



Daffodil
International
University

Internship Report

On

Dhaka Dairy plant (Milk-vita)

Submitted To,

Professor Dr. Md. Bellal Hossain

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LETTER OF TRANSMITTAL

18th November 2018

Professor Dr. Md. Bellal Hossain

Head

Department of Nutrition and Food Engineering

Daffodil International University

Subject: Submission of an Internship report on quality control assurance and production of dairy products.

Dear Sir,

It is great pleasure and honor for me to have the opportunity to submit internship report on **Quality control assurance and production of dairy products** as a part of the Nutrition and Food Engineering 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 assurance and production of dairy products. I have got the opportunity to work in Dhaka Dairy plant (Milk-Vita) in “quality control and production Department” For thirty days under the supervisor of **Dr. Khondokar Aminul Islam**, additional general manager and Co-supervisor **Shahriar Fardous Bhuyan**, Senior officer and **Md Abdur Rahman**, senior officer quality control 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 judgement and suggestion. Your kind advice will encourage me to perform better planning in future.

Sincerely Yours

Kaniz Fatima Nipa

ID: 151-34-344

Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

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CERTIFICATE APPROVAL

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I am pleased to certify that the internship report on production and quality control of dairy products conducted by **Kaniz Fatima Nipa**, bearing **ID No: 151-34-344** 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 findings presented in the report are the authentic work of Kaniz Fatima Nipa. I strongly recommend the report presented by Kaniz Fatima Nipa for further academic recommendations and defense/viva-voice. Kaniz Fatima Nipa bears a strong moral character and a very pleasant personality. It has indeed been a great pleasure working with her. I wish her all success in life.



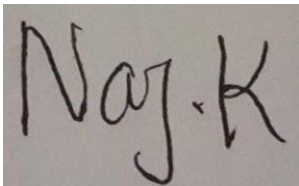
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ACKNOWLEDGEMENT

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

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

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

I am deeply indebted to my supervisor Prof. Dr. Md Bellal Hossain, Head of Department of Nutrition & Food Engineering, Daffodil International University for his whole-hearted supervision during my organizational attachment period.

I would also like to express my great respect & warmest thanks to my project co-supervisor Najia Kamrul, Lecturer of Department of Nutrition & Food Engineering for her whole-hearted help and supervision during my project work and organizational attachment period.

My gratitude goes to the entire NFE Department of Daffodil International University for arranging the Internship Program that facilitates integration of theoretical knowledge with real life situations.

Moreover, I would also like to express my gratitude to Bangladesh Milk Producers Co-operative Union Limited (BMPCUL), fellows, seniors and colleagues who gave me good advice, suggestions, inspiration and support. I must mention the wonderful working environment and group commitment of this organization that has enabled me to deal with a lot of things.

I am also thankful to **Dr. Khondoker Aminul Islam** “AGM”, 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 heart-felt respect to Managing Director

BACKGROUND

We are tried our level best to put more emphases on the consumer demand and its recovery process since it was the topic of our course program. This report is to be used only for the academic purpose. We have collected all the necessary and relevant information from various primary and secondary sources. We would like to give thanks to everyone who has helped and encouraged us in the process of preparing this report.

Keywords: Dairy product, Quality control, processing of product etc.

INTRODUCTION

- ❖ **History of milk-vita:** The Company was established as a cooperative that would collect milk from farmers in rural areas and sell them in urban areas of Bangladesh. Products manufactured by the company include liquid milk, yogurt, cream, power milk, butter and ghee etc.

The company was founded in 1974. In 2016 a government report found 12 private milk producers in Bangladesh were imitating the packaging of Milk Vita.

Milk Vita is a milk production company that produces milk under its own name. It is owned by Bangladesh Milk Producers Co-operative Union Limited, a cooperative managed by the government of Bangladesh. Milk Vita has 70 percent market share of liquid milk in Bangladesh. (1)

Milk is an ideal food for all kinds of mammals. Milk comes from mammary glands of mammals. Normally raw milk of cow and goat found in local market but processed milk are found in grocery shop as packaging milk. Now-a day a number of milk producer companies are available in Bangladesh. Bangladesh milk producers Co-operative Union Limited or milk-vita is one of them. Their purpose is to serve good products to consumer.

