Internship Report

On

Study on Lovello Ice Cream

At

Taufika Foods and Agro Industries Ltd.

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

Submitted To:

Prof. Dr. Bellal Hossain

Head of Department, Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

Submitted By:

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ID: 151-34-387

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Daffodil International University

Date of Submission: 20 December, 2018

Letter of Transmittal

Date: 20 December, 2018

To
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 Md. Rokibul Alam, ID: 151-34-387. 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 you

Md. Rokibul Alam
ID: 151-34-387
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Certificate of Approval

I am pleased to certify that the internship report on "Lovello Ice-Cream" at Taufika Foods and Agro Industries Ltd. conducted by Md. Rokibul Alam, bearing ID: 151-34-387 of Department of Nutrition and Food Engineering has been approved for Defense/Viva-voce. Under my supervision, Md. Rokibul Alam 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. Rokibul Alam. I strongly recommended the report present by Md. Rokibul Alam for further academic recommended and defense/viva-voce. Md. Rokibul Alam 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 and sound health. Then my parents, who had put me on the map and supported 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 work.

My deepest respects and thankfulness to **BM Rabbany,** Chief Human Resource Manager Lovello Ice Cream Ltd, and for allowing me to complete the internship in Lovello Ice cream.

I greatly appreciate **Md. Rafiqul Islam Assistant** Manager Quality Assurance Dept, **Md Shahadot Hosan,** Deputy Manager Admin & Compliance, **Md. Abdul Mojid ,** Assistant General Manager Production, **Md. Mostafa,** Deputy Manager, Electrical Dept. for giving me valuable time, sharing knowledge and teaching me various practical aspects of industrial life and organizational behavior.

I am bound to the Executives, Junior Executives, Lab Assistants of the Quality Assurance Dept.,

Md. Saddam Hosan, officer (QA), **Md. Liton Miah** Asst. Production Officer, **Md. Tarikul Islam** Asst. Quality Assurance Officer

, **Md. Shamim Hosan,** Asst. Manager, Mechanical Dept. **Md. Mozibur Rahman** Sr. Tech Officer. **Md. Mafuzur Rahman** Electrical Dept. Designation (TE).

Md. Mamun, Mechanical Dept. Designation (Operator), **Md. Amir Shohel,** Refrigeration Unit, Designation (Tech. Officer), Admin, Distribution of Lovello Ice cream for supervising, helping and sharing valuable information and cooperation.

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 difference types of Ice Cream.

To prepare Ice cream is used to milk, sugar, stabilizers, emulsifiers, water, food grade flavor, food grade color, fruit pulp, skim milk powder, butter oil, coconut oil, glucose. After preparing the mixing tank of ice cream pasteurized and homogenize. In Ice cream they mainly check physical, chemical, microbiological test for quality control.

Major objective of this report is to identify the actual health hazard and quality control of Lovello Ice cream Ltd and also develop the production and quality control. In this regard, Customers are very important for every business. My report is based on the hazardous free and qualified Lovello Ice cream. the report contains information of the organization itself, Sanitation, hygienic facilities of the overall industries and Collected qualified raw materials.

Also Involve the raw materials test, safe production, ultimately quality check of the final product than marketing. Also I have discussed about safe production and quality control of Lovello Ice cream.

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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. Valuka 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.

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.

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.

About Lovello Ice Cream

Lovello is a manufacture under Taufika foods and agro industries ltd. Taufika foods and agro industries it is an organization under Taufika group. Taufika has established at 2005 by Md. Ekramul Haque. He is an engineer and he worked almost 20 years for a foreign company in Malaysia. Then after 2000, he came back in Bangladesh and launched this group. The group started Taufika engineering LTD (TEL) which involved in engineering business and build of steel and RCc building, project management and Turnkey general civil construction etc. Since when it has started, it is manufacturing only healthy, Halal and savory Lovello Ice Cream prepared of imported high quality raw materials using state-of-the-art technology.

Lovello, confide in confirming long-term presence by being profitable and successful. They, so deeply take on customers' suggestion, give best attempt and improve as well as add new volumes to their business so that they can confirm anointing in this extremely competitive ice cream industry. This technique has qualify them to effectively dispute the challenge. And that challenge is to stay competitive with the front edge technologies and making quality full product and having a good portion of market share. Close competitor of lovello is polar, it have already same amount of shares in the market So , from here its clear Lovello commits in producing value added products and showing the business's commitment to utilize resources effectively.

Lovello introduce the extensive choice of ice cream to its consumers, compare with other competitors in the market. Lovello is Introducing a total of fifty seven items .But popular ones are couple toub, hidden heart, heart beats, kulfi, shell & cone, Choco bar, Choco blast and family pack items. Lovello has good flavors than what helping them to compete in the industry and constantly introducing new and innovative items. With times lovello is giving the indication of become leading ice cream seller in this industry.

They Started with Choc-bar, which is now contributing 11% of the total sales mainly, constructs of Choco bar and mini choc. Both of those are vanilla flavored and implicated with chocolate and deliver consumers an energetic feeling and they satisfy themselves into it. Then our next analysis about Hidden heart which has already five percent contribution in sales and has flavor of vanilla and strawberry ripple implicated by hazelnut coating and also have coconut taste.

COMPANY PROFILE:

Corporate Head Quarters : Plot- 80, Road -2, Banani, Dhaka – 1230

Year of Establishment : 2016, February 14

Parents Company : Taufika foods and agro industries ltd

Parents group : Taufika group

Managing director : Md. Ekramul Haque

Objective of the Studyl

There are two objectives of this study

- General Objective.
- Specific Objective.

General Objective:

The main objective is to hazard free safe production and quality control of Ice cream, that's help gain real life exposure and get a clear idea about dairy product as well as promoting brand.

Specific Objective:

The specific objectives of this study are as following:

- To focus on the hygienic production and quality control of Lovello Ice cream
- To have an idea of activities Lovello Ice cream.
- To know different activities of the organization.
- To identify the hazard during the processing and production of Ice cream in the plant, and finding how to take necessary steps.
- To identify different critical control point in Ice cream.
- To describe the processing of Ice cream.
- To fulfill the requirement of NFE Program.
- To give an overview of Taufika Foods and Agro Industries Limited Lovello Ice cream.

Scope of the study

This study has been conducted on dairy based industry and standard quality control activities of lovello Ice cream . This report has been prepared through extensive discussion with internal processing, quality assurance of final product. The main focus of this internship training is the hygienic production and quality control of Ice cream, compositional standard and quality processing of milk products carried by the dairy Producers Company. The report covers details about the hygienic production and quality control Ice cream. However, the study is related to the hygienic production area and quality control department and this section I got an opportunity to only work in this area.

Sources of data

There are two source of data. These include primary source of data and secondary source of data.

Primary Sources of data

- Practical deskwork in lovello Ice cream.
- I was recruited as a trainer where my job is to learn how dairy related practical knowledge gain.
- Collected data sometime employee's internal management of lovello Ice cream experienced worker.
- During my job I have experienced a lot of important things about dairy based product section which is helping me to do my report.

