The term Spice and Condiments applies to natural plant or vegetable products or mixtures in whole or ground form, which are used for imparting flavour, aroma and piquancy to the food items. Spices and condiments are a major commercial crop in India, and earn a major part of foreign exchange annually. They have been the backbone of agricultural industry. The importance of spices and condiment in dietary, medicinal and other uses, and their commercial importance are immense. India is known the world over as the home of spices. Thus spices are an important group of agricultural goods, which are virtually indispensable in the culinary art. Spice processing includes different steps: spice cleaning, spice reconditioning and spice grinding. Some spices were also used for preserving food like meat for a year or more without refrigeration. In the 16th century cloves for instance were among the spices used to preserve food without refrigeration. Cloves contain a chemical called eugenol that inhibits the growth of bacteria. It is a natural antibiotic. It is still used to preserve food like Virginia Ham. Likewise later mustard and ground mustard were also found to have preservative qualities. India alone contributes 25 30% of the total world trade in spices. It may be interesting to note that nine spices namely pepper ginger clove cinnamon cassia mace nutmeg pimento (allspice) and cardamom alone contributed as much as 90% of the total world trade. Pepper is the most important spice in the world and so also of India.

This book basically deals with brief history of spices, uses of spices, world trade in spices area & production of spices in India, area and production of spices in India, major and minor spices of India, spice processing, quality issues with spices, bird chillies and Tabasco chillies, basil or sweet basil, seasoning blend duplication and tricks, sauces and gravies, snack seasonings, quality issues with spices, etc. This book is a single compendium which deals with all aspects and facts of spices and condiments which may meet the requirements of all those handling them at various stages, from harvesting to their end use. This book contains post harvest management, the potentials of genetic engineering, high production technology in spices with plantation and processing of various spices and condiments such as vanilla, turmeric, tamarind, saffron, black pepper, onion, mint, ginger, garlic, curry leaf, coriander etc.

Contents
1. INTRODUCTION
   Brief History of Spices
   Uses of Spices
   World Trade in Spices—Area & Production of Spices in India
   Area and Production of Spices in India
   Major and Minor Spices of India
   Export of Value-added Spice Products:
   (Spice Oleoresins & Essential Oils)

2. VALUE ADDED SPICE PRODUCTS

3. POST-HARVEST MANAGEMENT
   Procedure for Post-Harvesting Handling
   Drying of Spices
   Ginger Products

4. HIGH PRODUCTION TECHNOLOGY IN SPICES

5. POTENTIALS OF BIOTECHNOLOGY IN IMPROVEMENT IN SPICE CROPS
   The Potentials of Techniques Related to Tissue Culture
   Somatic Embryogenesis
   Organogenesis
   Micropropagation
   Secondary Metabolites from Cell Cultures
   A vitro Germplasm Conservation
   The Potentials of Genetic Engineering: Gene and Genome Analysis Techniques
   Genetic Manipulation by Gene Technology
   Agrobacterium Mediated Gene Transfer
   Gene Transfer by Electroporation
   Gene Transfer by Microprojectile Bombardment
   Gene Marker and Genome Analysis Techniques
   Non-PCR Based Marking Technique: Restriction Fragment Length Polymorphism
   Arbitrary/Semiarbitrary Primer Based PCR Techniques
   Site Target PCR Technique
   Marker Assisted Selection

6. DISEASES OF SPICE CROPS

7. INSECT-PESTS OF SPICES AND THEIR CONTROL

8. SPICE PROCESSING
   Spice Cleaning
   Magnets
   Sifters
   Air Tables
   Destoners
   Air Separators
   Indent Separators
   Spiral Separators
   Spice Reconditioning
   Spice Grinding
   Postprocessing Treatments
   Ethylene Oxide
   Propylene Oxide
   Irradiation

