Food Preservation has become an integral part of the food processing industry. There are various methods of food preservation; drying, canning, freezing, food processing etc. Food processing is one the method of food preservation which is the set of methods and techniques used to transform raw ingredients into food or to transform food into other forms for consumption by humans or animals either in the home or by the food processing industry. Canning is one of the various methods of food preservation in which the food is processed and then sealed in an airtight container. This process prevents microorganisms from entering and proliferating inside. Dehydration is the process of removing water or moisture from a food product. Food dehydration is safe because water is removed from the food. 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. Benefits of food processing include toxin removal, preservation, easing marketing and distribution tasks, and increasing food consistency. In addition, it increases seasonal availability of many foods, enables transportation of delicate perishable foods across long distances and makes many kinds of foods safe to eat by deactivating spoilage and pathogenic micro organisms. Nanotechnology exhibits great potential for the food industry. New methods for processing nanostructures are being developed having novel properties that were not previously possible. As such, due to the recent up gradation of preservation techniques, the preservation industry is also growing almost at the same rate as the food industry which is about 10 to 12% per year. The purpose of this book is to present the elements of the technology of food preservation. It deals with the products prepared from various fruits and vegetables commercially. Relevant information on enzymes, colours, additives, flavours, adulteration, etc., has been given. This book also contains photographs of equipments and machineries used in food preservation. This book will be very useful for new entrepreneurs, food technologists, industrialists, libraries etc.

Contents

1. Introduction of Food Technology
   Source of Man's Food
   Impact of Science and Technology

2. Acceptable Food to Eat
   Nature's Seal of Quality
   Food Flavors
   Food Colors
   Our Senses Can Fail Us
Excessive Heating Impairs Foods, Moderate Heating May Improve Foods
Food Spoilage Must Deter Natural Processes
Safe Food for Man Food Poisoning Food Intoxications Food Infections
Sanitation and Health

3. The Refrigerated Storage of Perishable Commodities
Temperature of Objects Temperature Measurements Metabolism a Function of Temperature
Energy Deficit of Ice Creating Energy Deficits Mechanically Keeping Fresh Foods Edible Animals Foods

4. Principles of Food freezing
Influence of Freezing on Vitamins
Influence of Freezing on Parasites
Thawing Damage to Frozen Foods

5. Principles of 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
Air-The Drying Medium
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
Influence of Drying on Micro-organisms
Influence of Drying on Enzyme Activity
Influence of Drying on Pigments in Foods
Dehydration of Fruits
Dehydration of Vegetables
Dehydration of Meat
Dehydration of Fish
Dehydration of Milk
Dehydration of Eggs
Packing of Dehydrated Foods
Influence of Drying on Food Acceptance

6. Principles of Food Preservation by Canning
The Art of "Appertizing"
Temperature vs. Pressure of Boiling Water
Spoilage of Food Caused by Micro-organisms
Evolution of Containers for Canning
Important Food Groups
Micro-organisms Associated with the Food Groups
Sources of Spoilage Organisms
Heat Resistance of Micro-organisms
Important in Canning
Factors Influencing the Heat Resistance of Spores
Influence of Food Ingredients on Heat Resistance of Spores
Heat Resistance of Enzymes in Food
Heat Penetration into Food Containers and Contents
General Method for Calculating the Process Time for Canned Foods
Inoculated Pack Studies
Adequacy of Heat Processes
Spoilage of Canned Foods
Microbial Spoilage
Failure of Glass Containers
Surface Markings on Broken Glass
Vacuum-pressure Relations in Canning Process
Storage of Canned Foods
External Corrosion of Cans
Coding the Pack
Influence of Canning on the Quality of Food
Colour
Flavor and Texture
Protein
Fat and Oil
Carbohydrates
Vitamins
Misconceptions Relating to Canned Foods
Improvements in Canning Technology

7. Principles of Food Preservation by Fermentation and Pickling
Life with Micro-organisms
Fermentation of Carbohydrates
Industrially Important Organisms in Food Preservation
Order of Fermentation
Types of Fermentations of Sugar
Fermentation Controls
Sources of Salt
Wine and Beer
Salted-Fermented Foods
Deterioration of Fermented and Pickled Products
Nutritional Value of Pickled Products
Future Trends

8. Preservation of Food as Sugar Concentrates
Concentrated but moist
High solids high acid foods
Jelly
Jam
Fruit Butter
Marmalade
Pectin and gel formation
Invert Sugar
Jelly Making
Other Fruit Preserves
Candied and GlacÃ©d Fruits
Maraschino Cherries
Sweetened Condensed Milk
Future Trends

9. Preservation of Foods with Chemical additives
Introduction
Definition of Chemical Additive
Importance of Chemical Additives
Legitimate Uses in Food Processing
Undesirable Uses of Additives
Safety of a Food Additive
Functional Chemical Additive Applications
Historical Significance
Specific Uses of Chemical Additives
Additives Permitted and Prohibited in the United States
Chemical and Use
Food Regulation and Compliance
Miller Pesticide Amendment of 1954
1958 Food Additives Amendment
1960 Color Additives Amendment
Chemical Preservatives
Preservatives (Antimycotics)
Specified Uses and Amounts
Preservatives (general)
Specified Use
Microbial Antagonists
Antibiotics
Quality Improving Agents
Other Chemical Additives
Artificial Flavoring
Artificial Coloring
Other Agents
Chemical Additives and the Future

