

# **National Apprentice & Industrial Training Authority**

## **Report on Industrial Training**

**At**

**Richi Dairies Lanka (Pvt) Ltd**

**Keppetipola**



**Faulty of Technology  
University of Ruhuna, Sri Lanka**

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## **Preface**

The six-month industrial training at Richi Dairies Lanka (Pvt) Ltd. from July 5, 2023, to January 5, 2024, provided me with a comprehensive insight into the production process, company activities, quality control systems, and welfare and cooperative initiatives. This report encapsulates my experiences and learnings during this significant period.

In the following pages, I aim to delve into three key areas: an Introduction to Richi Dairies Lanka (Pvt) Ltd., detailing its history, current business status, strategies, products, and organizational structure; an exploration of my Training Experience, shedding light on interactions with senior staff, fellow workers, and the overall dynamics of the work environment; and a Conclusion that outlines future scopes for training.

The first chapter unfolds the rich history of Richi Dairies Lanka (Pvt) Ltd., providing insights into its current business standing, strategic approaches, product portfolio, and organizational framework. The subsequent chapter delves into the intricate details of my training experiences, encompassing interactions, challenges, and the wealth of knowledge gained during this immersive journey.

In the concluding chapter, I offer insights into the future scopes of training based on my observations and experiences. This Preface sets the stage for a comprehensive exploration of my industrial training at Richi Dairies Lanka (Pvt) Ltd., highlighting the multifaceted aspects that have contributed to my professional and personal growth.

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## **Abbreviation**

Pvt	- Private
Ltd	- Limited

NAITA	- National Apprentice and Industrial Training Authority
EPF	- Employees' Provident Fund
ETF	- Employees' Trust Fund
PPE	- Personal Protective Equipment
GMP	- Good Manufacturing Practices
HACCP	- Hazard Analysis and Critical Control Point
ISO	- International Organization for Standardization
LR	- Lactometer Reading
KQ	- Keeping Quality

## Chapter 01

### 1 Introduction

#### 1.1 About Training Institute

##### 1.1.1 Nature Of Business



Figure 1: Company Logo

Richi Dairies Lanka Pvt (Ltd) is a dairy located in Sri Lanka, one of the 68 dairies within the country. The address of Richi Dairies Lanka Pvt (Ltd) is Keppetipola, Erabadda Road, Sri Lanka. The company is owned by Mr. Priyantha Kumara Manathunga. From 2013 to 2015, they established five milk chilling centers, achieving the target of collecting 28,000 liters per day from 4800 farmers via five collecting centers in Bandarawela, Keppetipola, Haputale, Ragala, and Gorakella areas.

Initially, the enterprise operated on a small scale, producing only yogurt. Over five years, Richi Dairies Lanka (Pvt) Ltd made successful advancements. The Keppetipola Milk Chilling Center was established in 2010, initially collecting around 50L per day from a small number of dairy farmers. Within six months, this increased to 2000L per day, with the entire collection supplied to Pelwatta Dairies.

Due to poor milk collection systems by state, private organizations, and other suppliers, a large number of dairy farmers were invited to supply milk to the Milk Chilling Center. KMCC expanded its collection activities in rural areas, offering input services to farmers. Factors impacting efficiency, viability, and sustainability of milk collection were observed. By 2013, daily collection rose to 10,000 L, leading to the establishment of additional chilling centers with a capacity of 35,000 L.

Richi Dairies Lanka (PVT) Ltd was incorporated on November 15, 2018, under the Company Act of 2020 as a limited liability company. After constructing buildings, installing machinery, and organizing distributions, the company commenced processing and distributing dairy products to the Sri Lankan market on April 24, 2020, as a dairy production factory.



Figure 2: Richi Dairies Lanka (Pvt) Ltd.

Initially, manufacturing and distribution activities were carried out by 12 employees in the Production department and 6 employees in the Sales and Distribution department only in Uva province.

The Company currently operate with more than 60 employees, two of the company's distribution centers and 12 distribution agents island wide. They have been awarded ISO 9001 and ISO 22000 certifications in 2019 for meeting HACCP (Hazard Analysis and Critical Control Points) and GMP (Good Manufacturing Practices) production requirements.

There are currently only 12 agencies of Richi Dairies Lanka (Pvt) Ltd, located in Ambilipitiya, Awissawella, Balangoda, Gampola, Godakawela, Kandy, Kuliypitiya, Kurunagale, Kuruwita, Mahawa, Manikhinna, and Nawalapitiya. The company consists of five sections:

1. Milk reception section
2. Process section

3. Packaging section
4. Storing section
5. Wastewater management

The Richi Dairies Lanka (Pvt) Ltd is manufactured the different types of dairy products.

- ✓ Set Yoghurt
- ✓ Jelly Yoghurt
- ✓ Treacle Yoghurt
- ✓ Strawberry and Vanilla flavored Drinking Yoghurt
- ✓ Curd
- ✓ Strawberry and Vanilla flavored Ice packets
- ✓ Orange Drink
- ✓ Milk Toffee



Figure 3: Products of Company

### 1.1.2 Organization Chart

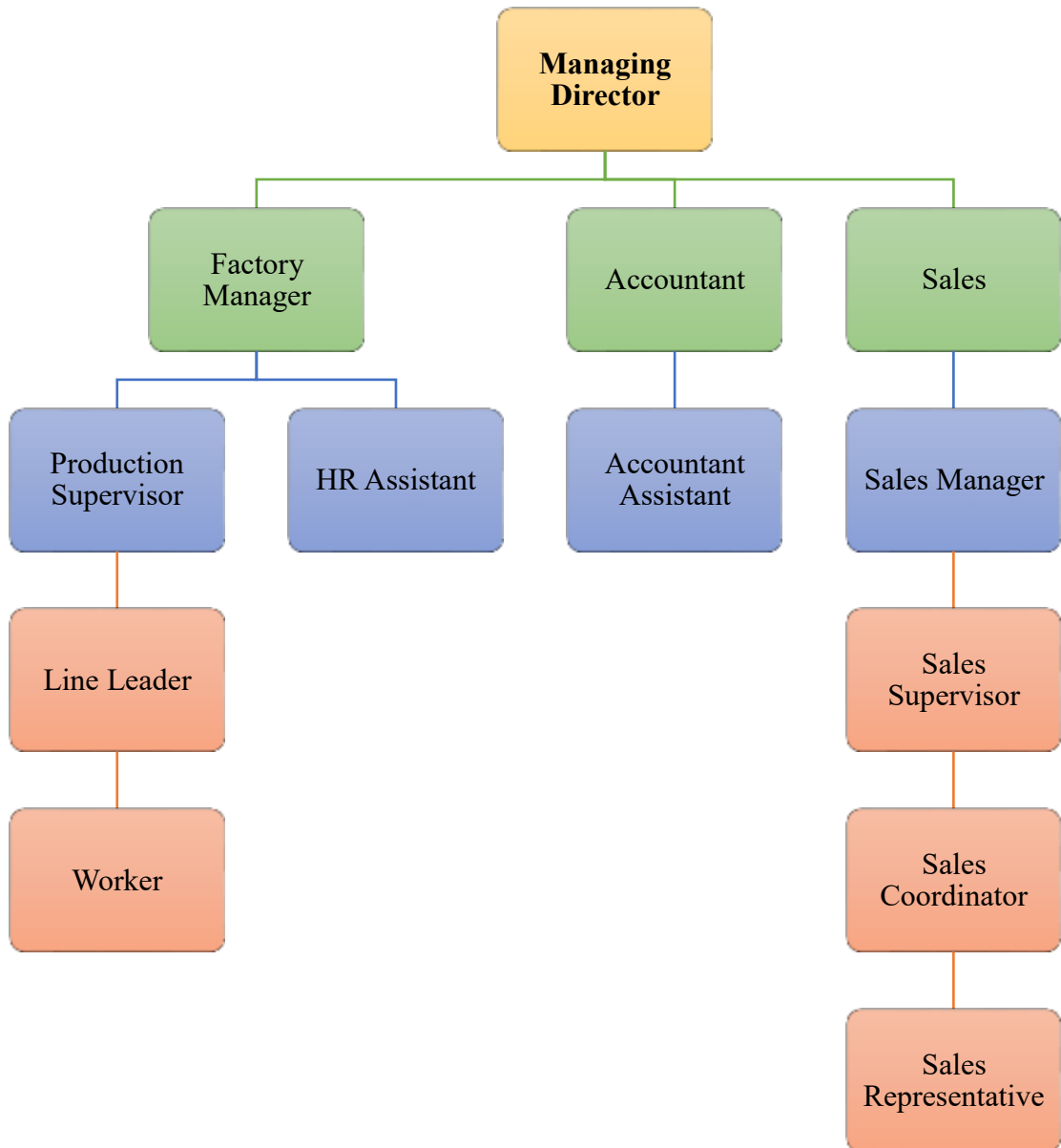


Figure 4: Organization Chart

## **1.2 Co- Operate plan**

### **1.2.1 Vision**

To become a leader and trusted in the dairy industry in Sri Lanka.