NIIR Project Consultancy Services (NPCS) 2/17
Steam Sterilization
9. QUALITY ISSUES WITH SPICES
   Sampling
   Sample Preparation
   Volatile Oil
   Moisture
   Total Ash and Acid Insoluble Ash
   Granulation
   Crude Fiber, Starch, and Nonvolatile Methylene
   Chloride Extract
   Spice Specific Tests
   Piperine Level of White and Black Pepper
   Volatile Oil of Mustard Seed
   Extractable Color of Turmeric
   Phenol Content of Nutmeg and Mace
   Extractable Color of Paprika Products
   Heat Level of Red Pepper
   Microanalytical Determination of Filth
   Microbiological Methods
10. SPICE EXTRACTIVES
    Spice Volatile Oils
    Spice Oleoresins
    Use of Spice Extractives
    Replacement of Spices with Oils and Oleoresins
11. SIMPLE SEASONING BLENDS
    Soluble Seasonings
    Celery Salt
    Garlic Salt and Onion Salt
    Chili Powder
    Curry Powder
    Pickling Spice
    Poultry Seasoning
    Pumpkin Pie Spice
    Apple Pie Spice
    Oriental Five Spice Blend
12. MEAT SEASONINGS
    Overview of the Industry
    Overview of Formulating
    Meat Block
    Cure
    Curing Accelerator
    Brine
    Pickup
    Formulations
    Restricted Ingredients
    Natural Flavoring Regulations
    Seasoning Formulas
    Fresh Sausage
    Cooked Sausage
    Rubs
    Dry and Semidry Sausages
    Brines
13. SNACK SEASONINGS
Overview of the Industry
All Natural/No MSG
Low Calorie-Snacks
Unique Flavors
Multigrain Chips
Overview of Formulating
Will the seasoning be Topically Applied or Applied in an Oil Slurry?
What is the Base Product the Seasoning will be Used On?
Is the Base Product Salted?
What is the Target and Maximum Cost for this Seasoning?
Formulations
Potato Chips
Extruded Snacks
Tortilla and Corn Chips
Popcorn
Nuts
Rice Cakes
Pork Skins
14. SAUCES AND GRAVIES
Overview of the Industry
Overview of Formulating
Formulations
Gravies
Sauces
Tomato Based Sauces
Cream Based Sauces
15. ETHNIC SEASONINGS
Introduction
Cajun and Creole
Italian
Mexican
Caribbean
Indian
Chinese
Others
16. SEASONING BLEND DUPLICATION AND TRICKS
Duplication
Introduction
Duplication Steps
Tasting
Tricks of the Trade
Introduction
Colors
Anticaking Agents
Labeling
Synergistic Ingredients
Flavors
Microbiology
Why Seasoning Blends?
17. LEEK (ALLIUM PORRUM) AND CHIVES
(ALLIUM SCHOENOPRASUM)
Introduction
Leek — Allium Porrum
Area, Production in H.P./Hills in India and World
Uses Including Medicinal Properties
Nature of Crop
Varieties Suitable for Mild-Winter Regions
Varieties Suitable for Cold-Winter Regions
Breeding
Seed Production
18. AJOWAN OR BISHOP’S WEED
Description and Distribution
Composition
Uses
19. ALLSPICE OR PIMENTA
Description and Distribution
Composition
Uses
20. AMCHUR
Description and Distribution
Composition
Uses
21. ANARDANA
Description and Distribution
Composition
Uses
22. ANGELICA
Description and Distribution
Composition
Root
Fruit
Peel Oil
Volatile Oil
Uses
23. ANISEED
Description and Distribution
Composition
Adulteration
Distillation of Oil
Uses
24. ASAFOETIDA
Description and Distribution
Extraction of Asafoetida
Types/Varities of Asafoetida
Composition
Oil of Asafoetida
Adulteration
Uses
25. BALM OR LEMON-BALM
Description and Distribution
Composition
Volatile Oil
Uses
26. BASIL OR SWEET BASIL
Description and Distribution
Varieties
Types of Basil Oil
Yield of Herb Oil
Distillation of Oil
Composition
Quality of Oil
Adulteration of Sweet Basil Oil
Uses

