

# **The Complete Technology Book on Cocoa, Chocolate, Ice cream and other Milk Products**

**Author:** NIIR Board of Consultants & Engineers

**Format:** Paperback

**ISBN:** 8186623906

**Code:** NI144

**Pages:** 624

**Price:** Rs. 1,275.00    **US\$** 33.95

**Publisher:** National Institute of Industrial Research

Usually ships within **5** days

Cocoa, Chocolate and Ice Cream are the products which has a good nutritious value and relatively inexpensive food. Cocoa butter is used in chocolate and to cover other confectionery products. Now a day chocolate and ice cream are gaining good popularity among the society all over the world. Chocolate is a key ingredient in many foods such as milk shakes, candy bars, ice creams etc. It is ranked as one of the most favorite flavors in the world. Despite its popularity, most people do not know the unique origins of this popular treat. Chocolate is a product that requires complex procedures to produce. The process involves harvesting coca, refining coca to cocoa beans, and shipping the cocoa beans to the manufacturing factory for cleaning, coaching and grinding. These cocoa beans will then be imported or exported to other countries and be transformed into different type of chocolate products. Ice cream is a frozen dessert usually made from dairy products, such as milk and cream, and often combined with fruits or other ingredients and flavors. The meaning of ice cream varies from one country to another like frozen custard, frozen yogurt, sorbet, and gelato and so on. The ice cream industry has traditionally grown at a healthy rate of 12% per annum. India is the second largest milk producing country. Milk products like butter, curd, ghee, etc have become an essential part of our food and are consumed in good quantity every day. In spite of the huge demand that exists for such milk based items conventional methods are employed for producing these items. The growth in cocoa, chocolate, Ice cream and other milk product industry has been primarily due to strengthening of distribution network and cold chain infrastructure.

Some of the fundamentals of the book are cocoa bean production, sources of cocoa bean supplies, refining for production of chocolate masses for different uses, shipment of cocoa beans, cocoa processes , cocoa for drinking, instant cocoas, drinking chocolates manufacturing cocoa, cocoa butter & replacement fats , coatings and cocoa , chocolate manufacture, chocolate bars and covered confectionery , chocolate molding, determination of fat in cocoa and chocolate products, determination of cooling curve of cocoa butter and similar fats, the manufacture of dairy products, ice cream manufacture, energy value and nutrients of ice cream etc.

The present book contain formulae, processes and other relevant details related to manufacture of cocoa products, chocolates, ice cream and other milk products. An attempt has been made to bring in to focus the significant aspect of cocoa products, dairy products manufacturing. It is hoped that the subject matter contain and its presentation will be very helpful to new entrepreneurs, professionals, institutions, technocrats and students etc.

## **Contents**

### **1. COCOA BEAN PRODUCTION**

- Introduction
- Botanical types
- The preparation of cocoa beans
- Fermentation
- Drying
- The cut test
- Sources of cocoa bean supplies
- Shipment of cocoa beans
- Infestation of cocoa
- Microbiology of cocoa
- 2. COCOA MASS, COCOA POWDER, COCOA BUTTER
- Introduction
- Cocoa mass
- Cocoa powder
- Cocoa butter
- Quality control
- 3. PARTICLE SIZE REDUCTION
- Introduction
- Current types of particle size reduction process
- Grinding cocoa nib into cocoa mass
- Refining of chocolate masses
- The roll refiner
- Refining for production of chocolate masses for different uses
- 4. COCOA PROCESSES
- RawBean Cleaning
- Roasting
- The NARS Process
- Micronizer
- Roasting of Nib
- Sterilization
- Alkalization
- Cocoa Liquor Treatment
- Winnowing(Cracking & Fanning)
- Winnowing Machines
- Large nib:
- Small nib:
- Nib dust (fine nib)
- Shell dust, small shell, cyclone dust
- Large shell
- NIB GRINDING, COCOA LIQUOR, HEAT TREATMENT
- Ball or Bead Mills
- PROCESSING OF COCOA LIQUOR
- Flavour Development Processes
- (The following is a summary of the methods used.)
- Simple Heating of Thin Films
- ThinFilm Roasting and Air Scrubbing
- ThinFilm Roasting with Vacuum
- General Comments
- ALKALIZATION
- Alkalization of Nibs
- Alkalization of Liquor
- Drying, Roasting, Pressing, and Grinding

