



Daffodil
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**PRODUCTION AND QUALITY CONTROL SYSTEM OF
DHAKA DAIRY PLANT (MILK VITA)**

AN INTERNSHIP REPORT

BY

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Submitted to the Department of Nutrition and Food Engineering
in the partial fulfillment of B.Sc. in Nutrition and Food Engineering

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APPROVAL

This Project titled “**Internship Report on Production and Quality Control at Dhaka Dairy plant (Milk Vita)**” submitted by **Fowzia Angel** to the Department of Nutrition and Food Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved as to its style and contents.

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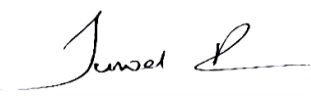
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DECLARATION

I hereby declare that this project has been done by me under the supervision of **Juwel Rana, Assistant Professor, Department of NFE, Daffodil International University**. I also declare that neither this Internship nor any part of this Internship has been submitted elsewhere for the award of any degree.

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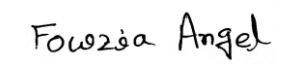
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ABSTRACT

I had the privilege of working for a couple of months at Milk Vita, a well-known nationallevel co-operative firm in Bangladesh. During MILK VITA internship, I was learnt practical thing experience in different areas. In this is holding companies a certain manufacture a variety of farm product such as Yogurt, Labang, Matha, Roshogolla etc. I would like to convey my gratefulness to Milk Vita providing this lucky chance to work with this company and gain practical experience in my area of expertise. This internship has helped me to create a connection between theoretical knowledge and hand works on relevant field and has given me valuable skills for future endeavors.

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CHAPTER1

INTRODUCTION

1.1 Introduction

I had the opportunity to work in (Milk Vita), a dairy plant in Mirpur, Dhaka during my 11th semester of my University life. I worked a temporary employment from September 10, 2022, until November 12, 2022.

Bangladesh Milk Producers Co-operative Union Limited was established in November 2022 which is the largest or most prominent dairy group in the country. Milk Vita manufacturing 70% market share of liquid milk in Bangladesh. This company Milk Producers which has many divisions to run its operations.

Our main concern was the Department of Quality Control and the Department of Production in which I supervised the accompanying exercises.

- Perform all quality management tasks according to defined quality parameters.
- Ensure that the innovation and development spirit is maintained.
- Comprehending the manufacturing and item costs.
- As directed by the organization's administration, create and submit basic reports.
- Every day, power must get a report on the cost, efficiency, and usage of generating.
- To establish essential development agreements that align with the Generation.

1.2 Training Goal

Students can bridge the knowledge gap between theory and practice by working in entry-level positions, which also serve as a temporary participating internship. Every department's main goal is to prepare students for vital professional roles in management. They frequently participate in pertinent workshops for professional development and session to advance their knowledge and abilities.

1.2.1 The Internship

- ✎ Internships, whether in the various different sectors, provide learners with a hands-on, practical experience in society.
- ✎ By doing this, a break between completing particular tasks for the internship organization is avoided. Learning more about the intricate workings of human motivation in a bigger organization.
- ✎ Students can apply classroom theory to real-world job circumstances, such as public administration experiences, through internships.
- ✎ Students who work with governmental, private or nonprofit organizations receive invaluable real-world experience from organizations before to applying for jobs.
- ✎ Their job options are expanded by this exposure potential while instructing them on workplace values.
- ✎ Students can put their advanced talents to use through internships.

1.3 Milk Vita's Products

There are 12 milk producers' company in Bangladesh were taken as a model the packaging this company. Products manufactured by the company (Dairy Plant of Dhaka) include liquid milk are,

1. Flavored Milk
2. Ice-cream [Cup, Lolli, Choco-bar, Container]
3. Pasteurized Liquid Milk
4. Labang
5. Matha
6. Curd [Sweet and sour]
7. Roshogolla
8. Roshomalai
9. Para Sandesh
10. Chana Misti etc.



Figure 1.1: Milk Vita's Products

CHAPTER 2

PROCESSES & PLANT OF MILK

2.1 Processing of Liquid Milk

At the beginning, farmers in the hamlet supply fresh raw milk, which is quickly refrigerated to 4°C. The milk is thereafter shipped via refrigerated transport this Dairy Farm". The milk must be kept refrigerated at constant at least 24 hours at 4°C .

2.1.1 Mechanism

- ◆ Transporting and gathering milk.
- ◆ Vehicle refrigeration.
- ◆ Refrigeration.

2.1.2 Primary Plant

- ◆ Plants for processing liquid milk.
- ◆ Standardization.
- ◆ and quality control.

2.1.3 Another Plant

- ◆ Innovation.
- ◆ Ice-cream.
- ◆ Sweet met product
- ◆ Yogurt.

2.1.4 Dairy Taker

Raw milk is loaded onto a tanker and transported to the dairy facility in Dhaka from rural areas through two distinct classes of 50,000 Liters and 100,000 Liters tankers. The process of standardization begins when liquid milk is moved from the milk collection platform to the reserve tank.

2.2 Making Formula of Liquid Milk

Every country sells to its customers at a distinct level of milk content. For marketing purposes, Bangladesh Standards and Testing Institution "BSTI" certified liquid milk is commonly characterized:

Its ContainsinBangladeshi Standards (BDS)

- Water percentage is 87%
- Corrective Lactometer Reading or CLR is 28.6%.
- 8-9% of SNF (Solid Non-Fat).
- 3.25-3.9% of Fat.



Figure 2.1: Making Formula of Liquid Milk

Table 2.1: Dairy Products Fat & SNF

Name of Products	Amount of Fat (In Percentage)	Amount of SNF (In Percentage)
Ice-cream	10.0	10.72
Lassi	3.6	8.5
Vanilla flavor liquid milk	2	8.4
Card	5	13
Choco flavor liquid milk	2	8.2
Chocolate Bar	7	13

2.3 Process of Separation

The first stage of the separation process is to separate the fat and cream from raw or whole milk, leaving behind skim milk.

Heated milk is typically temperature of 50°C and 55°C in order to improve the separation of these two components.

