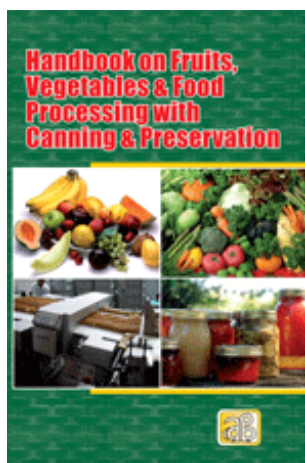


# Handbook on Fruits, Vegetables & Food Processing with Canning & Preservation (3rd Edition)



**Author:** NPCS Board

**Format:** Paperback

**ISBN:** 9788178330839

**Code:** NI19

**Pages:** 688

**Price:** Rs. 1,475.00 **US\$** 150.00

**Publisher:** Asia Pacific Business Press Inc.

Usually ships within **5** days

Natural foods such as fruits and vegetables are among the most important foods of mankind as they are not only nutritive but are also indispensable for the maintenance of the health. India is the second largest producer of fruits and vegetables in the world. Fertile soils, a dry climate, clean water and abundant sunlight help the hard working farmers to produce a bountiful harvest. Although there are many similarities between fruits and vegetables, there is one important difference that affects the way that these two types of crop are processed like fruits are more acidic than vegetables. Food processing is the set of methods and techniques used to transform raw ingredients into food or to transform food into other forms for consumption. Food processing typically takes clean, harvested crops or butchered animal products and uses these to produce attractive, marketable and often long shelf-life food products. Canning is a method of preserving food in which the food is processed and sealed in an airtight container. Food preservation is the process of treating and handling food to stop or greatly slow down spoilage (loss of quality, edibility or nutritive value) caused or accelerated by micro organisms. One of the oldest methods of food preservation is by drying, which reduces water activity sufficiently to prevent or delay bacterial growth. Drying also reduces weight, making food more portable. Freezing is also one of the most commonly used processes commercially and domestically for preserving a very wide range of food including prepared food stuffs which would not have required freezing in their unprepared state. Fruits and vegetable processing in India is almost equally divided between the organized and unorganized sector, with the organized sector holding 48% of the share. The present book covers the processing techniques of various types of fruits, vegetables and other food products. This book also contains photographs of equipments and machineries used in fruits, vegetables and food processing along with canning and preservation. This book is an invaluable resource for new entrepreneurs, food technologists, industrialists etc.

## Contents

### 1. Characteristics of the Food Industry

Components of the Food Industry  
Allied Industries  
Interrelated Operations

## 2. Food Quality Assurance

The Need

A Role for Government

Microbiological Standards

A Role for Industry

Design of Company QA Program

Objectives

Raw Material Quality Assurance

In-process Quality Assurance

Finished Product Quality Assurance

## 3. Quality Factors in Foods

Appearance Factors

Color and Gloss

Consistency

Textural Factors

Measuring Texture

Texture Changes

Flavor Factors

Additional Quality Factors

Quality Standards

Planned Quality Control

## 4. Preserve, Candied and Crystallized Fruits and Vegetables

Preserve

General considerations

Candied Fruits/Vegetables

Process

Glazed Fruits/Vegetables

Crystallized Fruits/Vegetables

Problems in Preparation of Preserves and Candied Fruits

## 5. Food Preservation by Fermentation

Life with Microorganisms

Fermentation of Carbohydrates

Industrially Important Organisms in Food Preservation

Order of Fermentation

Types of Fermentations of Sugar

Fermentation Controls

Wine

Preservation

Sterilization Filtration

Beer

Vinegar Fermentation

Principles of Vinegar Fermentation

Vinegar Making

Preparation of Yeast Starter

Alcoholic Fermentation

Acetic Fermentation

Cheese

Kinds of Cheese  
Cottage Cheese  
Swiss Cheese  
Blue Cheeses

## 6. Chemical Preservation of Foods

What Are Food Additives?  
Importance of Chemical Additives  
Legitimate Uses in Food Processing  
Undesirable Uses of Additives  
Safety of a Food Additives  
Functional Chemical Additive Applications  
Specific Uses of Chemical Additives  
Additives Permitted and Prohibited in the United States  
Chemical Preservatives  
Microbial Antagonists  
Sorbic Acid  
Antibiotics  
Quality Improving Agents  
Other Chemical Additives  
Artificial Flavoring  
Artificial Coloring