Alkalization of Cocoa Cake  
 Alkalization of Whole Beans  
 Water Treatment  
 LIQUOR PRESSING  
 Temperature of the Liquor  
 Moisture Content  
 Degree of Roast/Protein Coagulation  
 Homogenizing  
 Particle Size  
 Pressures  
 EXPELLER PRESSING  
 COCOA GRINDING  
 Cocoa Fineness  
 COCOA FOR DRINKING, INSTANT COCOAS, DRINKING CHOCOLATES MANUFACTURING COCOA  
 Drinking Cocoa  
 Instant Cocoa  
 Drinking Chocolate  
 COCOA POWDER MICROBIOLOGY, COMPOSITION, ANALYSIS  
 Cocoa Composition and Specifications  
 Contamination and Adulteration of Cocoa Powder  
 5. Cocoa Butter & Replacement Fats  
 COCOA BUTTER  
 Prime Pressed Cocoa Butter  
 ExpellerPressed Cocoa Butter  
 SolventExtracted Cocoa Butter  
 Constitution of Cocoa Butter  
 Properties of Cocoa Butter  
 New Sources of Supply Natural Variations  
 Supercooling, Cooling Curves  
 Crystallization, Polymorphism  
 Hardness, Penetration  
 Contraction  
 Solvent Extraction of Cocoa Butter  
 Refining of SolventExtracted Fat  
 Deodorization of Cocoa Butter  
 COCOABUTTER REPLACEMENT FATS  
 Equivalent Fats (CBE)  
 Substitute Fats (CBS)  
 Other Fats Associated with Cocoa Butter  
 Allied Fats  
 6. EMULSIFIERS IN CHOCOLATE CONFECTIONERY  
 7. COATINGS AND COCOA  
 VEGETABLE LECITHINS  
 Soya Lecithin  
 Other Vegetable Lecithins  
 Fractionated and Modified Vegetable Lecithins  
 USE OF VEGETABLE LECITHIN AND OTHER PHOSPHOLIPIDS IN CHOCOLATE  
 SYNTHETIC PHOSPHOLIPIDS AND MODIFIED VEGETABLE LECITHINS  
 Toxicity Checks on YN  
 Viscosity  
 Other Physical Effects of Lecithin Addition  
 Other Surface Active Compounds  
 RHEOLOGY, VISCOSITY, DEFINITIONS, MEASUREMENT OF VISCOSITY

## VISCOMETERS

Simple Viscometers

Rotational Viscometers

The Gardner Mobilometer

## USE OF LECITHIN IN CHOCOLATE, COCOA POWDER, CHOCOLATE DRINKS

Chocolate

Cocoa and Drinking Chocolate Powders

## 8. CHOCOLATE MANUFACTURE

### INGREDIENTS

Sugar and Other Sweeteners

Cocoa Butter

Milk Products

Emulsifiers

Other Fats

### FLAVOUR

### REWORK

### CHOCOLATE PROCESSES

Preparation of Ingredients

Mixing

Refining

Milk Chocolate Processes

Conching

Other Conches and Chocolate Making Systems

Viscosity of Chocolate

## 8. CHOCOLATE BARS AND COVERED CONFECTIONERY

### PRODUCTION METHODS

Molding

Enrobing

Panning

Tempering

### OTHER CHOCOLATE PROCESSES

Chocolate Drops (Chips)

