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

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9. ONION PICKLE

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Onion Pickle Process Flow Diagram

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Process Flow of Onion Chutney

11. ONION PASTE

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Frozen Onion Paste

Manufacturing Process of Onion Paste

Process Flow of Onion Paste

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Crushing of Bulbs

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b. Direct Steam Distillation

Advantages of Direct Steam Distillation

Disadvantage of Direct Steam Distillation

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Packing and Dispatching

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Cholesterol Levels

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Diabetes

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Skin Problems & Other Infections

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Manufacturing Process of Garlic Powder

Process Flow Diagram (Garlic Powder)

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Introduction

Manufacturing Process of Garlic Flakes

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Uses of Onion Flakes

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Raw Material Required

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Chemical Specification

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Bloody Maty Drinks

Spice Mixes

Dressings

Manufacturing Process of Onion Powder

Process Flow Diagram

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Potassium

Magnesium

Calcium

Low in Sodium

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Onion Maggot

Armyworms

Wireworms

Nematodes

Diseases

Pink Root

Botrytis

Rust

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Pest Control

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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

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Symptoms

Management

Cultural Methods

Biological Methods

Chemical Methods

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Symptoms

Management

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Cultural Methods

Chemical Methods

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Symptoms

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Cultural Methods

Chemical Methods

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Symptoms

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Management

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Management

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Cover Crop Residues as Mulch.

Cover Crops as Living Mulch.

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4. Tolerances

7. Contaminants

8. Pesticide Residues

5. Packing and Presentation6. Marking and Labelling

9. Hygiene

10. Methods of Analysis and Sampling

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Annex B: Unit 22. PACKAGING

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Drawn and Ironed Cans (DI)

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