Milk-vita collects milk from local village by Co-operative union. Before collecting them milk-vita test the quality of milk by their local experts. Then they transform collected milk to their all milk processed plant. But before sending then they chilled their collected milk for ensuring quality of milk.

Bangladesh milk products Co-operative Union Limited or Milk-vita serve pure products than any others milk Producers Company. Their purpose is to consumer satisfaction. They don't looking for more benefits like others. (2)

Members supply milk to societies twice a day on cash payment with a preferential system of weekly basis matched on the market day of each area. The rate of the farmer's milk is decided on the basis of fat and solid non-fat (SNF) percentage. Milk collected from cooperative societies is transported to the nearest plant for preliminary processing and afterwards milk of Tangail, Manikganj, Tekerhat and Sreenagar areas is brought to Dhaka for the production of liquid milk, cream, ice-cream, flavored milk, and sweet yogurt. Milk collected from Rangpur and Baghabarighat areas is processed at Baghabarighat Dairy Plant for Powder Milk, Butter and Ghee (butter oil) production. All products of the organization are marketed under the trade name of 'Milk Vita' (3)

- ❖ **Origin of the report:** Internship program is a graduation requirement for NFE students. Daffodils International University and department of NFE provide Internship opportunity for students in different company and different sectors. Its main purpose to give the student knowledge about practical experience and real work place. It gives an opportunity to students 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 earn about competency and efficiency of real work environment.

- ✓ To help students to express dependability, initiative, and professionalism and tasks they are assigned.
- ✓ To get closer contact with job seekers.
- ✓ To fulfill the requirement of NFE program.
- ✓ To compare the real scenario with the lessons learned in DIU.
- ✓ To know about milk-vita.
- ✓ To learn about production and quality control of dairy products.
- ✓ To learn different types of dairy products.

This report is the result of one month long internship program conducted in Bangladesh milk products Co-operative Union Limited or Milk-vita is prepared as a requirement for the completion of the NFE program of DIU. As a result I need to submit this report based on the quality control assurance and production of dairy products.

❖ **Objective of the study:** Objectives are divided into two groups:

1. General objective
2. Specific objective

General objective:

- The main objective of this study is this is to learn production and quality control of milk and milk products.
- To fulfill the Bachelor of Nutrition and 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 products Co-operative Union Limited or Milk-vita
- To know different activities of this organization.
- To give an overview of Bangladesh milk producers Co-operative Union Limited or Milk-vita.

❖ **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 and dairy products compositional standard and quality and processing of dairy products by the dairy 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 and quality control assurance department.

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❖ **Methodology:** A systematic procedure is required for the preparation of the final report. Methodology starts from selection of topic, data source, and interpreted result in a systematic manner and key points are to be fine out. The overall processes of methodology are as follow.

❖ **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 sources.

➤ **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 website 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.

❖ **Limitation of the report:** Every report has some limitation so my report has also some limitation. These are including 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 were unable to give me much information.

