PRESERVATION AND CANNING OF FRUITS AND VEGETABLES

PRODUCT INTRODUCTION

Product-mix
Product: Products Prepared from Fruits and Fruits and Vegetables
Availability of raw material
Manpower
Capital
Lack of awareness
Marketing facilities
Transport facilities
Availability of containers
Publicity
Role of Government

FOOD COLOURS

Natural colouring matters
Synthetic colours
Banned colours

FOOD ADDITIVES AND BROMI-NATED VEGETABLE OIL (B.V.O.)

Functions and uses of food additives
Classification of food additives
Brominated vegetables oils (B.V.O.)
Substances prohibited as additives in foods
Additives to be used with Caution

METHODS OF PRESERVATION

Prevention or delay of microbial decomposition
Prevention or delay of self decomposition of the food
Prevention of damage by insects, animals, mechanical causes, etc.
Asepsis (Absence of infection)
Preservation by High Temperature
Thermal Death Time (TDT') of bacteria
Heat resistance of bacterial spores
Aspecitic Canning
Details of process
Hot Pack or Hot Fill
Preservation by Low Temperature
Preservation by Chemicals
Sulphur dioxide
Benzoic acid
Preservation by Drying
Preservation by Filtration
Preservation by Carbonation
Preservation by Sugar
Preservation by Fermentation
Preservation by Salt
Preservation by Acids
Preservation by Oil and Spices
Preservation by Antibiotics
Preservation by Irradiation

CANNING AND BOTTLING OF FRUITS AND VEGETABLES

Principle and Process of Canning
Selection of Fruits and Vegetables
Flow sheet for Canning
Process
Grading
Washing
Peeling
Cutting
Blanching
Disadvantages
Cooling
Filling
Syruping
Brining
Exhausting
Sealing
Processing
Cooling
Storage
Containers for Packing of Canning Products
Tin Containers
Glass Containers
Canning of Fruits and Tomatoes
Botting of Fruits
Canning and Bottling of Vegetables
Preparation of Vegetables
Specific Requirements for Canning of Fruits and Tomatoes
Specific Requirements for Canning of Vegetables
General Considerations in Establishing a Commercial Fruit and Vegetable Cannery
Availability of Raw Materials Site and Building
Availability of Labour
Duration of Canning Season
Water Supply
Disposal of Cannery Waste
Transport Facilities
Causes of Spoilage of Canned Foods
Spoilage Due to Physical and Chemical Charges
Swell
Overfilling
Faulty Retort Operation
Under Exhausting
Panelling
Rust
Foreign Flavours
Damage
Undesirable texture
Corrosion of Cans
Leakage
Breathing
Bursting
Bucking
Discolouration
Stack Burning
Microbial Spoilage
Pre-processing Spoilage
Under-Processing Spoilage
Mesophilic Organisms
After Processing

FRUITS AND VEGETABLES DRYING/DEHYDRATION AND CONCENTRATION

Advantage of Dehydration Over Sun Drying
Drying/Dehydration Techniques
Common Driers Types Used for Liquid and Solid Foods
Fruit and Vegetable Natural Drying Sun and Solar Drying
Shade Drying
Osmotic Dehydration
Common Driers used for Drying/Dehydration
Air Convection Driers
Drum or Roller Driers
Differences between Conventional and Freeze Drying
Atmospheric Drying of Foams
Flow Sheet for Drying/Dehydration of Fruits and Vegetables
Use of Preservatives
Sulphuring
Spoilage of Dried Products
Schedule for Drying of Fruits
Schedule for Drying of Vegetables
Reconstitution Test for Dried/Dehydrated Products
Food Concentration
Methods of Concentration
Changes During Concentration
Intermediate Moisture Foods (IMF)
FREZING OF FRUITS AND VEGETABLES

Technological Flowsheet for Preparation of Fruits/Vegetables for Freezing
Methods of Freezing
By Direct Immersion
By Indirect Contact with Refrigerant
By Air Blast (Air Blast Freezing)
Change During Freezing
Changes During Storage
Physical Changes
Chemical Changes
Freezing process for fruits and vegetables
Flow sheet for Freezing of Beans
Flow sheet for Freezing of Carrot
Flow sheet for Freezing of Peas
Flow sheet for freezing of Cauliflower
Flow sheet for Guava Freezing
Flow sheet for Orange Freezing

