Internship Report

ON

Study on Lovello Ice-Cream

At

Taufika Foods and Agro Industries Limited.

Bashile, 6 No Union Parishad, Bhaluka Upazila, Mymensingh.

Submitted To:

Prof. Dr. Md. Bellal Hossain

Head

Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

Submitted By:

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ID: 151-34-357

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Date of Submission: 22 Dec, 2018

Letter of Transmittal

Date: 22 December, 2018

Prof. Dr. Md. Bellal Hossain

Head

Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

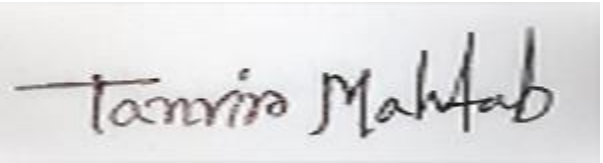
Subject: Submission of Internship Report.

Dear Sir,

I am Tanvir Mahtab, ID: 151-34-357. Now I am hereby submitting my internship report, which was a part of the NFE program. It was a great achievement to work active supervision. This report was based on, “Lovello Ice-Cream”. This internship gave me both academic and practical exposures.

I will be highly obliged if you are enough to receive this report and provide your valuable judgment.

Sincerely yours,



Md. Tanvir Mahtab

ID: 151-34-357

Department of Nutrition and Food Engineering

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Daffodil International University

Certificate Approval

I am pleased to certify that the internship report on "Lovello Ice-Cream" at Taufika Foods and Agro Industries Ltd. conducted by Md. Tanvir Mahtab, bearing ID: 151-34-357 of Department of Nutrition and Food Engineering has been approved for Defense/Viva-voce. Under my supervision, Md Tanvir Mahtab worked in "Lovello Ice-Cream" at Taufika Foods and Agro Industries Ltd.

I am pleased to hereby certify that the data and test presented in the report are authentic work of Md. Tanvir Mahtab. I strongly recommended the report present by Md. Tanvir Mahtab for further academic recommended and defense/viva-voce. Md Tanvir Mahtab bears a strong moral character and a very pleasant personality. I wish his all success in life.

Prof. Dr. Md. Bellal Hossain
Head
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Acknowledgements

First of all, my gratitude goes to the almighty Allah for giving me the patience and capability to complete my duty and responsibilities in a well-being and sound health. Then my parents, who had put me on the map, supported and encourages me in every situation.

I would like to express my gratitude to **Professor. Dr. Md. Bellal Hossain,** Head of the Dept. of Nutrition and Food Engineering, Daffodil International University for creating this enormous scope of practical knowledge in the curriculum and providing me valuable guidance to complete my internship work.

My deepest respects and thankfulness to **Mr. Rafiqul Islam,** Assistant Manager (Quality Assurance, R&D) Taufika Foods and Agro Industries Ltd, and for allowing me to complete the internship in "Lovello Ice-Cream".

I greatly appreciate **Mr. Ekramul Haque**, Managing Director of Taufika Group, Md. **Abdul Mojid,** Assistant General Manager Production, **Md. Liton Miah,** Assistant Quality officer, **Md. Shahadot Hossain,** Deputy Manager-HR, Admin & Compliance, **Ismail Hossain,** Production Manager**, Saddam Hossain,** Assistant Quality officer in "Lovello Ice-cream"

Abstract

The Internship was conducted at Taufika Foods and Agro industries Ltd. in “Lovello Ice-Cream” from 06 October, 2018 to 01 November, 2018. This factory mainly manufactures by different types of Ice-Cream and only Ice-Cream Cake.

To prepare Ice-Cream is used to sugar, Skim milk powder, water, stabilizer, emulsifier, food grade flavor, food grade color, butter oil, coconut oil, anhydrase milk fat, full cream milk powder and L-glucose. After preparing the mixing tank of ice-cream pasteurized and homogenized. In Ice-Cream mainly check physical, chemical and microbiological test for quality control.

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Introduction

In my Bachelor of Science Degree in Nutrition and Food Engineering, I got an opportunity to work at Taufika Foods and Agro Industries Ltd Lovello Ice-Cream which is the part of my Internship program. The duration of my internship was 06 October, 2018 to 01 November, 2018. Taufika Foods and Agro Industries Ltd in Lovello Ice-Cream is a very popular and dairy based company in Bangladesh, which is situated in Bashile, Kathali, 6 no. Bhaluka Union Parishad, Mymensingh. Lovello Ice-Cream has many type of department. My concern to all this department getting some knowledge.

The motto of Lovello Ice-Cream "Beats of My Heart" suits best to define its various type of products, with more than 50 stock keeping units and 52 items product for retailers and business entrepreneurs. Ice creams of Lovello ice-cream is not only made for only the retailers but also the company is finely serving the demand of the commercial clients of the food business such as premium ice cream serving parlors and Ice cream cake. To reach every pocket of the country the company has established 11 points of major distributors or dealers all over the Bangladesh.

There are a mentionable number of skilled human resources from home and abroad in the world class state-of-the-art factory, where Lovello ice cream will be produced according to the obtained result on opinion, demand and taste from a long survey amongst ice cream lovers.

Physical, Chemical and Microbiological tests and their documentation of the incoming raw and packaging materials, ongoing products and finished products is a unique system strictly maintained by the all departments of the factory.

To share their quality and experiences, the company regularly accepts interns from renowned educational institutions all over the country. Here, the students not only get familiar with the industrial and organization lie and behavior, the also get the chance to learn the reality of the food processing industry. As the student of Nutrition and Food Engineering of Daffodil International University Three Students were given the opportunity to complete our internship five weeks in Lovello Ice-Cream.

About Lovello Ice-Cream

The Taufika Foods and Agro Industries Ltd launched a new ice cream brand, Lovello, at the Hotel Pan Pacific Sonargaon in the city. Lovello Ice Cream was formally launched on February 14, 2016 on Valentine's Day.

Managing Director of the company Ekramul Haque, Chief Operating Officer, Momtazul Islam, Head of Operations, PW Gunapala, (GM), Head of Planning and Marketing Pervez Hasan were, among others, present.