### **1.2.2 Mission**

Producing our products with ensured healthy and high quality with profitability and market growth by using modern technology and high-quality inputs, so that protecting milk suppliers under higher welfare program and leading eco-friendly production processes with building a healthy nation.

### **1.2.3 Objectives**

- Strengthen the milk farmers by purchasing milk for higher price of Nuwaraeliya and Badulla district farmers
- Promoting fresh milk & milk products produced by using those milk throughout the country.
- Creating job opportunities for the youth and selected peoples with specific needs of the Area
- Bring high quality products to international market.
- Introducing innovations to local markets
- Transforming into a company that is a strength to the national economy.
- Increasing the market share
- Introducing new technology to the production process

### 1.3 Management Practices

#### 1.3.1 Recruitment Procedures

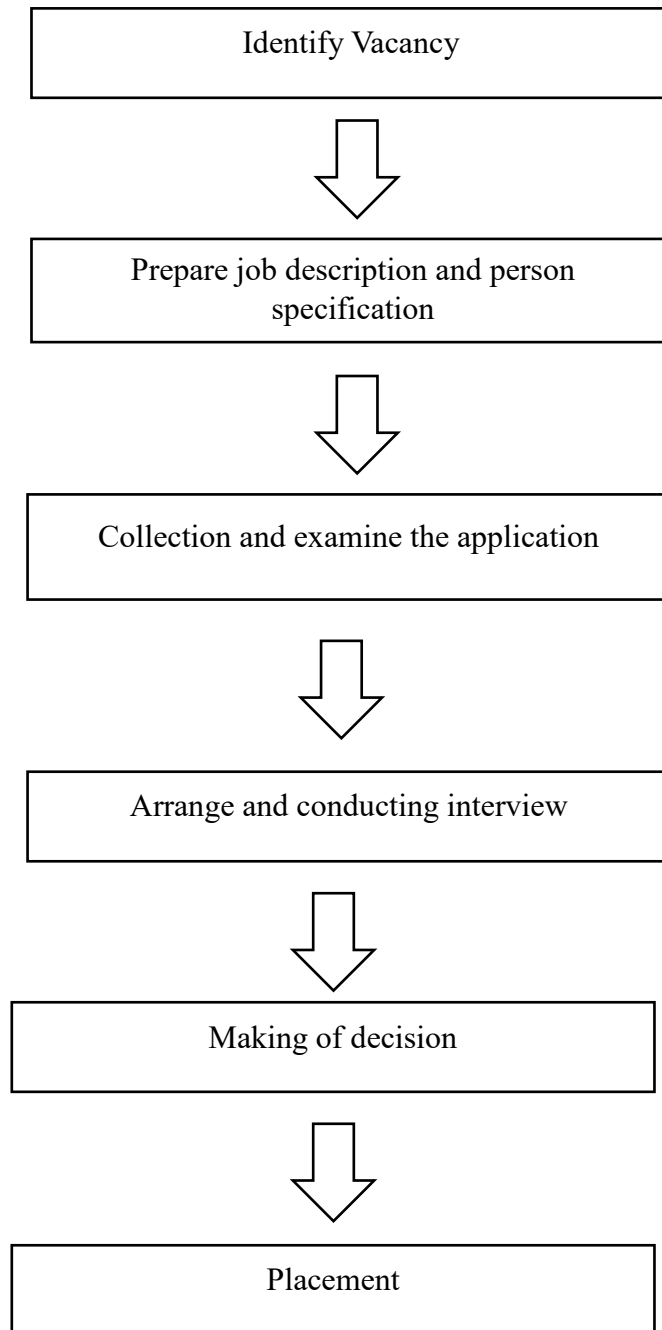


Figure 5: Recruitment Procedure

### 1.3.2 Leave

- The company adheres to the Leave Act regarding employee leave policies.
- Employees are entitled to Annual Leave, Casual Leave, Medical Leave, Maternity Leave, and Study Leave.
- Each employee is entitled to 4 leaves per month and a total of 48 leaves per year. Leave applications must be submitted to the office with the signatures of both the supervisor and manager at least 3 days before taking the leave.
- In case of a medical leave, employees are required to submit a medical certificate to the HR department upon return.

### 1.3.3 Employees Trust and Employees Provident Funds (ETF, EPF)

Employees who have worked for only one day at the factory are eligible for EPF (Employee Provident Fund) and ETF (Employees' Trust Fund) benefits. Both EPF and ETF contributions must be deposited into the employee's account, linked to the EPF and ETF numbers of the factory, managed by the central bank.

#### ➤ Contribution Rates:

- ETF: 3% (Employee Trust Fund)
- EPF: 20% (Employee Provident Fund)
  - 8% deducted from the employee's basic salary.
  - 12% contributed by the factory.

#### Withdrawal Policies:

- ETF funds are available for withdrawal whenever an employee requires them.
- EPF funds can be withdrawn under specific conditions:
  - Male employees must reach 55 years of age, while female employees must reach 50 years of age.
  - In case of illness.
  - When an employee plans to go abroad.

### 1.3.4 Welfare Activities

- For one year, provide a uniform, boots.

- Give dead donations and festival advanced.
- Annual trip
- Conducting a society with all employees and staff members of the factory.
- Provide funeral remuneration.

### 1.3.5 Safety Practices

Ensuring safety practices is crucial and complex, particularly in work environments, to establish a secure environment for employees. Below are the safety-related activities implemented within the factory:

- **Head caps, masks, and gloves** are mandatory attire when entering the factory's production plant.
- **Boots and safety shoes** are compulsory within the production plant to protect against falling materials that could impact the feet.
- **Aprons** are required to be worn inside the production plant for tasks involving work with milk.



Figure 6: Employer with safety materials

## ❖ Hygienic Practices

The company's hygienic practices encompass two key categories:

### 1. Personal Hygiene Practices

- **Protective Clothing:** Employees must wear suitable protective clothing (aprons, face masks, head caps, boots) exclusively within the plant to prevent contamination.
- **Health Standards:** Individuals who are unwell or diseased are restricted from entering the factory premises.
- **Avoidance of Unhygienic Activities:** Smoking, spitting, chewing, eating, and coughing activities are prohibited within the plant.
- **Jewelry Removal:** Rings, watches, and badges should be removed before entering the production plant.
- **Uniform Maintenance:** Employees are required to wear clean uniforms.
- **Hand Hygiene:** Prior to commencing work and after activities such as using toilets, individuals entering the manufacturing plant must wash, dry, and disinfect their hands.
- **Nail Maintenance:** Keeping fingernails short is encouraged.
- **Regular Change of Disposable Items:** Disposable gloves and masks should be changed regularly.

### 2. Equipment and Processing Hygiene (CIP Process and Waste Management)

- This section may involve specific details related to cleaning-in-place processes and waste management within equipment and processing areas.