Roller Depositing

Aerated Chocolate

Chocolate Flake or Bark

Chocolate Vermicelli or Streusel

Laminated Chocolate

Chocolate Tempering

Compound Coatings

Measurement of Degree of Temper

### CHOCOLATE MOLDING

Molding Chocolate Blocks or Bars

Hollow Goods

Foiled Articles

Shell Forming Equipment

The Westal SCB Process

### COMPOSITION OF CHOCOLATE FOR MOLDING

### MOLDING AND SHELL PLANT COOLERS

Tablets

Shells

### GOOD MANUFACTURING PRACTICE

### CHOCOLATE ENROBING

Mechanical

- Chocolate Cooling
- Enrober Coolers
- Automatic Enrober Systems
- Chocolate Enrobing Problems
- Zein Glazes
- 9. QUALITY CONTROL
- Who Decides the Standard of Quality?
- Who Controls Quality?
- How Should Quality Control Be Organized?
- RAW MATERIALS
- Type of Raw Material
- The Supplier
- PROCESS CONTROL
- InLine Process Control
- FINISHED PRODUCT INSPECTION
- Appearance
- Incidence of Sampling Taste Checks
- Weight Control
- Shelf Life Keeping Limits and Keeping Tests
- Microbiological Quality Control
- Food poisoning
- Factory Hygiene and Sanitation
- Prevention of Foreign Matter Contamination
- Travel Tests
- 10. SPECIAL METHODS OF ANALYSIS
- PARTICLESIZE DETERMINATION
- Methods of Determination
- Micrometer
- Metriscope
- Method of Determination
- Microscopes
- Sieving Methods for Determining Particle Size
- Elutriation (Sedimentation) Methods
- Particle Sizing by Laser Beam
- The Coulter Counter
- DETERMINATION OF FAT IN COCOA AND CHOCOLATE PRODUCTS
- Rapid Methods using Trichlorethylene Extraction
- Refractometer Methods
- Determination of Fat Using Nuclear Magnetic Resonance
- Determination of Cooling Curve of Cocoa Butter and Similar Fats
- Method Apparatus
- Procedure
- The Melting Point of Fats
- Determination of Fusion, Slip and Clear points
- Determination
- Softening Point of Fats
- Barnicoat Method
- Hardness of Fats
- Foam Test Modified Bickerman Method
- WATER ACTIVITY, EQUILIBRIUM
- RELATIVE HUMIDITY
- Determination of A/W
- Calculation of A/W/ERH

Determining A/W Using Solutions of Salts

A/W Determination by Protimeter

SCIENTIFIC INSTRUMENTS EMPLOYED IN PRODUCTION DEPARTMENTS

Viscometers

Refractometers

1. Traditional Method

2. Standardized Method

SWEETENED DAHI

Market Quality

Packaging and Storage

Keeping Quality

Increasing Keeping Quality

Dahi Powder

1. Whole Milk Dahi

2. Skimmed Milk Dahi

11. THE MANUFACTURE OF DAIRY PRODUCTS

Butter

CHURNING

CHEESE

THE MANUFACTURE OF HARD CHEESE

SOFT CHEESE

12. TECHNOLOGY OF KHOA MANUFACTURE AND STORAGE

DEFINITION

KHOA A REMUNERATIVE PRODUCT WITH SIMPLE TECHNOLOGY

VARIETIES AND GRADES OF KHOA

1. Pindi

2. Dhap

3. Danedar

CHEMICAL COMPOSITION OF KHOA

MICROBIOLOGICAL QUALITY OF KHOA

EXISTING TRADE PRACTICES

METHODS OF MANUFACTURE

SMALL SCALE PREPARATION OF KHOA

1. Equipment

2. Quality of Milk

3. Traditional Process

IMPROVED BATCH METHOD FOR KHOA PREPARATION

PACKAGING AND STORAGE OF KHOA

LEGAL ASPECT OF KHOA MANUFACTURE

13. TECHNOLOGY OF MANUFACTURE OF YOGHURT AND DAHI

YOGHURT

2. Details of Manufacture

METHOD OF PREPARATION OF FLAVOURED YOGHURT

CURD (DAHI)