PRODUCTION PART OF MILK VITA

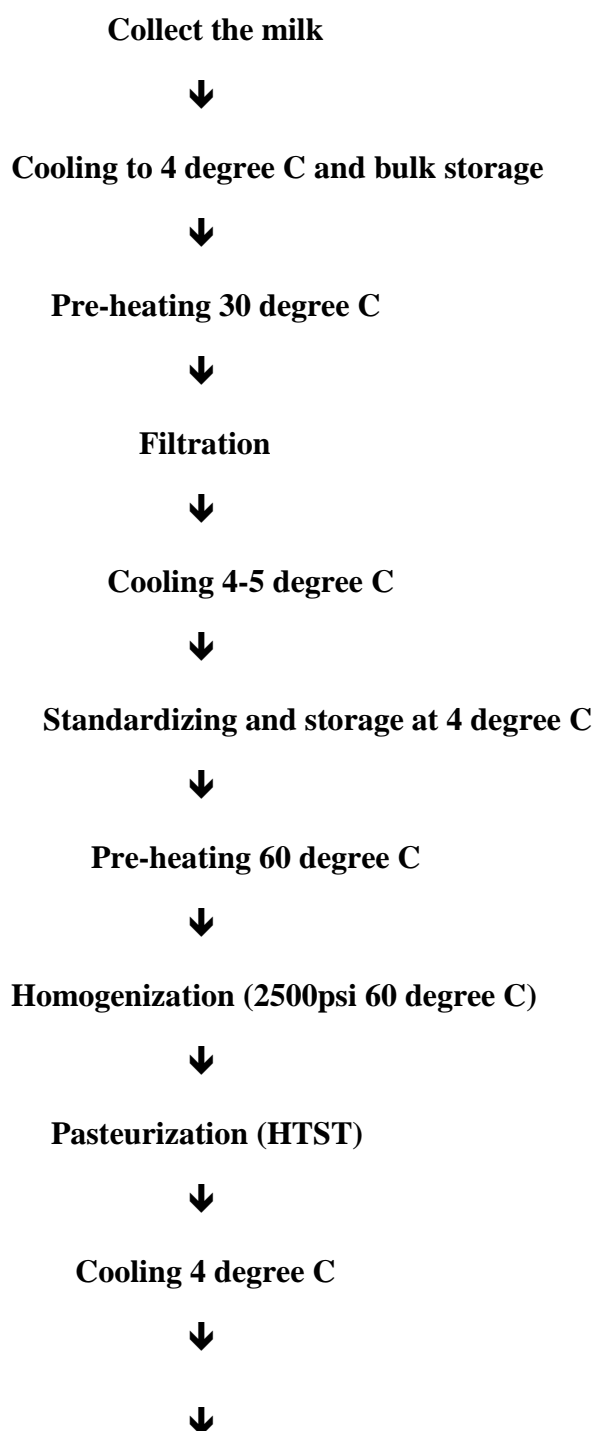
➤ **Definition of milk:** Milk is a translucent white liquid substance which is produced by mammary glands of mammals. It is the primary source of nutrition for young mammals before they are able to digest

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. (4)

➤ **Milk composition:**

- ✓ Water: 87.3%
- ✓ Total solid: 12.7%
- ✓ Fat: 3.7%
- ✓ Solid not Fat: 9% (Protein: 3.8%, Lactose: 4.5%, Mineral: 0.7%).

➤ **Manufacturing of process milk: Pasteurized milk flow chart below including:**



Packaging



Storage at 2-4 degree C

▪ Procedure:

- 1) First of all collect the milk at local village or farm.
- 2) Then raw milk passed through platform test and other adulteration test.
- 3) Then milk send into receiver tank and cooling at 4 degree C.
- 4) Storage milk recombined with skim milk on full cream milk maintain fat percentage 3.5% according BSTI.
- 5) If raw milk has higher fat percentage then skim milk is added to make balance. If raw milk has less percentage then full cream milk is added to make balance.
- 6) Then standardizing and storage milk at 4-5 degree C.
- 7) Then again pre-heat the milk at 60 degree C.
- 8) Then pasteurization milk at 80-86 degree C 15 second via High temperature short time method.
- 9) Then pasteurized milk is homogenized by milk homogenizer. Homogenizer work is mixing of fat globule in milk. Then cooling them at 4 degree C.
- 10) Then packaging the milk and storage at 2-4 degree C.



Fig: Process milk (Picture collect from google)

➤ Manufacturing process of chocolate milk: Ingredient for 400 kg:

- Solid milk powder: 12kg
- Full cream milk powder: 30kg
- Sugar: 33kg
- Stabilizer: 0.60kg
- Cocoa powder: 2.80kg
- Color: 0.032kg
- Water: 321.568kg

▪ **Procedure :**

- 1) At first hot water (60 degree C) with all ingredients mixing SMP, FCMP, sugar and blended 80 degree C in the mixing vat.
- 2) The mixture is pasteurized by heating process vat to at 81 degree C for 15 second.
- 3) Then homogenizer mixing at 60 degree C.
- 4) Then foil paper packaging.
- 5) Then storage at 2-4 degree C.



Figure: chocolate milk.

➤ **Manufacturing process of Ice-cream: Ingredient for 100 kg:**

- Sugar: 16%
- Butter: 8%
- Stabilizer: 0.5%
- Full cream milk powder: 13.5%
- Flavor: 0.21%
- Skim milk powder: 1.1%
- Water: All the rest.

▪ **Procedure:**

- 1) At first some hot water (60 degree C) added in blending vat all ingredients then add water as blended temperature 80 degree C.

