The Complete Book on Onion & Garlic Cultivation with Processing (Production of Onion Paste, Flakes, Powder & Garlic Paste, Powder, Flakes, Oil) 2nd Revised Edition

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SERVICES

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Onion (Allium cepa L.) has been valued as a food and a medicinal plant since ancient times. It is also used indifferent forms of processed food, e.g. pickles, powder, paste, and ?akes, and it is known for its medicinal values.

Garlic belongs to the genus Allium, which comprises of approximately 600 known species distributed over the whole northern hemisphere. Characteristic for Allium species are herbaceous, perennial bulbous plants with a typical leek odour.

Onion and Garlic are the spice commodities used for flavouring the dishes. These are considered as valuable medicinal plants offer variety of medicinal properties. Onion & garlic are important commercial crops with versatile applications. The demand for the processed products is increasing day by day due to its convenience to handle and use. Onion & Garlic can be processed into a wide variety of products. As per the estimate, approximately 6.75% of the onion produced is being processed. Besides fulfilling the constant demand of domestic population, India exports 13 to 18 lakh tons of onion annually worth around Rs. 2200 crores of foreign exchange revenue. Similarly in case of garlic, the production increased from 4.03 lakh tons to 12.26 lakh tons.

In the world market, the demand for onion and garlic products is increasing as they are hygiene and easy to handle, able to avoid wastage. There are good prospects for these processed products to export to gulf countries and even Europe. Overall, global Garlic market continues to indicate a perceptible growth. After China, India is the second largest producer of onion and enjoys 19% share of the global onion production. Maharashtra and Karnataka are the chief onion producing states in India and contribute near about 45% of the total production of onion in India. Production of onion in India is about 15m tones a year.

Proper placement of onion & garlic products (like; onion pickle, onion chutney, onion paste, garlic oil, garlic paste, garlic powder, garlic flakes, onion flakes, onion powder) in the departmental stores, super markets, shopping malls backed-up by publicity is the key to success. It is also possible to have tie-up with exclusive restaurants, star hotels, renowned caterers for their regular requirements.

This handbook is designed for use by everyone engaged in the Onion & Garlic products manufacturing. Major contents of the book are Varieties of Onion, Onion Production, Onion Dehydration, Types of Garlic, Garlic Growing, Garlic Dehydration, Onion Pickle, Onion Chutney, Onion Paste, Garlic Oil, Garlic Paste, Garlic Powder, Garlic Flakes, Onion Flakes, Onion

Powder, Pest Species and Pest Control of Garlic and Onion, Integrated Weed Management, Packaging, Product Advertising and Sales Promotion, Marketing, Plant & Machinery Photographs, Addresses of Plant & Machinery Suppliers, Sample Plant Layouts etc. 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 Onion & Garlic products manufacturing.

1. INTRODUCTION OF ONION

Nutrition per Serving of Onions

Medicinal Value of Onion

Effect

Chemical Structure and Influences on Flavour

Uses

Culinary Uses

Non-Culinary Uses

Historical Use

2. VARIETIES OF ONION

Yellow Onions or Brown Onions

Red Onion

White Onion

Sweet Onions

Green Onions or Scallions

Pearl Onions

Phytochemical Properties of Onion

Health Benefits of Onion

Cardiovascular Benefits

Support for Bone and Connective Tissue

Anti-Inflammatory Benefits

Cancer Protection

Other Health Benefits

Diseases of Onion

Damping-Off

Purple Blotch (Alternaria Porri)

Onion Smut

Onion Smudge

Black Mould

Bacterial Brown Rot

Onion Yellow Dwarf

White Rot

Neck Rot

3. ONION PRODUCTION

Phases of Growth

Vegetative Phase

Bulbing Phase

Blooming Phase

Climatic Requirements

Soil

Site Selection and Planting

Cultivars

Onion Sets

Irrigation

Weed Control

Pest Management Harvest Curing Storing 4. ONION DEHYDRATION **Dehydrated Onion** Onion Varieties Suitable for Dehydration Uses of Dehydrated Onions **Dehydration Practices for Onion** Solar Drying Convective Air Drying Fluidized Bed Drying Microwave Drying Infra Red Drying Vacuum Drying Freeze Drying Osmotic Dehydration Onion Dehydration Process **Processing Steps** Power Production and Energy Requirements 5. GARLIC - AN INTRODUCTION Uses **Culinary Uses** Spiritual and Religious Uses Historical Use Other Uses Properties of Garlic **Chemical Structure** 6. TYPES OF GARLIC 1. Softneck Garlic 2. Hardneck Garlic Diseases of Garlic Health Benefits of Garlic Cardiovascular Benefits Garlic and Cancer Anti-Inflammatory Benefits Across Body Systems Antibacterial and Antiviral Benefits Garlic and Blood Pressure Antioxidative Effects of Garlic 7. GARLIC GROWING Climate **Land Preparation** Soil/Nutrients Soil Fertility **Planting** Plant Development Mulching Irrigation and Labor Pest Management Weed Control Harvest and Storage Marketing 8. GARLIC DEHYDRATION

