a vat to at 81°C for 15 seconds and subsequently cooled by the chilled water which helps to destroy pathogenic bacteria present in the mixture.
3. Then homogenization the mixers.
4. Then chocolate milk is packaged by foil paper packaging.
5. Then they are stored in the storage room at 40°C temperature.
6. Then they distribute in the market to serve the consumers.



Figure: Chocolate milk

**Health Benefits of Chocolate Milk:**

- Protein source for muscle repair
- Speeds-up Recovery
- Boost energy
- Strengthens Bones
- Boosts Immunity
- replenish calcium levels
- Regulates Blood Pressure
- Improves Digestion



## 4.3 Ice-cream:

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

- Sugar-16%
- Butter-8%
- Stabilizer-0.5%
- FCMP- 13.5%
- Flavor- 0.21%
- SMP- 1.1%
- Water- All the rest

### Procedure:

1. At first, taken some hot water (approximately 60°C) is added into the blending vat. Then full cream milk powder (FCMP), skim milk powder,(SMP), sugar, stabilizer and finally remaining water is added. Then all ingredient mixing, the mixing operation is blended at 80°C in the mixing vat so that the warm mix which dissolves them.
2. Then the mixture is pasteurized by a continuous heating process. Then 81°C for 15 seconds the liquid mixture is heated in a vat and subsequently cooled by the chilled water which helps to destroy pathogenic bacteria present in the mixture.
3. Then going to Homogenizer the Homogenization helps largely to the smoothness of Ice-Cream which gives fine dispersion of butterfat globules in the mixture. The function of the homogenizer is to breakdowns the fat globules.
4. Then Aging, after the homogenization the mix is cooled down to 40°C.The mix held in vat from 3 to 24 hours at a temperature of 50°C.
5. Then fill them in the ice-cream container.
6. Then freezing them in at freezing temperature.
7. Then ice-cream are kept at hardening room for 1 hour at -200°C where semi-solid become solid ice-cream.
8. After hardening ice-cream are kept in the storage room where temperature maintained -4to -20°C.
9. Then they are ready to sell.

### **Health Benefits of Ice Cream:**

- Source of Vitamins
- Source of Minerals
- Provides Energy
- Stimulates the Brain

## **4.4 Sweet Yoghurt & Sour Yoghurt**

### **4.4.1 Sweet Yoghurt Manufacturing Process Sweet yogurt:**

Sweet yogurt is a popular dairy product. It is popular in both young and children. Particularly in all aged people. Sweet yogurt is another product made by milk-vita.

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

1. Milk
2. Sugar
3. Culture



Figure: Sweet Yoghurt

**Procedure:**

1. 1st milk is taken in a cleaned vessel then boil them at boiling temperature until 40% reduced by weight, Milk-vita wants to assist good product to people so they do this.
2. Then add 15% sugar in the milk then heat the mixer.
3. Then Remove from the heat and cool until 40°C temperature.
4. Then added starter culture in the mixer.
5. Then preserve it 6 hours to make curd.
6. Then keep them at 40°C temperature.
7. Then they are ready for packaging.
8. Then marketing them for sale.

**Benefits of using Sweet Yogurt:**

1. Good for digestion
2. Easy to eat
3. Not much expensive

**4.4.2 Sour Yogurt manufacturing process Sour Yogurt:**

Milk-vita produces sour yogurt. It is popular for using it in cooking specially in a roast- making.

**Ingredients/Recipe:**

1. Whole milk
2. Skim milk
3. Culture

**Procedure:**

1. 1st whole milk is taken in a cleaned vessel then add skim milk into it
2. Then boil them at boiling temperature then cool as soon as possible to 40 to 45°C



**Figure: Sour Yogurt**

3. Added starter culture in it
4. Then wait for 4 hours to coagulate the mixer
5. Then packaged in a plastic box
6. Then they kept them in the refrigeration
8. Then they are marketing for sale.