## Chapter 02

### 2 Training Experience at the Richi Dairies Lanka (Pvt) Ltd

#### 2.1 Experience

- Operating the machineries of dairy production process.
- Quality testing of collected milk.
- Participation in production.
- Contribute to packing and storage.

#### 2.2 Collection of Raw Milk

Raw milk is the major raw material requirement in dairy products manufacturing industries. Dairy farmers supply milk to chilling centers, mainly (directly or indirectly).

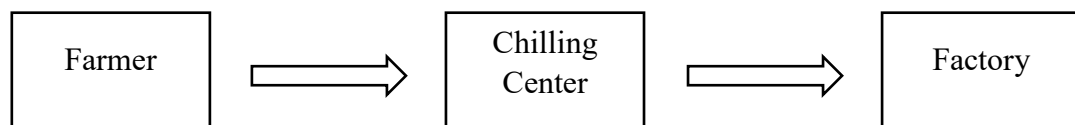


Figure 7: Milk Collecting Network

- Source of raw milk collection – Dairy farmers in welimada area and haputhale area.
- Frequency of raw milk collection – Twice per day at 5.00 A.M. to 8.00 A.M. in the morning and at 3.00 P.M. to 5.00 P.M.

During collection of raw milk, the Lactometer Reading (Density) is checked by using field lactometer. The lactometer reading value gives an idea about adulteration of milk. Sometimes dairy farmers adulterated milk to increase their profit by adding several impurities. In here they used lactometer test as a reference to detect adulterants free milk.

### 2.2.1 Chilling Center

Chilling center was the place, in which the raw milk obtained from dairy farmers are reception, chilling and storage for the production purpose.

### 2.2.2 Unloading and Testing of Milk

Upon arrival at the chilling center, raw milk is transported in milk cans. It's imperative that these milk cans are numbered upon arrival and promptly placed on the floor after being unloaded from the vehicles. Subsequently, a representative sample is obtained by mixing the quantities from various cans for quality testing to ensure compliance.

Raw materials form the fundamental basis for finished products. Adherence to high-quality standards is crucial to prevent contaminations, spoilage, or alterations in the composition of the final products. Testing involves evaluating a small sample for taste, odor, appearance, and color to guarantee the overall quality of the raw milk.

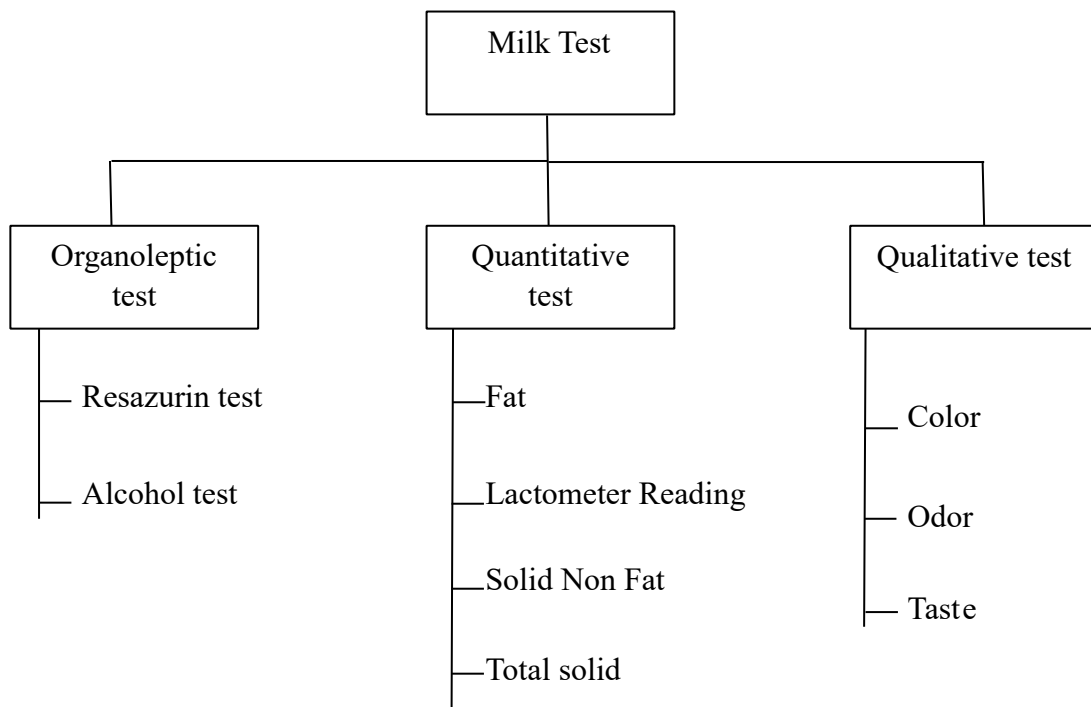


Figure 8: Milk Test

#### 2.2.2.1 Organoleptic Test

At here the raw milk received was checked for characteristic color, odor and taste.

## 2.2.2.2 Qualitative Test

### 2.2.2.2.1 Alcohol Test

If the tested milk at good quality, there will be no coagulation or precipitation.

This test is utilized to assess the protein stability in milk. Milk containing 0.21% acid or higher levels of calcium and magnesium compounds tend to coagulate upon the addition of alcohol.

Materials Required:

- 75% Ethyl alcohol solution
- Milk sample
- Petri dish
- Pipette

Procedure

1. 5ml of milk sample was added to the petri dish.
2. Then 75% of 5ml of ethyl alcohol was added to the same petri dish and mixture was shaken gently.
3. Then, petri dish was observed whether the milk is coagulated or not.

Interpretation:

If the tested milk at good quality there will be no coagulation or precipitation.



Figure 9: Fresh and Spoiled milk samples

#### 2.2.2.2.2 Keeping Quality of Raw Milk (Resazurin Test)

The primary objective of this test is to assess the hygiene and potential shelf life of raw milk. It employs resazurin as an indicator to estimate the redox potential of milk. The test evaluates the oxygen levels in milk, correlating it with the quantity of existing bacteria. Higher microbe presence corresponds to increased oxygen usage, resulting in a reduced color change in the resazurin indicator.

Materials Required:

- Resazurin solution
- Test tube
- Pipette
- Water bath (37<sup>0</sup>C)

Procedure:

1. 10ml of milk sample was taken to a sterile test tube by using a sterile pipette.
2. Then 1ml of resazurin solution was added to the same test tube.
3. The rubber stopper was fixed and mixed by inverting the tube without incorporating air and placed it in water bath by maintaining at 37<sup>0</sup>C.
4. After incubation for 10 minutes examined its color using following chart

Color Class Number	Color	Grade of Milk
6	Blue	Excellent
5	Light Blue	Very Good
4	Purple	Good
3	Purple pink	Fair
2	Light Pink	Poor
1	Pink	Bad
0	White	Very Bad

Table 1: Result of resazurin test



Figure 10: Resazurin Test

### 2.2.2.3 Quantitative Test

#### 2.2.2.3.1 Fat Determination Test

The Gerber method is a chemical test to determine the fat content of milk. Care should be taken to avoid soiling the neck of the butyrometer when adding milk.  $H_2SO_4$  is used to destroy protein membrane of fat globules and Amyl alcohol is separated the fat layer.

Brownish color development is due to sugar (lactose) caramelization.

Materials required:

- Sulphuric acid
- Amyl alcohol
- Butyrometer
- Rubber stopper
- Milk sample
- Centrifuge
- Water bath
- 10.94ml pipette



Figure 11: Centrifuge

Procedure:

1. 10ml of sulphuric acid was transferred in to the butyrometer.
2. Then 10.94ml of raw milk was added in to it along the wall of the butyrometer.
3. Then 1ml of amyl alcohol was added and sealed with rubber stopper.
4. After that the butyrometer was shaken carefully.
5. After that the butyrometer was centrifuged under 1100rpm for 4 minutes and it was removed from centrifuge.
6. Finally, the fat level was read by adjusting the stopper up to down wards.

Interpretation:

Fat content of the raw milk should be between 3.9% and 4.5 %.