2) Then the mixture is pasteurized by a continuous heating process. The liquid mixture is heated in a vat to at 80 degree C for 15 seconds and subsequently cooled by the chilled water which helps in a vat to destroy pathogenic bacteria present in the mixture.

3) 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 globule.

4) After the homogenization the mix is cooled down to 4 degree C. This is known as aging. The mix held in vat from 3 to 24 hours at a temperature of 5 degree C.

5) Then fill them in the Ice-cream container.

6) Then freezing them in at freezing temperature.

7) Then Ice-cream is kept at hardening room for 1 hour at -20 degree C where semi solid become solid ice-cream.

8) Then packaging ice-cream.

9) After hardening ice-cream are kept in storage room where temperature maintained -4 to -20 degree C.

10) Then it's ready for marketing.



Figure: Chokber ice-cream

➤ **Manufacturing process of sweet yoghurt: Ingredients:**

- Milk
- Sugar
- Culture

▪ **Procedure:**

- 1) First of all milk is taken in cleaned vessels.
- 2) Then boil them at boiling temperature until 40% reduced by weight, milk-vita wants to assist good products to people so the do this.
- 3) Then add 15% sugar in the milk.
- 4) Then heat the mixer.
- 5) Remove from the heat and cooled until 40 degree C.
- 6) Then added starter culture in the mixer.

- 7) Then preserved it 6 hours to make curd.
- 8) Then keep them at 40 degree C temperature.
- 9) Then it's ready for packaging.
- 10) Then distribution in market.



• **Health benefit of yoghurt:**

- It is easier to digest than milk.
- It is packed with vitamin
- It is boosts the immune system
- It curbs our hunger.
- It is good for bone
- It is good for digestive system

➤ **Manufacturing process of sour yoghurt: Ingredient**

- Whole milk
- Skim milk
- Culture

▪ **Procedure:**

- 1) 1) First of all milk is taken in cleaned vessels.
- 2) Then add skim milk into it.
- 3) Then boil them at boiling temperature.
- 4) Then cool as soon as possible to 40-50 degree C.
- 5) Added starter culture in it.
- 6) Then wait for 4 hours to coagulate the mixer.
- 7) Then package in plastic box.
- 8) Then they kept them in the refrigeration.
- 9) Then they are marketing for selling.



▪ **Health benefits of sour yoghurt:**

- It boosts your digestion system and works best for stomach upsets, indigestion, bloating, etc.
- High in calcium and protein, beneficial for those who are lactose intolerant and can't take in milk.
- It works as an energy booster. It also hydrates your body and works as an antioxidant.
- Curd can be an excellent Ayurvedic home remedy for many health conditions.
- Great for hair and skin.
- Best form of fat-curd has the same nutritional value as milk.

➤ **Manufacturing process of Laban (A yoghurt drink):** It is dairy product which is also known as yoghurt drink. It found all over the world but specially in south- Asian country. Milk-vita provides 80% yoghurt in their Laban. **Ingredient: For 150 kg**

- Sour curd: 128 kg
- Salt: 0.89 kg
- Treated water: 21.7 kg
- Sugar: 12.87 kg
- Xanthene gum: 0.038 gm

▪ **Procedure:**

- 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 24 hours.
- 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.

➤ **Manufacturing process of Matha (A yoghurt drink): Ingredient for 35 kg.**

- Sour curd: 29.5 kg
- Water: 7.39 kg
- Sugar: 2,5 kg
- Salt: 0.22 kg
- Bit salt: 0.027 kg
- Xanthene gum: 0.0088kg

▪ **Procedure:**

- 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) Then packaging in bottles jar.
- 6) Finally wrapping them in a cartoon or box.
- 7) Then stored them in the storage room for 24 hours.
- 8) Then distributed in market.

➤ **Manufacturing process of Rash-malai:** It is one of the sweet dairy products made by milk-vita. It is also a popular sweet dessert in south- Asian country. Ingredient:

- Curd
- Flour
- Baking powder
- Green cardamom
- Syrup

▪ **Procedure:**

- 1) At first some baking powder and curd without water are mixed together to make dough.
- 2) Some flour is used in the dough to make easier handle and make good shapes of sweet.
- 3) Then small sweet balls are kept in the syrup for few hours.
- 4) Then sweet balls are separated from syrup.
- 5) In the meantime milk is heated until they become half by volume.
- 6) Then hot milk is added into the sweet balls.
- 7) Some green cardamom are used for flavor
- 8) Then they kept for being cool.
- 9) Then cool rash-malai is package in 1 kg box container.
- 10) After packaging they kept in the storage room. Then they distributed to the seller.