Secondary Sources of data

- Official website of lovello Ice cream.
- Secondary data has been provided by my onsite supervisor Mr. Rafiqul islam (QC manager).
- Newspaper, journal, articles etc.
- Annual report of lovello Ice cream.

LITERATURE REVIEW

According to U.S. Federal Regulations (21CFR135.110), ice cream is a frozen food made from a mixture of dairy ingredients, containing at least 10% milk fat before the addition of bulk ingredients, such as flavorings and sweeteners (Marshall and others2003a). A gallon of ice cream must weigh a minimum of 4.5 pounds and contain at least1.6 pounds of food solids (Martinez Martin and others 2001). In addition, the minimum weight of 540g/L limits the amount of air that can be incorporated, called the overrun, which is the percentage of increase in volume over the volume of mix frozen per unit total volume, to approximately the same volume over the volume of mix (Thomas 1981).

Alexander (1997) demonstrated that typical ice creams contain about 10%-12% fat, while some premium products contain 16%-18% fat. Another composition standard for ice cream proposed by the International Ice cream Association (ICA) was described as following: non-fat products <0.5 % fat, low-fat 0.5-2 % fat, reduced fat 2-7% fat and full-fat 10% (Farooq 1997).

That is also to say that reduced-fat ice cream is a product of at least 25% total fat than typical ice creams; light ice cream is defined as a product of at least 50% total fat or 33% fewer calories than the referenced products; low-fat ice cream contains a maximum of 3 grams of total fat per serving (1/2 cup), and non-fat ice cream is a product of less than 0.5 grams of total fat per serving.

Categories of Ice cream:

The production of ice-cream includes many steps classified under the following three main parts-

1. Ice-cream mix making (mixing of ingredients, pasteurization and homogenization)
2. Soft ice-cream production (aging and freezing); and
3. Hard ice-cream production (packaging, hardening and Storage)

General Composition of Ice cream:

- Milk fat: >10% - 16%
- Sucrose: 10% - 14%
- Corn syrup solids: 4% - 5%
- Stabilizers: 0% - 0.4%

- Emulsifiers: 0% - 0.25%
- Milk solids-not-fat (SNF): 9% - 12%
- Water: 55% - 64%

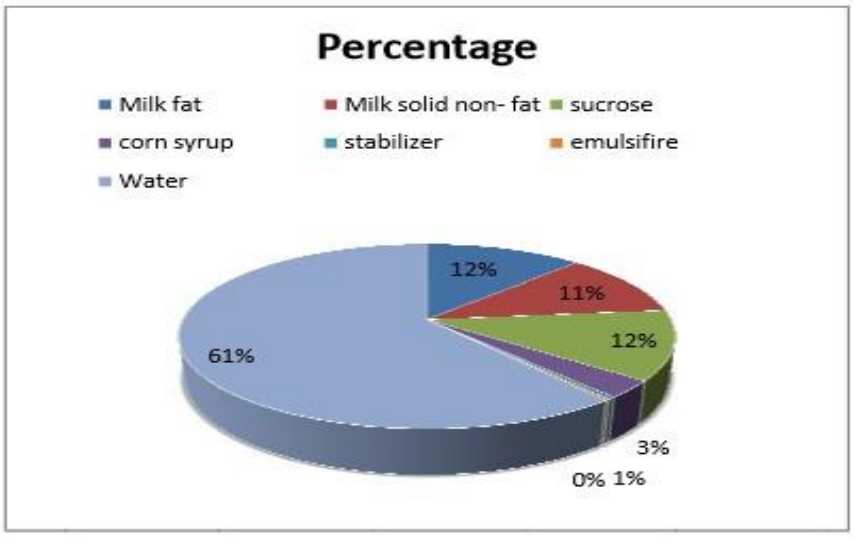


Figure: Percentage composition of ice cream.

Composition of Ice Cream

	Low-fat ice creams	Soft-frozen ice creams	Hard ice creams		
			Standard brands	Premium brands	Super-premium brands
Component	(%)	(%)	(%)	(%)	(%)
Fat	3.0 - 8.0	10.0 - 10.0	10.0 - 12.0	12.0 - 15.0	15.0 - 18.0
Milk Solids-not-fat	13.0 - 11.5	12.5 - 12.0	11.0 - 9.5	11.0 - 9.5	11.0 - 9.5
Sucrose	11.0 - 12	13.0 - 10.0	10.0 - 15.0	10.0 - 15.0	10.0 - 15.0
CSS	6.0 - 4.0	4.0 - 4.0	5.0 - 3.0	5.0 - 3.0	5.0 - 3.0
Stabilizer	0.35 - 0.15	0.35 - 0.15	0.35 - 0.15	0.35 - 0.15	0.35 - 0.15
Emulsifier	0.15 - 0.10	0.15 - 0.15	0.15 - 0.10	0.15 - 0.10	0.15 - 0.10
Water	66.3 - 63.7	64.0 - 63.7	64.0	62.0 - 60.0	<60.0
Total Solids	33.6 - 36.3	36.0 - 36.3	36.0	38.0 - 40.0	>40.0

Milk solid non fat composition:

The SNF contains, on average, dry wt. basis, 38% protein, 54% lactose, and 8% ash (including 1.38% Ca, 1.07% P, 1.22% K, and 0.7% Na).

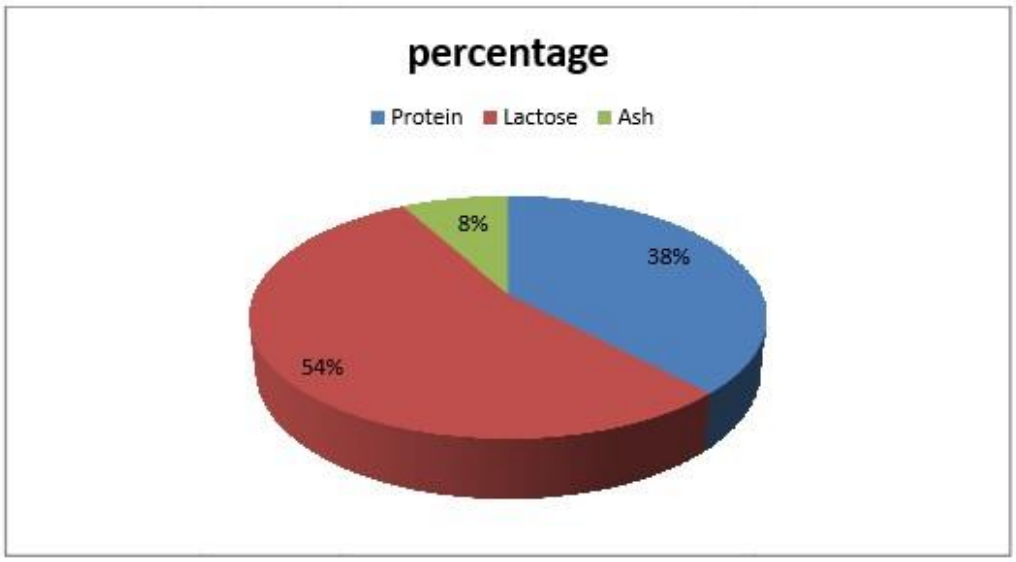


Figure: Percentage composition Milk solid non fat.