FRUIT BEVERAGES

Fruit beverages
Preparation and Preservation of Unfermented Fruit Beverages
Unfermented Beverages
Flow sheet for Processing of Apple Juice
Flow sheet for Processing of Grape Juice
Flow sheet for processing of Pine Apple Juice
Flow sheet for processing of Pomegranate Juice
Flow sheet for Processing of Citrus Juice
Flow sheet for Processing of Mango Juice
Flow sheet for Extraction of Bale Pulp
Flow sheet for Extraction of Guava Pulp
Flow sheet for Extraction of Jamun Juice
Flow sheet for Extraction of Aonla Pulp and Juice
Flow sheet for Extraction of Lemon/Lime Juice
Flow sheet for Extraction of Karonda, Phalsa and Plum Fruits
Flow sheet for Extraction of Papaya Pulp
Flow sheet for Extraction of Ginger Juice
Flow sheet for Processing of RTS Beverages
Flow sheet for Processing of Cordial
Technological Flow sheet for Removal of Astringency From Orange Juice
Flow Sheet for Processing of Squash
Flow sheet for Processing of Barley Water
Technological Flow sheet for Processing of Cider

VINEGAR

Types of Vinegar
Step Involved in Vinegar Production
Preparation of Vinegar
Slow Process
Orleans Slow Process
Quick process (Generator or German Process)
Distributing compartment
Central compartment
Receiving compartment
Method of Preparation
Precautions
Problems in Vinegar
Production
Preparation of Vinegar
Slow Process
Orieans Slow Process
Quick process (Generator or German Process)
Distributing compartment
Central compartment
Receiving compartment
Method of Preparation
Precautions
Problems in Vinegar Production

JAM, JELLY AND MARMALADE

Jam
Technology Flow sheet for Processing of Jam
Problems in Jam Production
Jelly
Important Consideration in Jelly Making
Pectin
Acid
Sugar
Judging of End-Point
Problem in Jelly Making
Marmalade
Jelly Marmalade
Jam Marmalade
Problems in marmalade making
Technological Flow sheet for Processing of Marmalade

PICKLES

Preservation with Salt
Lime Pickle
Processing Flow Sheet for the Lime Pickle
Lime and Green Chilies Pickle
Mango Pickle
Processing Flow sheet for Mango Pickle
Sweet Mango Pickle
Sweet Lime Pickle
Preservation with Vinegar
Papaya Pickle
Processing Flow Sheet for Papaya Pickle
Pear Pickle
Processing Flow sheet for Pear Pickle
Onion pickle
Processing Flow sheet for Onion Pickle
Cucumber Pickle
Processing Flow Sheet for Cucumber Pickle
Preservation with oil
Mango pickle
Processing Flow sheet for Mango Pickle
Aonla pickle
Processing Flow sheet for Aonla Pickle
Karonda pickle
Processing Flow sheet for Karonda Pickle
Lime pickle
Processing Flow sheet for Lime Pickle
Bitter Gourd Pickle
Processing Flow sheet for Bitter Gourd Pickle
Brinjal Pickle
Red Chilli Pickle
Processing Flow Sheet for Red Chilli Pickle
Green Chilli Pickle
Processing Flow sheet for Green Pickle
Preservation with Mixture of Salt, Oil Spices and Vinegar
Cauliflower Pickle
Processing Flow sheet for Cauliflower Pickle
Carrot Pickle
Sweet Turnip Pickle
Processing Flow Sheet for Sweet Turnip Pickle
Red Chilli Pickle
Sweet Jackfruit Pickle
Processing Flow Sheet for Sweet Jackfruit Pickle
Tomato Pickle
Processing Flow Sheet for Tomato Pickle
Mixed vegetable Pickle Process
Problems in pickle making

SAUCES/KETCHUPS & CHUTNEY

Chutneys
Recipes for Chutneys
Sweet mango Chutney
Processing Flow sheet for Sweet Mango Chutney
Apple Chutney
Processing Flow Sheet for Apple Chutney
Plum Chutney
Processing Flow Sheet for Plum Chutney
Wood Apple Chutney
Processing Flow-Sheet for Wood Apple Chutney
Apricot Chutney
Processing Flow sheet for Apricot Chutney
Papaya Chutney
Processing Flow Sheet for Papaya Chutney
Tomato Chutney
Aonla Chutney
Processing Flow Sheet for Aonla Chutney
Sauces (Ketchups)
Recipes for Sauces (Ketchups)
Tomato Sauce
Apple Sauce
Plum Sauce
Processing Flow sheet for Plum Sauce
Processing Flow Sheet for Apple Sauce
Papaya Sauce
Processing Flow Sheet for Papaya Sauce
Mushroom Sauce
Aonla Sauce
Processing Flow sheet for Aonla Sauce
Problem in the preparation of Sauces/Ketchups
Black neck