The factory of Lovello has been setup on 5 acres of land in Bhaluka Upazila of Mymensingh district with an initial investment of Tk 1.0 billion, Md Ekramul Haque, managing director of Taufika Foods and Agro Industries Ltd.

The Unit was then assembled with upcoming, Modern machineries form the best manufacturers all over the world. Lovello has ensured quality at competitive prices and enthusiasts can enjoy a range of products which are unique, all the raw materials, machineries and technologies related to ice cream processing have been imported from EU and the US.

Lovello Ice Cream has been producing from the only well-planned eco-friendly ice cream factory of the country, established in a huge aesthetic landscape at Bhaluka, Mymensingh with own power support and green ETP plant. The factory was launched, following all standards and mandatory steps before entering the market.

The unprecedentedly yummy ice creams like Hidden Heart (3 Flavours in 1), Heart Beats (2 flavors in 1), Toffee Beats, Hazel Beats, Sixty Nine Lolly, 50ml mini cup, 750ml container and many more, according to the ice cream lovers' palate and pocket. For the first time in Bangladesh, it has brought Premium quality Shahi Khajur Malai with 100 per cent natural Khajur flavor, Mini Cone, Couple Tub, Hidden Heart Single and Heart Beats Single in mini size variation to meet individual needs and demand. Now it is time to become the heart beats of everyone. That is why their slogan is '**Beats of My Heart.'"**

Lovello' keeps trying utmost to acquire the love of ice cream lovers. They will commercially start selling LOVELLO Ice cream from Dhaka International Trade Fair (DITF) 2016 at LOVELLO Pavilion. No 23."

To serve the safest ice creams to health concern customs Lovello Ice-Cream has taken the ISO/FSSC 22000 certificate, Halal Certificate and Hazard Analysis Critical Control Point (HACCP) system accreditation voluntarily.

"Lovello", a new ice cream brand of Taufika Foods and Agro Industries Limited, says a press release. To keep it in taste apart from all other brands available ice creams in market and ensuring the best quality, Lovello is going to use highest class imported raw materials and natural flavors.

The following segments will describe the multiple units of Lovello Ice-Cream to its readers as clearly as possible.

Aim of the Training

Internships provide an opportunity for students to link theory with practice and further serve as a temporary labor pool for those agencies that have committed to participate in the Internship program. The department fulfill its mission of preparing students for significant professional and managerial positions in all the sectors. Relevant professional development topics and workshops are discussed weekly.

Quality Assurance (QA) Department

Quality Assurance (QA) is the brain of an organization which judges and verdicts the difference between acceptable and unacceptable. Quality Assurance is the only department which get its area of supervision and control in every aspects of the production. The duty starts from receiving the raw materials till the product is consumed by the gourmet. The Quality Assurance Department works in collaboration with rest of the departments and units to produce the product of best quality.

Objectives

- Incoming raw material certification
- Production line and process control
- Ensure Good Manufacturing Practices (GMP)
- Maintain Effluent Treatment Plant (ETP)
- Maintain Hygiene for Workers.

Tests Operated by the Quality Assurance Department

Physical Tests of QA Department

a. Incoming Ingredients:

1. Appearance (color and texture).
2. Visible foreign material identification.
3. Determination of Total solid percentage.

4. Determination of Moisture percentage.

5. Determination of Density test.

6. Finding the correct Lactometer Reading (CLR) of milk sample.

7. Determination of Specific gravity of sample.

8. Measuring temperature of a sample.

9. Measuring the P^H of a sample.

10. Measuring the Brix Unit of the sample.

11. Determination of "Glycol Test" of Baume meter of sample.

12. Determination of "Organoleptic Test" of the sample.

b. Finished & Ongoing Products:

1. Weight of the sample.

2. Hygiene and cleanliness of products and production floor, storage areas.

3. Chilling and hardening temperature and status.

4. Filling quality of the products.

5. Packaging conditions and quality of the products.

6. Sealing conditions of the products.

7. Coating quality of the products.

c. Tests of Effluent Treatment Plant:

1. Measuring the amount of "Dissolved Oxygen" (DO) of sample.
2. Measuring the amount of "Total Dissolved Solid" (TDS) of sample.
3. Measuring the amount "Total Soluble Substance" (TSS) of sample.
4. Measuring the amount of "Biological Oxygen Demand" (BOD) of sample.
5. Measuring the amount of "Chemical Oxygen Demand" (COD) of sample.

Chemical Tests of QA Department

a. Incoming Ingredients:

1. Determination of Fat percentage of a sample by "Gerber Method".
2. Determination of "Testable Acidity Percentage" of a sample.
3. Determination of "Free Fatty Acid Test" (FAA) of a sample.
4. Determination of "Alkalinity Test" of a sample.
5. Determination of Percentage of Total Solid (TS) Test of a sample.

b. Clean In Place (CIP) Effluents:

1. (H_2O_2) detection.
2. Presence of Sodium (Na) detection.
3. Presence of Nitric Acid (HNO_3) detection.

c. Boiler Water:

1. Hardness of soft water or boiler feed water.

2. Hardness of hot boiler water or discharge water.

Microbiological Tests of QA Department

1. Counting “Standard Plate Count” of the sample.
2. Detecting presence of E. coil in sample.
3. Transferring culture for production purpose.
4. Preparing culture for production purpose.
5. Determining of “Coliform Test” of a sample.
6. Monitoring of Air & Environment.
7. Determining of Yeast & Mold Count Test of a sample.
8. Determination of Swab Test.

For convenience and elaboration some of the major tests operated in the Quality Assurance Dept. are mentioned below with their procedures and results.

Microbiology Lab Instruments:

- Water Bath
- Autoclave
- Test Tube rack
- Magnetic stirrer Hot plate
- Colony Counter
- Microscope
- Analytical Balance
- Incubator
- Laminar air low
- Injection cooker
- Centrifuge machine
- Moisture machine
- Digital Balance
- Pipette rack
- Desiccator

Gluten Test:

1. 10g of sample is taken.

2. 3ml of water is added.