Raw materials & Ingredient of ice cream

- Skim Milk Powder (SMP)
- Sugar
- Liquid glucose
- Anhydrous Milk fat/butter oil
- citric acid anhydrous
- Luxice lygomme for ice cream
- Luxice for lolly
- Hydrogenated Vegetable Fat
- cocoa powder
- Full cream milk powder (FCMP)
- Fruit Pulp
- coconut oil
- Gur
- Soya Lecithin
- Nuts

- Toffee compound coating
- condensed milk
- Treated Water etc.

Table-1: Ice Cream produce temperature

Unit	Temperature
Aging Tank	5°c
Ice cream mix	58°c - 63’c
Hot water	95°c
Pasteurizer	85°c - 90°c
Cooling temperature	7°c - 10°c
Cold storage	(-)27°c - 30°c
Herding	(-) 25°c - 30°c
Raw material cold store	2°c
Production floor	22-24°c

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

Table-2: Physical Tests:

SI No.	Incoming Ingredients:
1	Appearance (color and texture)
2	Visible foreign material identification
3	Total solid percentage determination
4	Moisture percentage determination
5	Density determination
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 pH of a sample
10	Measuring the Brix Unit of the sample
	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	Coating quality of the products
7	Sealing conditions of the products

Table-3: Chemical Tests

Sl No.	**Incoming Ingredients**
1	Determining the Fat percentage of a sample by "Gerber Method"
2	Determining the "Testable Acidity Percentage" of a sample
3	Analysis of liquid milk by "Milk Lab Pro Machine"
4	Identifying presence of Alcohol in milk sample
Sl No.	**Clean In Place** (CIP) Effluents:
1	(H2O2) detection

2	Presence of Sodium (Na) detection
3	Presence of Nitric Acid (HNO3) detection
Sl No.	**Boiler Water:**
1	Hardness of hot boiler water or discharge water
2	Hardness of soft water or boiler feed water

Table-4: Microbiological Tests

1	Counting "Total Plate Count" of the sample
2	Detecting presence of E. coli 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.

Table-5: Test of Effluent Treatment Plant (ETP)

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 of "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.

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

Gluten Test:

- 10g of sample is taken
- 3ml of water is added
- Making a dough
- Keeping the dough in water
- Washing the dough until the starch is removed
- Weight the wet gluten
- Keep it on the foil paper and divide it into smaller parts
- Keeping them in oven for 4 hours

- 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 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

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^{0}C.

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^{0}C 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.

Sodium Hydro-oxide (NaOH) Detection in (CIP) Water:

- Take some of the (CIP) water in a test tube
- Add few drops of "Phenolphthalein" indicator in the sample and shake it slowly
- If Sodium Hydro-oxide (NaOH) is present, the sample will turn into "Pink Color".

ESTIMATION OF TOTAL COLONY (STANDARD PLATE COUNT)

PREPARATION OF SAMPLE

To avoid any difficulties in obtaining representative test portions only melted samples may be used. For the purpose of melting, the frozen sample may be kept at room temperature or, if required, in water – bath at a temperature not exceeding 45oC for not more than 15 minutes. Thoroughly mix the samples before removal of test portions

APPARATUS

Lab bench –having a smooth level surface

Hot air oven- capable of giving uniform and adequate temperatures, equipped with a thermometer, calibrated to read up to 220oC,and with vents suitably located to assure prompt and uniform heating

Refrigerator-to keep samples at 0o to 5oC until samples are tested, for storage of prepared media etc. Autoclave-capable of providing uniform temperatures within the chamber up to the sterilizing temperature of 121oC, equipped with accurate mercury-filled thermometer with bulb properly located so as to register the minimum temperature within the sterilizing chamber (with or without temperature recording instrument),pressure gauge and properly adjusted safety valve.

Incubator- water-jacketed or anhydric type, electrically heated, thermostically controlled, and provided with shelves so spaced as to assure uniformity of temperature as required.

1. Colony counters
2. pH meter
3. Water bath
4.Balance
5. Magnetic stirrer

Dairy Bacteriological pipettes-of nominal capacity 1.1 ml for deliver successive 0.1 ml and one -milliliter portions without recharging

Pipette container-Preferably of metal, may be round, square or rectangular, length about 400 mm. Dilution bottles / test tubes

Petri dishes-out side diameter 98 mm (inside diameter about 94 mm), depth 15 mm, with flat bottom and free from bubbles, scratches or other defects.

Petri dish container.-metal boxes with covers, cylindrical or square, for protection and convenient handling of dishes both before and after sterilization.

REAGENTS:

a) Dilution water (Phosphate buffer or Ringer's solution)-Prepare stock phosphate buffer solution by dissolving 34 g of potassium dihydrogen phosphate (KH2PO4) in 500 ml of distilled water, adjust to pH 7.2 with 1 N sodium hydroxide solution and make up to one loiter with distilled water. For use as dilution water, take 1.25 ml of stock phosphate buffer solution and make up to one liter with distilled water.

Prepare stock Ringer's solution by dissolving sodium chloride 9.0g ,potassium chloride 0.42g, crystalline calcium chloride (CaCl2.5H2O),0.48 g (0.24 g in case of anhydrous calcium chloride) sodium bicarbonate 0.2 g in 1000 ml of distilled water. For use as diluents, take 250 ml of stock solution and make up to 1000 ml with distilled water.

b) Culture media / ingredients of culture media (plate count agar)

Measurement of Test Portion-For grater accuracy, in view of variable overruns and differences in density of mixes, it is preferable to use only gravimetric measurement in preference to the volumetric method. Using sterile pipette, aseptically transfer 11.0 g (using a balance sensitive to 30 mg) of test portion directly into dilution bottles containing 99 ml of buffered distilled or Ringer's solution.

PROCEDURE

Sterilization of sampling & planting equipment This type equipment (e.g. sampler, pipettes, Petri dishes etc) are sterilized with dry heat in hot air sterilizer/ oven at not less than 160oC for not less than two hours. Do not crowd the oven and if it is loaded to capacity it is advisable to use longer periods or slightly higher temperature. Preparation Culture Medium

Prepare the culture medium in accordance with the following procedure: Weigh the ingredients properly mentioned below and take these in a suitable container (neutral glass or stainless steel containing desired amount of distilled water). Allow to seek for 3 to 5 minutes and then bring the mixture into complete solution with minimum delay by boiling over an asbestos centered wire gauge. Electromagnetic stirrer can be used to bring these into solution as alternative. Then pH of the medium solution is determined (with a pH meter and adjusted to the desired level by the addition of sodium hydroxide (1 N) or hydrochloric acid (1 N)

Sterilization of medium:

Before sterilization, bring the medium to boiling temperature stirring frequently. Distribute the medium in a suitable container e.g., flasks to restore the lost water. To prevent contamination of media and excessive evaporation during storage, pliable metal foil rubber, plastic, parchment or heavy Kraft paper may be fitted securely over containers before autoclaving.