DEFINITION

CLASSIFICATION

FOOD AND NUTRITIVE VALUE

COMPOSITION

USES OF DAHI

SWEET SOUR DAHI

1. Traditional Method

2. Standardized Method

SWEETENED DAHI

Market Quality  
Packaging and Storage  
Keeping Quality  
Increasing Keeping Quality  
Dahi Powder  
1. Whole Milk Dahi  
2. Skimmed Milk Dahi  
14. FLAVOUR DEVELOPMENT IN CHOCOLATE  
Introduction  
Fermentation  
Drying  
Roasting  
Conching  
Conclusion  
15. ICE CREAM  
16. ENERGY VALUE AND NUTRIENTS OF ICE CREAM  
ENERGY VALUE AND NUTRIENTS  
CALORIC CONTENT OF ICE CREAM AND RELATED PRODUCTS  
PROTEIN CONTENT OF ICE CREAM  
MILKFAT CONTENT  
CARBOHYDRATES IN ICE CREAM  
MINERALS IN ICE CREAM  
VITAMINS IN ICE CREAM  
PALATABILITY AND DIGESTIBILITY  
OF ICE CREAM  
17. ICE CREAM INGREDIENTS  
OPTIONAL INGREDIENTS  
COMPOSITION OF MILK  
MILK PRODUCTS USED IN ICE CREAM  
Sources of Fat  
Skim Milk and Buttermilk, Liquid and Dry  
Dry Whole Milk  
Concentrated Milks  
Special Commercial Products  
Mineral Salts  
SWEETENERS  
Relative Sweetness  
Effect of Sweeteners on Freezing Point  
Sucrose  
Corn Sweeteners and Related Ingredients  
Maple and Brown Sugars  
Honey  
Nonnutritive Sweeteners  
Fat Replacers  
Sugar Alcohols  
Syrups  
18. STABILIZERS AND EMULSIFIERS  
USES OF STABILIZERS  
KINDS OF STABILIZERS  
CHARACTERISTICS OF INDIVIDUAL STABILIZER INGREDIENTS  
ICE CREAM IMPROVERS  
EMULSIFIERS  
INDUSTRIAL USAGE

## 19. FLAVOURING AND COLORING MATERIALS

### FLAVOURS FOR FROZEN DESSERTS

#### VANILLA

Imitation Vanilla Flavourings

Consistency in Vanilla Quality

Vanilla Ice Cream

#### CHOCOLATE AND COCOA

Processing Cocoa Beans

Characteristics of Cocoa

Chocolate Ice Cream

Preparing Chocolate Syrup

Freezing Characteristics

Chocolate Confections

### FRUITS IN FROZEN DESSERTS

Fresh Fruit

Candied and Glaced Fruits

Dried Fruits

### PROCEDURES AND RECIPES

Strawberry Ice Cream

Raspberry Ice Cream

Peach Ice Cream

Cherry Ice Cream

Ice Cream with Complex Flavours

Sugar Free

#### NUTS

#### SPICES AND SALT

### COLOR IN FROZEN DESSERTS

### FLAVOURING LOWFAT AND NONFAT ICE CREAM

## 20. MIX PROCESSING

### PREPARATION OF THE MIX

Combining the Ingredients

### PASTEURIZATION OF THE MIX

### HOMOGENIZATION

### AGING MIXES

### PACKAGING MIXES FOR SALE

### FLAVOURING MIXES

## 21. THE FREEZING PROCESS

### PREFREEZING TESTS

### FREEZING OPERATIONS

### CHANGES THAT TAKE PLACE DURING THE FREEZING PROCESS

### REFRIGERATION NEEDED TO FREEZE ICE CREAM

### CALCULATING REFRIGERATION REQUIREMENTS

### TYPES OF FREEZERS

The Continuous Freezer

The Refrigeration System

Advanced Programmable Freezers

Shut Down and Cleaning of the Freezer

The Batch Freezer

Operation of the Batch Freezer

Filling Containers from a Batch Freezer

## 22. FANCY MOLDED ICE CREAMS, NOVELTIES, AND SPECIALS

### PRODUCTION SYSTEMS



# About NIIR

**NIIR PROJECT CONSULTANCY SERVICES (NPCS)** is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

---

**NIIR PROJECT CONSULTANCY SERVICES** , 106-E, Kamla Nagar, New Delhi-110007, India. **Email:** [npcs.india@gmail.com](mailto:npcs.india@gmail.com) **Website:** [NIIR.org](http://NIIR.org)

Wed, 20 Mar 2024 16:28:29 +0530