3. Making a dough.

4. Keeping the dough in water.

5. Washing the dough until the starch is removed.

6. Weight the wet gluten.

7. Keep it on the foil paper and divide it into smaller parts.

8. Keeping them in oven for 4 hours.

9. Weight the dry gluten.

Viscosity Determination:

1. At first the sample is taken into a medium sized beaker.

2. Then a suitable Spindle is selected and set on the viscometer.

3. The viscometer is switched on and seed is increased gradually.

4. Higher reading at higher speed is taken and multiplied with suitable factor to obtain the viscosity in centipoise (CPS) and the temperature of the sample is mentioned with it.

Brix Test:

1. The Brix meter is taken and cleaned with running water.

2. Then the receptor is scrubbed with soft cloth or tissue paper to remove any residues from the previous experiment as well as soaking away the cleaning water.

3. The sample is agitated so that concentration of the solid present in the sample can disperse ideally.

4. Then some amount of sample is taken by a glass rod and 2 to 3 drops are placed on the receptor.

5. The lid of the receptor is placed over to enclose the sample inside it.

6. The light entering passage is opened then the receptor end is placed against light source and placing one eye on the piece of the Brix Meter.

7. Three types of scales are available in the Brix meter, according to the nature of the sample the scale is set by moving the regulator over it.

8. The Brix is displayed by creating a blue-violet in the display.

Total Solid (TS) Percentage Determination:

1. This test is operated by a “Moisture Analyzer”

2. To Place the sample on the platform of the analyzer small pieces of foil papers are used.

3. First turn on the machine.

4. Put a small piece of foil paper on the platform.

5. The machine display will display the weight of the foil paper.

6. Since it is not needed for the test, press the “Tare” button to neglect the weight of the foil paper to measure only the weight of the sample.

7. Put 0.515g to 0.560g of sample on the foil paper.

8. After putting the sample on the foil paper the display of the machine will ask you to close the lid and press the start button.

9. Then close the lid and press the start button to start the test.

10. When all the moistures will be removed the sample the machine ill stop the heating process automatically and show the amount of “Total Solid”.

11. To know the amount of moisture present in the sample the “Display” button is prepared or the Total Solid (TS) is minus calculated 100.

Fat Test:

Purpose: Fat is an important ingredient of ice cream. To ensure the recommended quality of fat, this test is performed. To serve this purpose, Gerber method is used usually.

Apparatus:

1. 0-20% Gerber Butyromter
2. Rubber stopper pipettes - 5ml
3. Automatic dispenser for amyl alcohol – 1ml
4. Automatic dispenser for sulfuric acid – 10ml
5. Shaking stands for butyrometer
6. Centrifuge Machines, working at 1100 r.p.m.
7. Water bath
8. Thermometers (0-100^{0}C)

Reagents

1. Sulfuric acid 91% Conc.
2. Amyl alcohol – density 0.816
3. Distilled water

Procedure details:

1. Take 10 ml of sulfuric acid into a butyrometer with the help of automatic dispenser in such a way so that the neck does not wet.

2. Take 5gm of mix sample in the butyrometer. The mix sample temperature when added should be 20^0C.

3. Using the same pipette take 5 ml of arm distilled water to the butyrometer.

4. Add 1 ml of amyl alcohol to the butyrometer with the help of Tilt.

5. Close the neck of the butyrometer with a stopper properly.

6. Shake the Butyrometer gently until all the content of butyromter is thoroughly mixed and no white particle is left.

7. Place the butyromter immediately in the centrifuge after mixing.

8. Centrifuge it for 5 minutes at 1100 r.p.m.

9. After centrifugation remove the butyrometer from centrifuge and place it in the water at 65^0C for at least minutes.

10. After 3 minutes remove the butyrometer from water bath and adjust the position of the fat on the graduated scale.

11. Now read the fat percentage at the lowest point of meniscus at eyes level.

Length of Caustic Soda (NaOH):

Materials:

1. 0.1 N HCL solution.

2. 1% NaOH solution of unknown Strength.

Preparation of sodium hydroxide solution:

1. Weigh 1.0 gm of NaOH.

2. Dissolve in small volume of distilled water in a 100ml measuring flask and shake properly until dissolve completely.

3. Complete to the mark with distilled water, place the stopper on the bottle and thoroughly mix the solution.

Procedure:

1. Transfer with a pipette 10ml of NaOH solution to a conical flask.

2. Add one two drops of **phenolphthalein indicator.**

3. Add 0.1 N HCL solution from the burette till the end point. (The color changes from pink to colorless)

4. Repeat the experiment three times and tabulate the results.

Calculations:

$$\text{Strength of NaOH (\%)} = \frac{\text{Ml of burette reading} \times 0.1 \times 40 \times 100}{\text{weight of Titrated sample}(0.1) \times 100}$$

Procedure for Standard Plate Count:

Purpose:

To find out the total microbial load in the product so as to ensure that the microbial count meets the specification.

Procedure details:

1. Test Condition:

(i) Carry out the test under aseptic condition.

(ii) Wear approved garments, gloves, masks and headwear.

2. Method of Test:

(i) Pour Plate Method.

3. Equipment and Materials:

(i) Petri dishes, Measuring cylinder, conical flask, Test tube.

(ii) Pipettes with pipette filler, marker, Burner.

(iii) Colony counter with suitable light source.

(iv) Incubator, Autoclave, Hot air oven.

(v) Electric Balance.

(vi) P^H Meter.

(vii) Water bath.

4. Media Preparation:

(i) Prepare different media according to the requirement of the test.

(ii) Follow the instruction of the media manufacture while preparing the media.

(iii) Transfer Plate Count Agar and ringer solution in different conical flask as per requirement before autoclaving.

(iv) Autoclave the media at 121^0C and 15 psi pressure for 15 minutes.

(v) Use the agar media when the temperature comes down below 45^0C.

5. Carry out the Test:

(i) Mark under the Petri dishes with location, date and dilutions number.

(ii) If necessary dilute the sample with suitable sterile dilutes (for e.g. Ringer solution, Normal Saline etc.)

(iii) Using separate sterile pipets take 1 ml sample from each dilution to each marked petri dish.

(iv) Pour 15- 18 ml of Bacteria Culture Media to each petri dish and swirl.

(v) Cover and allow the medium to solidify (5-10 min).

(vi) Incubate the petri dish in an inverted position for 18-24 hours at 37^0C.

Observation and Results:

(i) After 24 hours observed the petri dish by using a mechanical hand counter.