Figure 12: Fat Test

#### 2.2.2.3.2 Lactometer Test

This test aims to identify any alteration in the density of milk due to adulteration. Adulteration, such as adding water or other substances, leads to deviations from the normal density of milk. The lactometer test is employed based on the principle that the specific gravity of whole milk and skim milk varies.

Materials required:

- Milk
- Lactometer
- Measuring
- cylinder

Procedure:

1. Raw milk sample was mixed and poured it in to a measuring cylinder.
2. Then, lactometer was dropped slowly into the milk sample.
3. Then, lactometer reading was observed and recorded just above the surface of the milk.

Interpretation:

During doing this test temperature of the raw milk should be at 20°C. Heat is affected to the density of the substance. Increasing the temperature of the liquid is caused to become thin and there it is resulted less weight per unit of volume. For this reason, lactometer reading is taken at a standard temperature, which is 20°C. When addition of water to milk, it tends to decrease the lactometer reading of the milk.



Figure 13: Lactometer Test

#### 2.2.2.3.3 Solid Nonfat Content (SNF) and Total Solid Content

$$\text{SNF} = (\text{fat} * 0.22) + (\text{Lactometer Reading} * 0.25) + 0.75$$
$$\text{Total Solid Content} = \text{Fat content} + \text{Solid nonfat content}$$

Solid nonfat content should be range from 8 to 8.5. Total solid content of the raw milk sample should be greater than 12%.

### 2.2.3 Storage of Raw Materials

There was a well-designed warehouse for storing the raw materials it was located near by the factory production department.

- The factory was followed First in First Out concept for storing of the raw materials (FIFO). The first raw materials reception is also the first raw materials released for the production.
- Materials are placed on pallets by keeping adequate space from walls, floors or roof.
- Storage of raw materials separately from chemicals.
- Provide adequate space.
- Starter cultures are stored under cold conditions.



Figure 14: Plastic bottles and Corrugated boxes

## 2.3 Productions

### 2.3.1 Set Yoghurt

This was the most demanded dairy product in the factory. Batch type of manufacturing process was followed, and 4000-4500 Yoghurt products was contained in one batch. Normally 4/5 number of yoghurt batches was manufactured per day.

Ingredients:

Fresh milk, Milk powder, Sugar, Probiotic yoghurt culture, Gelatin, Flavor (Vanilla), Permitted food additives (INS 202)

The main cultures in yoghurt are.

- Lactobacillus bulgaricus
- Streptococcus thermophiles

Protein	3.7g
Carbohydrate	13.2g
Fat	3.5g
Energy (Kcal)	100.0

Table 2: Nutritional information (per 100g)



Figure 15: Set Yoghurt

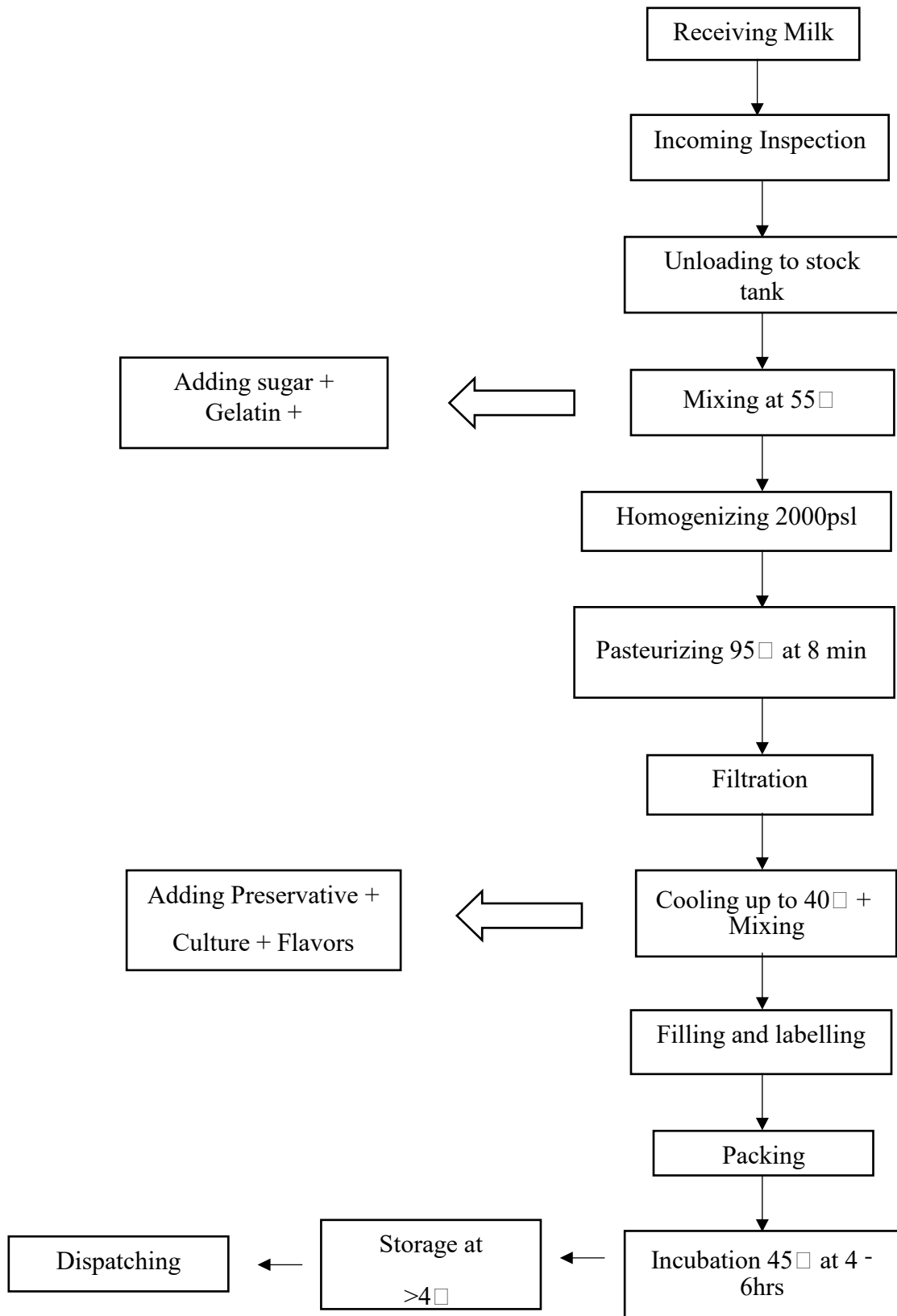


Figure 16: Set yoghurt process flow chart

In the yoghurt production first, fresh milk received, and quality testing are done if milk is good take, it for processing. The mixture is heated up to 55°C and sent to the homogenizer. The purpose of homogenization is to break large fat globules into small fat globules and to disperse evenly in the mix. Homogenized milk was pasteurized in 95°C at 8 minutes for destroying the pathogenic microbes. Then after the filtration step mixture was sent to the balance tank and then cooled up to 40°C. The purpose of this cooling is supplying the maximum and proper conditions for the yoghurt culture.

Then the filled yoghurt was packaged in carton boxes prior to incubate at 45°C for 4-6 hours to set the yoghurts. Finally, the produced yoghurts were stored at >4°C in cooling room.

Ingredients	Uses
Milk	Main ingredients
Preservative	To increase the shelf life/preservation
Gelatin	Set the yoghurt
Milk powder	To increase fat in to 3.5
Culture	To ferment lactose to produce lactic acid
Flavor	Improve sensory properties (taste, odor)
Sugar	Improve taste, flavor and texture, help to set yoghurt

Table 3: Set Yoghurt Ingredients and Uses

### 2.3.2 Jelly Yoghurt

Ingredients:

Probiotic yoghurt culture, permitted food colors (INS110, INS122), permitted food additive (INS202), Natural fruits, Natural identical pineapple and vanilla flavors.

Potassium sorbet used as preservative.

