

# **The Complete Book on Tomato & Tomato Products Manufacturing (Cultivation & Processing)(2nd Revised Edition)**

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Tomato is one of the most popular fruit in the world. The products of tomato like paste, juice, ketchup, etc. are widely used in kitchens all around the world. Tomatoes and tomato-based foods are considered healthy for the reason that they are low in calories, but possess a remarkable combination of antioxidant micronutrients.

Tomato industry has been growing significantly over the past several decades. Changing life style and taste of consumers in different countries will motivate the growth of the tomato products market. The industries can retain maximum market share by differentiating their products in the market, by coming up with innovative products and by focusing on different packaged tomato products.

India is one of the largest consumers of tomatoes, as well as the second largest tomato producing country in the world followed by China. Although raw tomato consumption is the mainstream means of consumption in today's India, the market for processed tomato is expected to expand in the near future considering the remarkable economic growth and dietary culture changes.

Tomatoes are widely grown commodity with 136 mt production in the world. There is a big market for tomato products. The market scenario has revealed a positive indication for the specially packed tomato products in local as well as outside market. It is estimated that the total production of processed fruit & vegetable in India is about 15.0 lakh tonne.

The major content of the book are varieties of tomato, select the best seeds and seedlings, growing preparation, canning of tomatoes, how to store & preserve tomatoes, basis for successful cultivation of tomato, crop husbandry, tomato pruning, dehydration/drying of tomatoes, canning of tomatoes, preserving by heating, tomato pulp, tomato paste, tomato ketchup, tomato juice, tomato powder, hazard analysis and critical control points, FPO and Agmark, products packaging, marketing.

The purpose of this book is to present the elements of the technology of tomato preservation. The book explains raw material requirement, manufacturing process with flow diagrams of various tomato products with addresses of plant & machinery suppliers with their photographs. It deals with the products prepared from tomato commercially.

It will be a standard reference book for professionals, entrepreneurs, food technologists, those studying and researching in this important area and others interested in the field of tomato products manufacturing.

## 1. INTRODUCTION

Varieties of Tomato

Other Tomato Varieties

Major Tomato Growing Belts in India

Botanical Description of Tomato Plant

Uses of Tomatoes

Health Benefits

Home Remedy of *Solanum Lycopersicum* (Tomato)

Medicinal Uses of Tomato (*Solanum Lycopersicum*)

Benefits of Tomato

Lower Cholesterol

Reduce Heart Disease

Lower Blood Pressure

Regulates Blood Sugar

Counteract Acidosis

Reduce Migraines

Boost Immunity

Natural Sunscreen

Strengthen Bones

Treatment of Vasodilation

Lead Toxicity

Eye Disorder

Combating Stroke

Mood

Wound Repair

Diabetes

## 2. BASIS FOR SUCCESSFUL CULTIVATION OF TOMATO

Climate and Soil

Temperature and Light

Climate Zones for Tomato Varieties

Zone A

Zone B

Zone C

Soil

Water and Humidity

Choice of Varieties

Growing Preparation

Site Selection

Land Preparation

Purchasing Tomato Seedlings

Seedlings

Nursery Management

Crop Spacing and Arrangement

Transplanting

## 3. CROP HUSBANDRY

Bulky Organic Manures

Farmyard Manure  
Sheep and Goat Manure  
Poultry Manure  
Concentrated Organic Manures  
Oil Cakes  
Major Sources of Manures  
Advantages of Organic Manures  
Fertilizers  
Nitrogen  
Phosphorus  
Potassium  
Calcium  
Minor Elements  
Watering/Irrigation  
1. Surface Irrigation  
2. Sprinkler Irrigation  
3. Drip Irrigation  
Pruning  
Pruning to Shape  
Nipping  
Heading  
Trimming Leaves  
Weed Control  
Crop Rotation  
Protected Cultivation  
Greenhouses  
Climate Control  
Water Supply and Crop Husbandry  
Types and Constructions  
Financial Turnover  
Organic Farming  
Soil Fertility  
Crop Rotation  
Sanitation Practices

#### 4. TOMATO PRUNING

Pruning Unstaked Plants  
Pruning Tops of Plants  
Pruning Roots  
Identify Tomato Suckers  
Support Systems  
Staking and Spacing Options: Cages, Fences, or Stakes  
Basic Reasons for Pruning  
Types of Pruning Cuts  
Types of Training Systems  
Pruning and Fruit Quality  
Fruit Size  
Hollowness  
Earliness and Harvest Period  
Types of Pruning Maintenance

