



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

**An Internship Report**

**On**

**Production & Quality Control of Dairy Product**

**At**

Bangladesh Milk Producers Co-operative union Limited (Milk-Vita)

(Dhaka Dairy Plant)

Milk-Vita road, Mirpur Section-7, Dhaka

**Supervised by**

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**Submitted date: 13-05-2019**

## Letter of Transmittal

Date: 13-05-2019

To

Prof. Dr. Md. Bellal Hossain

Professor and Head

Department of Nutrition & Food Engineering

Daffodil International University.

**Subject: Submission of an internship report on Production & QC assurance.**

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.

Thank you again for your support & patience.

Sincerely Yours

**MD. Rashadul Islam Rezvi**

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## Declaration

I am pleased to certify that the Internship report on **Production & Quality control of dairy products** by **MD. Rashadul Islam Rezvi**, bearing respectively **ID: 162-34-534** of the department of Nutrition & Food Engineering has been approved for presentation & defense/ viva-voice.

I am pleased to hereby that the data & finding presented in the report are the authentic work of MD. Rashadul Islam Rezvi. I strongly recommended that report presented MD. Rashadul Islam Rezvi for further academic recommendations & defense/ viva-voice. Md. Rashadul Islam Rezvi bears a strong moral character & a very pleasant personally. It has indeed a great pleasure working with him.

I wish him all success in life.



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

Professor and Head

Department of Nutrition & Food Engineering  
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## Acknowledgment

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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 objectives and goals.

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I also grateful to all the other NFE Faculty members for their great help during university life.

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 wish to express immense gratitude & humbly convey my heartfelt respect to the managing director.

## **Abstract**

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.

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**CHAPTER-ONE**  
**INTRODUCTION**



Milk is an ideal food. 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 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.

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 nutrient-rich, white liquid food produced by the mammary glands of mammals. It is the primary source of nutrition for infant mammals. It contains many other nutrients including protein and lactose. Interspecies consumption of milk is not uncommon, particularly among humans, many of whom consume the milk of other mammals.



## **1.2. Objective of the Study**

Objective study is divided into two types.

1. General Objective.
2. 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:**

- 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).

### **1.3. Methodology**

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.

### **1.4. Limitation of the report:**

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

- Due to some rules and regulation they did not give me some information because that is against their Policy.
- All of them were not filled up the feedback properly which cause insufficient of data.
- Due to insufficient time we was unable to collect 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 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**

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 increase purchasing power.
- To increase popularity
- To create new employment opportunity.
- To keep business morality.
- To develop local farmers condition.
- To ensure adulteration free final product.
- To increase quantity and quality products for consumers.

## **2.3 Products:**

- ❖ Pasteurized 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.

#### **3.1.1. 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-

- Acidity test.
- CLR test.
- Fat test.
- Organoleptic test.

#### **3.1.2 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**

## Composition of milk:

- Water-87.3%
- Fat- 3.7%
- Lactose – 4.5%
- Mineral – 0.7%
- Protein – 3.8%
- Albumin & Gluten- 0.5%

## 4.1 PASTEURIZED MILK

### Procedure:

- ❖ Raw milk is collected from farm and from co-operative union office.
- ❖ Collected raw milk is passed through platform test and others adulteration test.
- ❖ Then passed milk is chilled in a storage vat at 4°C.
- ❖ Storage milk is recombined with skim milk or full cream milk for maintaining fat percentage (3.5%) according to BSTI standard.
- ❖ If raw milk have higher fat percentage then skim milk is added to make balance.
- ❖ If raw milk have less fat percentage then full cream milk is added to make balance.
- ❖ Then these recombined milk is pasteurized at 80 to 85°C for 15 seconds.



Figure: 4.1 Milk Pasteurizer

- ❖ Pasteurized milk is homogenized by milk homogenizer.



Figure: 4.2 Milk Homogenizer

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



Figure: 4.3 Milk Packaging Machine

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



Figure: 4.4 Packaged Milk

- ❖ If found any fault in pasteurized packaged milk then it is taken away from packaging area and follow the procedure again.
- ❖ Well packaged pasteurized milk is stored in the freezing room at 0 to 40°C.