Figure: Rash-malai**QUALITY CONTROL PART OF MILK-VITA****➤ Quality control check of raw milk such as:**

- Platform test or Alcohol test.
- CLR test
- Fat test
- Soda test
- Salt test
- Sugar test

➤ Quality control check of final products:

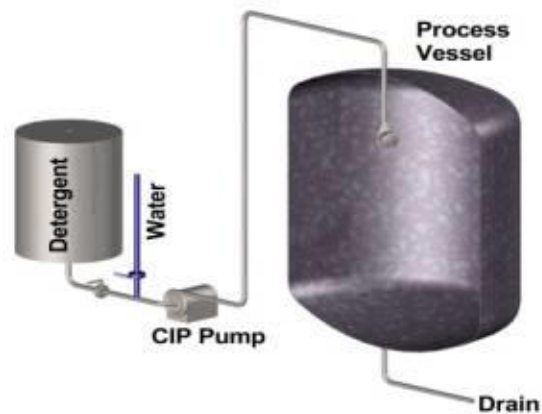
- Peroxide test of pasteurized milk.
- Microbial test
- Sensory test.

- **C.I.P:** C.I.P means cleaning-in-place. C.I.P is use to ensure safety and to avoid contamination. Use caustic soda as a chemical for ensures C.I.P. Cleaning in place, or CIP, refers to all those mechanical and chemical systems that are necessary to prepare equipment for food processing, either after a processing run that has produced normal fouling or when switching a processing line from one recipe to another. Cleaning in place means that cleaning takes place without dismantling the system. CIP is an important component in guaranteeing food safety in food processing plants. Successful cleaning

between production runs avoids potential contamination and products that don't meet quality standards. Carrying out CIP correctly – from design to validation – ensures secure barriers between food flows and cleaning chemical flows.

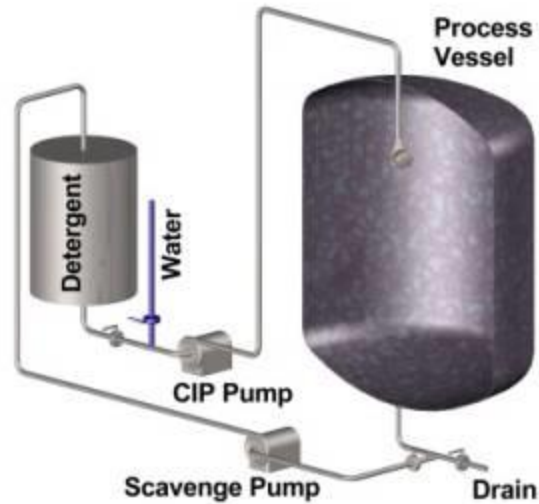
- **CIP Different types of Cleaning-in-Place systems exist:**

1) **Single pass system:** New cleaning solution is introduced to the plant to be cleaned and then disposed to drain. In most cases, a single pass system would start with a pre-rinse to remove as much soiling as possible. The detergent clean and a final rinse would follow this. (5)



2) **Recirculation system:** The cleaning solution is made up in an external tank then introduced to the plant to be cleaned. It is recirculated and topped up as required until the cleaning cycle is complete. When the detergent clean is complete it is then normal to carry out a final rinse.

Recirculation systems use less water and cleaning detergents but require greater capital outlay and in some circumstances may be unsuitable due to cross contamination from one process to another. (5)



▪ **C.I.P Procedure:**

- 1) At first cold water is used to wash the pipe or vat or tanker.
- 2) Then use hot water to wash the pipe or vat or tanker.
- 3) Then use sodium Hydroxide (caustic soda) 0.5% to 2% volume of water to wash again.
- 4) Then use hot water to clean the sodium hydroxide
- 5) Finally takes last water as a simple to ensure C.I.P
- 6) Use phenolphthalein indicator with the water if no color change found that means C.I.P has not been done perfectly.
- 7) But if water turns into pink color with phenolphthalein indicator that means C.I.P has not been done perfectly.
- 8) Then again have to follow the C.I.P procedure.