**Benefits of using sour yogurt:**

1. Good for increase taste of food
2. Helpful for flavor
3. Economic benefits

## **4.5 LABAN (A Yogurt Drink)**

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

### **Ingredients:**

- Yogurt
- Salt
- Stabilizer
- Sugar
- water

### **Procedure:**

1. For making Laban at first yogurt is poured into the mixer machine then salt and sugar are added to the yogurt
2. The stabilizer is used in the mixer after adding the stabilizer in the mixer operator started the mixer machine and mixed it properly for an hour with heat.
3. Well mixed mixer is ready to pour as Laban into the packaging bottle or jar.
4. Poured bottles are sealed and labeled them nicely
5. After Labelling, bottles are stored in the freezing room for 24hours
6. Then bottles are taken outside and make them dry
7. Finally wrapping them in a cartoon or box
8. Then stored them in the storage room.

### **Benefits of Laban:**

1. It is good for digestion
2. It increases palatability.

#### **4.6 Matha (A Yogurt Drink)**

It is a dairy product which is also known as yogurt drink. It found all over the world but specially in South-Asian country. Milk-vita provides 80% yogurt in there Matha.

##### **Ingredients:**

- Yogurt
- Sour curd
- Salt
- Bit salt
- Stabilizer
- Sugar
- water

##### **Procedure:**

1. For making matha at first yogurt is poured into the mixer machine then salt, bit salt and sugar are added to the yogurt
2. The stabilizer is used in the mixer after adding the stabilizer in the mixer operator started the mixer machine and mixed it properly for an hour with heat.
3. Well mixed mixer is ready to pour as matha into the packaging bottle or jar.
4. Poured bottles are sealed and labeled them nicely
5. After Labelling, bottles are stored in the freezing room for 24hours
6. Then bottles are taken outside and make them dry
7. Finally wrapping them in a cartoon or box
8. Then stored them in the storage room.

##### **Benefits of Matha:**

1. It is good for digestion
2. It increases palatability.

## 4.7 Rash-malai:

It is one of the sweet dairy products made by milk-vita. It is also a popular sweet dessert in the South-Asian country.

### Ingredients/Recipe:

- Curd
- Flour
- Baking powder
- Green Cardamom
- Syrup



**Figure: Rash-malai**

### Procedure:

1. 1st some baking powder and curd without water are mixed together to make a dough some flour is used in the dough to make an easier handle and make good shapes of sweet.
2. Then small sweet balls are kept in the syrup for few hours

3. Then syrup is separated from sweet balls in the meantime, milk are heated until they become half by volume
4. Then hot milk is added into the sweet balls
5. Some green cardamom is used for flavor.
6. Then they kept for being cool
7. Then cool rash-malai are packed in 1kg box container
8. After packaging, they kept in the storage room
9. Then they distribute to the sale.



# **CHAPTER-FIVE**

## **Quality Control Section**

### **5.1 Quality control check of raw milk such as:**

- Platform test/ Alcohol test,
- CLR test
- Fat test
- Soda test
- Salt test
- Sugar test.

### **5.2 Quality control check of final products:**

- Peroxide test of pasteurized milk,
- Microbial test &
- Sensory evaluation check.

### **5.3 C.I.P (Cleaning-in-Place):**

The full meaning of C.I.P is Cleaning-in-Place. C.I.P is using to ensure safety and to avoid contamination. Use caustic soda as a chemical to ensure C.I.P

#### **Purpose of C.I.P:**

- To avoid contamination
- To ensure safety
- To maintain the reputation

#### **Procedure:**

1. At 1st cold water is used to wash the pipe/vat/tanker then use hot water to wash the pipe/vat/tanker
2. Then use Sodium Hydroxide (caustic soda) 0.5 to 2% / Volume of water to wash again
3. Then use hot water to clean the sodium hydroxide
4. Finally takes last water as a sample to ensure C.I.P

5. Use Phenolphthalein indicator with the water if no color change found that means C.I.P has been done perfectly.

6. But if the water turns into pink color with Phenolphthalein indicator that means C.I.P has not been done perfectly

7. Then again have to follow the C.I.P procedure.

#### **Use of C.I.P:**

- Use for transport tanker
- Use for storage vat & pipes
- Use for transport tanker

### **5.4 Platform test:**

Platform test is also known as an alcohol test. 68% ethanol is used for this test. Normally it was done by the ratio of 1:1 but in milk-vita it was done by the ratio of 2:1, ethanol: sample (milk). This test is done to find out milk acidity.