Incoming Inspection Schedule for Packing Materials:

Purpose:

To verify and document that all applicable specifications and requirements pertaining to packing materials.

Procedure Details:

1. Packing materials will be checked with required specification and manufacturing purchase order documentation.

2. Select randomly 1 unit sample from each batch or lot.

3. Record the details of the received materials on the – Receiving Log Sheet.

4. Ensure the number of items, products type, product code the packing slip.

5. Keep sample of previously supplied, acceptable packs, for reference & comparison.

6. Ensure basic measuring methods to check pack dimensions/compressive strength, etc.

7. Ensure effective water barriers.

8. Material deemed unacceptable will be tagged sign by the QA designate.

9. Store packaging and other items off the floor and at least 18 inches (50cm) away from walls and ceilings. Maintain adequate space between the rows of stored products for cleaning, monitoring and inspection.

10. Undertake proper rotation of all packaging supplies and other materials on First In, First Out basis (FIFO).

11. Use clean pallets; use slip-sheets between pallets and bags of ingredients and between double stacked pallets to protect pallets from damage by pallets.

12. For details of the packing materials requirements, Follow the specification of packing materials.

Incoming Inspection schedule or Raw Materials:

Purpose:

To verify and document that all applicable specifications and requirements pertaining to raw materials and product specifications.

Procedure details:

1. Raw materials will be checked with required specification and manufacturing purchase order documentation.

2. Select randomly 1 unit (100gm to 500gm) sample from each batch or lot.

3. Record the details of the received materials on the – Receiving Log Sheet.

4. Ensure the number of items, products type, product code and shelf life match the packing slip.

5. Material deemed unacceptable will be tagged sign by the QA designate.

6. Store ingredients, finished goods, packaging and other items off the floor and at least 18 inches (50cm) away from walls and ceilings. Maintain adequate space between the rows of stored products for cleaning, monitoring and inspection. Store ingredients deemed as "Allergens" separately from non-allergen ingredients in controlled "Allergens Only" locations.

7. Undertake proper rotation of all packaging supplies and other materials on First In, First Out basis (FIFO).

8. Use clean pallets; use slip-sheets between pallets and bags of ingredients and between double stacked pallets to protect pallets from damage by pallets.

9. For details parameter of the raw materials requirements.

Foot Bath Operation:

Purpose:

To Prevent Cross Contamination.

Procedure:

1. Clean the bath with water.
2. Pour 12 liters tap water.
3. Add 300 ppm Cl_2 in water as bleaching powder.
4. Mix well.
5. Put into water on SS tray.

Frequency:

2 times in a day

Determination of Solid Non-Fat (SNF):

Purpose:

Percentage of Solid Non- Fat (TS) of mix is determined to ensure the over ingredient quantity.

Procedure:

SNF % can easily measure by a simple calculation

$$SNF\ \% = TS\% - Fat\%$$

Disposal of Used Media:

Purpose:

To control the source of contamination that comes from bacterial culturing (for daily microbiology tests).

Procedure:

1. After colony counting, collect all the petri dish and taken into polypack.
2. Do not open the lid of petri dish anyhow.
3. Tight the open mount of bag with a less and insert into autoclave.
4. Run the autoclave for 15 minutes.
5. After autoclaving remove the petri dish and give time to cool down for solidifying.
6. Then open the dish and collect the solid media into a poly bag.
7. Then set it to lab garbage, from where it will be take into outside burner.

CIP Chemical Residual Test:

Purpose:

To ensure that no chemical residual present after CIP.

Procedure:

(i) Take 5 ml CIP water in a test tube, add 1-2 drops phenolphthalein indicator and shake well. If pinkish color found then residuals present.

(ii) Nitric Acid residual test.

Take 5 ml CIP water in test tube, add 1 ml Vanadium penta-oxide indicator and shake well. If pink or red color found then residuals present.

Total Hardness in water

EDTA Titrimetric Method

Limited: Measure hardness of water such as drinking water, water from water, reservoir water.

Equipment:

1. Burette 10 ml.

2. Pipette 1, 2, 25 or 100 ml.

3. Erlenmeyer flask 250 ml.

Reagent:

1. Erionchrome Black-T indicator powder 0.5%

2. Buffer Solution

3. EDTA solution 0.02 M.

Method:

1. Take sample 50 ml in Erlenmeyer flask.

2. Pipette Buffer solution 1 ml add in the same flask.

3. Add Eriochrome Black- T indicator powder 0.5% in small amount.

4. Titrate with 0.02 EDTA solution until purple change to blue. Record volume of EDTA solution that used in titration. Calculate follow formula. Report as ppm or mg/L of Hardness (as $CaCO_3$) should be done in Fume hood.

Total Hardness mg/L = $\frac{V \times B \times 1000}{\text{ml sample}}$

(As $CaCO_3$)

When,

V = Volume of EDTA solution that used in titration

B = mg of $CaCO_3$ is equivalent with 1.0 ml of EDTA (=Molarity of EDTA × 100)

Preparation of 0.5% Erichrome Black T Indicator:

- Weight 0.5 g Erichrome Black T indicator and 100 g NaCl (Dry in 105^0C hot air oven for 2 hours and cool in desiccator)
- Grind & mix it by pestle in Mortar.
- Store it in amber reagent bottle.

Preparation of 0.02 M EDTA Solution:

- Dry EDTA at 104 ± 1^0C in hot air oven for 2 hours and cooling in desiccator.
- Weight 7.44 g EDTA in 150 ml beaker and add boiled distilled water and stir well until dissolved. Then pour into 1000 ml volumetric flask & adjust volume up to mark with boiled distilled water.