▪ **Purpose of C.I.P :**

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

▪ **C.I.P for use:**

- Use for transport tanker
- Use for storage vat or pipe.

- Use for processing pipe, vat, tanker.

➤ **Platform test of milk:** Platform test is also known as alcohol test. 68% ethanol and 32% water are make solution. This test is done for find out milk acidity. Normally it done by the ratio 1:1 bur milk-vita it done by the ratio of 2:1, ethanol: sample (milk).

- **Apparatus & Equipment:**

- Test tube
- Pipette
- Ethanol
- Sample (milk).

- **Procedure:**

- 1) First of all 2ml 68% ethanol is taken into a test tube by a pipette.
- 2) Then 1ml milk is added into the test tube.
- 3) Shake the sample for white.
- 4) 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.
- 5) If milk not coagulates then alcohol negative and this milk this good for further process.
- 6) Remember that have to be careful about the use of apparatus.

➤ **CLR test:** CLR means corrected lactometer reading. This test ae use to determine specific gravity of milk.

- **Materials:**

- Lactometer was used at 29°C calibration temperature.
- °C thermometer.
- Measuring cylinder.

- **Procedure:**

- 1) Milk sample was mixed gently and poured it gently into a measuring cylinder.
- 2) The Lactometer was sinking slowly into the milk.
- 3) The last Lactometer degree just above the surface of the milk was read and recorded.
- 4) If the temperature of the milk is different from the calibration temperature of the lactometer, the temperature correction was calculated.
- 5) For each °C above the calibration temperature 0.2°L was added.

6) For each °C below calibration temperature 0.2 °L was subtracted from the recorded lactometer reading.

▪ **Purpose of CLR test:**

- The difference of CLR at various regions.
- To find out CLR of milk from different breed of cattle.
- Difference of CLR in relation to feeding.
- CLR of milk at society level.



➤ **Fat test of milk:** Fat test is another quality control test parameter 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:**

- Milk
- Sulfuric acid
- Amyl alcohol
- Pipette.
- Centrifuge machine
- Butyrometer
- Butyrometer stand
- Rubber stopper

▪ **Procedure:**

- 1) Put the clean and dry butyrometer in a butyrometer stand with open mouth upwards.
- 2) Run 10 ml of sulfuric acid with the tilt measure in the butyrometer.
- 3) Pipette out 10.75 ml of milk sample gently by the side of butyrometer, whose temperature is about 15-21 degrees C.
- 4) Pour 1 ml. of amyl alcohol with tilt measure.
- 5) Stopper the butyrometer with the help of lock stopper using regulating pin.

- 6) The tube is well mixed till mahogany red color is obtained. Keep the butyrometer in hot water bath till it attains 15-21 degrees C and the butyrometer are placed in the centrifuge at 1100 rpm for 4 minutes.
- 7) Take out the butyrometer in an upright position with the stopper end down wards.
8. Keep the butyrometer in hot water bath at (65 degrees C) for some time.
9. Note the reading, Reading should be taken from bottom of the fat column to lower border of meniscus on the scale.

▪ **Purpose of fat test in milk:**

- To determine different milk fat
- To check adulteration
- To check level of fat in milk.



Figure: centrifuge machine.

- **Salt test in milk:** It is another adulteration test. People add salt to increase SNF (solid not fat) of milk.

• **Apparatus& Equipment:**

- Test tube
- Silver Nitrate (AgNO_3)
- Potassium chromate (K_2CrO_4)
- Sample milk

▪ **Procedure:**

- 1) Take 5ml silver nitrate in a test tube.
- 2) Add 4 to 5 drops potassium chromate.
- 3) Then finally take 1ml milk.
- 4) If brown color seen in the mixer it means salt negative
- 5) If color turns into slightly yellowish color that means salt positive.



Figure: salt test

- **Sugar test in milk:** Sugar test is also adulteration test in milk. Because some dishonest people are intentionally add some sugar in milk to increase the density of milk. So to find out these officials do this test.