#### **Apparatus & equipment:**

- Sample (Milk)
- Test tube
- Pipette
- Ethanol

#### **Procedure:**

1. 1st of all 2ml 68% ethanol is taken into a test tube by a pipette
2. Then 1ml milk is added to the test tube then Shake the sample for a while.
3. If milk coagulates and stable with the test tube's body then alcohol positive, so this milk is not perfect for further process as pasteurized milk.
4. If milk does not coagulate then alcohol negative and this milk this good for the further process.
5. Remember that have to be careful about the use of apparatus.

## 5.5 Fat test:

A fat test is another quality control test of milk. It is also important for pricing the milk. Because milk-vita fixed price of milk by fat percentage. A different animal has a different fat percentage in their milk.

### Apparatus & equipment:

- Sample (Milk)
- Butyrometer, Nockstop, & pin
- Centrifuge machine
- Sulfuric acid
- Amyl alcohol

### Procedure:

1. 10ml sulfuric acid is taken into butyrometer then 10.47ml milk is added into it.
2. Then 1ml amyl-alcohol also added to the mixer some water has been added to adjust the mixer.



**Figure: Butyrometer**

3. Then nock-stop and a pin are used to lock the butyrometer.
4. Then shake the mixer for sometimes then put the butyrometer in the centrifuge machine for 5mintues with 110RPM at 60°C.

5. Then measure the fat percentage by open eyes.
6. Normally 3.5 is expected but it can be 3.2 to 4.2
7. Need to be careful in time of using centrifuge machine.

**Purpose of Fat test:**

- To know the fat percentage
- To know how much skim milk should use
- Extracted extra fat can be useful for making other dairy products
- To minimize cost
- To fix the price of milk.
- To extract extra fat from milk

**5.6 CLR (Corrected Lactometer Reading) test:**

Corrected Lactometer Reading is the short form CLR. It also is known as specific gravity test or density test. In this test lactometer and temperature reading is important. If temperature found below 20°C then for per 1°C, 0.2 will be deducted from lactometer reading. Similarly, temperature found greater than 20°C then for per 1°C, 0.2 will be added with lactometer reading. This test is used to know the density of milk. A normal specific gravity of milk is 1.026 to 1.028.

**Apparatus & Equipment:**

- Sample (milk)
- Lactometer jar
- Lactometer with thermometer



**Figure: Corrected Lactometer Reading test**

**Procedure:**

1. Clean the lactometer and jar finely then put the lactometer into the jar
2. Then put the milk into the jar
3. To adjust temperature flow the water on the jar
4. Then measure the lactometer reading and temperature.
5. Then calculate the CLR.

**5.7 Peroxidase test:**

It is another quality control parameters of pasteurized milk. This test is conducted to verify the effectiveness of pasteurization of milk.

**Apparatus & Equipment:**

- Test tubes
- Pipette
- $H_2O_2$
- Paraphenylenediamine
- NaOH

**Purpose of this test:**

- To check the quality of pasteurized milk.
- To check the pasteurization is done properly or not

**Procedure:**

1. Take 5ml milk in a test tube Add 1 drop Sodium Hydroxide and shake it
2. Then add 1 drop Hydrogen Peroxide and shake it
3. Then add 2 drops paraphenylenediamine and shake the mixer for a few seconds
4. Wait 30 seconds
5. If any color change was seen in the mixer then peroxidase positive that means pasteurization has not been done properly
6. If seen no color change then peroxide negative that means pasteurization done properly.

**5.8 Soda Test:**

It is one type of adulteration test.

**Apparatus & Equipment:**

- Test tube
- Sample milk
- 100% Ethanol
- Rosalic acid

**Procedure:**

1. Take 2ml 100% alcohol in a test tube then Add 2ml milk in it.
2. Then Add 2ml rosalic acid
3. If pink color is seen then soda positive
4. If orange color is seen soda negative.

## 5.9 Salt test:

It is another adulteration test. People add salt to increase the SNF of milk.