Procedure:

1. Dry $CaCO_3$ at 104±10C in hot air oven for 2 hours and cooling in desiccator.

2. Weight 0.20 g into 150 ml beaker.

3. Add gradually conc. HCl (1+1) drop by drop by 11 ml pipette until to dissolve.

4. Add 2o ml distilled water, heat to hot plate and boil 2-3 minutes to get rid of CO_2 and let it cool.

5. Add 2-3 drops Methyl Red indicator and adjust p^H by 3 N NH_4OH

6. Now take it into 100 ml volumetric flask and adjust volume up to mark with distilled water.

7. Now pipette 25ml $CaCO_3$ solution and add 50 ml distilled water and mix well.

8. Add 1 ml Buffer Solution.

9. Add 0.5% Erichrome Black T powder by spatula very small amount.

10. Titrate with EDTA solution until the solution becomes blue and record volume of burette reading.

Calculation:

$$\text{Molarity of EDTA (M)} = \frac{W \times 25 \times 100}{V \times 1000}$$

Where,
W = Weight of $CaCO_3$
V = Volume used of EDTA (ml)

Production department of “Lovello Ice-Cream”

Production Department holds the responsibility for which the company is established. The department is responsible for producing products of best quality with the help of the other departments. The department works for 24 hours like the Quality Assurance whenever it is needed. This department holds the highest number of the active personnel among all the departments. So, great responsibilities come with greater number of the personnel.

General Concept of Ice Cream Production

Ice Cream is a frozen dessert usually made from dairy products such as milk and cream and often combined with fruits or other ingredients and flavors. Most varieties contain sugar, although some are made with other sweeteners. In some cases, artificial flavorings and colorings are used in addition to or instead of the natural ingredients. The mixture of chosen ingredients is stirred slowly while cooling, in order to incorporate air and to prevent large ice crystals from forming. The result is smoothly textured semi-solid foam that is malleable and can be scooped.

Types of Mix used in Lovello Ice-Cream

- White mix
- Kulfi mix
- Shell & Cone mix
- Malai mix
- Chocoblast mix
- Lolly mix
- Ambrosia mix
- Cake mix
- Shai Swandesh mix
- Shai khejur mix
- Chocolate mix
- Strawberry mix

Amount of Batch

- 2500 kg
- 2200 kg

Production Line

There are 4 production lines in Lovello. The following products are produced in

- **ROLLO-23**
- **COMET C2**
- **SL- 600**
- **FREEZER**

Lovello Ice Cream Factory Raw Materials:

- Hazel nut coating.
- Toffee compound coating
- Ice- cream coating
- Soya Lecithin
- Maize Starch
- Luxice -1006
- Fresh Fortified soya bean oil
- Igloo Sugar
- Cone spray coating
- Skim milk powder (SMP)
- Whole milk powder
- Cocoa powder
- Pea nut.
- Vanilla flavor powder

- Luxice 6700
- RBD coconut oil
- Full cream milk powder
- Flour 100% pure
- Chocolate counverture
- Citric acid
- Liquid glucose
- F1- 160116 Malai kulfi flavor
- Spray Dried SMP
- Vegetable fat
- Anhydrous milk fat.

Homogenization

Homogenization is needed to breakdown the fat globules and proper mixing of the mix. The homogenization pressure maintained at 176 bars and 63^0C temperature.

- It blends the ingredients thoroughly.
- It improves the texture and palatability of the ice cream.
- It prevents the separation of the fat in aging.

Pasteurization

Pasteurization is done at a temperature of 85^0C for 20-25 sec.

- It completely destroys the all pathogenic organism.
- It helps to long the shelf life of the product.

Aging

The homogenized mix is cooled rapidly to about 4^0C to prevent bacterial growth and held this temperature for about 4 hours.

- ❖ It improves the structure of the ice cream.
- ❖ It improves the melting point of ice cream.

Stabilizers for Ice cream

Stabilizers for ice-cream is an integrated mix of emulsifier and stabilizer, widely used in the production of ice cream. The stabilizer is the active part of the product, which stabilizes the different phases of ice cream (water, air, oil).

The range of Stabilizer Lux series

- Luxice 1005
- Luxice 1205
- Luxice 3655
- Luxice 3670
- Luxice 453
- Luxice 6700
- Luxice 6702
- Luxice 8701

Emulsifier

Emulsifier substances, which reduce the surface tension, thus contributing to the desorption of protein and as a consequence, improve the ice cream whipping quality, dry of extrusion and give cream form to the finished product.

Fat

Fat makes up about 10 to 15% of an ice cream mix and may be milk or vegetable fat. The fat gives creaminess and improve melting resistance by stabilizing the air cell structure of the ice cream. Milk fat is used in the form of whole milk, cream, butter or anhydrous milk fat (AMF). Milk fat can be replaced by vegetable at, where refined or hydrogenated coconut oil and palm kernel oil are most commonly used. The use of vegetable fat in ice cream is regulated by legislation in many countries.

Sugar

Sugar is added into increase the solids content of the ice cream and give it the level of sweetness consumers prefer. Ice cream mix normally contains between 12 to 20% sugar. Sugar is the common description for the saccharine, including monosaccharide's, disaccharides, starch derivatives, lactose (milk Sugar).The consistency of the ice cream can also be adjusted by selecting different types of sugar. This makes it possible to produce ice cream that is easy to scoop.

Colours

Natural or artificial colours are added to the mix to give the ice cream an attractive appearance. Local legislation exits in most countries regarding the use of colours in food.

Milk solids-no-fat

MSNF consist of proteins, lactose and mineral salts derived from whole milk, skim milk, condensed milk, milk powder and why powder. In addition, to its high nutritional value, MSNF helps to stabilize the structure of ice cream due to its water-binding and emulsifying effect. The same effect also has a positive influence on air distribution in the ice cream during the freezing process, leading to improved body and creaminess. In a well-balanced recipe, the quantity of MSNF should always be a proportion to the water content. The optimal level is 17 parts MSNF to 100 parts water:

$$\% \text{ MSNF} = \frac{17\ (100 - \text{other solids percent})}{117}$$

Over-run

Overrun is the term for the percent of expansion of ice cream achieved from the amount of air incorporated into the product during the freezing process. An overrun of 50%nmeans that it has expanded 50%. For best quality and appearance of soft serve a 50-60% overrun is the most desirable.

Calculation of Over-run in Lovello ice cream

$$\% \text{ of Overrun} = \frac{\text{Weight of Mix} - \text{Weight of Ice cream}}{\text{Weight of Ice cream}} \times 100$$

Flavors

Flavors are a very important factor in the customer's choice of ice cream and can be added at the mixing stage or after pasteurization. The most popular flavors are vanilla, chocolate and strawberry. In the EU, flavors are classified in three groups: natural, nature-identical and artificial. Nature-identical flavors are the most commonly used. The most common ice cream flavors are vanilla, nougat, chocolate, strawberry and nut.