2.3.1 Flowchart of the Process of Separation

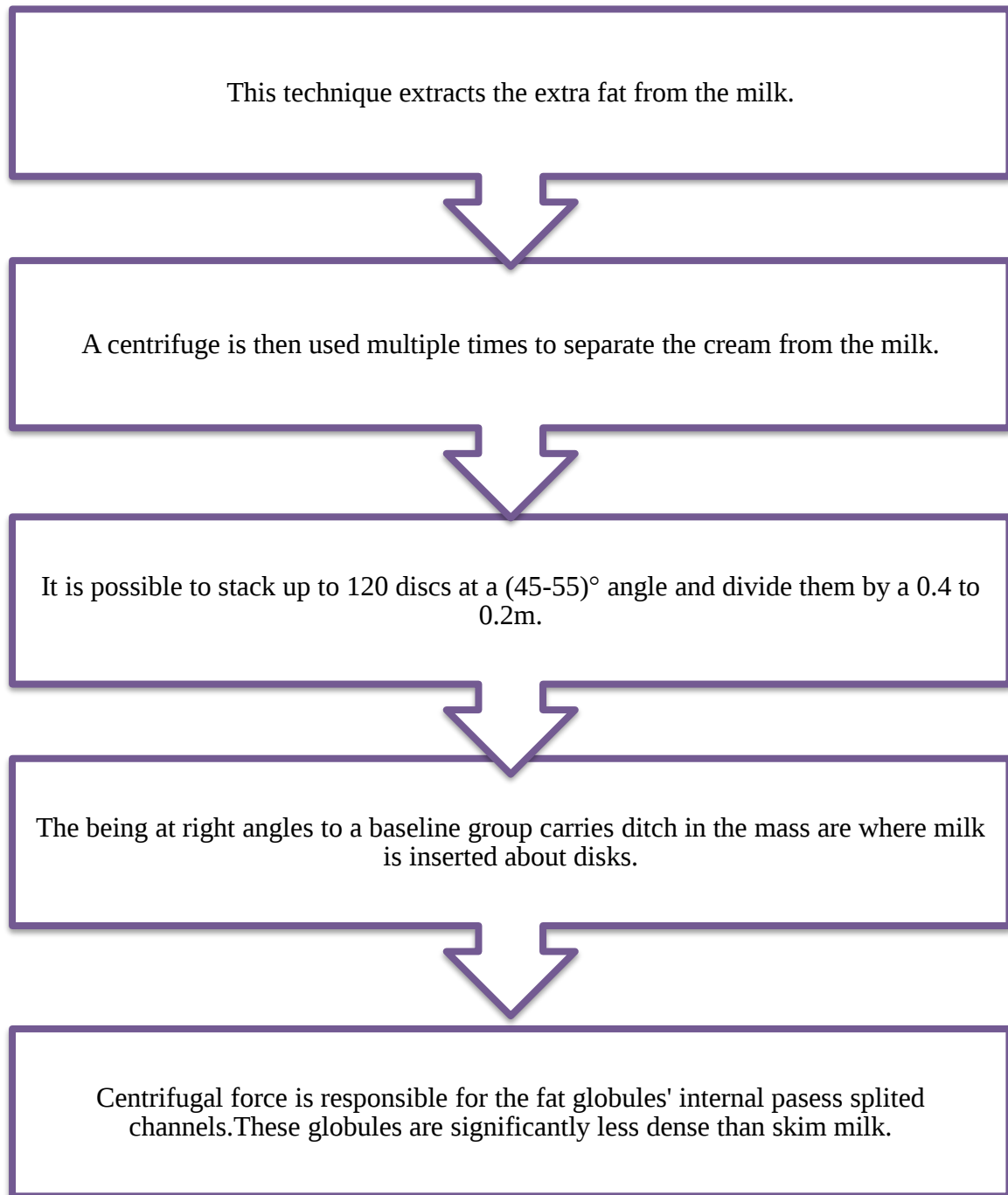


Figure 2.2: Flowchart of Separation Process

2.4 Milk Standardization

The product loses the ideal ratio what we require when the fat is eliminated. To preserve regular ratio separation, the streamlet cream, skim is should be reassembled specified level. The skim milk outlet will release all of the milk if it is fully closed.