Sterilize the medium by autoclaving at 121oC for 20 minutes. To permit passage of steam into and from closed containers when autoclaved, keep stoppers slightly loosened. It is noted that the materials likely to be charred in dry heat (e.g. rubber, cork, and cotton, paper) can be sterilized by autoclaving along with medium.

Before use, aseptically remove the portion of each batch of sterile the medium, determine the pH thereof and record the reaction of medium, acceptable range, being pH 7.0±0.1. Because pH is apt. to decrease during sterilization, heat media only enough to assure sterility after dissolving the ingredients.

Preparation and sterilization of dilution Blanks:

Prepare stock Ringer's solution by dissolving 9.0 gm of NaCl, 0.42 gm of KCl, 0.48 gm of crystalline calcium chloride ($CaCl_2 . 6H_2O$) or 0.24 gm of anhydrous $CaCl_2$, 0.2 gm of $NaHCO_3$ in 1000 ml of distilled water. For use as diluent, take 250 ml of stock solution and make up to 1000 ml with distilled water Fill dilution bottles with

phosphate buffer or Ringer's solution so that after sterilization each contains 99 ml or 9 ml or desired amounts.

Optionally use 99 ml dilution blanks to which 11 ml (gm) of previous dilution has been added or 9 ml blanks to which 1 ml of previous dilution thereof, has been added.

Sterilize it by autoclaving at 121oC for 20 min. After sterilization and before use, observe the amount in each blank and discard those with variations exceeding ±2 percent. Correctly calibrated, automatic water measuring device may also be used. When it is considered necessary to use bulk sterilized water, measure directly into sterile dilution bottles and use prepared blanks promptly.

SAMPLING

To obtain the representative sample, thoroughly mix the ice cream mix before removal of test portion. Then with the help of sterile sampler take100 ml ice cream mix aseptically and keep the sample in refrigerator at 0o to 5oC until it is tested.

Preparation of Serial Dilutions.

For greater accuracy in view of difference in density of mixes it is preferable to use only gravimetric measurement in preference to volumetric method.

To make the first dilution (1:10) aseptically transfer 11.0 gm sample using a sterile pipette and sensitive balance to 30 mg directly into the dilution bottles containing 99 ml of ringer's solution. Then mix it by shaking up and down 25 times. Vortex machine can also be used for proper mixing. Now to make the 2nd dilution (1:100) transfer 11 ml of diluted mix from 1:10 diluted bottle to another dilution bottle containing 99 ml of Ringer's solution using a sterile pipette.
Mix it well and repeat the process to make more dilution e.g. 1:100, 1: 1000 and so on as per need

SELECTION OF THE DILUTIONS

Usually the dilutions are selected in such a way so that the total count will be within 30 to 300 per plate. Where standard plate counts per milliliter are expected between 10000 and 30000, prepare at least 2 plates of sample selecting 1:100 and 1:1000 dilutions. To prevent possible errors in computations, avoid the use of odd dilutions. Where the standard plate count per ml is normally under 1000 prepare plates form 1:10 and 1:1000 dilutions. In case, if the number of colonies per plate

exceeds the range limit, repeat the sampling and use more dilutions. Noted that replica plate should be done in every dilution to get higher accuracy in counting.

Inoculation

After selecting the dilutions, take a fresh pipette and inoculate 1 ml of the final dilution into Petri dishes. Hold the tip of plate above the bottle of the dishes, blow out the content, wait 3 seconds, touch the tip of the pipette against the dish, blow out the last drop. The dilutions should be inoculated in Petri dishes in duplicate.

POURING PLATES

Melt the required quantity of medium in boiling water or by exposure to flowing steam in a partially closed container but avoid prolonged exposure to unnecessarily high temperature during and after melting. Don't melt more medium than will be used within three hours. Re-sterilization of media may cause partial precipitation of ingredients.

When holding temperature is less than 30 min, promptly cool the melted medium to about 45oC and store it until used, in a water bath or incubator at 43o to 45oC. If the holding time appreciably exceeds 30 min, preferably store the medium at 48oC to 50oC. Use a separate pilot flask or bottle (similar to that used for the medium) containing water into which thermometer extends for temperature control of the medium in water bath or incubator. Don't depend up to the sense of touch to indicate proper temp. For pouring agar. Select a number of samples to be plated in any one series so that not more than 20 min. elapse between diluting first sample and pouring last plate in series.

Introduce 12 to 15 ml of liquefied medium at 42o to 44oC into each plate. Gently lift the cover of the dish only, enough to insert the pipette or to pour in the medium. Sterilize the lips of media containers by exposure in the flame (a) immediately before pouring (b) periodically during pouring operations and (c) when purring is completed for each batch of plates, if portions of melted media remain in container.

and are to be used without subsequent sterilization for pouring additional plate. As each plate is poured, thoroughly mix the medium with test portions in the Petri dishes by rotating clock wise and anti-clock wise and fitting the dish without splashing the mixture over edge to spread the mixture evenly over the bottom of plats. Allow the dishes to stand until the medium has set.

INCUBATION

After solidification, invert the plates and promptly place them in the incubator for 48 hours at 37 ± 0.5oC and don't stack more than 6 high.

To reduce the tendency for spreader formation, avoid excessive humidity in incubator but prevent excessive drying of medium by controlling ventilation and air circulation. Agar in plates should not lose mass by more than 15 percent during 48 hours incubation and should no apparent signs of dryness in 4 days. Where excessive dry conditions prevail, it would be desirable to place a beaker containing water inside the incubator.

COLONY COUNTING

After required incubation, count all colonies using a colony counter equipped with guide plate ruled in centimeter square. Record the total colonies with the hand tally. Avoid mistaking particles of undisclosed medium or precipitated matter in plates for pin pointy colonies. To distinguish colonies from dirt speaks and other foreign matter, examine doubtful objects carefully.

OBSERVE THE FOLLOWING DIRECTION WHILE COUNTING

(a) Normally one plate with 30 to 300 colonies: Select spreader free plates with 30 to 300 colonies. Count all colonies including those of pinpoint size. Record the dilution

(b) Duplicate plates: If more than one plate of a certain dilution is prepared but only one yields 30 to 300 colonies, count other duplicate plate unless exchanged under (d) and (g) and include such counts in average (arithmetic)
(**c) Consecutive dilutions** (30 to 300 colonies): If plates from two consecutive decimal dilutions yield 30 to 300 colonies each, compute estimated count per ml for each dilution (by multiplying colonies per plate by dilution factor used) and report the arithmetic average as SPC / ml unless the higher computed count is more than twice the lower one, in which case report the lower count SPC/ml.

(d) Spreaders: If spreader occurs on plate, count colonies on representative portions only when (i) colonies are well distributed in spreader free areas (ii) area covered by spreaders does not exceed one-half of the plate. When it is not possible to avoid counting of spreader colonies such as the chain type colonies not too distinctly separated which appears to be caused by disintegration of a bacterial clump when Petridish is rotated to mix agar with dilution water, where only one

such chain exists count it as a single colony. Where one or more chains appear to originate from separate sources, count each source as one colony.
(**e)No plate with 30 to 300 colonies:** Where there is no plate with 30 to 300 colonies and one or more plates with more than 300 colonies use a plate having nearest to 300 colonies per plate.