Protein	3.7g
Carbohydrate	13.2g
Fat	2.3g
Energy	100.0Kcal

Table 4: Nutritional information in jelly yoghurt (per 100g)



Figure 17: Jelly Yogurt

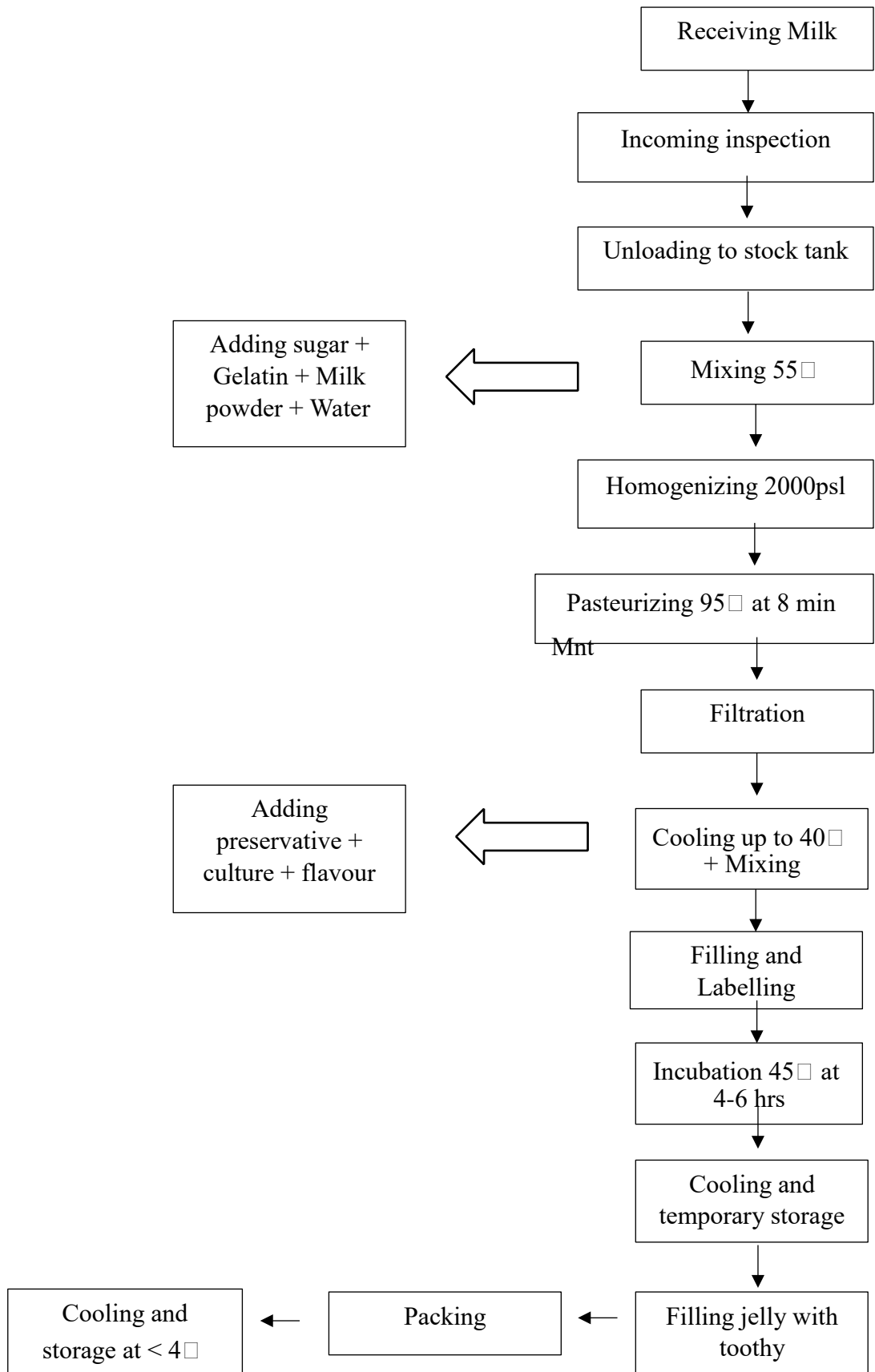


Figure 18: Jelly yogurt process flow chart

### 2.3.3 Drinking Yoghurt

Drinking yoghurt also a member of the yoghurt family. In here they were manufactured two types of drinking yoghurt products based on the flavors.

1. Vanilla flavored drinking yoghurt
2. Strawberry flavored drinking yoghurt with basil seed

The standardized milk mixture is inoculated with starter culture, and it is fermented in the holding tank. After incubation the mixture is stirred, and flavors are incorporated. Finally, the mixture is cold and fill to the bottle.

#### ❖ Vanilla Flavored Drinking Yoghurt

Ingredients:

Fresh milk, Sugar, Gelatin, Probiotic yoghurt culture, permitted food preservative (INS202), Nature identical vanilla flavor.

Protein	2.4g
Carbohydrate	13.2g
Fat	2.5g
Calcium	75mg
Energy	84.9Kcal

Table 5: Nutritional information (per 100g) of vanilla flavored drinking yoghurt



Figure 19: Vanilla Drinking Yoghurt

❖ Strawberry Flavored Drinking Yoghurt with Basil Seed Ingredients:

Fresh milk, Sugar, Gelatin, Probiotic yoghurt culture, permitted food preservative (INS202), Nature identical strawberry flavor, permitted food colors.



Figure 20: Strawberry Drinking yoghurt



Figure 21: Process flow chart of Vanilla and Strawberry Drinking yoghurt

Ingredients	Uses
Milk	Main ingredient
Sweetener	Reduce naturally sour flavor of yogurt
Sugar	Increase taste, flavor and texture
Preservative	To preservation
Culture	To fermentation

Table 6: Ingredients and Uses of Drinking yoghurt

### 2.3.4 Curd

Cow's milk is used as the main ingredient for curd production. Other than that gelatin, sugar, full cream powder, starter culture and preservatives (Potassium sorbet) were used at the milk boiling section as the ingredients for curd production.

A good quality curd should have a firm and uniform texture with pleasant aroma and a smooth and glossy surface. The standard for curd made from cow milk is pH 4.5, milk fat 7.5%.

Protein	2.6g
Carbohydrate	13.8g
Fat	5.3g
Calcium	76mg
Energy	86.2Kcal

Table 7: Nutritional information of Curd (per 100g)