## 4.2. Ice-cream:

Ingredients/Recipe: (For 100kg)

- i. Sugar-16%.
- ii. Butter-8%.
- iii. Stabilizer-0.5%.
- iv. FCMP- 13.5%.
- v. Flavor- 0.21%.
- vi. SMP- 1.1%.
- vii. Water- All the rest.

### Procedure:

- ❖ At 1<sup>st</sup> 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. The mixing operation is blended at 80°C in the mixing vat so that the warm mix which dissolve them.
- ❖ 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.
- ❖ Homogenization helps largely to the smoothness of Ice-Cream which gives fine dispersion of butterfat globules in the mixture. The function of homogenizer is to break downs the fat globules.
- ❖ After the homogenization the mix is cooled down to 4°C. This is known as aging. The mix held in vat from 3 to 24 hours at a temperature of 5°C.
- ❖ Then fill them in the ice-cream container.
- ❖ Then freezing them in at freezing temperature.
- ❖ Then ice-cream are kept at hardening room for 1 hour at -20°C where semi-solid become solid ice-cream.
- ❖ After hardening ice-cream are kept in the storage room where temperature maintained -4 to -20°C.
- ❖ Then they are ready for marketing.

### **4.3. Sweet Yoghurt Manufacturing Process**

#### **Sweet yoghurt:**

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

Ingredients/Recipe:

- i. Milk.
- ii. Sugar.
- iii. Starter Culture.

#### **Procedure:**

- ❖ At 1<sup>st</sup> milk are taken in a cleaned vessels.
- ❖ Then boil them at boiling temperature, Milk-vita wants to assist good product to people.
- ❖ Then add 15% sugar in the milk.
- ❖ Then heat the mixer.
- ❖ Remove from the heat and cooled until 40°C.
- ❖ Added starter culture in the mixer.
- ❖ Then preserve it 6 hours to make curd.
- ❖ After that keep 4°C temperature in the storage.
- ❖ Then they are ready for packaging.
- ❖ Finally marketing them for sell.

## **4.4. Sour Yoghurt manufacturing process**

### **Sour Yoghurt:**

Milk-vita produce sour yoghurt. It is popular for using it in cooking specially in roast-making.

Ingredients/Recipe:

- i. Whole milk.
- ii. Skim milk.
- iii. Starter Culture.

### **Procedure:**

- ❖ At 1<sup>st</sup> whole milk are taken in a cleaned vessels.
- ❖ Then add skim milk into it.
- ❖ Boil them at boiling temperature.
- ❖ Then cool as soon as possible to 40 to 45°C.
- ❖ After that then add starter culture in it.
- ❖ Then wait for 4 hours to coagulate the mixer.
- ❖ Packaged in plastic box.
- ❖ Kept them in the refrigeration.
- ❖ Finally they are marketing for selling.

## 4.5. LABAN

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:

- i. Yoghurt.
- ii. Salt.
- iii. Stabilizer.
- iv. Sugar.

### Procedure:

- ❖ For making Laban at 1<sup>st</sup> yoghurt is poured into the mixer machine.
- ❖ Then salt and sugar are added into the yoghurt.
- ❖ Then stabilizer is used in the mixer.
- ❖ Well mixed mixer is ready to pour as Laban into the packaging bottle or jar.
- ❖ Poured bottles are sealed and labeled them nicely.
- ❖ After Labelling bottles are stored in the freezing room for 24hours.
- ❖ Then bottles are taken outside and make them dry.
- ❖ Finally wrapping them in a cartoon or box.
- ❖ Then stored them in the storage room.