- **Apparatus& Equipment:**

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

- **Procedure:**

- 1) First of 5ml resorcinol solution are taken into a test tube.
- 2) Then add 1ml milk into the test tube.
- 3) After added milk it becomes coagulated.
- 4) Then use holder to hold the test tube to put it into the Bunsen burners' flam.
- 5) Keep it until boiling.
- 6) Then take away from flam and give time to cool the mixer.
- 7) Then within few minutes if mixer turns brick red color which means sugar test positive.
- 8) If mixer shows slightly red color then it is sugar test negative.
- 9) Sugar test positive milk are not acceptable.

- **Purpose of sugar test:**

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

➤ **Soda test of milk:** Soda test is also known as milk adulteration. There are many methods known for detection of adulteration in milk but the methods discussed below are simple but rapid and sensitive methods to detect adulteration. In milk neutralizers like hydrated lime, sodium hydroxide, sodium carbonate or sodium bicarbonate are added which are generally prohibited.

- **Apparatus& Equipment:**

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

- **Procedure:**

- 1) Take 5 ml of milk in a test tube.
- 2) Then 5 ml ethanol followed by 4-5 drops of rosalic acid.
- 3) If the color of milk changes to pinkish red, then it is inferred that the milk is adulterated with sodium carbonate/sodium bicarbonate and hence unfit for human consumption.
- 4) If the color is yellow brown then the test is negative.



Figure: Soda test.

➤ **Peroxide test of pasteurized milk:**

• **Apparatus& Equipment:**

- Hydrogen peroxide.
- Paraphenylenediamine
- Sample (milk)
- Sodium hydroxide
- Pipette

▪ **Procedure:**

- 1) Take 5ml milk in a test tube.
- 2) Add 1 drop sodium hydroxide and shake it.
- 3) Add 1 drop hydrogen peroxide and shake it.
- 4) Add 2 drops paraphenylenediamine and shake the mixer for a few seconds.
- 5) Wait 30 seconds.
- 6) If any color change seen in the mixer then peroxidase positive that means pasteurization has not been done properly.
- 7) If seen no color change then peroxidase negative that means pasteurization done properly.

▪ **Purpose of peroxidase test:**

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

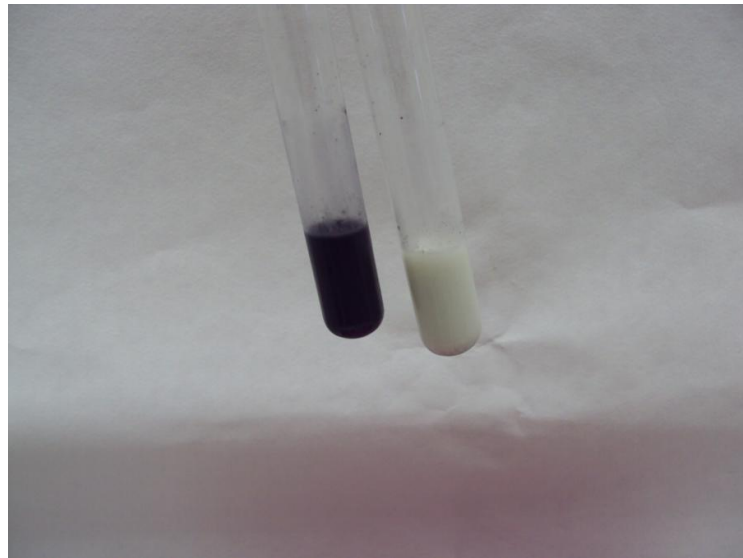


Figure: peroxidase test

- **Microbiological or Bacteriological test:** Bacteriological test is important to know about the bacterial count in milk products. Because bacteria such as *E. coli* can cause contamination in milk. *E. coli* can cause many problems in consumers if their number is high in the milk. Normally total count of bacteria range is 20 to 25 thousand. *E. coli* causes dysentery more than this is not acceptable. Also coliform bacteria are concern to count. If found more coliform then have to do C.I.P again in production channels.
- **Characteristic of coliform bacteria:**
 - Gram negative bacteria
 - Group of bacteria
 - Rod shape
 - Gas producer (CO₂)
 - Their production mainly occurs in soli.
 - 10/ml
- **Apparatus:**
 - Bunsen burner
 - Pipettes
 - Dilution tubes
 - Petri dishes
 - Incubator
 - Autoclave
 - Refrigerator
 - Spirit lamp