(f)All plates with less than 30 colonies: If plates from all dilutions yields less than 30 colonies each, record actual number of colonies with lowest dilutions [unless excluded by (d) and (g)] but report the computed count as "less than 30 times of the corresponding dilution.

(g)Laboratory accidents: If all plates from any sample show no colonies or have successive spreader growth or are known to be contaminated or are otherwise unsatisfactory, report the result as "Laboratory Accident (LA)" or Spreaders (SPR) etc.

ESTIMATION OF COLONIES ON CROWDED PLATES (a) Where colonies per plate appreciably exceed 300, count colonies in portions of plate, representative of colony distribution and estimate there from the total number per plate. Where there are less than 10-colonies/ cm2 count colonies from 12 to 14 (13 preferred) such areas, selecting representative (6 or 7) consecutive squares diagonally across the plate
and (6 or 7) consecutive square at right angles thereto. Provided no squares are recounted, initial selection of squares to be counted may be vertical and remainder at right angles thereto (Sum of colonies in 13 representatives per cm2 multiplied by 5, yields estimated colonies per plate)

(b)Where three more than 10 colonies/ cm2 count the colonies in 4 such representative squares. Multiply the average number found per plate. To avoid error among estimates caused by unequal distribution of colonies depending upon varying depths of media in plates, use dishes with feat bottoms.

RECORDING OF COUNTS:

After counting the colonies per plate express the result as the no. of microorganisms especially bacteria per milliliter by multiplying the count with dilution factor. The result recorded as "standard plate count per ml (SPC/ml) or standard plate count per gram (SPC/gm).

In such cases where constantly low standard plate counts are obtained, it may be desirable to occasionally incubate the plates at 5-7oC for 7 days of determine the presence of psychrophilic organisms.

Effluent Treatment Plant (ETP)

The Effluent Treatment Plant (ETP) located inside the factory is the unique exemplar among the food processing industry. Most of the food processing industry throw away their waste waters in the drainage system with or without any kind of physical, chemical and microbiological treatment. But Igloo Ice cream and Milk Unit has taken the futuristic and responsible step to stand beside the conservation of the environment and practicing the concept of recycling water to lessen the pressure on both ground and surface water. The plant is operated by (2) operators under the supervision of the Quality Assurance Dept.

Goals of the Effluent Treatment Plant (ETP)

The production department uses lots of water in the production floor for general cleaning purpose and especially for Clean in Place (CIP) procedure.
The (CIP) procedure, multiple types of chemicals such as Sodium Hydroxide (NaOH), Hydrochloric Acid (HCl), Nitric Acid (HNO3) and heated water. These chemical mixed water carries out a large amount of fats and greases from the production floor. These fats and greases are removed from the waste water, filtered, microbiologically and chemically treated to make the water suitable for washing of the vehicles and gardening, to decrease the use of ground and surface water, as well as eliminating the chance of contamination.

Operations of the Effluent Treatment Plant (ETP)

1. The (CIP) water runs into the (Equalizer Tank-1), here (4) layers of nets or barriers are placed inside to separate the bigger and solid wastes such as sticks, plastic papers etc. The fats by the activity of Specific Gravity, floats on the surface of the water of the tank and the fats are separated regularly.

2. The filtered water then runs into the (Equalizer Tank-2) then pumped into a tank where the tank is sectioned into (3) sections. The first part has the addition of Ferrous Sulfate (FeSO4), the second part lime (CaOH) and the third one has the addition of Polyelectrolytes. First and Third part an agitation system to mix the chemicals properly. Here, the excess amount of sludge is separated by mechanical force and then moved to the “Sludge Bed”.

3. The chemical mixed water falls into the Primary Clarifier. Here the tank has an output to the “Bioreactor-1”. In the bioreactor, the water is dozed with Di-

Ammonium-Phosphate (DAP) and Urea from two different tanks as the water needs to be treated

4. From the Bioreactor-1, the water enters the Bioreactor-2, both the bioreactor has aeration system to mix Oxygen from the air with the water at its maximum rate.

5. Aerated water is the subject to treatment of the Secondary Clarifier. The water is clarified by mechanical force and sedimentation process to make it suitable for more filtration.
6. Before entering the (2) filters, the water is put into (2) collection tanks to regulate the flow into the filters as per need.

7. The (2) filters contain membrane filtration system to make it suitable for gardening and transportation cleaning process.

Production Department

Production Department holds the responsibility for which the company is established. the dept. is responsible for the producing of best quality with the help of other departments. The dept. works for (24 hour) like the quality assurance whenever it is needed. This dept. holds the highest number of the active personnel among all the departments. So great responsibilities come with greater number of the personnel. Production department produce ice cream upon market demand.

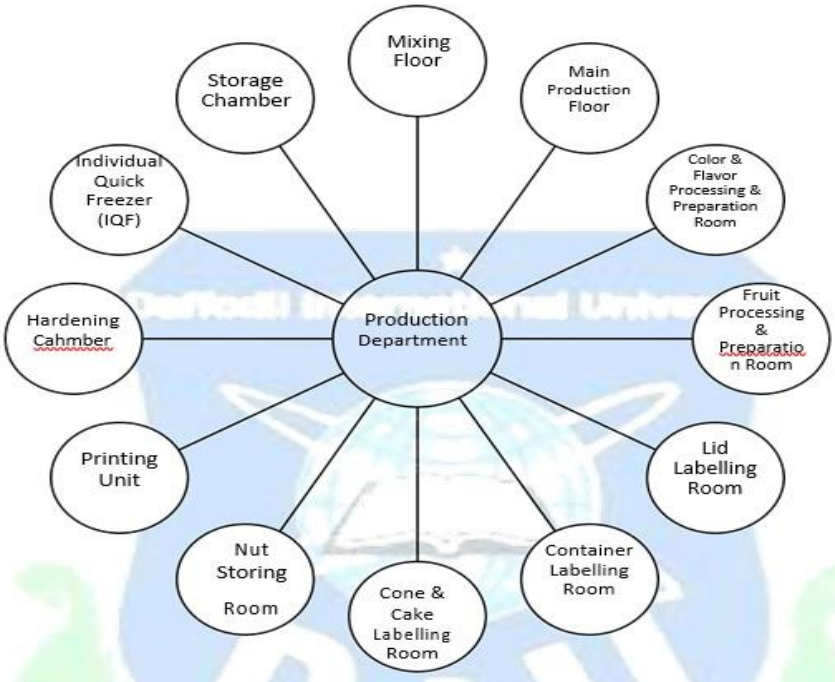


Figure: Subunits of the Production Department

In the mixing floor the basic raw materials and ingredients are gathered and mixed together in the ratio set the production office. Sometimes colors, flavors, are added here/ in the floor there are pasteurizer, homogenizer, aging and mixing tanks, reprocess tanks are available to carry the regular unit operation.