2.4.1 Flowchart of Standardization of Milk

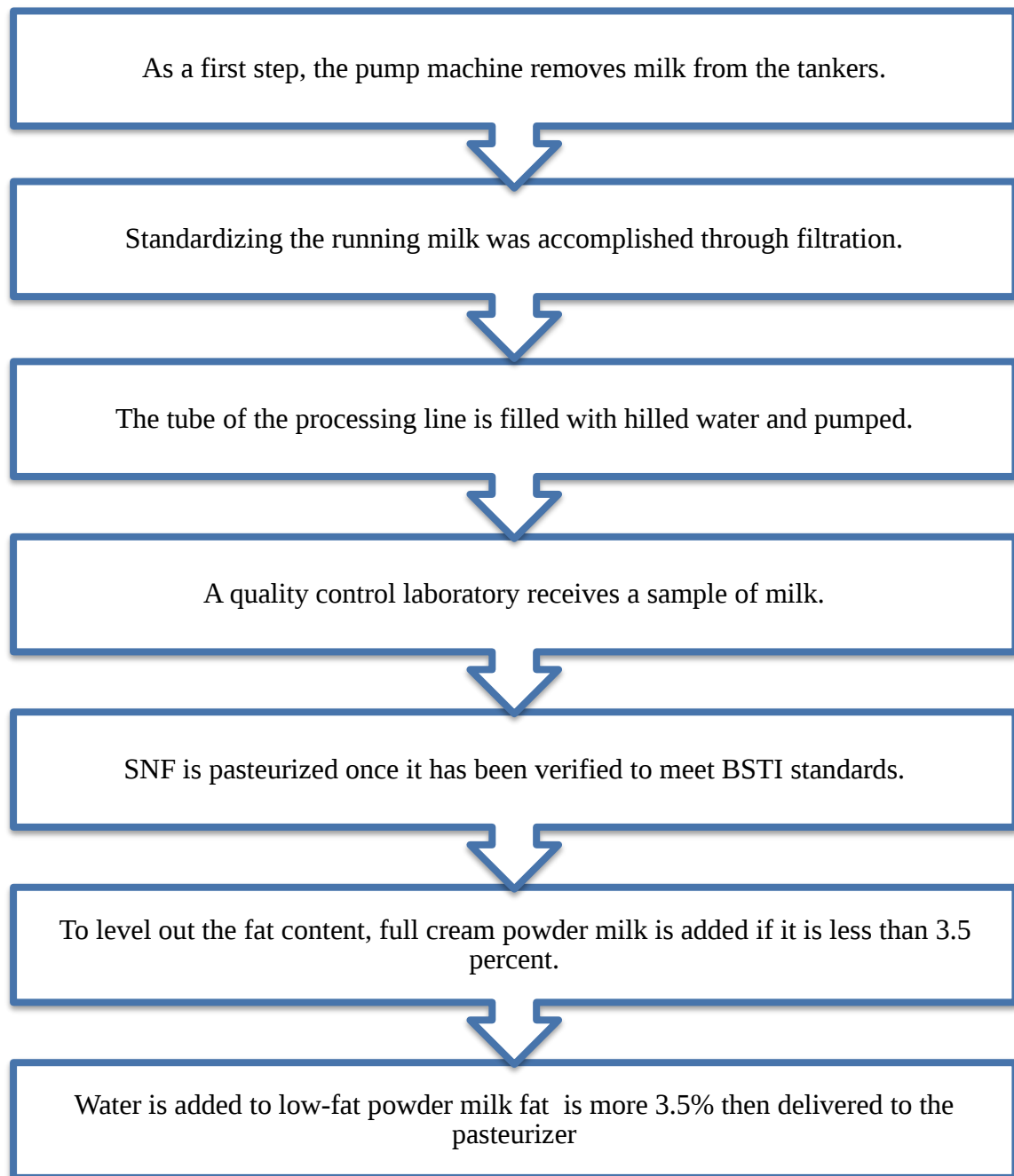


Figure 2.3: Flowchart of Standardization Process

2.5 Process of Pasteurization

There are two distinct steps in the pasteurization process. Raw milk can be treated via vat pasteurization, which removes dangerous germs and pathogens without compromising the milk's quality. 150°F is the temperature at which the raw milk is heated throughout this procedure(66°C) and maintained there for further thirty minutes.

An additional technique for pasteurizing raw milk is high-temperature short-time (HTST) pasteurization. Prolong its shelf life and guarantee its safety.

2.5.1 Pasteurizer

When examined more closely, the pasteurizer is revealed to be a sequence-based heat-exchanging device. After being heated, the raw milk is held for a little while before being cooled. After passing through this heat exchanger, the raw milk are heat minimum 72°C by water of hot. Pasteurized milk is term used to identify the final product that has gone through the pasteurization process.



Figure2.4: Pasteurization Unit

2.5.2 Flowchart of Pasteurization

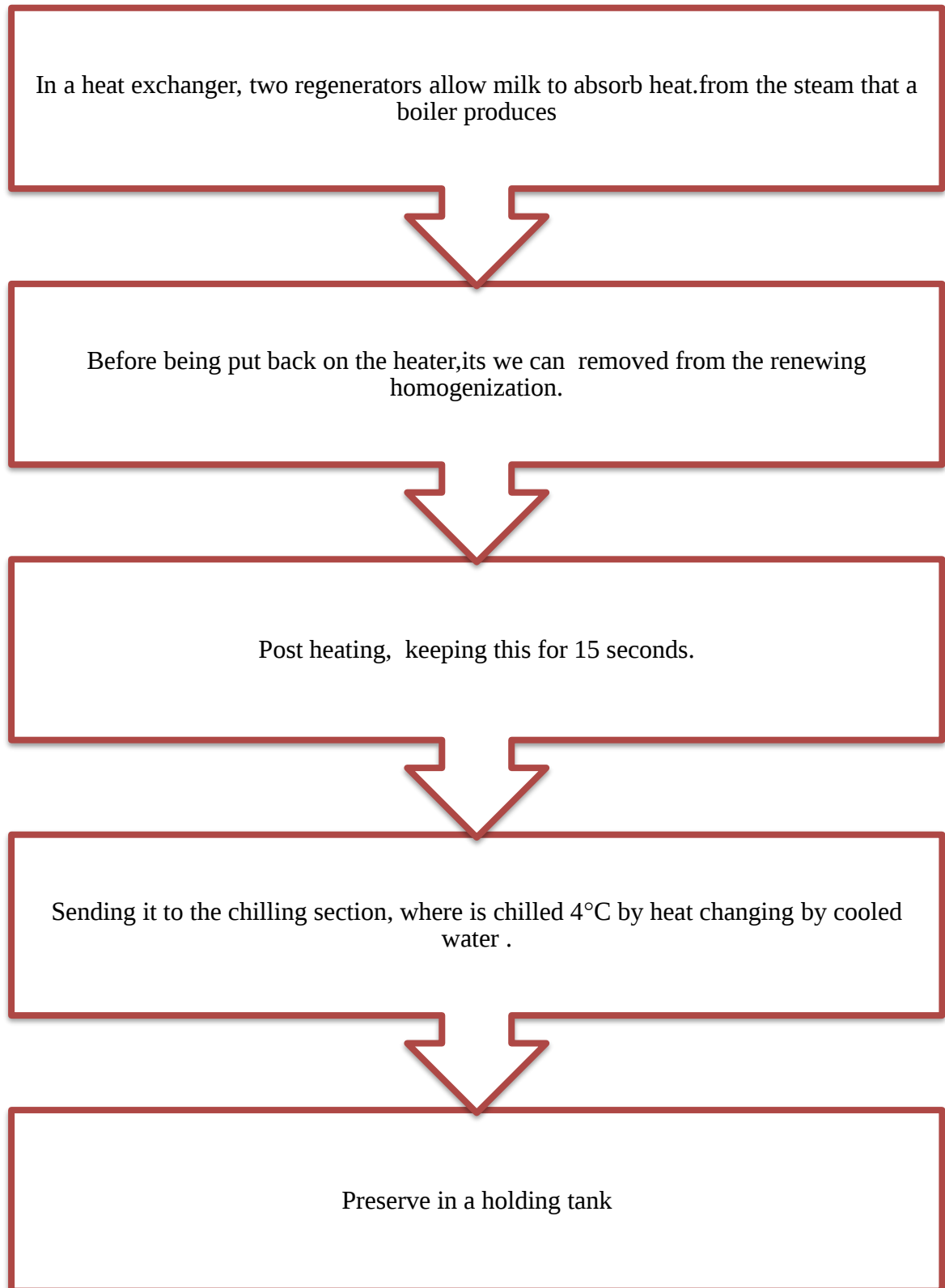


Figure 2.5:Flowchart of Pasteurization Process

2.6 Processing of Flavored Milk

The dairy industry processes raw milk to make a variety of products including flavored milk, chocolate bars and ice cream. However, other ingredients beyond milk are also present in those goods, such as cream, sugar, cocoa powder, color, flavor, and water. The following chart displays the correct ratio of each essential ingredient:



