Spice Cultivation and Processing

(Celery, Cinnamon, Coriander, Cloves, Fennel Seed, Garlic, Ginger, Lemon Balm, Mustard, Onion, Parsley, Savory, Sorrel, Tamarind, Turmeric, Sesame, Sassafras, Rosemary, Poppy Seed, Paprika, Oregano, Lemongrass)
Introduction

A spice is a seed, fruit, root, bark, or other plant substance primarily used for flavoring, coloring or preserving food. Spices are distinguished from herbs, which are the leaves, flowers, or stems from plants used for flavoring or as a garnish. Sometimes, spices may be ground into a powder for convenience. Many spices have antimicrobial properties. This may explain why spices are more commonly used in warmer climates, which have more infectious diseases, and why the use of spices is prominent in meat, which is particularly susceptible to spoiling. Spices are sometimes used in medicine, religious rituals, cosmetics or perfume production, or as a vegetable.
A condiment is a spice, sauce, or, preparation that is added to food to impart a particular flavor, to enhance its flavor, or in some cultures, to complement the dish. The term originally described pickled or preserved foods, but has shifted meaning over time.

Many condiments are available packaged in single-serving packets, like mustard or ketchup, particularly when supplied with take-out or fast-food meals.
They are usually applied by the diner, but are sometimes added prior to serving; for example, in a sandwich made with ketchup, mustard or mayonnaise. Some condiments are used during cooking to add flavor or texture to the food; barbecue sauce, compound butter, teriyaki sauce, soy sauce, and marmite are examples.
Some of the fundamentals of the book are definition of spices and condiments nomenclature or classification of spices and condiments, Indian central spices and cashew nut committee, origin, properties and uses of spices, forms, functions and applications of spices, trends in the world of spices, yield and nutrient uptake by some spice crops grown in sodic soil, tissue culture and in vitro conservation of spices, in vitro responses of piper species on activated charcoal supplemented media, soil agro climatic planning for sustainable spices production, potentials of biotechnology in the improvement of spice crops, medicinal applications of spices and herbs, medicinal properties and uses of seed spices, effect of soil solarization on chillies, spice oil and oleoresin from fresh/dry spices etc.
# Market Outlook

## Indian Export of Spices

<table>
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<tr>
<th>Year</th>
<th>Qty (Tonnes)</th>
<th>%Change (QTY)</th>
<th>Value (Million)</th>
<th>($ Value)</th>
<th>%Change (Value)</th>
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<td>2013-14</td>
<td>896565</td>
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<td>2429</td>
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<td>490832</td>
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Total spices export from India stood at 226,225 tonnes valued at US$ 621.78 in April-June 2016, registering a year-on-year growth of 3 per cent.

The global market for spices has witnessed continued demand during the last few years and is estimated to reach 83,468 kilo tons by 2022, at a CAGR of 2.84% from 2016 to 2022.
Increase in versatile demand across various food and beverage segments particularly for convenience foods and beverages are likely to drive the global spices market during forecast period 2016 to 2022. The global market for condiments is expected to cross USD 37.6 billion by 2022 at a CAGR of 4.7%.
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• Crop Improvement Strategy or Breeding Strategy
• Yield of Berries
• Plant Protection
• Post-Harvest Technology
• Grades/Types
• The ISO Grades of Pimento (Whole and Ground)
• Physical Requirements for Whole Pimento
• Chemical Requirements of Whole Pimento
• Storage of Pimento
• Transport of Pimento
• Composition
• Packaging and Storage
• Processed Products
• Pimenta Berry Oil
• Pimenta-leaf Oil
• Pimenta Oleoresin and Oil
• As Food Flavourant
• Use in Medicine
• Berry Oil
• Leaves
• Pimenta Bark and Wood
• A. Star-Anise
• Indian Names
• Description and Distribution
• Area and Production
• Crop Management
• Soil and Climate
• Propagation
• Raising Nursery and Transplanting
• Weeding
• After-care Mulching
• Manuring and Fertilization
• Maturation and Flowering
• Fruit Development
Harvesting of Fruits
Yield of Fruit
Post-Harvest Technology
Drying of Fruit
Processing Technology and Products
Manufacturing Essential Oil
Native vs Modern Distillation of Oil
Yield of Oil
Quality of Star-anise Oil
Quality Grading of Star-anise Oil
Leaf Oil
• Fatty Oil
• Star-anise as Flavourant
• In Medicine
• Star-anise Oil
• B. Japanese star-Anise
• Description and Distribution
• Area, Production and Exports
• Crop Management
• Post-Harvest Technology
• Processing Technology
38. BALM OR LEMON BALM