### Apparatus & Equipment:

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

### Procedure:

1. At 1st take 5ml Silver Nitrate in a test tube then add 4 to 5 drops  $\text{K}_2\text{CrO}_4$  in it.
2. Then finally take 1ml milk
3. If brown color is seen in the mixer it means salt negative
4. If color turns into the slightly yellowish color that means salt positive

## 5.10 Sugar Test:

Sugar test is one kind of adulteration test. Some bad people added some sugar in milk to increase the density of milk. So to find out these officials do this test.

### Apparatus & Equipment:

- Sample milk
- Test tube holder
- Test tube
- Bunsen burner
- Resorcinol solution



**Purpose of sugar test:**

- To ensure safety
- To check adulteration
- To ensure there is no added sugar in milk

**Procedure:**

1. 1st of all 5ml resorcinol solution are taken into a test tube then add 1ml milk into it
2. After that added milk, it becomes coagulate
3. Then use the holder to hold the test tube to put it into the Bunsen burners flame
4. And Keep it until boiling
5. Then take away from flame and gives time to cool the mixer
6. Then within a few minutes if mixer turns brick red color which means sugar test positive
7. If the mixer shows a slightly red color then it is sugar test negative
8. So Sugar test positive milk is not acceptable.

**5.11 Microbiological /Bacteriological test:**

The bacteriological test is essential to know the bacterial count in milk and milk products. Because bacteria such as E. coli can cause contamination in milk. And E. coli can cause many problems in consumers if their number is high in the milk. Generally total count of bacteria range is 30 to 35 thousand. E. coli cause dysentery. More than this is not acceptable. Also, Coliform bacteria are a concern to count. If found more coliform then have to do C.I.P again in production channels.

**Characteristic of Coliform:**

- 10/ml
- Rod Shape
- Their production mainly occurs in soil

- Gram-negative bacteria
- Group of bacteria
- Gas producer (CO<sub>2</sub>)

**Apparatus:**

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

**Purpose of Microbiological test:**

- To ensure the safety of consumers health
- To ensure there is no contamination
- To ensure proper C.I.P

**Procedure:**

1. 1st of all make a ringer solution or saline solution by water and salt (Such as sodium chloride, potassium chloride, calcium chloride etc.)
2. Then pour them in the dilution tube then heat them until boil and remove from heat & let them cool
3. After that Spirit lamp is used to sterilize the pipette every-time before when use took a sample into the petri dish.
4. For coliform take 0.5ml and for total count take 1ml milk into the ringer solution and shake it to dilution the solution



**Figure: Microbiological test**

5. Then take 1ml from the dilution solution into another ring solution and dilute them
6. Then take 1ml from it and transfer it into a petri dish.
7. Then transfer red agar into the sample containing petri dish for coliform but transfer white agar into the sample containing petri dish for a total count
8. Adding red agar 2 times is good for the growth of bacteria
9. Then keep them in the incubator at 40 to 42°C for 18 hours.
10. After 18 hours count the bacteria by open eyes.
11. For total count calculate the bacteria by divided the petri dish into 4 parts and count 1 parts bacteria and multiply with 4 and multiply the digit by 100.
12. But for coliform count the colony and write them in the note.
13. If any unexpected result found then warn the operators to make sure proper C.I.P next time.

# **Chapter Six**

## **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:**

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

The specific gravity of milk varies from animal to animal. Normal 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 raise the density of milk by lying 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

The 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

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. A 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 diseases in human.

### **6.10 C.I.P Test:**

Positive (+) = Pink color

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

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

# **Chapter Seven**

## **Conclusion**

## **7.1 Conclusion:**

This internship program of milk-vita helped to learn lots of things about dairy products. Learn about milk process and variety test. It has covered both production and quality control site. It was a great opportunity to know about milk-vita and its regular works. Further, it enriched the knowledge about the processing of some dairy products such as pasteurized milk, chocolate milk, ice-cream, Laban, yogurt etc. also know how to maintain milk long time. It will be supportive in future to conduct adulteration test of dairy products. Adulteration test of milk such as soda test, salt test, sugar test etc has been learned there. Hopefully, during this internships, the knowledge gathered about doing products. Especially the information about BSTI standards of different doing products would be helpful in the future life. Also, knowledge about how to work in an industry, and learn about how to build up a network in a corporate job. And culture of a job market. Also, know the rules and regulation of the industry.

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