Drying

Methods of Drying

1. Hot Air Drying

2. Solar and Open Sun Drying

Experimental Setup

Design

Raw Material and Sample Preparation

Washing

Drying Process Flow Chart of Dehydrated Garlic

Equipment/Apparatus Used

Measurement of Variables

Air Temperature and Relative Humidity

Air Velocity

Solar Radiation

Initial Moisture Content (IMC)

Moisture Content during Drying Experiment

Equilibrium Moisture Content (E.M.C.)

Moisture Ratio (M.R.)

Drying Rate (D.R.)

Average Drying Rate (A.D.R.)

Quality Evaluation of Dehydrated Garlic

Rehydration Ratio, Coefficient of Rehydration

Comparison between Solar and Open Sun Drying

Freeze Drying

Fluidized Bed Drying

Dehydration Process

Dehydration Process Flow Diagram

Safety Precautions & Other Cares in Garlic Dehydration

9. ONION PICKLE

Introduction

Raw Material

Onion Pickle Manufacturing Process

Onion Pickle Process Flow Diagram

10. ONION CHUTNEY

Introduction

Manufacturing Process of Onion Chutney

Process Flow of Onion Chutney

11. ONION PASTE

Introduction

Nutrition Information of Onion Paste

Frozen Onion Paste

Manufacturing Process of Onion Paste

Process Flow of Onion Paste

12. GARLIC OIL

Introduction

Garlic Oil manufacturing Methods

Manufacturing Process

Removal of Undesired Material

Washing of Bulbs

Peeling

Crushing of Bulbs

A Steam Distillation

a. Hydrodistillation

b. Direct Steam Distillation

Advantages of Direct Steam Distillation

Disadvantage of Direct Steam Distillation

Inspection and Analyzing

Packing and Dispatching

Heart Diseases

Cholesterol Levels

Process Flow Diagram

Diabetes

Bodily Aches and Pains

Skin Problems & Other Infections

Other Ailments

13. GARLIC PASTE

Introduction

Manufacturing Process of Garlic Paste

Process Flow of Garlic Paste

14. GARLIC POWDER

Introduction

Uses of Garlic Powder

Manufacturing Process of Garlic Powder

Process Flow Diagram (Garlic Powder)

15. GARLIC FLAKES

Introduction

Manufacturing Process of Garlic Flakes

16. ONION FLAKES

Introduction

Properties of Onion Flakes

Uses of Onion Flakes

Manufacturing Process of Onion Flakes

Plant & Machinery Required

Raw Material Required

17. ONION POWDER

Introduction

Varieties of Onion Powder

Chemical Specification

Nutritional Information

Uses of Onion Powder

Meat Rubs

Bloody Maty Drinks

Spice Mixes

Dressings

Manufacturing Process of Onion Powder

Process Flow Diagram

Health Benefits of Onion Powder

Low in Fat and Calories

Potassium

Magnesium

Calcium

Low in Sodium

18. PEST SPECIES AND PEST CONTROL OF GARLIC AND ONION

(a) Indirect Pests of Garlic

Removal of Scapes

Weed Control

Insects

Onion Thrips

Onion Maggot

Armyworms

Wireworms

Nematodes

Diseases

Pink Root

Botrytis

Rust

Viruses

Pest Control

Disease Management

Onion and Garlic

Damping Off Symptoms

Management

Cultural Methods

Biological Method

Chemical Methods

Purple Blotch

Symptoms

Management

- (i) Cultural Methods
- (ii) Host Plant Resistance
- (iii) Biological Methods
- (iv) Chemical Methods

Stemphylium Leaf Blight

Symptoms

Management

Cultural Methods

Host Plant Resistance

Chemical Methods

Colletotrichum Blight/Anthracnose/Twister Disease

Symptoms

Management

Cultural Methods

Host Plant Resistance

Chemical Methods

Fusarium Basal Rot/Basal Plate Rot (Fusarium Oxysporum F.sp Cepaae).