Table 2.2: Flavored Milk Formulated Table

Items Ingredient	Flavored Milk		
	chocolate	Vanilla	Mango
Std. Milk	52.30	57.66	57.66
Cream (40%)	—	—	—
Sugar	9	8	8
S.M.P.	4.05	3.80	3.80
Stabilizer	0.20	0.20	0.20
Cocoa Powder	0.70	—	—
Color	0.008	0.008	0.033
Flavor	—	0.34	0.34
Water	34.70	29.90	30.10

2.7 Preparation of Flavored Milk

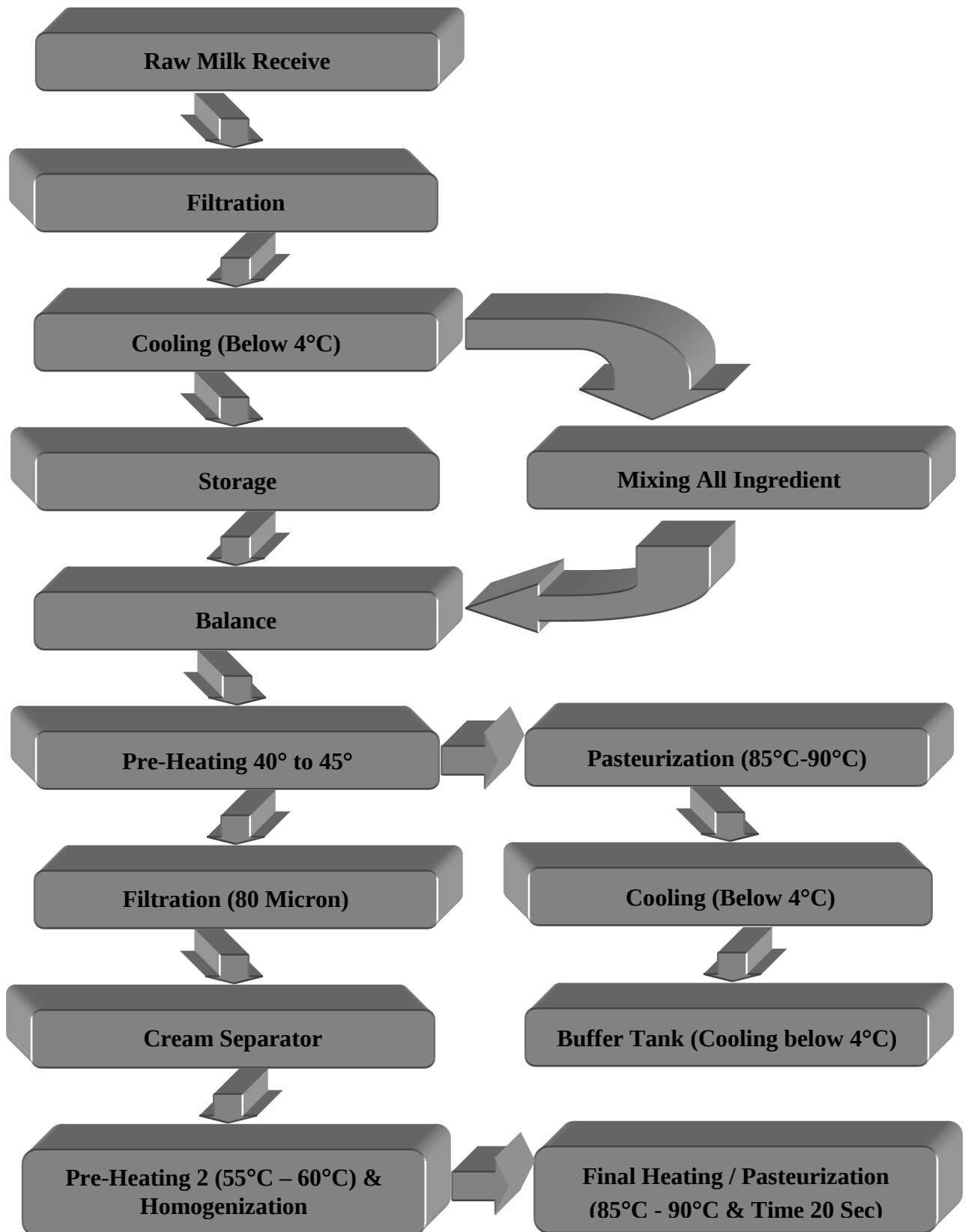


Figure 2.7: Process of Flavored Milk

2.8 Preparation of Labang

Labang is a term used to describe a fermented milk-based food or drink that is often made by adding boiling milk, usually whole milk, curd or leftover milk, and then chilling it overnight.

At 40°C to 45°C, thermophilic starters such *Streptococcus thermophilus*, *Lactobacillus acidophilus*, and *Lb. delbrueckii subsp. bulgaricus* ferment heat-treated cow milk to produce labang (Baroudi and Collins 1976; Chammas et al. 2006b). Depending on the product, the milk used may be full-fat, partially skimmed, or totally skimmed, thereby resulting to the commercialization of whole-fat, low-fat, and fat-free Labang (Libnor 1999).