## 7. Cold Preservation and Processing

Distinction Between Refrigeration and Freezing  
Refrigeration and Cool Storage  
Requirements of Refrigerated Storage  
Controlled low Temperature  
Air Circulation and Humidity  
Modification of Gas Atmospheres  
Changes in Food During Refrigerated Storage  
Freezing and Frozen Storage  
Initial Freezing Point  
Freezing Curve  
Changes During Freezing  
Choice of Final Temperature  
Food Composition  
Noncompositional Influences  
Freezing Methods  
Air Freezing  
Packaging Considerations  
Some Additional Developments

## 8. Heat Preservation and Processing

Sterilization  
Commercially Sterile  
Pasteurization  
Blanching  
Selecting Heat Treatments  
Heat Resistance of Microorganisms  
Thermal Death Curves  
Margin of Safety  
Heat Transfer

Conduction and Convection Heating  
Cold Point in Food Masses  
Determining Process Time and Process Lethality  
Protective Effects of Food Constituents  
Different Temperature-Time Combinations  
Heating Before or After Packaging

## 9. Food Pickling and Curing

Pickled Fruits and Vegetables  
Use of Salt Stock  
Sour Pickles, Sweet Pickles, Processed Dill Pickles  
Sauerkraut  
Olives  
Fermented And Pickled Products  
Deterioration  
Nutritional Value  
Bloater Damage Control  
Controlled Fermentations in Commercial Brining Tanks  
Brine Recovery  
Defect Reduction  
The Principles of Fish Salting  
The Influence of the Composition of Salt  
Commercial Methods of Salting Fish  
Brine-salting  
Dry-salting  
Comparative Efficiency of Brine-salting and Dry-salting  
Some-curing Processes  
Cold-smoking (Heavy Salt Cure)  
Smoked Salmon  
Hard-smoked Salmon  
Meat Curing and Smoking  
Pickled Meats  
Salt  
Sugar and Corn Syrup Solids  
Nitrite and/or Nitrate  
Nitrosamines  
Phosphates  
Sodium Erythorbate  
Cured Meat Color  
Role of Nitrite and/or Nitrate in Meat Color  
Sausages and Table-ready Meats  
Dry Sausage Manufacture  
Processing  
Fermentation

## 10. Food Preservation by Drying

Drying-A Natural Process  
Dehydration-Artificial Drying  
Dehydration vs. Sun Drying  
Why Dried Foods?  
Dehydration Permits Food Preservation  
Humidity-Water Vapor Content of Air  
RH-The drying Medium

Types of Driers  
Adiabatic Driers  
Heat Transfer through a Solid Surface  
Criteria of Success in Dehydrated Foods  
Freeze-Dehydration (Freeze Drying)  
Triple Point of Water  
Temperature Changes in Meat Freeze-dehydration  
Influence of Dehydration on Nutritive Value of Food  
Dehydration of Fruits  
Dehydration of Vegetables  
Dehydration of Animal Products  
Dehydration of Fish  
Dehydration of Milk  
Dehydration of Eggs  
Packaging of Dehydrated Foods

#### 11. Food Preservation by Canning 1

Temperature vs. Pressure  
Heat Resistance of Microorganisms Important in Canning  
Factors Influencing the Heat Resistance of Spores  
Heat Resistance of Enzymes in Food  
Heat Penetration into Food Containers and Content  
Storage of Canned Foods  
External Corrosion of Cans  
Coding the Pack  
Influence of Canning on the Quality of Food  
Color  
Flavour and Texture  
Protein  
Improvements in Canning Technology  
Retort Pouches  
Testing a Good Seal  
Hazard Analysis

#### 12. Pickles

Preservation with Salt  
Preservation with Vinegar  
Preservation with Oil  
Preservation with Mixture of Salt, Oil, Spices and Vinegar  
Problems in pickle making

#### 13. Chutneys and Sauces/Ketchups

Chutneys  
Recipes for chutneys  
Sweet mango chutney  
Apple chutney  
Plum chutney  
Wood apple chutney  
Apricot chutney  
Papaya chutney  
Tomato chutney  
Aonla chutney  
Sauces (Ketchups)

## Recipes for sauces (ketchups)

Tomato sauce

Apple sauce

Plum sauce

Papaya sauce

Mushroom sauce

Aonla sauce

Problem in the preparation of sauces/ketchups

## 14. Mushroom Processing

Dehydration

Preparation of ketchup

Preservation with salt and acetic acid

Pickling

Canning

Mushroom poisoning

## 15. Tomato Processing

## 16. Jam, Jelly and Marmalade

Jam

Problems in jam production

Jelly

Important considerations in jelly making

Pectin

Acid

Sugar

Judging of end-point

Marmalade

After pectin extraction

## 17. Freezing of Fruits and Vegetables

Preparation of fruits/vegetables for freezing

Methods of freezing

Sharp freezing (Slow freezing)