- Indian Names
- Description and Distribution
- Crop Management
- Soil and Climate
- Propagation
- Cultural Practices
- Harvesting
- Yield
- Post-Harvest Technology
- Processing Technology
- Manufacturing Essential Oil
• Physico-chemical Properties of Oil
• As Food Flavourant
• In Medicine
• Basil or Sweet Basil (Tulsi)
• Indian Names
• Description and Distribution
• Major Types of Basil
• American Basil
• Area, Production and Exports
• Crop Management
• Varieties
• Soil and Climate
• Breeding
• Propagation
• Plant Protection
• Harvesting
• Yield
• Post-Harvest Technology
• Packaging and Storage
• Composition
• Processed Products
• Distillation of Oil
• As Food Flavourant
• In Perfumery and Cosmetics
• In Medicine
• As Insecticide, Insect-Repellent and Bactericidal
• Use of Basil Seeds
• Bay or Laurel Leaves
• Indian Names
• Description and Distribution
• Post-Harvest Technology
• Drying
• Composition
• Processing Technology
• Essential Oil Recovery
• Physico-chemical Properties of Volatile Oil
• Bay Leaves for Flavouring
• Fat from Bay or Laurel Berries
• Laurel Wood Utilization
39. CURRY LEAF

- Indian Names
- Description and Distribution
- Area, Production
- Crop Management
- Curry Leaf Cultivation in Homesteads of South Kerala
- Raising Nursery
- Manuring
- Harvesting
- Weeding
- Prophylactic Measures for Plant Protection
- Cost of Cultivation
• Cultivars and their Sensitivity to Winter Temperature
• Plant Protection
• Termites
• Post-Harvest Technology
• Packing and Storage
• Composition
• Processed Products
• Volatile Oil
• Dehydrated Curry Leaves
• As Food Flavourant
• In Indigenous Medicine
• In Perfume and Cosmetics
• Fruits
• Wood
• Hyssop
• Description and Distribution
• Area, Production and Exports
• Crop Management
• Soil and Climate
• Planting and Cultivation
• Harvesting
• Yield
• Post-Harvest Technology
• Composition
• Processing Technology
• Distillation of Essential Oil
• Yield of Essential Oil
• Physico-chemical Properties of Volatile Oil
• As Condiment
• In Medicine
• Volatile Oil Uses
• Marjoram
• Indian Names
• Description and Distribution
• Crop Management
• Soil and Climate
• Propagation
• Influence of Growth Regulators on Growth, Herbage and Essential Oil Yields
• Harvesting
• Flowering
• Post-Harvest Technology
• Drying, Packing and Storage
• Composition
• Processed Products
• Volatile Oil
• As Food Flavourant
• In Perfumumery and Cosmetics
• In Medicine
40. PEPPERMINT

Indian Names
Description and Distribution
Crop Management
Processed Products
Volatile Oil
In Medicine/Pharmaceuticals
Waste Utilization
Spearmint
Indian Names
Description and Distribution
Crop Management
Important Steps in its Successful Cultivation in India
• Composition
• Processed Products
• Volatile Oil
• Origanum
• Indian Names
• Description and Distribution
• Crop Management
• Soil and Climate
• Propagation
• Sowing
• After-care
• Harvesting
• Post-Harvest Technology
• Drying
• Composition
• Processed Products
• Volatile Oil
• As Food Flavourant
• In Medicine
• Other Uses
• Parsley
• Indian Names
• Description and Distribution
• Area, Production and Trade
• Crop Management
• Climate and Soil
• Direct Sowing/Sowing in Nursery Beds
• Transplanting of Seedlings
• Manuring/Fertilizers
• Harvesting
• Yield
• Post-Harvest Technology
• Composition
• Processed Products
• Dehydrated Parsley
• Volatile Oil
• Fatty Oil
• As Food Flavourant
• In Medicine
41. ROSEMARY