27. BAY OR LAUREL LEAVES
Description and Distribution
Composition
Volatile Oil
Uses

28. BLACK-CAREWAYâ€“KALAZIRAâ€™
Botanical Description
Soil and Climatic Requirements
Propagation Techniques
Planting Techniques
Seed and Seed Rate
Method of Sowing
(i) Through Seeds
(ii) Through Tubers
Cultural and Irrigation Operations
Growing Possibilities
Plant Protection
Diseases
Insect-Pests
Harvesting and Storage
Yield
Economics
Market
Prospectiveness

29. CAPER
Description and Distribution
Composition
Uses

30. CAPSICUMS OR CHILLIES
(I) CHILLIES
Description and Distribution
Uses and Nutritive Value
Origin and History
Production and Distribution
Nature of Plant
Pollination
Production Technology
Soil
Climate
Sowing Time
Seed Rate
Transplanting
Interculture and Weed Control
Manures and Fertilizers
Irrigation
Harvesting
Drying of Chillies
Seed Production
Genetic Improvement
Introduction and Selection
Hybridization
Hybrid Breeding
Breeding for Disease and Insect-Pest Resistance
Mutation Breeding
(II) PAPRIKA (C. annum)
Importance
What is a Good Paprika?
Major Types of Paprika
Area/Production in H.P. Hills in India and World
Export of Oleoresin from India
Nature of the Crop and its Uses Including Medicinal Properties
Production Technology
Planting Season
Seed Production
Other Information
Composition
Uses
(III) BIRD CHILLIES AND TABASCO CHILLIES
(C. frutescens Linn.)
31. CARAWAY
Description and Distribution
Composition
Adulteration
Volatile Oil
Uses
32. CARDAMOM
I. Cardamom (Aframomum species)
(i & ii) Madagascar and Cameroon Cardamoms
(iii) Korarima
(iv) Grains of Paradise or Guinea Grains
Composition
Uses
33. GREATER CARDAMOM
(I) BENGAL CARDAMOM
Description and Distribution
Uses
(II) ROUND CARDAMOM
Description and Distribution
Uses
(III) CAMBODIAN CARDAMOM
(IV) GREATER INDIAN CARDAMOM (LARGE CARDAMOM) OR NEPAL CARDAMOM
Description and Distribution
Production Technology
Breeding
Seed Production
Post-Harvest Management
Composition
Volatile Oil
Uses
34. LESSER CARDAMOM OR TRUE CARDAMOM
Description and Distribution
Harvesting and Drying/Curing
Drying in a Heated Chamber—Kiln Drying
Bleaching of Cardamom
Varieties/types of Cardamoms
Composition
Uses
35. CASSIA
(I) JANGLI-DALCHINI (Cassia)
Description and Distribution
Uses
(II) TEJPAT (INDIAN CASSIA LIGNEA)
Description and Distribution
Leaf Oil
Bark oil
Uses
(III) TEZPAT
Description and Distribution
Uses
(IV) CASSIA OR CASSIA CHINA
Description and Distribution
Preparation/Curing of Cassia Bark
Composition
Cassia Oil
Adulteration in Cassia Oil
Cassia Buds
(V) BATAVIA CASSIA
Description and Distribution
(VI) SAIGON CASSIA
Description and Distribution
Barking
Preparation and Processing of Bark
Uses
36. CELERY SEED
Description and Distribution
Plant Characters
Varieties
Crop Production
Climate and Soil
Nursery Management
Manures and Fertilizers
Irrigation
Inter-Culture
Harvesting
Post-Harvest Handling
Diseases and Insect-Pests
Diseases
Insect-Pests
Seed Production
Breeding