Figure 2.8: Labang

Table 2.3: Labang Formulated Table

Elements	Percentage of Elements	Percentage of Fat	Reading of Collective Lactometer	Total Amount in KG
Liquid Raw Milk	627 L		28.55	644
Curd				616
White Sugar	9.5			55.60
Sea Salt	0.73			4.20
Purified Water	15.5			92.69
Mixtue				769.35
Other Elements (i.e., Xanthan Gum)	0.031			0.22
Overall				769.69

2.8.1 Preparation Process of Labang

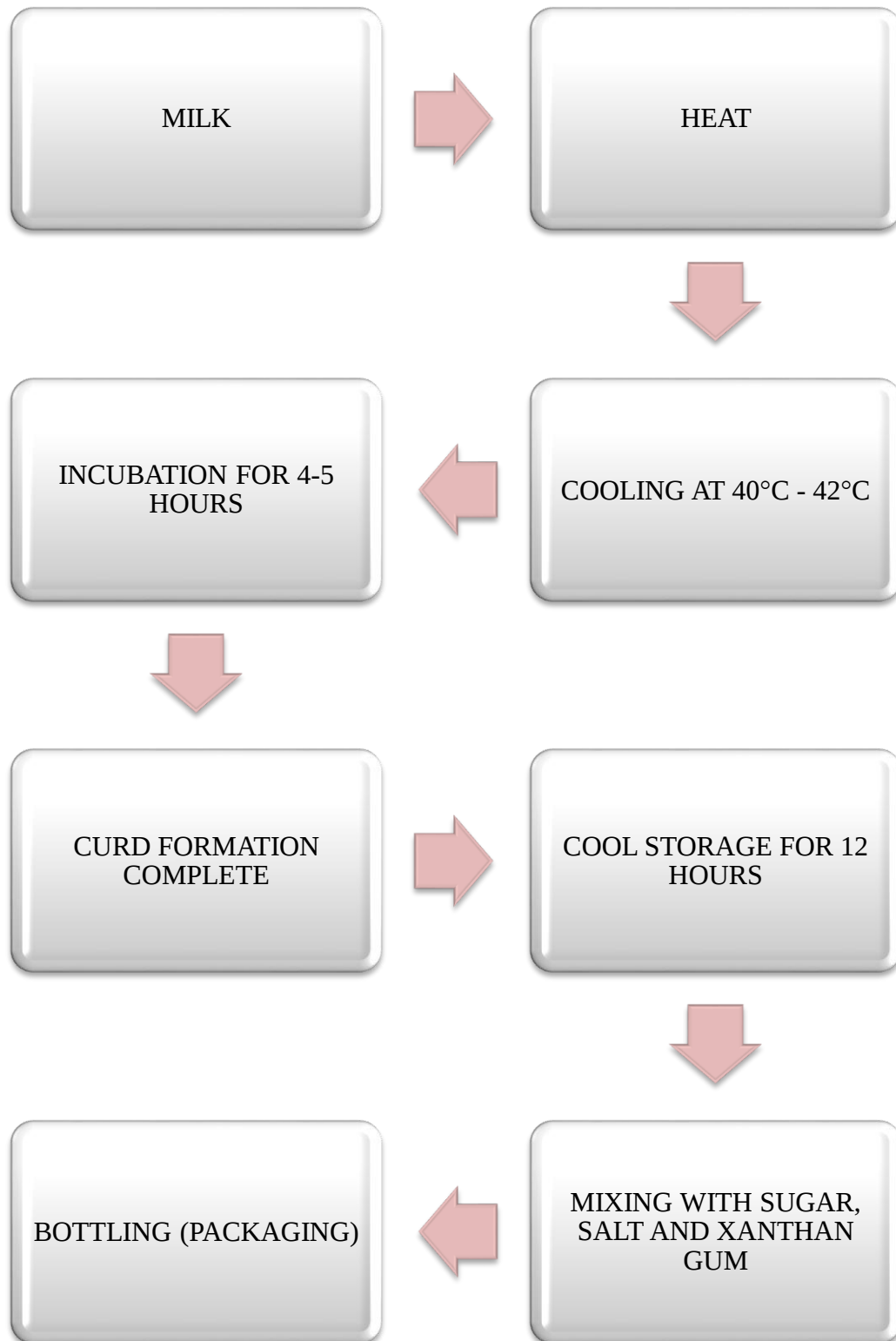


Figure 2.9:Flowchart of the Process of Labang

2.9 Preparation of Matha

The Indian subcontinent is the source of the beverage known as matha. It is prepared with a combination of sugar, spices and curd or buttermilk. To create matha, add the other ingredients, sugar, and spices to buttermilk. Milk Vita Matha has a lot of potassium and calcium.

A conversation that is provided below illustrates the correct proportions of each necessary ingredient:



Figure 2.10: Matha

Table2.4:Matha Formulated Table

Elements	Percentage of Elements	Percentage of Fat	Reading of Corrective Lactometer	Total Amount
Liquid Raw Milk	105 L		25	
Curd				50
White Sugar	3			5
Sea Salt	.60			0.60
Blackish iodine salt	20			24
Purified Water	17			17
Mixture	0.03			0.03
Other Elements (i.e., Xanthan Gum)				124.85
Overall				124.88