In the color and flavor processing room, he needed colors and flavors needed for certain products are prepared according to the recipes formulated by the production and research and development (R&D) dept. then mixed with the basic mix.

Process flow diagram for ice cream manufacture:

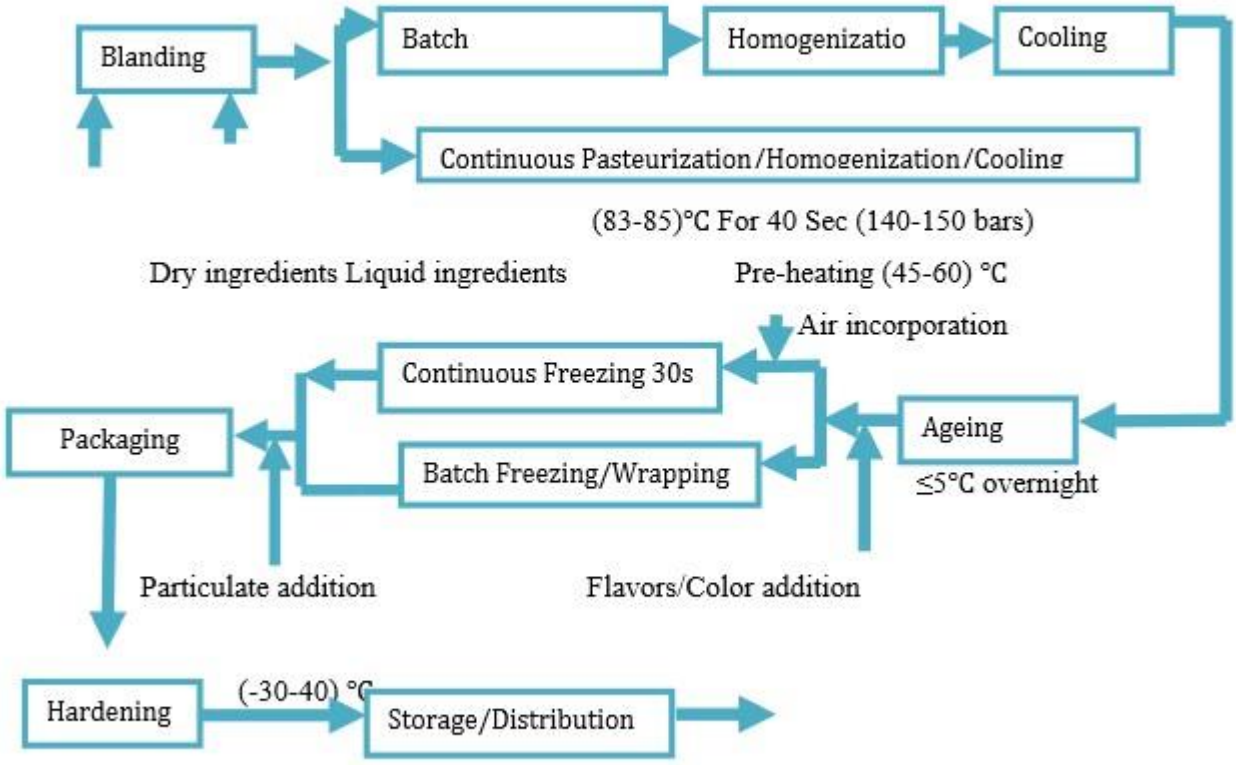
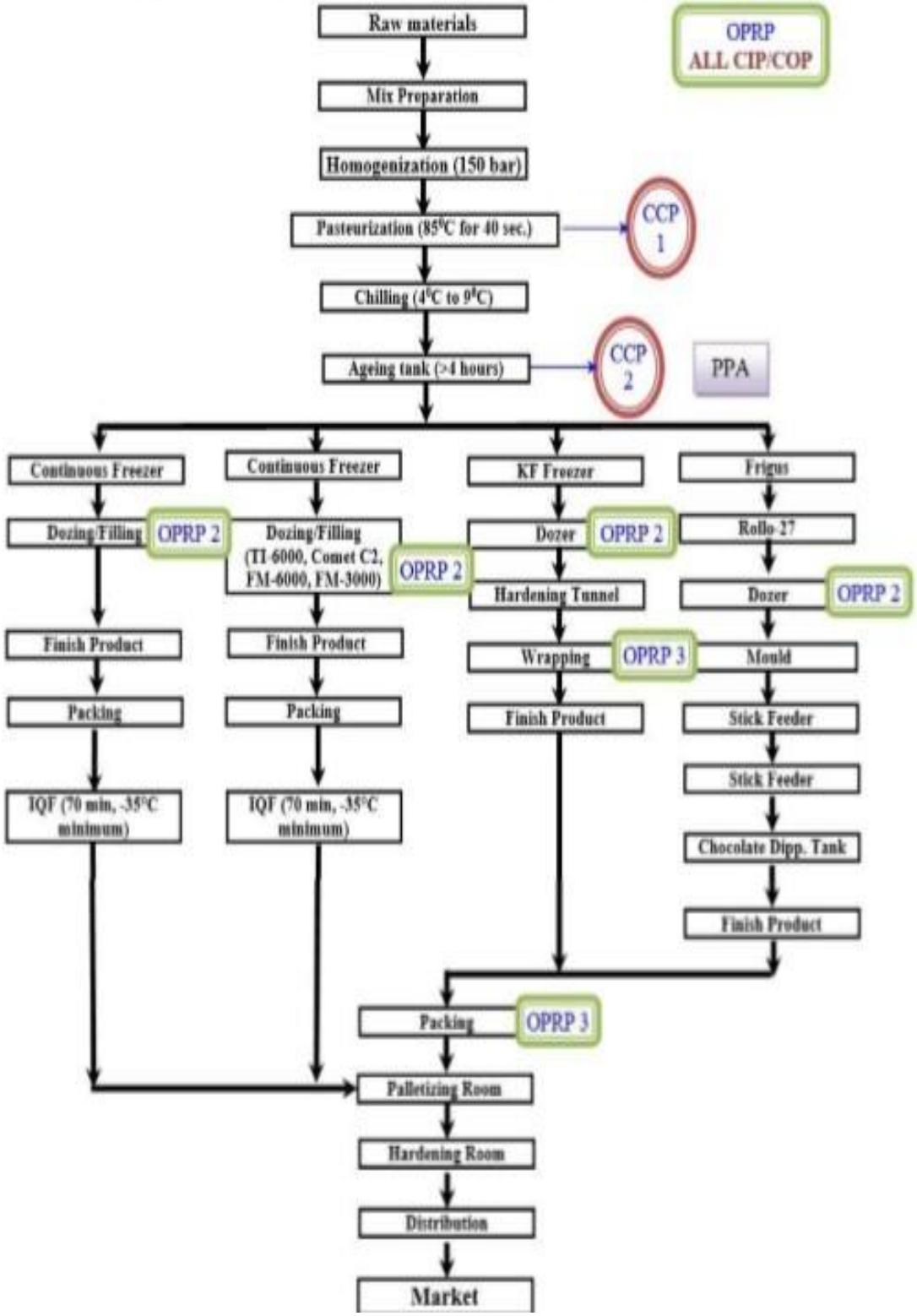


Figure: General flow diagram of ice cream production.