NIIR Project Consultancy Services (NPCS) 8/17
Composition
Volatile Oil
Celery Chaff Oil
Oleoresin of Celery Seed
Celery Leaf Oil/Herb Oil
Uses
37. CELERIAC
Description and Distribution
Composition
Uses
38. CHERVIL
Description and Distribution
Composition
Uses
39. CHIVES OR CIVES
Description and Distribution
Composition
Volatile Oil
Quality Specification
Uses
40. CINNAMON
Description and Distribution
Preparation and Curing of Bark
Composition
Uses
41. CLOVE
Description and Distribution
Preparation of Cloves
Extraneous Matter
Composition
Clove Bud Oil
Clove Stem Oil
Clove Leaf Oil
Adulteration
Uses
42. CORIANDER
Description and Distribution
Nature of Plant
Varieties
1. According to Colour
2. According to Seed Type
3. Improved Varieties
4. Other Varieties
Climate
Production Technology
Soil
Sowing Time
Seed Rate and Method of Sowing
Manure and Fertilizers
Irrigation
Interculture
Harvesting
Yield
Insect-Pests and Diseases
Control Measure
Composition
Volatile
Fatty Oil
Coriander Herb Oil
Adulteration
Uses
43. CUMIN SEED
Description and Distribution
Composition
Volatile Oil
Adulteration of Volatile Oil
Fixed Oil
Uses
44. CUMIN BLACK
Description and Distribution
Production Technology
Composition
Volatile Oil
Essential Oil
Fixed Oil
Uses
45. CURRY LEAF
Description and Distribution
Composition
Volatile Oil
Uses
46. DILL AND INDIAN DILL (SOWA)
Description and Distribution
Composition
Essential Oil
Uses
47. FENNEL
Description and Distribution
Production Technology of Fennel
Recommended Fennel Varieties
Fertilizer Recommendations for Fennel Varieties
Composition
Volatile Oil
Fixed Oil
Uses
48. FENUGREEK
Importance
Description and Distribution
Uses
Nature of Plant
Varieties
Non-Scented or Deshi
Scented
Improved Varieties
Pusa Early Bunching
Kasuri Selection
Other Varieties
Production Technology
Soil
Climate
Manure and Fertilizers
Sowing
Irrigation
Interculture
Crop Improvement
Harvesting
Yield
Common Methi
Kasuri Methi
Seed Production
Isolation
Inspection
Harvesting and Threshing
Diseases
Fixed Oil
Volatile Oil
Effect of Roasting and Cooking on Nutritive Value
Uses
In Medicine
49. GALANGAL
Description and Distribution
Composition
Volatile Oil
Oleoresin
Uses
Uses of Volatile Oil
50. GARLIC
Two Garlic Crops a Year
Varieties
Breeding
Seed Production
Minimum seed certification standards for garlic
(Allium sativum L.)
Field Standards
Seed Standards
Garlic Powder
Uses
51. GINGER
Description and Distribution
Breeding
Production Technology
Post-Harvest Management
Seed Production Technology
Post-Harvest Handling of Seed Crop
Composition
Volatile Oil
Ginger Oleoresin
Uses
Use of Ginger Oil
52. HORSE-RADISH
Description and Distribution
Composition
Adulteration
Uses
53. HYSSOP
Description and Distribution
Composition
Volatile Oil
Adulteration
Uses
54. JUNIPER
Description and Distribution
Composition
Adulteration
Volatile Oil
Composition of Volatile Oil
Uses
Other Uses/by-Products
55. KOKAM
Description and Distribution
Composition
Uses
56. STONE LEEK OR WELSH ONION
Description and Distribution
Composition
Uses
57. LOVAGE
Description and Distribution
Composition
Uses
58. MACE
Description and Distribution
Composition
Fixed Mace Oil
Adulteration
Uses
59. MARJORAM
Description and Distribution
Composition
Volatile Oil
Uses
60. MINT OR JAPANESE MINT
Description and Distribution
Uses
61. MUSTARD
Description and Distribution
(1) WHITE MUSTARD (SINAPIS ALBA OR BHIRTA)
Composition
Uses
(2) BLACK MUSTARD OR TRUE MUSTARD
(B. NIGRA KOCH)
Composition
Uses