Quick freezing

By direct immersion

Advantages

Disadvantages

By indirect contact with refrigerant

By air blast

Cryogenic freezing

Dhydro-freezing

Freeze-drying

Changes during freezing and storage for frozen products

Freezing process for fruits and vegetables

## 18. Vinegar

Types of vinegar

Steps involved in vinegar production

Outline Scheme of Vinegar Production

Preparation of vinegar

Slow process

Orleans slow process  
Quick process (Generator or German process)  
Precautions  
Problems in vinegar production

## 19. Drying and Dehydration of Fruits and Vegetables

Advantages of dehydration over sun-drying  
Spoilage of dried products  
Reconstitution test for dried/dehydrated products  
Reconstitution test

## 20. The Canning Process

Cans  
Types of Cans  
Square and Pullman Base  
Pear Shaped  
Round Sanitary  
Drawn Aluminum  
Oblong  
Can Materials  
Retorts  
Nonagitating Retorts  
Continuous Agitating Retorts  
Hydrostatic Retorts  
Establishment of Retort Schedule  
Pasteurized Canned Products  
Closing  
Pasteurizing Cook  
Cooling  
Storage and Shelf Life  
Aseptic Canning

## 21. Food Freezing

Development of a Frozen Food Industry  
The Freezing Point of Foods  
Percentage Water Frozen vs. Temperature of Food and Its Quality  
Size of Ice Crystals Formed  
Volume Changes During Freezing  
Refrigeration Requirements in Freezing Foods  
Freezing in Air  
Freezing by Indirect Contact with Refrigerants  
Direct Immersion Freezing  
Packaging Requirements for Frozen Foods  
Influence of Freezing on Microorganisms  
Influence of Freezing on Proteins  
Influence of Freezing on Enzymes  
Influence of Freezing on Fats  
Influence of Freezing on Vitamins  
Freezing of Bakery Products  
Packaging  
Storage Life of Frozen Bread  
Cookies and Cakes

- Frozen Dairy Foods
- The Ice Cream Industry
- Basic Ingredients
- Manufacture of Ice Cream
- The Mix
- Pasteurization
- Homogenization
- Cooling
- Freezing
- Hardening
- Hazard Analysis
- Hazard Categories

## 22. Cookie and Cracker Production Technology

- Ingredients Handling
- Mixing
- Dough Relaxation and Fermentation
- Dough Machining and Forming
- Dough Relaxing
- Cutting Stage
- Scrap Return
- Salter or Sugar Sprinkling
- Rotary Molding
- Extruder-Dough Formers
- Wire Cut
- Rout Press
- The Fruit Bar Coextruder
- Baking
- Direct-Fired Ovens, Gas Fired
- Convection (Indirect) Ovens
- Post Conditioning
- Secondary Processes
- Icings
- Enrobing
- Sandwiched Cookies and Crackers
- Biscuit Packaging

## 23. Snack Foods

- Introduction
- Popcorn
- Four Types of Popcorn
- Mechanism of Popping
- Quality factors
- Processing
- Formulated Puffed Snacks
- Ingredients
- Other Grain Products
- Expandable Ingredients
- Frying Fats
- Antioxidants
- Sweeteners
- Other Ingredients
- Extruders and Extruding



Types of Extruders  
Snacks that Are Cooked and Formed  
Drying

#### 24. Breakfast Cereals

Introduction  
Present Status  
Processing of Hot-serve Cereals  
Wheat Cereals  
Corn Cereals  
Oat Cereals  
Processing Ready-to-Eat Breakfast Cereals  
Flakes  
General Considerations  
Corn Flakes  
Wheat flakes  
Bran Flakes  
Shreds  
Shredded Wheat Biscuits  
Puffed Cereals  
General Considerations  
Oven-puffed Rice  
Puffing by Extrusion  
Sugar-coated Products  
Ovens

#### 25. Canned Meat Formulations

Corned Beef Hash  
Federal Meat Inspection Regulations  
Preparation  
Meat  
Potatoes  
Onions  
Canning  
Beef Stew  
Federal Meat Inspection Regulations  
Preparation  
Meat  
Potatoes  
Carrots  
Onions  
Preparation  
Canning  
Chili Con Carne  
Federal Meat Inspection Regulations  
Preparation  
Canning  
Vienna Sausages  
Federal Meat Inspection Regulations  
Preparation  
Canning  
Meat Balls with Gravy  
Federal Meat Inspection Regulations