TOMATO PROCESSING

Tomato Juice
Processing Flow sheet for Tomato Juice
Tomato Puree and Paste
Processing Flow sheet for Tomato Puree/Paste
Tomato Sauce/Ketchup
General Consideration
Recipe
Processing Flow Sheet for Tomato Sauce/Ketchup
Tomato Chutney
Processing Flow sheet for Tomato Chutney
Tomato Cocktail
Recipe
Processing Flow Sheet for Tomato Cocktail
Tomato Soup
Recipe
Canned Tomatoes
Tomato Pickle
Tomato Chilli Sauce
Processing Flow Sheet for Tomato Soup
Processing Flow sheet for Tomato Chilli Sauce

 POTATO PROCESSING

Quality Requirements of Potatoes for Processing
Important Considerations in Potato Processing
Specific Gravity and DryMater Content
Sugar Content
Discolouration
Peeling Potatoes for processing
Potato Chip/Wafers
Flow Sheet for Processing of Potato Chip/Wafers
French Fries (Frozen Potato Chips)
Flow Sheet for Processing of Potato French Fries
Potato Drying/Dehydration
Flow Sheet for Processing of Dehydrated Diced Potatoes
Potato Flour
Canned Potatoes
Flow Sheet for Processing of Canned Potatoes

PROCESSING OF MUSHROOM

Processing
Drying/Dehydration
Processing Flow Sheet for Mushroom Dehydration
Low temperature
High temperature
Chemicals
Processing Flow sheet for Canned mushrooms
Preparation of Ketchup
Flow Sheet for Processing of Mushroom Ketchup
Preservation with salt and acetic acid
Technological Flow Sheet for Preservation of Mushrooms with Salt and Acetic Acid.
Pickling and Lactic acid fermentation
Processing Flow sheet for Mushroom Pickle
Irradiation
Other products
Mushroom poisoning
Future thrust

FRUITS AND VEGETABLES OTHER PRODUCTS
Sauerkraut  
Processing Flow Sheet for Cabbage Saukerkraut  
Mango Slices (Amchur)  
Flowsheet for Processing of Mango Slices  
Mango Leather /Ampapar  
Flow Sheet for Process of Mango Leather  
Fruit Cheese  
Flow Sheet for Processing of Fruit Cheese  
Fruit butter  
Flow sheet for processing of fruit butter  
Fruit Toffee  
Flow sheet for Processing of Fruit Toffee  
Papain  
Processing Flow sheet for Manufacturing of Papain from Papaya Fruits

QUALITY CONTROL IN FOOD PROCESSING INDUSTRY

Raw Material Control  
Process Control  
Inspection of Finished Product  
Sensory Evaluation  
Packaging  
Paper and paper Board  
Labelling and Storage  
Prospects for Quality Control Services

FOOD ADDITIVES

Broad Classes of International Food Additives  
Preservatives  
Preservatives Permitted in Food Items  
Antioxidants  
Sequestrants  
Surface Acting Agents  
Bleaching and Maturing Agents and Starch Modifiers  
Flavouring Agents and Flavour Enhancers  
Flavour Enhancers or Potentiators  
Non-nutritive Dietary Sweeteners  
Nutrients Supplements  
Miscellaneous  
Food Colours  
Stabilizers and Thickeners  
Permitted Food Colours  
Safety of Food Additives

FOOD STANDARDS

Quality and Its Down Gradation  
Quality Centres  
Prevention of Food Adulteration Act  
Agmark  
Fruit Products Order  
FAQ (Fair Average Quality) Specification for foodgrains  
Bureau of Indian Standards  
Consumer Protection Act  
Export Inspection Council  
Other quality control legislations  
Food Labelling
SAUCES, DRESSINGS AND PICKLES

Sauces
Spiced Sauces
Sweet Sauces
Soy Sauces
Mayonnaise
Salad Dressing
Manufacture of Prepared Mustered
Manufacture of Concentrated Tomato
Manufacture of Tomato Juice
Pickles
General Classification of Pickles
Dill Pickles
Sour Pickles
Chutney
Chow chow
Sweet Pickles
Spiced Pickles
Bread and Butter Pickles
Mustard Pickles
Jamaica Pickle
Relish