2.9.1 Preparation Process of Matha

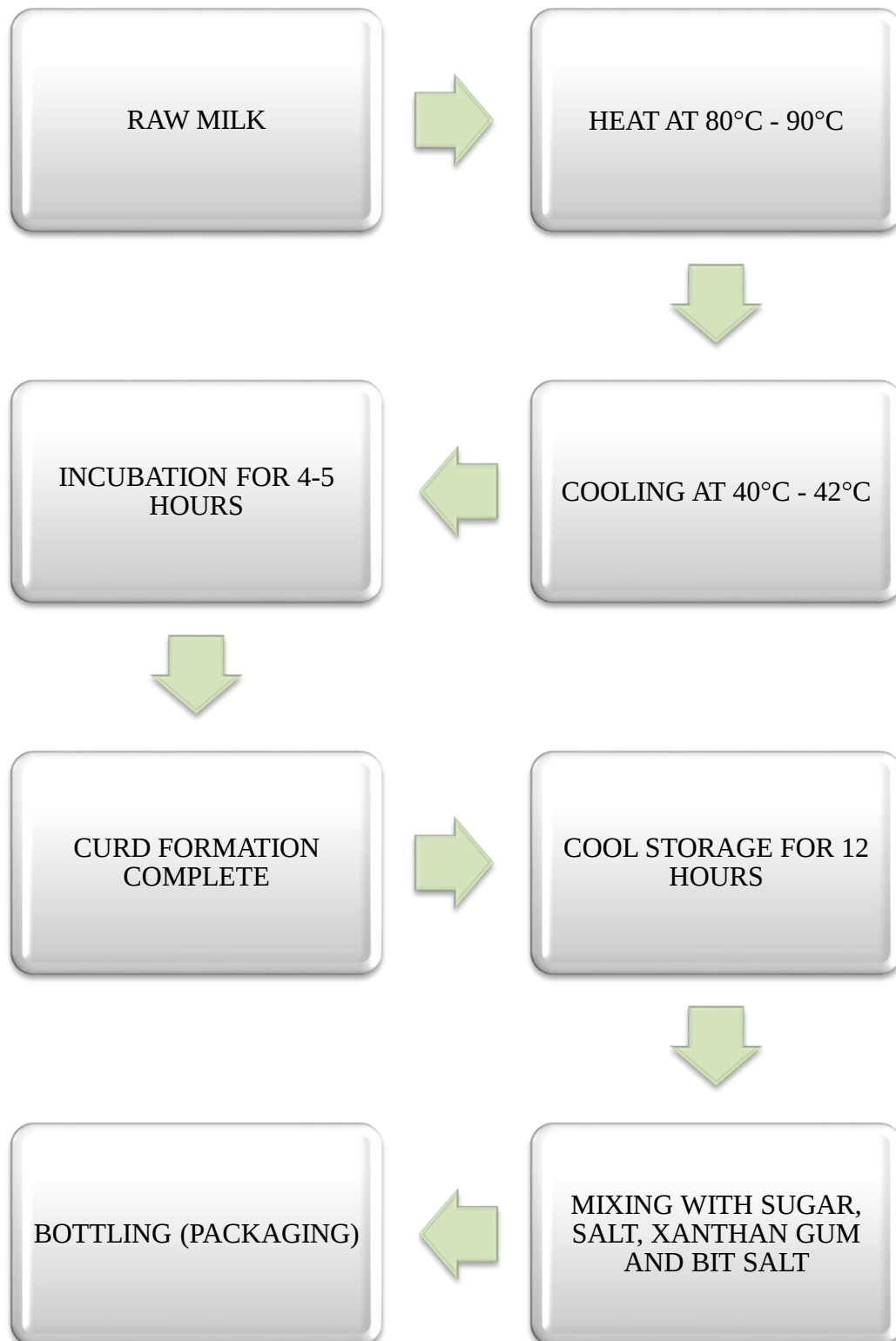


Figure 2.11: Flowchart of the Process of Matha

2.10 Preparation of Ice-cream

Typically prepared from milk or cream, ice cream is a frozen treat flavored with fruit, like peaches or strawberries, and a spice, like vanilla or chocolate, or with sugar or a substitute. Sometimes stabilizers are used together with food coloring. To provide air gaps and stop observable ice crystals from forming, the mixture is chilled below the freezing point of water and agitated. A flavored cream base and liquid nitrogen can also be whisked together to make it. The end product is a semisolid, smooth foam that solidifies at very low temperatures (less than 2°C or 35°F). The higher the temperature, the more bendable it gets.



Figure 2.12: Formulation of Ice-cream

Table2.5:Ice-cream Formulated Table

Items Ingredient	Ice-cream				Choco bar
	Chocolate	Vanilla	Mango	Strawberry	
Std. Milk	59	59	59	59	—
Cream (40%)	19	20	20	20	15
Sugar	16	15	15	15	15
S.M.P.	5.26	5.05	5.05	5	12.66
Stabilizer	0.50	0.50	0.50	0.50	0.50
Cocoa Powder	1.50	—	—	—	—
Color	0.083	0.011	0.033	0.10	0.04
Flavor	—	0.34	0.20	0.83	0.34
Water	—	0.36	0.21	0.42	0.32