13. Flow Chart of Ice-Cream



Fruits used for inclusion and as main ingredient are washed, peeled, blended and processed for further operations are prepared here in hygienic condition then transported to the production or mixing floor.

The mixes enter the main production floor from the mixing floor to the main production floor. Here the mixes are mixed with color, flavor if needed. Over run, Hardening is carried here. The cones directly enter the (IQF) from the machines as well as the cup items, Ripple enters the hardening room at a temperature minimum (-25$_{o}$C) for best hardening for approximately (20 minutes), then comes out. Rest of the items enters the (IQF) for further processing.

Lid and container labelling is done in to separate rooms. Here the workers stick the labels on the containers and lids supplied by the plastic unit or external suppliers manually.

Ice Cream Shelf Life

Finished Products are kept in storages behind the production floor and then transported to the transporting vehicles. The Temperature of the 1st storage is minimum (-18$_{o}$C) and the second one is minimum (-26$_{o}$C). Spoiled but fit for reprocessing; those products are preserved in those facilities too for further uses if they pass the quality tests.

Overrun

Over run is the most important unit operation done in this floor. Overrun means, incorporation of air into the mix with high speed and low temperature to increase the volume of the mix as the standard.

If Overrun is done more than the standard, that means, the weight of the products in (gram) is less than the standard. On the other hand, if the Overrun is lower than the standard, the weight of the product in (gram) is more than the standard. Moreover, any irregularity in the Overrun process will affect the mouth feeling, taste, smoothness and texture of the product.

$$\text{Overrun} = \frac{\text{Mix weight - Ice cream weight}}{\text{Ice cream weight}} \ 100\%$$

Table-6: Types of Mix

SI No.	Types of Mix
1	Vanilla Mix
2	Mango mix
3	Strawberry mix
4	Chocolate mix
5	Malai mix
6	Kulfi mix
7	Lolly mix
8	Kheer mix
9	Cake mix
10	Shahi Khajur Malai mix
11	Shahi Sandesh mix
12	Chocoblast mix
13	Sheel & Cone mix
14	Super premium Ice cream mix

Now here I am showing what ingredients needs for white mix, kulfi mix, lolly mix and super premium ice cream mix.

White mix	Kulfi mix
1.skim milk powder	1. skim milk powder
2. hydrogeneted vegetable oil	2. full cream milk powder
3. coconut oil	3. loxice legomme for ice cream
4. Liguid glucose	4. Liguid glucose
5. loxice legomme for ice cream	5. sugar
6. sugar	6. hydrogeneted vegetable oil
7. full cream milk powder	7. Water
8. water	

Lolly mix	Super premium ice cream mix
1.Liquid glucose	1.Skim milk powder
2. Luxice for lolly	2. Sugar
3. Sugar	3. Stabilizer
4. Citric acid anhydrous	4. Anhydrous milk fat
5. water	5. Vegetable oil
	6. Coconut oil
	7. Liquide oil
	8. Water

Table-7: Machine Name with the product list

Rollow-23	Straight Line (SL-600)
1. Chocobar	1. Hidden heart single
2. Malai	2. Heart beats single
3. Kulfi	3. Crunchy bar mini
4. Shell & Cone	4. Crunchy bar mega
5. Lemon Lolly	5. Hazal Beats mini
6. Orange Lolly	6. Hazal Beats Mega
7. Sixty Nine	7. Toffee beats
	8. Choco-blast

Machine Name with the product list

SI No.	Commet C-2
1	150 ml Vanilla cup
2	150 ml Strawberry cup
3	150 ml Mango cup
4	150 ml Choc. Cup
5	100 ml Vanilla cup
6	100 ml Strawberry cup
7	100 ml Mango cup
8	100 ml Choc. Cup
9	72 ml Vanilla Cone

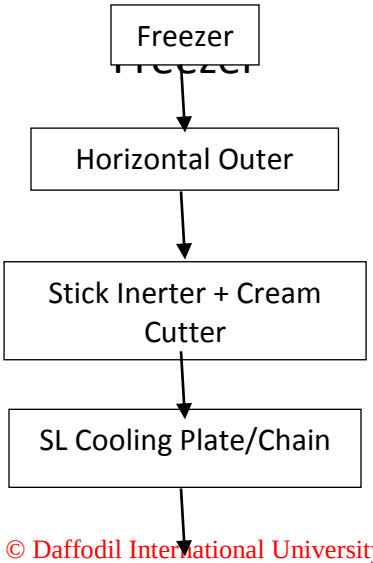
10	72 ml Choc. Cone
11	72 ml Toffee Cone
12	121 ml Vanilla Cone
13	121 ml Strawberry Cone
14	121 ml Choconilla Cone

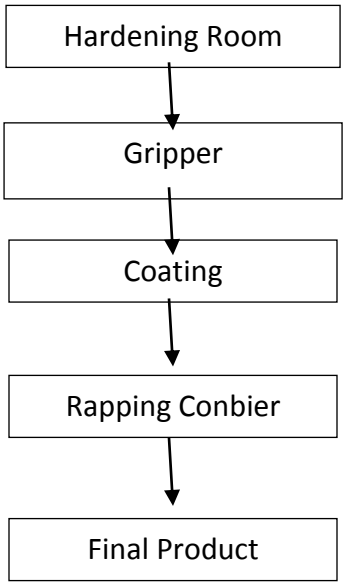
Machine Name: Freezer

Product List

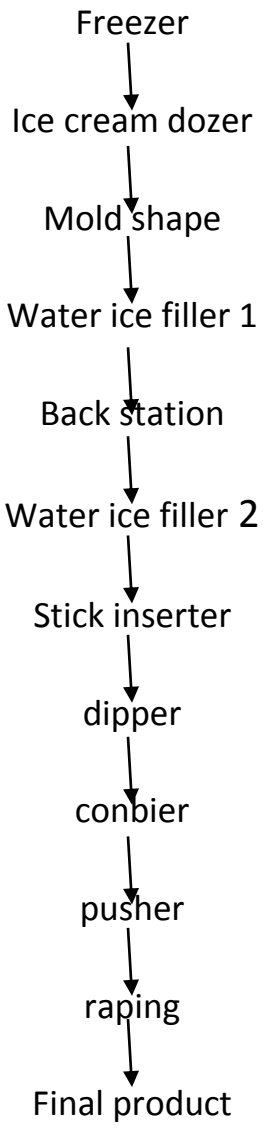
- 250 ml Tubs (vanilla, chocolate, mango, strawberry)
- 500 ml Tubs (vanilla, chocolate, mango, strawberry)
- 1 Liter Tubs (vanilla, chocolate, mango, strawberry)
- 2 Liter Tubs (vanilla, chocolate, mango, strawberry)
- 5 Liter Tubs (vanilla, chocolate, mango, strawberry)
- 1 Liter Shai Khejur Malai
- 1 Liter Shai Swandesh
- 1 Liter Khejur Malai
- Double Sundae Vanilla & Cramel
- Double Sundae Vanilla & Mango
- Double Sundae Vanilla & Strawberry
- Swirly Sundae (strawberry)
- Swirly Sundae (chocolate)
- 1 Liter Round Shape Cake
- Swing Ball
- 120 ml Shai Khejur Malai Cup