▪ **Procedure:**

- 1) At first make a ringer solution by water and salt (such as sodium chloride, potassium chloride, calcium chloride etc.)
- 2) Then pour them in the dilution tube.
- 3) Then pour them until boil and remove from heat and let then cool.
- 4) Then take 0.5ml milk and 9ml salt water.
- 5) Then takes 10ml bile agar which is white color in petri dish.
- 6) When media is cool then slowly added 1ml solution in this media.
- 7) After added this solution then spree this solution via speeder.
- 8) Then incubation for 18 hours. Then count bacteria colony.



Figure: coliform test.

Total Plate Count: The purpose of this work instruction is to ensure that the number of colony forming units (CFU) per millimeter or per gram of the original sample is determined correctly. A defined test portion or series of decimal dilutions of the sample are mixed with culture media in Petri dishes and incubated. The number of colony forming units (CFU) per milliliter or per gram of the original sample is calculated from the number of colonies counted on selected dishes. That is seen viable bacteria, live bacteria.

- **Reagents and equipment for media preparation:**

- Analytical balance
- Spatula
- Filter papers
- Autoclave
- Distilled water
- Water bath at 37°C
- Nutrient media
- Salt water solution
- Sterile Petri dishes 90 – 95mm diameter
- Sterile pipettes of 1ml and 10ml
- Sterile Petri dishes

- **Procedure:**

- NB was prepared and inoculated with E. coli and S. aureus which was isolated from milk samples.
- The culture was kept in incubation for overnight.
- Respective dilutions were prepared with NaCl for both E. coli and S. aureus.
- Spread plating of these dilutions was performed in NB agar plates.

- Plates were then incubated overnight to grow colonies.
- Colonies were counted and Colony Forming Unit (CFU/ml) was calculated by given formula
- $CFU/ml = (\text{no. of colonies} \times \text{dilution factor}) / \text{volume inoculated}$.

Pour Plate Method

1 Bacterial sample mixed with warm agar (45–50 °C)



2 Sample poured onto sterile plate



3 Sample swirled to mix, allowed to solidify



4 Plate incubated until bacterial colonies grow



Figure: Total plate count system.

(Image collects from google)

RESULT AND DISCUSSION OF QUALITY CONTROL UNIT

➤ Alcohol test:

- Alcohol test positive (+) = Coagulation of milk.
- Alcohol test negative (-) = No coagulation of milk.

In milk-vita we found mostly alcohol test is negative. Alcohol positive milk must be rejection for further process.

➤ 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 animals milk. And less than 2% fat containing milk must be rejected.

➤ CLR test:

Milk-vita tested milk specific gravity was 1.0286 which means no water was added in it. Specific gravity of milk varies from animal to animal.

Normal gravity of cow milk range is between 1.028- 1.030 and buffalo milk range is 1.030- 1.032. Sugar and flour is added to raise the density of milk by lying people.

➤ Peroxidase test:

- Peroxidase positive (+) = Blue color
- Peroxidase negative (-) = White color

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

➤ Soda test:

- Soda test positive (+) = Red rose or Brick color
- Soda test negative (-) = Orange color.

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

➤ Slat test:

- Salt test positive (+) = Yellow color
- Salt test negative (-) = Brown color.

Salt test was negative in milk-vita. Salt test positive milk is known as adulterated milk. If salt test is positive milk must be rejected. Salt is added to milk increase the solid not fat content of milk.

➤ **Sugar test:**

- Sugar test positive (+) = Brick red color
- Sugar test negative (-) = slightly red color.

Milk-vita sugar test was negative all time. Sugar test 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.

➤ **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.

➤ **Microbiological test:**

Total bacterial count test was 18 thousand/ml. Maximum 25 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 diseases in human.

➤ **C.I.P test:**

- C.I.P positive (+) = pink color
- C.I.P negative (-) = no color

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

- ❖ **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 activities. Further it enriched the knowledge about processing of some dairy products such as pasteurization 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, sugar test, salt test, etc. have been learned there. This internship program knowledge gathered about doing products specially the information about BSTI standards of different dairy products would be helpful in future life.

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The End