2.10.1 Preparation Process of Ice-cream

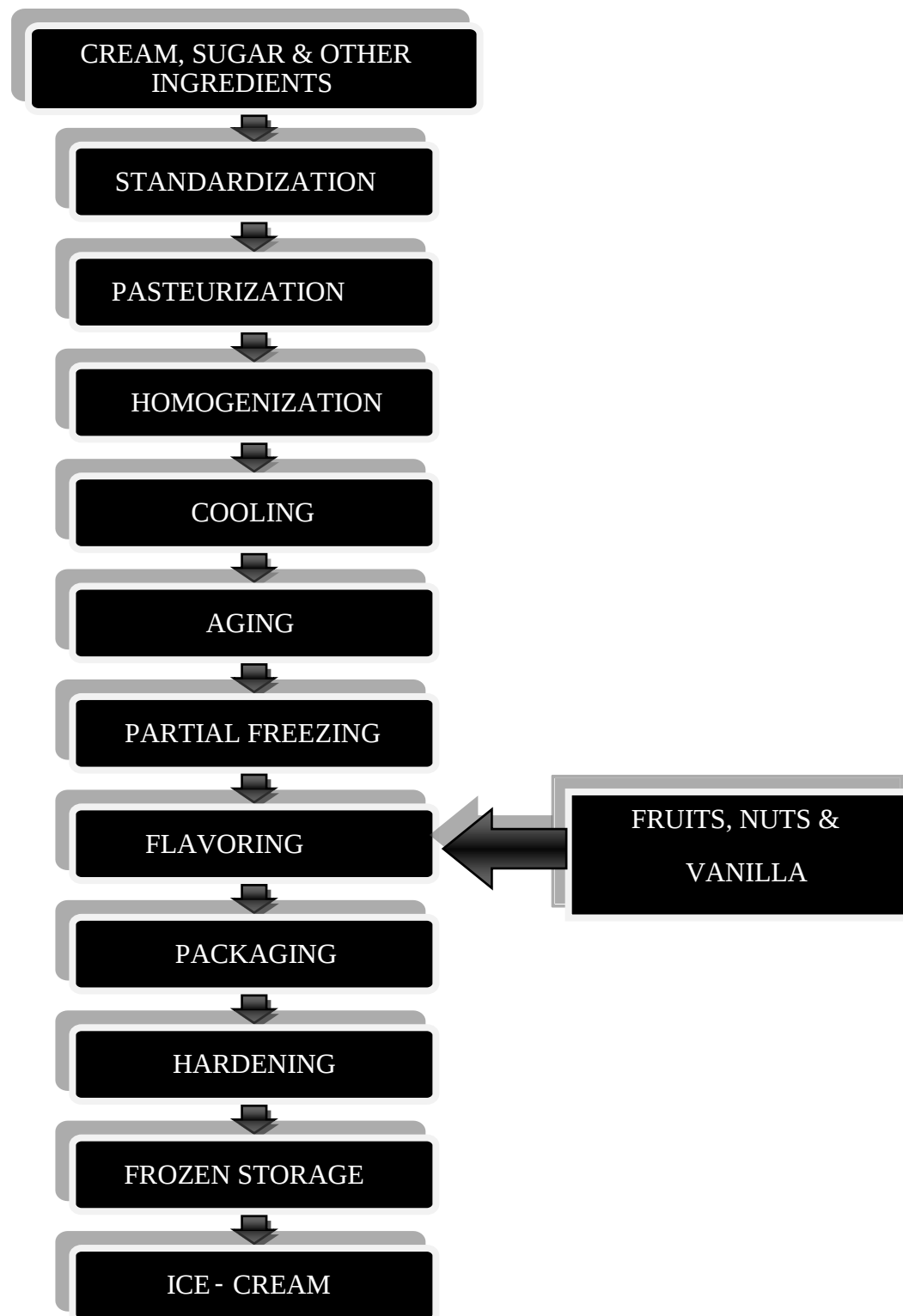


Figure 2.13: Process of Ice-cream

2.11 Preparation of Roshogolla



Figure 2.14: Process of Roshogolla

2.12 Preparation of Roshomalai

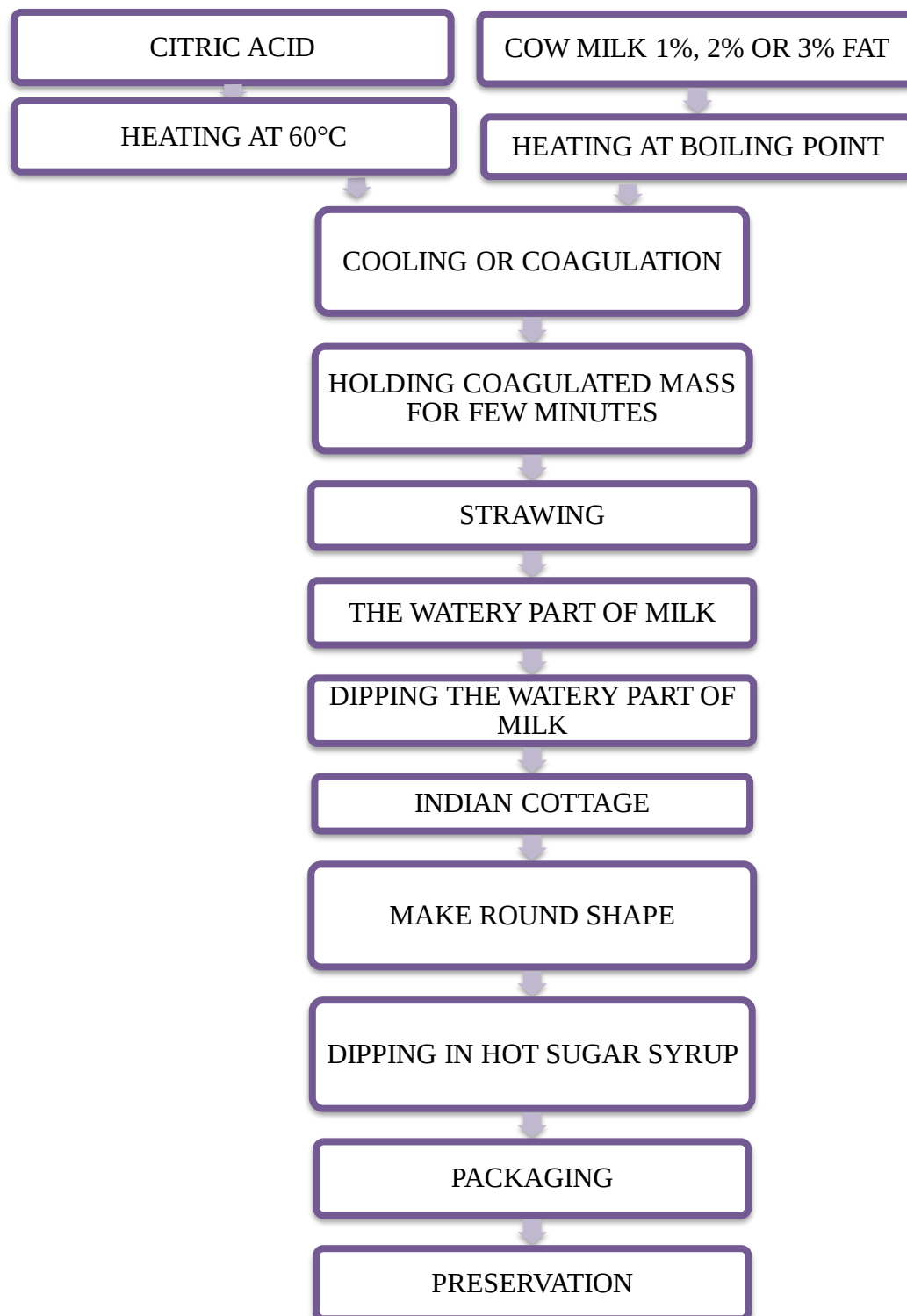


Figure 2.15: Process of Roshomalai

CHAPTER 3

QUALITY CONTROL OF LIQUID MILK

3.1 Quality Control of Liquid Milk

For raw milk, to be considered of a suitable quality level, it needs to be free of debris and sediment. Milk quality control refers to the process of using various tests to ensure that milk and milk products are safe, healthy, and meet the standards for chemical composition, purity, and levels of bacteria and other micro-organisms.