Symptoms

Management

Cultural Methods

Host Plant Resistance

Biological Methods

Chemical Methods

White Rot (Sclerotium cepivorum Berk)

Symptoms

Management

Cultural Methods

Biological Methods

Chemical Methods

Pink Root (Phoma (Pyrenochaeta) Terrestris, Fusarium Solani)

Symptoms

Management

Host Resistance

Cultural Methods

Chemical Methods

Black Mold (Aspergillus Niger Van Tieghem. A. Fumigatus (Green Mold) and A Alliaceus)

Symptoms

Management

Cultural Methods

Chemical Methods

Bacterial Rots

Symptoms

Management

Viral Diseases (Transmitted by Various Aphid Species or Mechanically to Onion)

(i) Onion Yellow Dwarf Virus

Symptoms

Management

(ii) Iris Yellow Spot Virus

Symptoms

Management

Onion and Garlic

Thrips

Management

Cultural

Planting Date

Mulching

Irrigation

Barriers

Biological Control

Plant Resistance

Botanicals

Chemical

Maggot (Delia Antique)

Symptoms:

Pest Management

Cultural

Chemical Control

Army Worms (Spodoptera Exiguo, S.litura) and Helicoverpa Armigera Hubner

Pest Management

Bulb Mite (Rhizoglyphus Robini Claparede)

Management

Eriophyid Mite (Aceria Tulipae Keifer)

Management

Red Spider Mite (Tetranychus Cinnabarinus)

Management

19. INTEGRATED WEED MANAGEMENT

Weed Characteristics

Monitoring

Herbicides

Preventing Weeds

Crop Rotation

Cover Crops

Cover Crop Residues as Mulch.

Cover Crops as Living Mulch.

Stale Seedbed Preparation Soil Solarization Sanitation and Composting Weed Problems Yellow Sweetclover and White Sweetclover. Seedling Mature Plant Nutsedge Seedling Young Plant Mature Plant **Annual Bluegrass** Collar Mature Plant Dodder Seedling Mature Plant Seeds 20. BUREAU OF INDIAN STANDARDS **Objectives Quality Policy Product Certification Process of Setting Standards** Indian Standards for Onion Indian Standards for Garlic 21. THE NATIONAL BUREAU OF AGRICULTURAL COMMODITY AND FOOD STANDARDS (ACFS) Mission Responsibilities Structure Notification of the National Committee on Agricultural Commodity and Food Standards Thai Agricultural Standard Garlic 1. Scope 2. Quality 3. Sizing 4. Tolerances 5. Packing and Presentation 6, Marking and Labelling 7. Contaminants 8. Pesticide Residues 9. Hygiene 10. Methods of Analysis and Sampling Annex A: Garlic Illustration Annex B: Unit Thai Agricultural Standard Onion 1. Scope 2. Quality 3. Sizing

4. Tolerances

7. Contaminants

8. Pesticide Residues

5. Packing and Presentation6. Marking and Labelling

9. Hygiene

10. Methods of Analysis and Sampling

Annex A: Onion Illustration

Annex B: Unit 22. PACKAGING

Packaging, Flexible

Introduction

Forms of Flexible Packaging

Manufacturing Techniques

Uses and Types of Flexible Packaging

Industrial Packaging

Metal Cans

Raw Materials for Can-Making

Steel

Aluminium

Can-Making Processes

Two-Piece Cans (Drawn Cans)

Single Drawn Cans

Drawn and Redrawn Cans (DRD)

Drawn and Wall-Ironed (DWI) Cans

Drawn and Ironed Cans (DI)

Three-Piece Cans

End-Making Processes

Coatings, Film Laminates and Inks

Container Handling

Storage and Distribution

Glass Containers

Attributes of Food Packaged in Glass Containers

Glass and Glass Container Manufacture

Melting

Container Forming

Design Parameters

Surface Treatments

Hot End Treatment

Cold End Treatment

Low-Cost Production Tooling

Container Inspection and Quality

Thermal Processing of Glass Packaged Foods

Glass Pack Design and Specification

Concept and Bottle Design

23. PRODUCT ADVERTISING AND SALES PROMOTION

Advertising

Advertising Mediums

Sales Promotion

Objectives of Sales Promotion

Different Chennels for Sales Promotions

1. Consumer Promotions

2. Trade Promotions

24. 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 25. PLANT & MACHINERY PHOTOGRAPHS 26. ADDRESSES OF PLANT & MACHINERY SUPPLIERS 27. SAMPLE PLANT LAYOUTS

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