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Ice cream Processing Steps

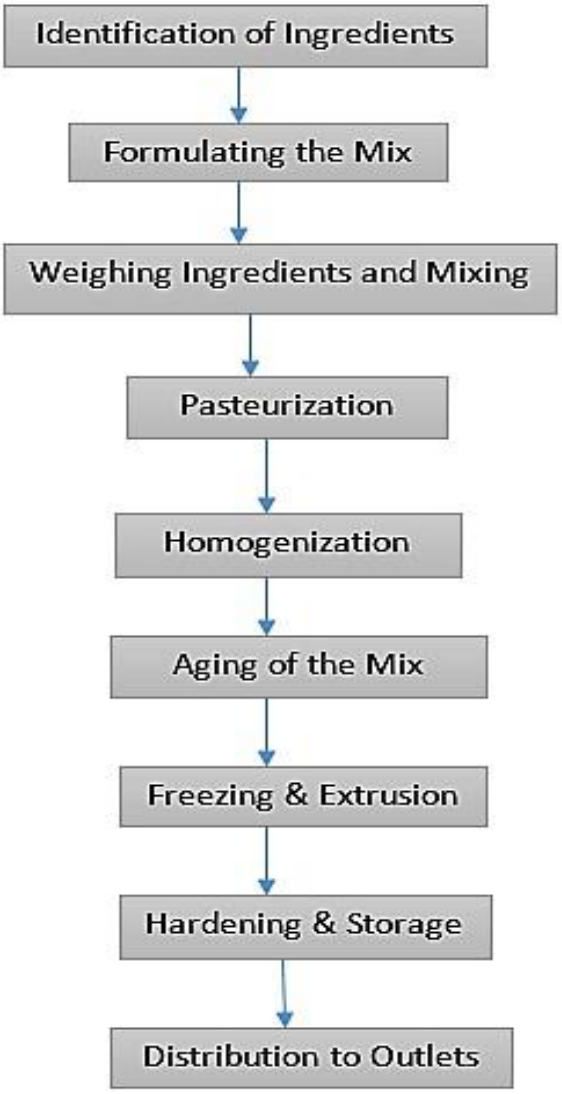


Fig: Flow diagram of ice cream processing.

Lovello Ice-cream Cone Unit

Raw Materials

1. Flour
2. Sugar
3. Soya bean Oil
4. Lecithin
5. Starch
6. Vanilla powder
7. Baking powder
8. Salt
9. Sodium Meta
10. Vanilla flavor
11. Water

Temperature

- 170-175^{0}C for mini cone.
- 180- 185^{0}C for big cone.

Machine Capacity

4500 - 5000 pics per hour.

Machine Name: Rollo-2

Product List

- Chocbar
- Malai
- Kulfi
- Shell & core
- Lemon Lolly
- Orange Lolly
- Sixty Nine Lolly

Machine Name: SL -600

Product list

1. Hidden Heart Single
2. Hidden Heart Double
3. Heart Beat Single
4. Crunchy Bar Mini
5. Crunchy Bar Mega
6. Hazel Beats Mini
7. Toffee Beats
8. Hazel Beats Mega
9. Chocoblast

Machine Name: Comet C2

Products List

1. 50 ml Cup (All)
2. 100 ml Cup (All)
3. 72 ml Cone (All)
4. 121 ml Cone (All)

Machine Name: Freezer

Product List

1. 250 ml Tubs (vanilla, chocolate, mango, strawberry)
2. 500 ml Tubs (vanilla, chocolate, mango, strawberry)
3. 1 Liter Tubs (vanilla, chocolate, mango, strawberry)
4. 2 Liter Tubs (vanilla, chocolate, mango, strawberry)
5. 5 Liter Tubs (vanilla, chocolate, mango, strawberry)
6. 1 Liter Shai Khejur Malai

7. 1 Liter Shai Swandesh
8. 1 Liter Khejur Malai
9. Double Sundae Vanilla & Cramel
10. Double Sundae Vanilla & Mango
11. Double Sundae Vanilla & Strawberry
12. Swirly Sundae (strawberry)
13. Swirly Sundae (chocolate)
14. 1 Liter Round Shape Cake
15. Swing Ball
16. 120 ml Shai Khejur Malai Cup