#### **4.6. Rash-malai:**

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

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

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

##### **Procedure:**

- ❖ At 1<sup>st</sup> Take baking powder and curd (without water) are mixed together.
- ❖ Added some flour to make a soft dough and to make small shapes of sweet.
- ❖ Then sweet balls are kept in the syrup for boiling until it turns into double.
- ❖ Then the sweet balls are separated from syrup.
- ❖ In the meantime milk are heated until they become half by volume.
- ❖ Then hot milk are added into the sweet balls.
- ❖ Some green cardamom are used for flavor.
- ❖ Then they kept for being cool.
- ❖ Then cool rash-malai are packed in 1kg box container.
- ❖ After packaging they kept in the storage room.
- ❖ Finally they distribute to the seller.

**CHAPTER-FIVE**  
**Quality Control Section**

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

- Acidity test.
- Fat 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:**

Full meaning of C.I.P is Cleaning-in-Place. C.I.P is use to ensure safety and to avoid contamination. Use caustic soda as a chemical for ensure C.I.P

#### **Procedure:**

- At 1<sup>st</sup> cold water is used to wash the pipe/vat/tanker.
- Then use hot water to wash the pipe/vat/tanker.
- Then use sodium Hydroxide (caustic soda) 0.5 to 2% / Volume of water to wash again.
- Then use hot water to clean the sodium hydroxide.
- Finally takes last water as a sample to ensure C.I.P.
- Use Phenolphthalein indicator with the water if no color change found that means C.I.P has been done perfectly.
- But if water turns into pink color with Phenolphthalein indicator that means C.I.P has not been done perfectly.
- Then again have to follow the C.I.P procedure.

## 5.4 Acidity test

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

### Apparatus & equipment:

- i. Test tube.
- ii. Pipette.
- iii. Ethanol.
- iv. Sample (Milk).

### Procedure:

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

## 5.5 Fat test:

Fat test is another quality control test parameters of milk. It also important for pricing the milk. Because milk-vita fixed price of milk by fat percentage. Different animal have different fat percentage in their milk.

Apparatus & equipment:

- Butyric meter, Lockstep, & pin.
- Sulfuric acid.
- Amyl alcohol.
- Centrifuge machine.
- Sample (Milk).
- Centrifuge machine.

## Procedure:

- At 1<sup>st</sup> 10ml sulfuric acid are taken into butyric meter.
- Then 10.47ml milk is added into it.
- Then 1ml amyl-alcohol also added into the mixer.
- Some water has been added to adjust the mixer.
- Then nock-stop and pin is used to lock the butyric meter.
- Then shake the mixer for some times.
- Then put the butyric meter in the centrifuge machine for 5mintues with 110RPM at 60°C.
- Then measure the fat percentage by open eyes.
- Normally 3.5 is expected but it can be 3.2 to 4.2.
- Need to be careful in time of using centrifuge machine.

## 5.6 Salt test:

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

### Apparatus & Equipment:

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

### Procedure:

- Take 5ml Silver Nitrate in a test tube.
- Add 4 to 5 drops  $\text{K}_2\text{CrO}_4$  in it.
- Then finally take 1ml milk.
- If brown color seen in the mixer it means salt test was negative.
- If color turns into slightly yellowish color that means salt test was positive.

## 5.7 Sugar Test:

Sugar test is one kind of adulteration test. Because some bad peoples are intentionally add some sugar in milk to increase the density of milk. So to find out this officials do this test.

### Apparatus & Equipment:

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

### Procedure:

- At 1<sup>st</sup> 5ml resorcinol solution are taken into a test tube.
- Then add 1ml milk into the test tube.
- After added milk it become coagulate.
- Then use holder to hold the test tube to put it into the Bunsen burners' flam.
- Keep it until boiling.
- Then take away from flame and gives time to cool the mixer.
- Then within few minutes if mixer turns brick red color which means sugar test positive.
- If mixer shows slightly red color then the sugar test is negative.
- Sugar test positive milk are not acceptable.

# **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 butyric meter 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 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.

### **6.4 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.

## **Chapter Seven**

### **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. Further, it enriched the knowledge about processing of some dairy products such as pasteurized milk, chocolate milk, ice-cream, Laban, yoghurt etc. 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. have been learned there. Hopefully during this internships the knowledge gathered about doing products specially the information about BSTI standards of different doing products would be helpful in future life.