Figure 22: Curd 450ml, 1000ml, 100ml

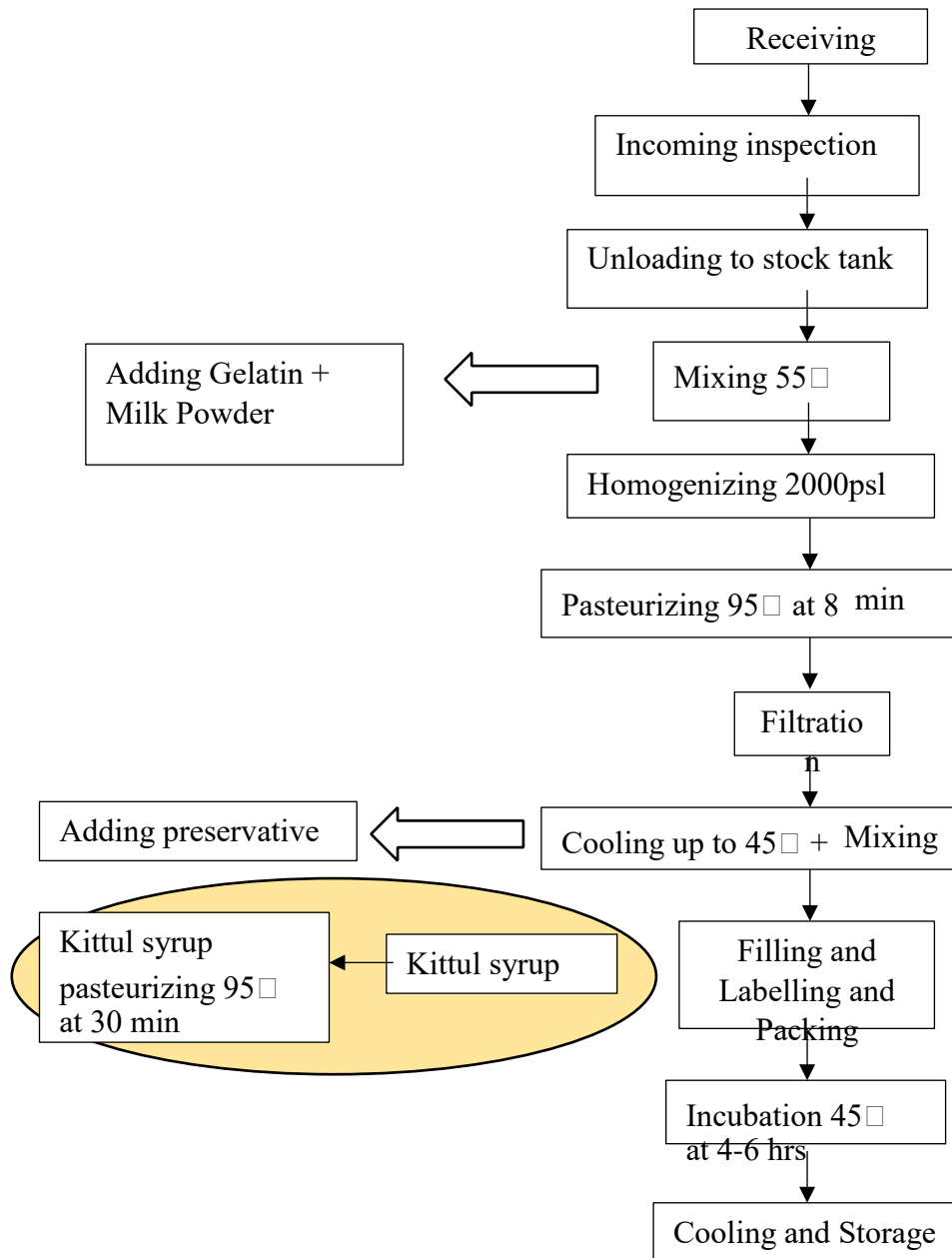


Figure 23: Process flow chart of Curd

Ingredients	Uses
Milk	Main ingredient
Gelatin	To set the curd
Sugar	To increase the taste, flavor
Milk powder (whole milk powder)	To increase the fat level
Culture	To ferment
Preservative	To preservation

Table 8: Ingredients and Uses of Curd

### 2.3.5 Orange Drink

In the orange juice preparation firstly boil the water to 45°C and add CMC and other ingredient and boil to 85°C. And mixture cool to 45°C and add flavor, acid and preservative. Then cloud emulsion and mixture fill into cups and seal.

Ingredients	Uses
Water	Main ingredient
Salt	Improve taste
Sugar	Improve taste, flavor
CMC	To thicken of mixture
Sodium benzoate	To thicken of mixture

Table 9: Ingredients and uses of Orange Juice



Figure 24: Orange Juice

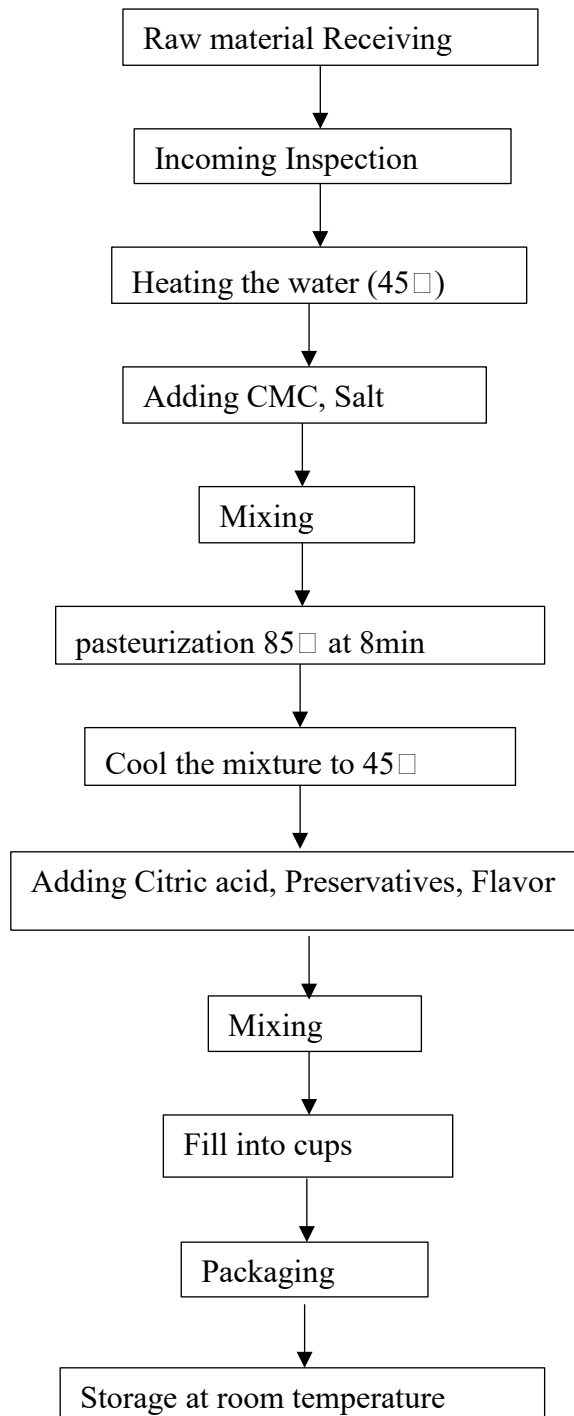


Figure 25: Process flow chart of orange juice

## 2.4 Special Machineries

### ❖ Storage Tank

4 °C temperature should be maintained inside the milk storage, where received milk should be kept for 10 to 12 hours until enough milk was collected for processing. In RDL, 3000L to 4000L of milk should be collected each day.



Figure 26: Storage Tank

### ❖ Culture Tank

Known also as an inoculation vat. To add probiotic culture, the temperature must be dropped by 40°C. Ten minutes later, begin filling.



Figure 27: Culture Tank

### ❖ Homogenization

A homogenizer was used to carry out this mechanical treatment. This process causes the milk to become whiter and the size of the fat globules to be decreased in order to prevent the formation of a cream layer. Homogenization also improves the flavour of milk. The three most important factors in homogenization are temperature, pressure, and time.

After homogenization, the milk gets whiter and more appetizingly coloured. Increase the mouthfeel, mouth flavour, and mouth feel sensitivity to fat oxidation.

Homogenization improves the stability of cultural products.



Figure 28: Homogenizer

### ❖ Pasteurization

Pasteurization is comparatively low order of heat treatment can destroy or inhibit the growth of pathogenic microorganisms. Pasteurizer or plate heat exchanger is used for pasteurization process. Plate heat exchanger and holding tubes are the equipment which related with pasteurization process in the plant. Plate heat exchanger was providing heat treatment for the milk mixtures (Set yoghurt, Drinking yoghurt, and curd mixtures). Plate heat exchangers used for precooling of milk.

Holding tube was hold heat treated milk for required time. Heat is transferred by using indirect heat transfer method. Temperature and time are very important factors which must be specified precisely in relation to the quality of products and shelf-life

requirements. Pasteurization has minimal effects on the organoleptic characteristics of the milk and there is no significant reduction of milk nutrients.

Different time-temperature combinations used in milk pasteurization.

- 63 °C for 30 minutes - Low Temperature/Long Time (LTLT)
- 85 °C for 10 minutes - High Temperature/Short Time (HTST) □ 90 °C for 5 minutes - Super pasteurization



Figure 29: Pasteurization

#### ❖ Filling machine

Automatically filling and sealing the yogurt, orange drink, and treacle yoghurt in this machine. When the yogurt filler machine is ready to operate, the machine should be filled with fermented milk, yogurt cups, and aluminum foil should be placed in the appropriate locations, and then the machine may be started. The cups are moved under the sealing equipment for sealing after being filled. One can alter the filling speed.