Vanilla Cup Processing

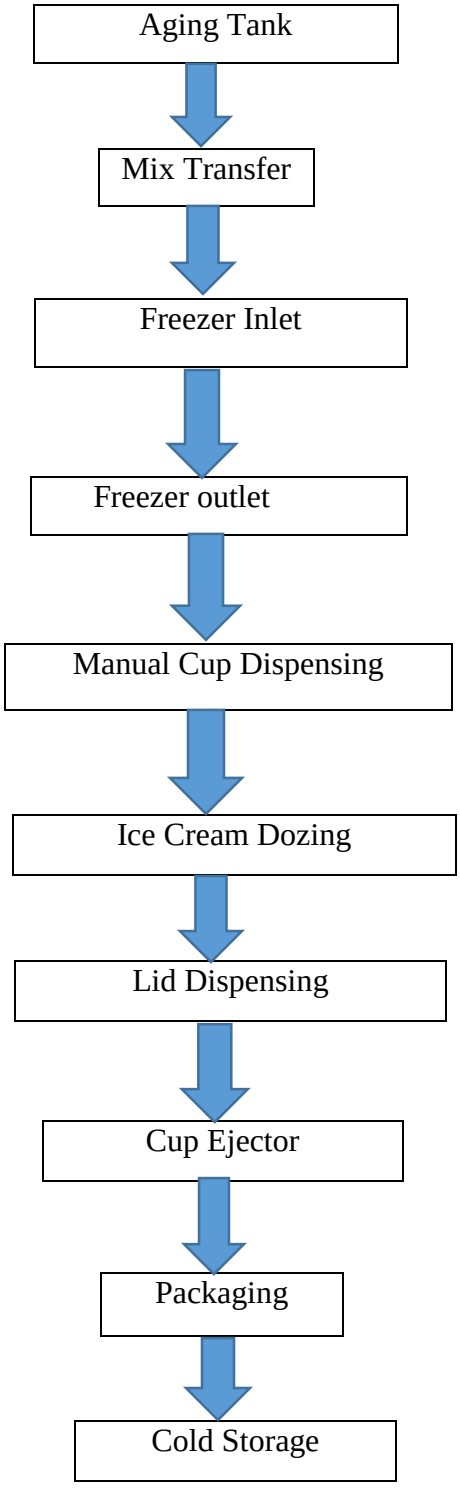
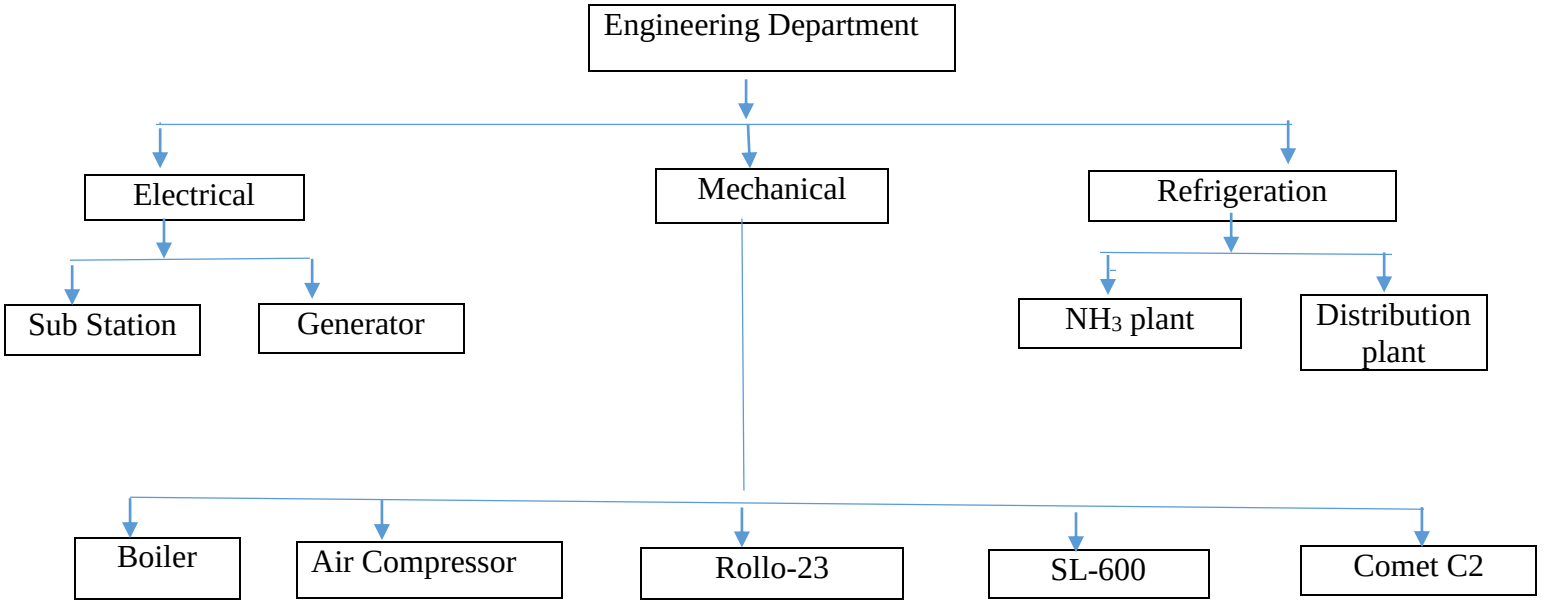


Fig: Flow Diagram of Vanilla Cup Processing

Engineering Department

The Engineering Department consists of these following sectors



NH_3 Plant

- Compressor
- Condenser
- Shiffun Trap
- High Pressure Receiver
- Low Pressure Receiver
- Liquid Pump
- Evaporator

Compressor

Compressor No.	1	2	3	4	5	6
Compressor Power (kw)	132	65	65	65	110	90
Suction Capacity	-45	-	-	-	-40	-5
Refrigerant Capacity	218.6	292	292	292	100.4	309.1
Oil Pump (kw)	2.2	1.5	1.5	1.5	2.2	2.2

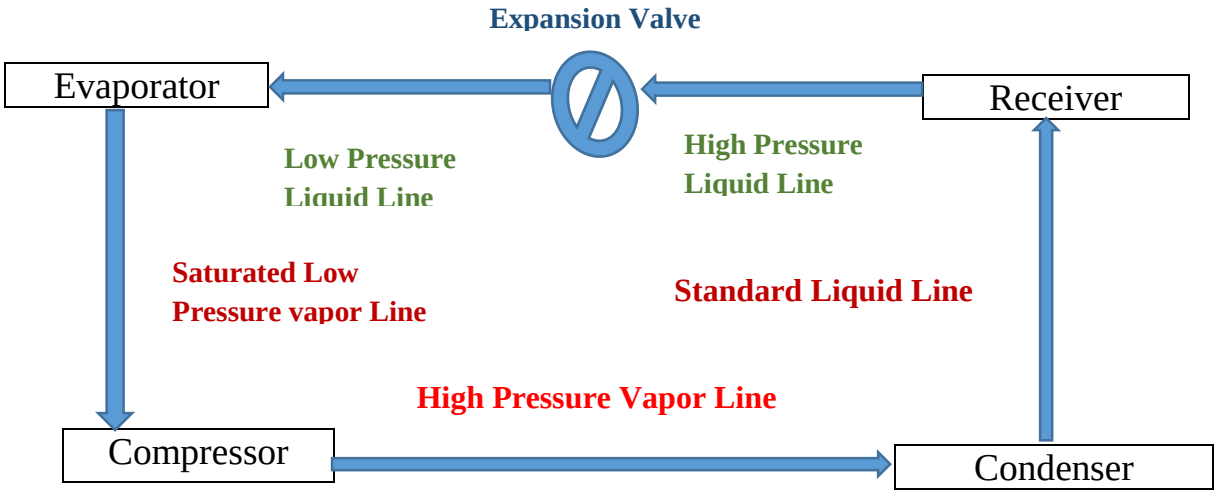
Condenser

Total Condenser 2 NOS

Every Condenser have 2 (two) fan and 1 (one) motor.