#### 5. DEHYDRATION/DRYING OF TOMATOES

Preparation

Drying Methods

1. Sun Drying
2. Oven Drying
3. Dehydrator Drying

Packaging and Storage

Health Benefits of Sun Dried Tomatoes

Description of the Tomato Drying System

## 6. CANNING OF TOMATOES

Preparing Equipment

Preparing Tomatoes

Packing the Jars

Adding Acid

Adding Salt

Closing the Jars

Processing

Step-By-Step Canning

Boiling Water Method

Step-By-Step Canning

Pressure Canner Method

Cooling the Jars

Testing the Seal

Storing

Before Using

## 7. PRESERVING BY HEATING

Introduction

Advantages

Disadvantages

Packing

Tins

Glass

Types of Heating

Pasteurization

Sterilization in a Bath of Boiling Water

Sterilization with a Pressure Cooker or Autoclave

Tins

Glass Jars

Storage and Consumption

## 8. TOMATO PULP

Introduction

Manufacturing Process of Tomato Pulp

Sorting

Washing and Trimming

Crushing

Pulping

Hot Process

Process Flow Diagram

## 9. TOMATO PASTE

Introduction

Raw Material Requirements

## Manufacturing Process of Tomato Paste

### Process Flow Diagram

## 10. TOMATO KETCHUP

Introduction

Uses of Tomato Ketchup

Ingredients Required

Process Description

Process Flow Diagram

## 11. TOMATO JUICE

Introduction

Manufacturing Process of Tomato Juice

Washing and Trimming

Crushing

Hot Pulping

Extraction of Juice

Deaeration

Acidification

Common Salt and Sugar

Packing

Homogenization

Thermal Processing of Tomato Juice

In-Can Processing

Bulk Processing

Process Flow Diagram

## 12. TOMATO POWDER

Introduction

Uses & Applications

Procedure for Making Tomato Powder

Primary Method

Secondary Method

Process Flow Diagram

## 13. HAZARD ANALYSIS AND CRITICAL CONTROL POINTS

Terms Used in HACCP

Developing a HACCP Plan

1. Assemble the HACCP Team

2. Describe the Food and its Distribution

3. Describe the Intended Use and Consumers of the Food

4. Develop a Flow Diagram which Describes the Process

5. Verify the Flow Diagram

Principles of HACCP

1. Conduct a Hazard Analysis

2. Determine Critical Control Points (CCPs)

3. Establish Critical Limits

4. Establish Monitoring Procedures

5. Establish Corrective Actions

6. Establish Verification Procedures

7. Establish Record-keeping and Documentation Procedures

Prerequisite Programs

## 14. FPO AND AGMARK

Goals of Ministry of Food Processing Industries (MOFPI)

Roles of MOFPI

Policy Support

Developmental

Promotional

Regulatory

Organization Chart of Ministry of Food Processing Industries

FPO Registration is Available for Following Products

Requirement For FPO Application Proceedings

AGMARK

Salient Features of AGMARK Products

AGMARK Products are Manufactured After

Grading and Marking of Vegetable Oils Under AGMARK

Agmark Registration is available for following Products

Requirement of Agmark Application Proceedings

## 15. PRODUCTS PACKAGING

Introduction

Definition of Food Packaging

Functions of Packaging Material

Packaging Materials for Tomato and its Products

Packaging of Tomato

Flexible Packaging

Forms of Flexible Packaging

Manufacturing Techniques

Plastics in Food Packaging

Use of Plastics in Food Packaging

Types of Plastics Used in Food Packaging

Types of Plastic Used in Packaging

Polyethylene

Polypropylene (PP)

Polyethylene Terephthalate (PET or PETE)

Polyethylene Naphthalene Dicarboxylate (PEN)

Flexographic Printing

Digital Printing

Printing and Labelling of Rigid Plastic Containers

In-mould Labelling

Labelling

Dry Offset Printing

Silk Screen Printing

Heat Transfer Printing

Glass and Glass Container Manufacture

Melting

Container Forming

Design Parameters of Glass Containers

Surface Treatments

Hot End Treatment

Cold End Treatment

Low-Cost Production Tooling

Container Inspection and Quality

Conclusion

Precautions during Packing

## 16. MARKETING

Functions of Marketing

Promotional Techniques

The Product Concept

Some Characteristics of Market Segmentation

Organization for New-Product Development

Developing New Products

Planned Obsolescence

Product Line Relationships

Product Features

The Sales Process

## 17. PLANT AND MACHINERY PHOTOGRAPHS

## 18. SAMPLE PLANT LAYOUT

## 19. ADDRESSES OF PLANT & MACHINERY SUPPLIERS

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