(3) INDIAN MUSTARD (B. JUNCEA)
Composition
Uses

62. NUTMEG
Description and Distribution
Composition
Quality Grades
Nutmeg Butter
Leaves
Bark
Fruit Rind
Adulteration
Uses

63. ONION
Description and Distribution
Breeding
Post-Harvest Handling
Quality Traits of Onion for Dehydrated
Dehydrated Onion Products
Onion Powder
Onion Salt
Composition
Composition of Onion Powder
Uses

64. OREGANO OR ORIGANUM
Description and Distribution
Composition
Volatile Oil
Uses

65. PARSLEY
Description and Distribution
Uses Including Medicinal Properties
Nature of Crop
Production Technology
Breeding
Seed Production

66. PEPPER—BLACK, WHITE AND GREEN
Description and Distribution
Production Technology
Establishing Plantation and Management
Post-Harvest Management
Types/Varieties
Hawestine and Sun-Drgung
Yield/Revery of Dried Papper
Inclined Belt Separator/Cleaner for Pepper
Value-added Pepper products
(1) White Pepper
(2) Processed Tender Green Pepper
Composition
Pungent Principles
Oil of Pepper
Adulteration
Pepper by-Products
Pepper Hulls
Uses

67. PEPPER, LONG
Description and Distribution
Composition
Uses

68. PEPPERMINT
Description and Distribution
Volatile Oil
Adulteration of Oil
Uses

69. POPPY SEED
Description and Distribution
Composition
Poppy Seed Oil
Uses

70. ROSEMARY
Description and Distribution
Composition
Volatile Oil
Adulteration
Uses

71. SAFFRON
Botanical
Historical
Description and Distribution
Soil and Climatic Requirements
Planting Techniques
Manures and Fertilizers
Preparation of Land
Varieties
Seed Selection of Seed/Corms rate/ha
Time of Planting
Seed/Corm Treatment
Method of Planting
Inter-Cultural and Irrigation Operations
Harvesting and Processing
Yield
Diseases and Pests
Protection from Domestic Animals
Grading
Marketing
Inter-Cropping
Economics
Chemical Composition
Adulterants
Picking of Flowers for Obtaining Saffron
Drying or Toasting of the Stigmas to Obtain Saffron
Yield
Composition
Adulteration
Uses
72. SAGE
Description and Distribution
Composition
Volatile Oil
Uses
73. SAVORY
Description and Distribution
Composition
Volatile Oil
Uses
74. SHALLOT
Description and Distribution
Composition
Volatile Oil
Uses
75. SPEARMINT
Description and Distribution
Composition
Volatile Oil
Uses
76. STAR-ANISE
Description and Distribution
Adulteration
Volatile Oil
Fatty Oil
Uses
77. SWEET FLAG OR CALAMUS
Description and Distribution
Volatile Oil
Uses
78. TAMARIND
Description and Distribution
Composition
Tamarind Pulp
Tamarind Juice Concentrate
Uses
79. TARRAGON
Description and Distribution
Composition
Volatile Oil
Uses
80. THYME
Description and Distribution
Composition
Volatile Oil
Uses
81. TURMERIC
Description and Distribution
World Trade of Turmeric
Production Technology
Climate
Soil
Planting Material
Varieties
Land Preparation
Time and Method of Planting
Application of Manures and Fertilizers
Mulching
Interculture
Irrigation
Crop Rotation and Inter-Cropping
Harvesting and Yield
Curing
Colouring Turmeric
Storage of Rhizomes
Insect-Pest and Diseases
Insects
Diseases
Leaf Spot
Leaf-Blotch
Control Measures
Rhizome-Rot
Breeding
Commercial Quality of Turmeric
Per-Capita Consumption
Composition
Volatile Oil
Oleoresin
Use
82. VANILLA
Description and Distribution
Harvesting and Curing
Quality Attributes of Vanilla
Composition
Adulteration/Substitution
Vanilla Extracts/Essences
Vanilla Sugar
Uses

About NIIR

NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes varies process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.