Refrigeration

Freon and **NH_3** are used as refrigerant in Refrigeration Cycle



Sub Station

- Drout Fuse
- Vacuum Circuit Breaker (11kv)
- Transformer (1500 kVA)
- Air Circuit Beaker
- Auto Change Over

Generator

Total Generator 2 NOS

1st Generator 800 kVA

2nd Generator 400 kVA

Distribution Department

Distribution Department is the most important department which takes the huge responsibility to transport the finished products in its peak condition in controlled and modified temperature and environment. Otherwise all the efforts of the rest of the departments will go to vain. The distribution department is placed beside the entry of the factory and the pallet washing room.

There are 11 points of dispatch in the Bangladesh. Three (3) of them are in Dhaka city and eight (8) of them are outside of the Dhaka. For distribution convenience the whole Bangladesh is divided into some certain territories or regions. A Regional Sales Manager (RSM) is responsible for the sales and activities of that certain area.

During the peak or High demanding Months, the market places huge demand. The demanding months are April, May, June, August and September. January, February, March, November and December are the low demanding months.

The Distribution runs with the help of the Transportation Unit. The vehicles produced by the transportation department carry the finished products in the certain temperature to the dealers. Dealers are the biggest receivers of the products. The facilities and freezers are built and supplied to the dealers in a sharing concept. The company cost of building a facility and cost of the freezers are carried by the company as well as the dealer. The company takes a certain amount of payment from the dealer to build the storing facility and cost of the freezers. Then the payment is deducted from the business profits.

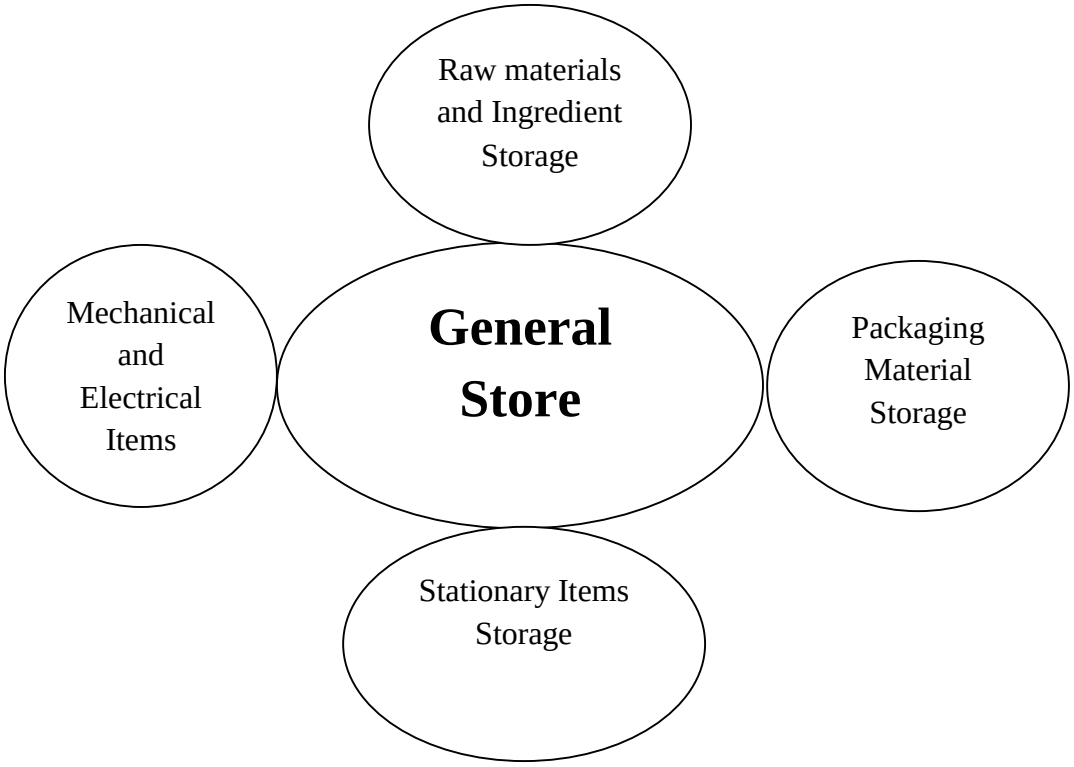
General Store

Lovello Ice cream has biggest floors for the General Store department for receiving, storing and supplying the incoming raw materials and other associated ingredient with the finished product.

The subunits of the General Store departments are,

- ⇨ Raw materials and ingredient storage.
- ⇨ Packaging Materials Storage.
- ⇨ Stationary Items Storage.
- ⇨ Mechanical and Electrical Parts Storage.

The raw materials, ingredient storage and packaging materials is divided into two floors for two types because of the needed storage temperature to store them in the peak condition before using. In the refrigerated storage, the temperature s kept below or at 10^0C for keeping the temperature sensitive raw materials such as different kinds of nuts, flavors, colors, essences etc.



Human Resources and Administration Department

In any organization, from the beginning, even before the organization starts to run, the human resource and administration is partially formed and starts to build the organization to its final phase. The Human Resource and Administration dept. is the internal distributor and quality controller for the human efforts related to the industry.

Responsibilities of the Human Resource and Administration Department

The responsibilities of the dept. start from the origin of the organization. It takes responsibility of the personnel from the recruitment to his retirement. The responsibilities of the dept. can be pointed as,

1. Setting up job Specification
2. Publishing Advertisement on Job Circular in the Medias
3. Receiving Documents from the Candidates
4. Creating Short list of the Candidates whose Quality Matches with the job Circular
5. Sending Call- up letter for interview
6. Participate with the Recruiting Dept. for choosing the best candidate for the post
7. Sending Appointment letter or offer letter to the chosen candidate
8. Give a briefing about the terms and conditions of the company
9. Making evaluation of the candidate
10. Cross checking the evaluation report with the related departments
11. Accompany with the personnel to his retirement or leaving the organization with the allowed benefits

Conclusion

Activities, organizational structures, unit operations, machines and tools were observed and described as simply as possible for quick and better understanding for the readers. It would be expected that, the recommendations would be read and considered for application as early possible.

References

All department of “Lovello Ice-Cream”.