Figure 30: Filling Machine

❖ Steam shrinks tunnel

It operates automatically. For labeling drinking yogurt products, a steam tunnel with a slat conveyor works well. The heat needed to shrink plastic substrates on products is produced by steam shrink tunnels rather than hot air. Typical examples of tamper evident packaging include bottles with shrink sleeves.



Figure 31: Shrink Machine

❖ Auto Filling Machine

This machine used to fill Curd and Drinking yoghurt. Semi-automated filling is done by adjusting value.



Figure 32: Auto Filling Machine

## **2.5 Cleaning and Sanitation**

There are two processes followed in factory.

### **I. Cleaning In Place Process (CIP)**

Cleaning in place means that rinsing water and detergent solutions are circulated through tanks, pipes and process lines without the equipment having to be dismantled. Quality is the main factor that keeps demand for any product in the market. The quality of the raw materials as well as the cleanliness/sanitation of equipment directly affects the quality of the finished products.

Therefore, it is important of the maintain cleanliness of the equipment for obtain best possible quality of the end products. CIP can be defined as circulation of cleaning liquids through machines and other equipment in a cleaning circuit. Cleaning in place is a method of cleaning the interior surfaces of process equipment such as tanks, pipes, pumps, heat exchangers and filling machines etc. In this factory they were conducted CIP process for sanitizing all equipment before and after the manufacturing process.

Procedure of CIP Process of the Factory

#### **1. Pre rinsing with water (at room temperature)**

This is done immediately after the production process for prevent the drying of milk residues. Dissolves sugar and melt fats.

#### **2. Cleaning with liquid soap**

Manually cleaned the interior and outer surfaces of the equipment with liquid soap.

#### **3. Cleaning with alkaline detergent**

Caustic soda was used as an alkaline agent. Circulation of the caustic soda solution for about 20 minutes. Softens of fats and making them easier to remove.

#### **4. Intermediate rinsing with water**

Rinsing out traces of remaining detergent from caustic soda.

#### **5. Cleaning with acidic detergent**

Used Nitric acid. Circulation of the nitric acid solution for about 20 minutes.  
Neutralize pH value after using caustic soda. Dissolved and remove protein and mineral deposits in the equipment.

6. Intermediate rinsing

7. Cleaning with disinfection agent

Used hydrogen peroxide. Circulation of hydrogen peroxide solution for about 20 minutes.

8. Final rinsing with hot water (Temperature at 90°C)



Figure 33: CIP Tanks

## II. Clean Out Place (COP)

This is accomplished through complete or partial disassembly of machinery and equipment. This COP was completed for filling machines (drinkable and set yoghurt) and other kitchenware. This is carried out prior to, during, and following processing. Machines' removable components were disassembled, scrapped, cleaned with water and tea tree oil, dried, and reassembled.

At the conclusion of each day, the floor and walls are also carefully cleaned.

## 2.6 Packaging Material and Labelling

The packaging process can be categorized into,

1. Primary packaging
2. Secondary packaging

In here set yoghurt cups act as the primary package and this over all process happen automatically in the product filling and sealing machine. In secondary packaging process, Check the accuracy of Manufacturing Date, Expire Date, Batch number, and price of the products (set yoghurt, curd products, drinking yoghurt). sealing quality and weight of the products also inspect label position verify label content Finally all the primary packages are placed in the corrugated (carton) box, the box act as a secondary package by manually with well-trained employees.

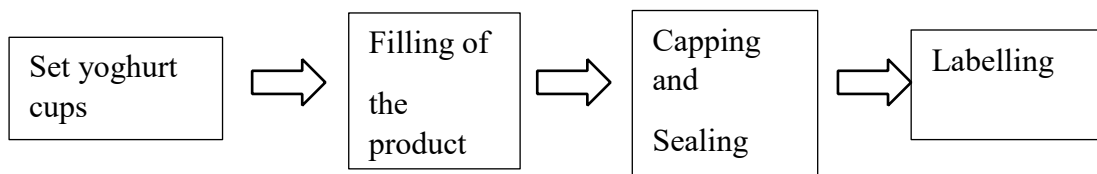
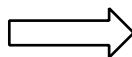


Figure 34: Set yoghurt packaging process



Primary Package



Secondary package

Figure 35: Primary and Secondary Packaging in Set yoghurt

In orange juice production, Polystyrene cups act as the primary package and Vacuum bag act as the secondary package.

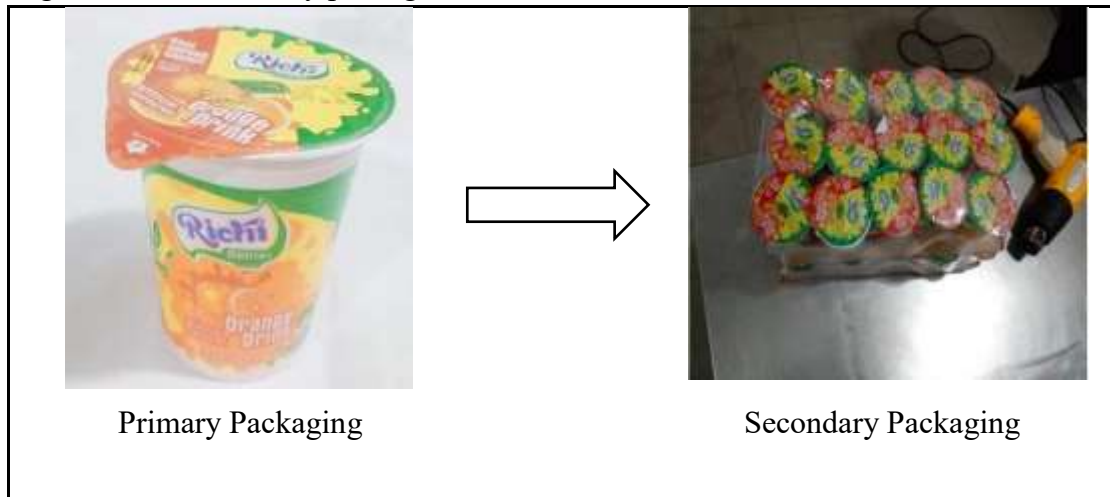


Figure 36: Primary and Secondary packaging in orange juice

Labelling also very important like the packaging. Labels provide necessary information to customers. It helps the concerned sides to good identification of products.

Name of the product	Label type
Set yoghurt	Printed laminated cups and printed aluminum foil
Jelly yoghurt	Printed laminated cups and printed aluminum foil
Treacle yoghurt	Printed laminated cups and printed aluminum foil
Drinking yoghurt	Printed laminated sleeves
Curd	Printed artwork on the lid and cups
Orange drink	Printed laminated cups and Printed aluminum foil
Milk toffee	Printed laminated Sticker

Table 10: Label Types of Products

## 2.7 Final Quality of Products

Final quality inspection of all production in Richi Dairies Lanka is done as follows.

Product quality inspection,

- Taste
- Appearance
- Foreign impurities
- Odor

Packaging quality inspection,

- Weight
- Sealing quality
- Labeling quality
- Coding

And finally test the overall quality of the products.

## 2.8 Waste Management Process

This is a dairy products manufacturing plant. In here generates varies kind of waste during processing handling storing and transportation of raw materials and finished products. There was a systematic way for managing wastes that assembly in the factory premises and removes waste in an environmentally friendly manner.

### ➤ Solid Wastes

- Cardboard boxes, paper, HDPE bottles caps, foils... etc.-: Packaging waste.
- Masks, Head caps, Boots -: personal protective equipment.

- These solid wastes are stored in the separate rooms and released for recycling process.
  - Liquid wastes
    - Sanitary wastewater.
    - Products manufacturing wastewater.
- The liquid wastes are released to wastewater treatment plant, which situated in the factory premises.

### 2.8.1 Wastewater Treatment Plant

The purpose of designing a wastewater treatment plant is to convert the wastewater to the acceptable standards of the Central Environmental Authority to discharge on to the Inland surface water.