Figure 3.1: Test of Raw Milk

3.2 Organoleptic Test

When low-quality milk has to be promptly identified and isolated, the organoleptic test is performed at the milk-receiving platform. No particular equipment, substance, or reagent is required for this test. To fully complete the assessment, the milk checker instead makes use of their keen senses of taste, smell, and visual.

3.2.1 Process of Organoleptic Test

- ✎ Open a milk tanker to get started.
- ✎ Gather a sample of milk quickly and evaluate its smell.
- ✎ Keep an eye on how the milk appears within the tanker.
- ✎ Check the milk container's cleanliness as well as the can lid.

3.3 Clot on Bolling Test (C.O.B)

The test is quick and simple. It is one of the old tests for too acid milk ($\text{pH} < 5.8$) or abnormal milk (e.g., cloistral or mastitis milk). If a milk sample fails in the test, the milk must contain different types of acids or rennet producing micro-organisms or the milk has an abnormal high percentage of proteins like cloistral milk. Such milk cannot stand the heat treatment in milk processing and must therefore be rejected.

3.3.1 Equipment for Clot on Bolling Test (C.O.B)

- Test tube.
- Spirit Lamp.

3.3.2 Procedure of Clot on Bolling Test (C.O.B)

- ✎ In a test tube we have to take 5ml of milk.
- ✎ We heated the test tube in a spirit lamp for two and a half minutes.
The outcome is what we see following observation

3.4 The Alcohol Test

It's a short and easy test. The basis for it is the instability of proteins when alcohol acts on them to raise acid and/or rennet levels. A positive test is also due to high concentrations of albumen (colostrum milk) and salts (mastitis).

3.4.1 Equipment of Alcohol Test

- Test tube.
- 2 ml of Ethyl alcohol

3.4.2 Procedure of Alcohol Test

- ✎ Take 3ml of raw milk in a test tube.
- ✎ Drop ethyl alcohol and Mix it properly.
- ✎ Note down the result.

3.5 Fat percentage of Milk

In many countries, the price farmers are paid for the milk they supply is largely determined by the fat content of the milk and cream. Additionally, the yield of milk produced and the percentage of butterfat must be known in order to determine the proper feed diet for high-yielding dairy cows.

Moreover, a lot of breeding programs need to know the proportion of butterfat in each particular milk. Additionally, milk and milk products undergo butterfat testing in order to precisely modify the butterfat content in standardized milk and milk products.

3.5.1 Process of Fat Test

- Add 10 milliliters of sulfuric acid (H_2SO_4) to the butyrometer.
- To fill the Butyrometer with 10.75 ml of milk, use a pipette designed for the Garber technique.
- Shake the mixture vigorously after adding 1 cc of amyl alcohol.
- Turn the butyrometer on and off for five minutes.
- Fill the butyrometer to the brim by adding a few drops of water. What we ultimately obtain in the butyrometer.

3.6 Corrective Lactometer Reading Test (CLR)

Specific gravity of milk is the density of milk abnormally changed from its normal value when adulterated with water or other ingredients or both. The associated with adulteration. It allows the milk processor to determine the milk's total solids (% TS) and solids not fat (SNF) when combined with the Gerber butterfat test. Kenya Standards (KBS No. 05-10: -1976) state that the SNF in regular milk should not be less than 8.5%.

3.6.1 Procedure of Corrective Lactometer Reading Test (CLR)

- ✚ First, a measuring cylinder with a 300–500 ml capacity is taken. Afterward, fill the cylinder with milk.
- ✚ Lower the Lactometer into the cylinder containing the milk with caution.
- ✚ Simply place your finger just over the surface of the milk to observe and record the lactometer reading ($^{\circ}\text{L}$).

3.1: CLR Table

Examine	Lactometer Reading	Heat of Raw Milk	Correction	True Value
01	29.6	17	-0.6	28.6
02	28.6	20	Nil	28.6
03	27.6	25	+1.0	28.6

CHAPTER 4

CLEAN IN PLACE

4.1 Clean In Place (CIP)

Cleaning internal surfaces of dairy plants.

4.2 CIP (Clean In Place) at Milk Vita:

(CIP) is an essential component of Milk Vita's quality control procedures. After a few months, all milk processing equipment has to be cleaned on a regular basis. For the dairy business to maintain strict safety and hygienic requirements, CIP is crucial.

A number of factors influence the effectiveness of how well Milk Vita cleans and sanitizes its milk contact surfaces, including the type of contamination, surface microtopography and compatibility with root cleaning chemical application techniques, speed of application and rate to form a film. The elements set in stone guarantee effective sanitation and cleaning procedure.

4.3 Cleaning Solution in CIP

Use Sodium Hydroxide solutions to clean place and processing pipe in dairy farm place by water.

4.4 Procedure of Cleaning

These procedures are part of the cleaning procedure used at the dairy plant in Dhaka, as per Dairy Practice Council (1993):

- ⇒ Dissolve the proper amount of a heavy-duty, well-balanced alkaline circulation.
- ⇒ Cleaner in a basin of cold water, producing caustic cleaning solution on centration in the range of 0.7% to 1%.
- ⇒ Fill the surge tank to the brim with the prepared cleanser.
- ⇒ Move the alkaline cleaning solution about for thirty minutes at 175°F for 45 minutes.

CHAPTER 5

CONCLUSION

Among the nation's dairy industry's leading cooperatives is Bangladesh Milk Producers Co-operative Union Ltd. (BMPCUL). Thank you for giving me the chance to be a part of this organization, where mentors have shown me true support. What they've given me several chances to express my opinions and observations regarding various facets theQC Department. This will be a priceless experience, in my opinion.

This actual word every step of the way has been extremely instructive and useful, exposing us to different industrial environments with varying phases of dairy production and quality control.

REFERENCE

Bangladesh Milk Producers Co-operative Union Limited (BMPCUL) (n.d.). *Dairy Processing Industry*.

MILK VITA: <http://www.milkvita.org.bd/>