FLAVOURS SYRUPS AND BEVERAGES

Flavoring Extracts
Essences
Aromatic Waters
Tinctures
True Fruit and Flavor Syrups and Fountain Supplies
Orange Syrup
Raspberry, Strawberry and Similar Fruit Syrups
Crushed Fruits for the Fountain
True Fruit Extracts
True Fruit Aromas (Concentrates)
Manufacture of Dry Shredded Coconut
Beverages
Bitters
Cordials
Cocktails
Liqueurs
Vermouth
Whiskey
Syrup Table
Per Cent Sugar in Solution at a given Temperature
Simplified Table for Manufacturing Syrup
The Principal Stages of Sugar Boiling

CANNED GOODS

Specifications for Canned Goods
General Description of Grades
Canned Fruits
Canned Soups
Canned Vegetables
Dried fruits
Canning of Fruits and Vegetables
Canning Methods
Methods of Canning Typical Products
Vegetables
Fruits
Sea Foods
Milk
Soups
specialties
Storage and Care of Canned Foods

EQUIPMENTS COMMONLY USED IN PRESERVATION OF FRUITS & VEGETABLES

Food dehydration
Food radiation technology
Food freezing and refrigeration
Food Canning
Processing of Fruits and Vegetables
Canning, Juice Processing and dehydration

PACKAGING

Suitability of different containers
Modern Packaging Materials and Forms

INSTITUTES OFFERING FOOD SCIENCE AND TECHNOLOGY

Existing training facilities in the area of food technology
Major centres of learning in Food Science/Technology

DISTRIBUTION CENTRE FOR FRESH FRUITS AND VEGETABLES

Product mix
Rational and Demand Assessment
Market Potential
Capacity of the Unit
Raw Material and its Availability
Project Cost
Means of Finance
Know How Suppliers
Machinery Suppliers
Suggested Marketing Strategy
Manpower Requirement
Infrastructure Required
Cost of Production and Profitability

PACK HOUSE AND COLD STORAGE

Product Mix
End Use
Market Potential
Capacity of the unit
Raw Material and its Availability
Project Cost
Means of finance
Know how supplies
Machinery Suppliers
Suggested Marketing Strategy
Manpower requirement
Infrastructure required
Cost of Production and Profitability

MANGO PULP/JUICE, PAPAYA PULP, GUAVA JUICE AND OTHER FRUIT PRODUCTS

Product Mix
End Use
Market Potential
Capacity of the Unit
Raw Material and its Availability
Project Cost
Means of Finance
Know-How Suppliers
Plant and Machinery Suppliers
Suggested Marketing Strategy
Man Power Requirement
Infrastructure Required
Cost of Production and Profitability (70% Cap. Utilization)

VACUUM FRIED FRUITS AND VEGETABLES

Product Mix
Product Applications
Market Potential
Suggested Installed Capacity
Raw Material Availability
Evaluation of Available Technology and Selection of Technology
Manufacturing Process in Brief
Product Quality Specifications
Requirement of Total Manpower and Its Cost
Utility Requirement and Cost
Project Cost

DEHYDRATED VEGETABLES ONION, POTATO, PEAS FENUGREEDED LEAVES AND OTHER VEGETABLES

Product Mix
End Use
Market Potential
Capacity of the Unit
Raw Material Requirement and Availability
Project Cost
Means of Finance
Technology Suppliers
Plant and Machinery Suppliers
Suggested Marketing Strategy
Manpower Requirement
Infrastructure Required
Cost of Production and Profitability

POTATO CHIPS/FINGER CHIPS

Product Mix
End Use
Market Potential
Capacity of the Unit
Raw Materials and its Availability
Project Cost
Means of Finance
Know-How Suppliers
Plant and Machinery Suppliers
Suggested Marketing Strategy
Manpower Requirement
Infrastructure Required
Cost of Production and Profitability
Project Cost
Means of Finance

**TOMATO PASTE/PUREE, OTHER PASTE AND CONCENTRATES**

Product Mix
End Use
Market Potential
Capacity of the Unit
Raw Material and Its Availability
Project Cost
Means of Finance
Know How Suppliers
Plant and Machinery Suppliers
Suggested Marketing Strategy
Manpower Requirement
Infrastructure Required
Cost of Production and Profitability

**MANUFACTURERS/SUPPLIERS OF PLANT, EQUIPMENTS & MACHINERIES**

Fruits and Vegetables Processing
Mixer
Complete Food Packaging Machinery

**MANUFACTURERS/SUPPLIERS OF PACKAGING MATERIALS**

**MANUFACTURERS/SUPPLIERS OF RAW MATERIALS**