- Total volume of wastewater produces 15000 L
- Treatment method is Physio- chemical.
- Type of reactor is Continuous.

The average expected chemical characteristics of the wastewater and the CEA stipulated standards for Inland surface waters.

Parameter	Value (Average)- expected	CEA stipulated parameters
pH	7- 7.5	6- 8.5
BOD <sub>5</sub> (20°C) (mg/l)	200- 300	30
COD (mg/l)	600- 900	250
TSS (mg/l)	50- 100	50

Table 11: Characteristics and Standards of wastewater

The average chemical characteristics of the wastewater

#### ❖ Treatment Process

The major unit processes are discussed as follow.

##### ✓ *Equalization Tank*

This is a tank with a capacity of 5000 liters. In this reactor it is expected the collected wastewater is allowed to equalize in order to produce a uniform wastewater prior to feeding to the main reactor (Coagulation- flocculation tank) ✓ *Coagulation Unit with Clarifier*

The wastewater in the equalization tank needs to be manually pumped to this unit. Coagulants and flocculants should be manually added with an appropriate pH correction and the wastewater needs to be stirred using the pump. In this unit the added coagulants will destabilize colloidal particles, hydrolyze and then form gelatinous flocs that absorb most pollutants particularly organics (around 80%) that may be present.

This will be sent into a settling tank; agitated wastewater shall be detained for 2-3 hours for effective sludge accumulation to occur.

The settled sludge shall be collected under gravity into sludge drying beds (composed of gravel and fine sand on top of the gravel bed). The collected sludge shall be adequately sun dried and then disposed in accordance to guidelines on safe disposal of contaminated material.



Figure 37: Major units of the Wastewater plant

### Treatment Process

#### 1. Collection of wastewaters to the acquisition tank

Flow balancing and adjustment of the PH. As a result of the use of acid alkaline detergent for plant cleaning and use of different raw materials during processing of products, the PH of the wastewater takes different values. This tank act as a buffer and regulates pH of the water about 7.0 Also the content is mixed well and prevent solids from settling.

2. Removing of the sludge

Water moved through a filter accumulated on the top of the tank. There, sludge of the tank.

3. Moving through the sand filter and collection to the aeration tank

There are three aeration tanks with the capacity of 10000 liters per each. These tanks are facilitated for biological water treatment process. It removes remaining impurities with the help of microorganisms. The aerobic bacteria are grown and digested organic matter present in the water.

4. Final filtration and releasing of treated water. That treated water use for their crop cultivation.

5. Making of compost fertilizer from removed sludge.

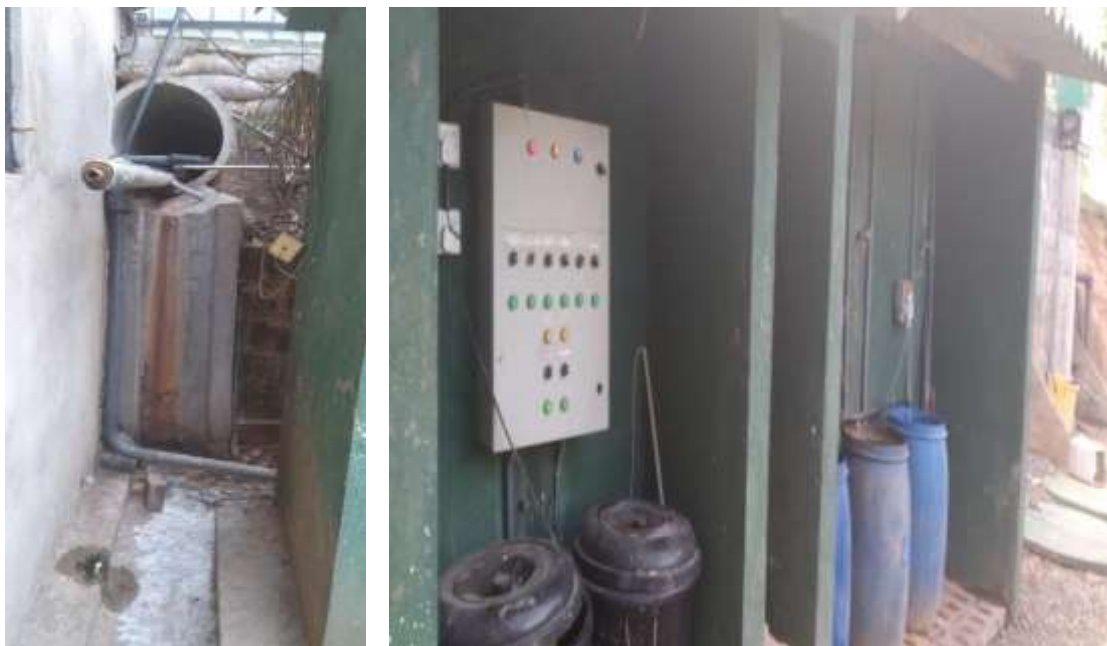


Figure 38: Wastewater tanks

**2.9 Shelf life of the Products**

Set Yoghurt 80ml	30 days
Jelly yoghurt 80ml	30 days
Curd with kittul Syrup pack 100ml	30 days

Curd 450ml	30 days
Curd 1000ml	30 days
Drinking yoghurt	30 days
Ice packets	1 year

Table 12: Shelf Life of the products

## Chapter 03

### 3 Conclusion, Suggestions and Certification

#### 3.1 Conclusion

In conclusion, my academic journey at the University of Ruhuna, Faculty of Technology, introduced me to new theories in the dynamic field of food technology. Theoretical knowledge, however, came to life during my industrial training, providing a valuable opportunity to apply what I had learned in a practical setting. The food sector, as I discovered, operates on different principles than those covered in the classroom, yet the fundamental connection between theory and practice remained evident.

The competitive and evolving nature of the industry demands a constant adaptation of theories to meet current challenges and unforeseen occurrences. Survival in the market is a collective struggle for all professions, emphasizing the importance of factors such as punctuality, diplomacy, knowledge, practical problem-solving, efficiency, effective communication, and adaptability during training.

The culmination of knowledge and experiences gained through the industrial training program equips me with a set of professional skills crucial for my future endeavors. I am confident that this training has not only broadened my understanding of the field but has also provided me with the tools necessary to navigate the complexities of the industry. This invaluable experience has laid a strong foundation for launching a successful career, and I am grateful for the opportunity to have undergone such comprehensive training.

### 3.2 Suggestions

- ✓ Establishing and expanding facilities for the production plant's new product development strategies.
- ✓ Increasing employee knowledge of maintaining product quality and cleanliness. Through planned training reducing equipment malfunctions to boost production capacity.
- ✓ Enhancing and maintaining the wastewater treatment facility will aid in minimizing pests, particularly flies, around the production facility.
- ✓ Creating a department for effective quality management

### 3.3 References

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- Richi Dairies Lanka (PVT) Ltd. Retrieved from [www.facebook.com](http://www.facebook.com) website:  
<https://www.facebook.com/Richidairies/>
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### 3.4 Certification

Name of Trainee : H.M.A.S.N. Jayathilake  
ID No : 992710225V  
Address : 35 Thilak, Udawelakapalla, Gedarawela,  
Keppetipola.  
Institute and Address : University of Ruhuna, Faculty of Technology,  
Karagoda, Uyangoda, Kamburupitiya.  
Programme : Bachelor of Biosystems Technology Honours  
(BBST Hons).  
Period : 4 years.  
Training organization and Address : Richi Daries Lanka Pvt Ltd,  
Erabadda Road, Karagaswagura, Keppetipola.  
Training period : 6 months (05 / 07 / 2023 – 05 / 01 / 2024)

This is to certify that this report is prepared by myself under training conducted at above organization.

.....  
Signature of the trainee (with date)

This is to certify that this report is prepared by above trainee under my regular supervision.

RICHI DAIRIES LANKA (PVT) LTD  
PV 00206348  
*Pradeep Kumar*

Signature of Employer with stamp.