10. Preservation of Food with Ionizing Radiations
A Place for Radiation Stabilized Foods
Discovery of Radioactivity
Alpha, Beta and Gamma Radiations
Dosimetry
Dose Distribution
Induced Radio-Activity in Treated Food
Mode of Action of Ionizing Radiations
Radiation Effects on Micro-organisms
Radiation Effects on Proteins
Radiation Effects on Enzyme Systems
Effects of Radiation on Amino Acids
Effects of Radiation on Vitamins
Radiation Effects on Carbohydrates
Radiation Effects on Lipids
Radiation Effect on Pigments
Radiation Effect on Parasites and Insects
Packaging of Radiation Stabilized Foods
General Methods for establishing Radiation Stabilization Process for Foods
The Food Product-Micro-organism Destruction
Dose Requirements for the Radiation Sterilization of Foods
Technological aspects of the Radiation Pasteurization of Foods
Radiation Resistant Organisms
Factors Influencing the Survival of Micro-organisms
from a Radiation Process
The Influence of the Type of Radiation on the
Inactivation of Micro-organisms
The Influence of Dose Rate on the Inactivation of
Micro-organisms
The Influence of Environmental Conditions on the
Survival of Micro-organisms from a
Radiation Process
Combination Processes
Conditions after Irradiation Affecting Survival and
Recovery of Micro-Organisms
The Food Product-Enzyme Destruction
Process for Radiation Sprout Inhibited White Potatoes
Process for Insect De-infestation of White Flour by
Irradiation
The Process for Food Stabilization
Process-Heat Inactivation of Enzymes plus
Radiation Destruction of Micro-organisms
Process and Product Specifications
Process for Radiation-Pasteurized Plant Tissues
(Fruits)
Process for Radiation-Pasteurized Animal Flesh
(Sliced Bacon)
Process for Radiation-Sterilized Meat (Chicken),
Fish and Vegetables
Non-Heat Method for Controlling Enzymes in Meat
Design of Radiation Processing Food Plants
Wholesomeness of Radiation Stabilized Foods
Some Public Health aspects of the Microbiology of
Irradiated Foods
Acceptability of Radiation Stabilized Foods
Quality Control with Radiation Stabilized Foods
Ionizing Radiations as a Unit Operation in the
Food Industry

11. Preservation of Semi-moist Foods
Introduction
Canned white bread
Storage stability
Sponge and Dough
Filling and Proofing
Processing
Finished Product
Fungistatic and fungicidal agents
Sorbic acid
Polyethylene
Semi-moist Pet Foods
Process for Semi-moist Pet Foods
Marbled, Textured Product
Water Activity
Production of Semi-moist Products Growing
Semi-moist Human Foods
Coarse Ground Beef and Beef Cubes
Other Products being developed

12. Principles and Preservation of Bakery Products
   Introduction
   Principles of Baking
   Dough
   Influence of Flour Proteins
   Flour Improvers
   Other Components of Flour
   Yeast Raised Dough Products
   Heat Generated During Mixing Doughs
   Heat of Hydration
   Cooling Requirements
   Continuous Bread Making Process
   Typical Formulations for Yeast Raised Bakery Products
   Baking Schedules
   Baking Reactions
   Chemically Leavened Bakery Products
   Leavening Acids
   Baking Powders
   Elements of Cookie Technology
   Cookie Flour
   Sugar
   Shortening
   Eggs
   Ammonia
   Water
   Baking Acids
   Soda
   Miscellaneous Ingredients
   Mixing and Baking
   Quality Cookie Chart
   Elements of Cake Technology
   General Rules for Formulating Cakes
   Cake Formulations
   Principles of Processing Cakes
   Baking
   Refrigerated Doughs
   Preservation of Bakery Products
   Fresh Bakery Products
   Freezing of Bakery Products
   Packaging
   Storage Life of Frozen Bread
   Cookies and Cakes
   Nutrient Losses in Bakery Products
   Packaged Fresh Bread
   Packaged Fresh Cookies, Crackers, Bakery Goods,
   Cake Mixes
   The Future

13. Storage Stability of Preserved Foods
Introduction
Relationships of Product Qualities and Storage conditions
Objective Tests of Quality of Stored Foods
Objective Odor Measurements
Mechanical Texturemeter
Long-term Storage of Preserved Foods
Temperature of Storage
Nutrients
Containers for Long-Term Storage
Storage Costs
Storage Stability of Selected Frozen Foods
Result
The Future

14. Food Preservation Using Ozone
Introduction
Physicochemical Properties of Ozone
Use of Ozone in Storage and Packing Facilities
Extension of Storage Life with Ozone
Ozonation to Sanitize packing Line Process Water
The Commercial Production of Ozone
Importance of Ozone in Fishing Industry
Future Perspectives

15. Food Preservation by Smoking Process
Introduction
Types of Smoking
The Difference between Curing and Smoking
Meat Curing and Smoking
Types of Smokers

16. Thermal Food Preservation
Introduction
Effect of Preservation Temperatures
Effect of Processing on Nutrients in Foods
Thermal Preservation Methods

17. Machinery & Equipments (Photographs)
Directory Section

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.


NPCS also publishes varies 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.