- Indian Names
- Description and Distribution
- Crop Management
- Climate and Soil
- Propagation
- Planting
- Harvesting
- Yield
- Post-Harvest Technology
- Drying and Packing
- Composition
- Processed Products
• Volatile Oil
• As Food Flavourant
• In Perfumery and Cosmetics
• In Medicine
• Sage
• Indian Name
• Description and Distribution
• Major Types of Sage in World Trade
• Different Forms of Sage
• Crop Management
• Climate and Soil
• Propagation
• Planting
• Harvesting
• Yield
• Post-Harvest Technology
• Drying
• Composition
• Marketing/Trading
• How to Handle and Store
• Processed Products
• Volatile Oil
• As Food Flavourant
• In Medicine
• Use in Perfumery
• As Anti-oxidant
• Use of Residue
• Uses of Seeds
• Clary Sage (Salvia sclarea Linn.) or Garden Sage
• Introduction
• Savory
• Indian Names
• Description and Distribution
• Area, Production and Exports
• Crop Management
• Soil and Climate
• Propagation
• Seed Rate, Method of Sowing and Weeding
• Harvesting
• Yield
• Post-Harvest Technology
- Processing Technology
- Essential Oil of Savory
- Composition of Dried Herb
- Composition of Fresh Herb
- Volatile Oil
- Tarragou
- Indian Names
- Description and Distribution
- Crop Management
- Soil and Climate
- Propagation
- Planting Season
- Harvesting
• Post-Harvest Technology
• Composition
• Processing Technology
• Essential Oil
• Physico-chemical Properties of Oil
• Precautions in the Storage of Oil
• As Food Flavourant
• In Medicine
• In Perfumery
• Thyme
• Indian Names
• Description and Distribution
• Major Types of Thyme
• Crop Management
• Climate and Soil
• Propagation
• Post-Harvest Technology
• Commercial Quality
• Composition
• Handling and Storage of Thyme
• Processed Products
• Thyme Extractives-Volatile Oil and Oleoresin
• Thymol
• As Food Flavourant
• In Medicine
42. ASAFOETIDA OR ASAFAETIDA

• Indian Names
• Description and Distribution
• Types or Varieties of Asafoetida Imported into India
• Method of Collection of Gum-resin
• Crop Management
• Varieties of Asafoetida
• Types/Varieties of Asafoetida of Commerce
• Quality Evaluation
• Composition
• Processed Products
• Oil of Asafoetida
• Oil of Galabnum
• Compounded Asafoetida Powder and Tablets : A Simple CFTRI Process
• As Food Flavourant
• In Medicine
• Calamus or Sweet Flag
• Indian Names
• Description and Distribution
• Crop Management
• Climate and Soil Requirements
• Preparation of Land
• Planting Method
• Planting Time
• Irrigation
- Weeding
- Manuring
- Harvesting
- Yield
- Plant Protection
- Post-Harvest Technology
- Preparation for the Market
- Adulteration
- Composition
- Processed Products
- Volatile Oil
- In Medicine
- In Perfumery
- As an Insecticide
- In Foods Beverages and Liquors
43. GALANGAL

- Description and Distribution
- Economic Importance
- Crop Management
- Varieties/Races of Galangal
- Planting
- Plant Protection
- Application of Manures/Fertilizers
- Harvesting
- Yield
- Post-Harvest Technology
- Composition
- Volatile Oil
- Oleoresin Content
• Galangal Rhizomes
• Galangal Oil
• Galangal Oleoresin
• Horse-Radish
• Description and Distribution
• Crop Management
• Post-Harvest Processing Technology
• Volatile Oil
• Composition of Horse-radish
• Adulteration
• As Condiment
• Horse-Radish Cream, Sauce or Relish
• In Medicine
• Long Pepper or Pipli
• Indian Names
• Description and Distribution
• Crop Management
• Soil and Climate
• Propagation
• Manuring
• Harvesting
• Yield
• Plant Protection
• Post-Harvest Technology
• Drying and Packaging.
• Composition
• Processed Products
• Volatile Oil
• As Food Flavourant
• In Medicine
44. SAFFRON

- Indian Names
- Description and Distribution
- Crop Management
- Soil
- Climate
- Land Preparation and Planting
- Manures and Fertilizers
- Irrigation
- Interculture
- Crop Rotation
- Effect of Plant Density on Flower, Yield and Corm Production
• Variation in Floral Characteristics of Saffron in different Kashmir Locations
• Harvesting or Picking of Flowers and obtaining Saffron
• Yield
• Cost of Cultivation of Saffron
• Economic Viability of Saffron Cultivation
• Pests and Diseases
• Recent Studies on Crop Management of Saffron in Iran
• Effect of Fertilizers (NPK)
• Post-Harvest Technology
• Sun-Drying of Saffron in Kashmir
• Effect of Different Processing (Different Drying and Dehydration Techniques)
• Composition
• Adulteration
• Packaging and Storage
• Marketing
• Processed Products
• As Flavourant and Colourant for Foods
• Medicinal Properties
45. VANILLA

- Indian Names
- Description and Distribution
- Commercial Forms of Vanilla
- General Characteristics of Vanilla Forms
- Qualitative Classification of Vanilla Pods
- Crop Management
- Climate
- Soil
- Preparation of Land
- Providing Supports (Posts) for Vines
- Planting
- Manuring
• Adulteration/Substitution
• Processed Products
• Vanilla Extracts/Essences
• Vanilla Sugar
• Vanilla Oleoresin
• Vanilla powder, Vanilla absolute and Vanilla Tincture
• As Food Flavourant and in Perfumery
• Vanillin

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