Preparation  
Canning  
Sliced Dried Beef  
Federal Meat Inspection Regulations  
Preparation  
Drying and Smoking  
Canning  
Luncheon Meat  
Federal Meat Inspection Regulations  
Preparation  
Canning  
Processing  
Sterile  
Pasteurized  
Potted Meat  
Federal Meat Inspection Regulations  
Preparation  
Canning  
Canned Hams-Pasteurized and Sterile  
Federal Meat Inspection Regulations  
Preparation  
Smoking  
Canning  
Filling and Pressing  
Closing  
Processing  
Pasteurized  
Sterile  
Plastic Packaged Hams  
Preparation  
Packaging  
Processing

## 26. Cured or Smoked Meats

Hams  
Classification of Ham  
Internal Temperature  
Added Substance  
Presence of Bone  
Commercial Ham Manufacture  
Curing  
Smoking/Cooking  
Cooked Ham  
Baked Ham  
Preparation  
Country Ham  
Preparation  
Westphalian Ham  
Preparation  
Scotch Ham  
Prosciutti Ham  
Preparation  
Honey Cured Hams

Preparation  
Bacon  
Canadian Bacon  
Wiltshire Bacon  
Beef Bacon  
Jowl Bacon  
Fat Backs and Heavy Bellies  
Smoked Pork Loin  
Picnic  
Shoulder Butt  
Corned Beef  
Smoked Fresh Meat  
Dried Beef  
Procedure  
Smoked and Cured Lamb  
Smoked Tongue  
Pickled Pigs Feet

## 27. Sausage Formulations

Ground Sausages  
Instructions  
Instructions  
Instructions  
Instructions  
Instructions  
Instructions  
Semidry or Summer Sausages  
Instructions  
Instructions  
Instructions  
Instructions  
Dry Sausages  
Instructions  
Instructions  
Instructions  
Emulsion-Type Sausages  
Instructions  
Instructions  
Instructions  
Instructions  
Instructions  
Instructions  
Instructions  
Instructions  
Liver Sausage and Braunschweiger  
Instructions  
Instructions  
Instructions  
Speciality Items  
Instructions  
Instructions  
Instructions  
Instructions

Instructions  
Instructions  
Instructions  
Instructions  
Mortadella  
Instructions  
Linguica (Portuguese Sausage)  
Instructions  
Instructions

## 28. Processing of Rice

Introduction  
Quality of Rice  
Milling of Rice  
Small-scale Milling  
Modern Conventional Milling  
Abrasive Milling of Rice  
Lye-peeling  
Extractive Milling  
Rice Flour  
Further Processing of Rice  
Boiling and Steaming  
Parboiling  
Quick-cooking Rice  
Shelf-stable Cooked Rice  
Rice Cakes  
Rice Milk

## 29. Creaming, Emulsions, and Emulsifiers

Emulsifier and Emulsions  
Classification  
Hydrophilic-Lipophilic Balance (HLB)  
Oil-in-Water Emulsions  
Type of Emulsifier used in Cookies and Crackers  
Phosphatides and Lecithin  
Synthetic Emulsifiers  
Function of Emulsifiers in Cookies and Crackers  
Eggs  
Emulsifier  
Mixing Operation in Cookie and Cracker Doughs  
Mixing Operation  
Creaming Method  
Two-stage Method  
Three-stage Method  
Baking Cookies and Crackers  
Emulsion Stability  
Viscosity  
To Lower Viscosity  
To Increase Viscosity  
Elevated Temperature  
Inversion Phase  
Phase Equilibria  
Batter Aeration

## 30. Principles of Food Packaging

Introduction

Functions of Food Packaging

Requirements For Effective Food Packaging

Types of Containers

Primary, Secondary, and Tertiary

Form-Fill-Seal Packaging

Hermetic Closure

Food-Packaging Materials and Forms

Metal

Metal Cans

Can Construction

Can Corrosion

Can Sizing

Glass

Glass Containers

Paper, Paperboard, and Fiberboard

Plastics

Laminates

Retortable Pouches and Trays

Edible Films

Wood and Cloth Materials

Package Testing

High Barrier Plastic Bottles

Aseptic Packaging in Composite Cartons

Military Food Packaging

Directory Section

Suppliers of the Plant and Machinery

Addresses of Packaging Machinery

Suppliers of Raw Material Suppliers

Machinery & Equipments (Photographs)

## 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.

---

**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)

Thu, 23 Nov 2017 09:21:22 +0530