Flow Diagram of Ice cream production of SL-600 Machine





Ice cream production process of Rollow-23



Lovello Ice Cream Cone Unit

Raw Materials

- Flour
- Sugar
- Soya bean Oil
- Lecithin
- Starch
- Vanilla powder
- Baking powder
- Salt
- Sodium Meta
- Vanilla flavor
- Water

Temperature

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

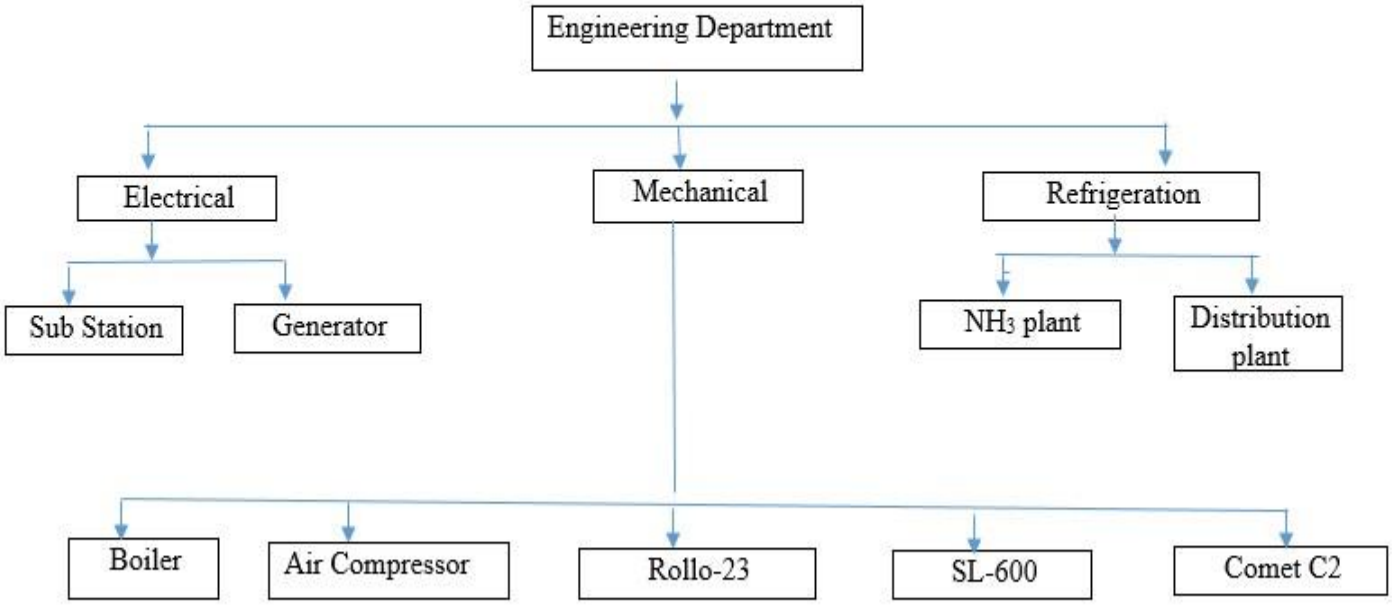
Machine Capacity

- 4500 - 5000 pics per hour.

Some product pictures of Lovello ice cream company

Engineering Department

The Engineering Department consists of these following sectors

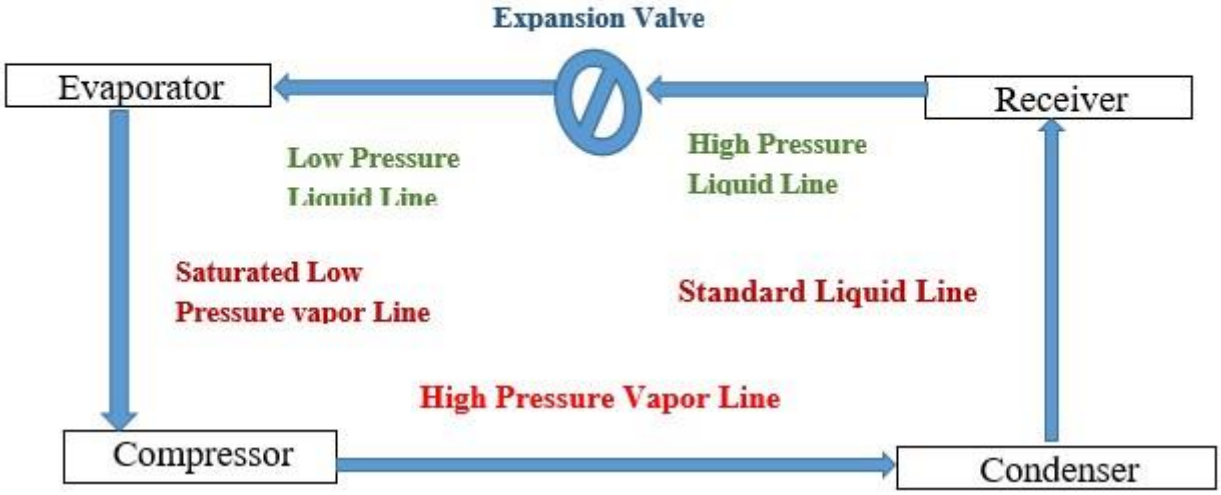


NH_3 Plant

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

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,

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 or 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 the personnel to his Retirement or Leaving the Organization with the Allowed Benefits

Conclusion

lovello Ice Cream factory is one of the largest Ice Cream Industry in Bangladesh. lovello Ice Cream Factory daily average different types of Ice Cream Production about 45,000 Litter. This Internship Report help us from many side about Ice Cream. Like- Raw material collection, Quality control, Manufacturing process and finished product quality checkup of Ice Cream and Ice Cream Products.

This study shows how to maintain the hygienic production and quality control of milk & Ice cream. The internship program has covered both hygienic production and quality control of dairy product. To ensuring the quality and hygienic production of milk & ice cream has been taken different types of test parameter, including Physical, Chemical, and Microbial Parameter.

Physical test (Organolapic, specific gravity, homogenization, pasteurization, pH, overrun) Chemical test (soda, hydrogen pre oxide, formalin, protein, fat, lactose, iodine specification, acid value, arsenic, total calcium, CIP, acidity) above these test is done in implementing routinely daily procedure in the lab. Microbiological test is very important especially for final product.The microbiological test is also carried out such as Total Plate Count (TPC), Coliform Count (CC), Yeast Mold count (Fungi) and Salmonella.

Report also represent how to produce Ice Cream as Industrially.

References:

All department of lovello ice cream.