

# Cultivation and Processing of Selected Medicinal Plants

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Medicinal plants are important for human health. These plants have been used from the prehistoric times to present day. These plants based medicines are consumed in all civilizations. It is believed that the herbal medicine can give good effect to body without causing side effects to human life. Medicinal plants are not only a major resource base for the traditional medicine & herbal industry but also provide livelihood and health security to a large segment of Indian population. Medicinal plants constitute a large segment of the flora, which provide raw materials for use by various industries. They have been used in the country for a long time for their medicinal properties. These plants are staging a comeback and herbal renaissance is happening all over the globe. The herbal medicines today symbolise safety in contrast to the synthetics that are regarded as unsafe to human and environment. Although herbs had been priced for their medicinal, flavouring and aromatic qualities for centuries, the synthetic products of the modern age surpassed their importance, for a while. However, the blind dependence on synthetics is over and people are returning to the naturals with hope of safety and security. Besides, the usage of medical plants has been increasing as an important role that can support the economic system. Ayurveda, the well known indigenous system of medicine, is still regarded as a well organised traditional health care for large sections of rural as well as urban population of India. The medicinal plants sector at present is not well organised and needs special attention. Although different Ministries and Department in the Government sector and NGOs and individuals in the private sectors are making their efforts in different directions, yet there is a need to co ordinate and systematize. The medical plants for health are used as herbal treatments and therapies that can be new habits for culture. The market is very competitive and could easily be oversupplied.

This book basically deals with therapeutic potential of medicinal plants, medicinal plants priorities in Indian medicines diverse studies and implications, recent developments of some natural products, production and management of medical plants on farms, classification, identification and naming of medicinal plants, pests and pest management in medicinal plants, Ajmalicine (Raubasine): a medicinally important alkaloid from catharanthus roseus (vinca rosea), cultivation of rutin bearing eucalyptus species, iridoids and secoiridoids of the genus swertia, studies on medico ethnobotany, tropical periwinkle, tulsi, etc. The present book covers cultivation practices of selected commercially important medicinal plants with their processing details and uses. The book is very resourceful for medicinal plants growers, professionals, researchers, entrepreneurs and agriculture universities.

## 1 . THERAPEUTIC POTENTIAL OF MEDICINAL PLANTS

## Concluding Remarks

### 2. DRUG BIOAVAILABILITY ENHANCEMENT – A NEW CONCEPT

What is Bioavailability?, Equivalence and Equivalent, Chemical equivalence, Bioequivalence, Therapeutic equivalence, Clinical equivalence, Absolute and Relative Bioavailability, Relative (comparative) bioavailability, Incomplete Bioavailability, History, Bioavailability Enhancement, Conventional Approach, New Concept, Spartein, Development of New Concept of Bioavailability Enhancement, Choice and Rationale of Comprehensive Evaluation of Bioavailability Enhancer, Clinical Evaluation of New Concept, Results of Phase-1 and Phase-II Clinical Trials, Default Patients in Phase-II, Highlights of Bioavailability Enhancing Effects of RLJ-NE-210

### 3. MEDICINAL PLANTS - PRIORITIES IN INDIAN MEDICINES DIVERSE STUDIES AND IMPLICATIONS

Medicinal Plants based Drug Industry, Medicinal Plants Based Drug Industries in Indian Systems of Medicine, Plant Parts Extract and Galenicals, Essential Oils from Plants, Phytopharmaceuticals, India's Strength in Medicinal Plant Wealth, Drugs From Plants: An Integrated Approach to Development, Better utilization of Traditional Systems of Medicine, Quality Control Standards, Modernization of Methods of Products, New Dosage Forms & Pharmacokinetics, Safety of Drugs used in Chronic Diseases, Integration with Modern Medicine, Priorities in Research on Medicinal Plants & Diverse Studies, Antiprotozoal Drugs from Plants, Antiulcer Drugs from Plants, Antirheumatic Plants, Antidiabetic Plants, Antiasthmatic Plants, Antiviral Plants, Hepatoprotective Plants, Fertility Control by Plants, Anti-cancer Drugs from Plants, Plants for Urinary Stoaes, Plants as Sedatives/Tranquillizers, Plant Laxatives, Pitfalls in Plant-drug Research and Implications, Herbal Drug/Intellectual Property Rights (IPR), Herbal Drug Trade, Herbal Medicines - Medicinal Marvel or Money Spinning Malarkey, Sociopolitical, Economical & Ethical Issues in Medicinal Plants Research, Herbal Drug Development, Standardization of Herbal Drugs

### 4. RECENT DEVELOPMENTS OF SOME NATURAL PRODUCTS

Monoterpene Iridoids, Valtrats, Saponins, Sataver, Centella asiatica, Horse Chestnut, Sterols, Sitosterol: (Beta-Sitosterol), Guggul, Cardenolides, Thevetia neriifolia, Amino Acid, Mucuna pruriens, Alkaloids, Aristolochic acid, Flavonoids, Silybum marianum, Gingko biloba, Miscellaneous, Adaptogens, Ginseng, Withania Somnifera (Ashagabdha), Tinospora cordifolia (Guduchi Gilobe), Anticancer Drugs, Vinca Alkaloids, Podophyllotoxin, Maytansinoids, Ellipticine, Gossypol, Taxol, Camptothecins, Bryostanins, Acetogenins, Castanospermine, Hypericin, Comosolic Acid, Forskolin, Artemisinin (Quinghaosu), Echinacea species

### 5. PRODUCTION AND MANAGEMENT OF MEDICAL PLANTS ON FARMS

Yield Maximization, Maximum Economic Yield (MEY), Plant Population and Crop Yield, Plant Population and Geometry, Response of Crop Plants to Plant Population, Time of Planting, Preparation of Soil For Sowings, Burying Debris and Weeds, Aerating the Soil, Incorporating Compost, Ensuring a Frost Tilth, Depth of Sowing, Methods of Digging, Single Dig, Double Dig, No-Dig, Preparation of Beds, Size of the Beds, Types of Beds: Flat or Raised Beds?, Why Raised Beds?, How to Make Bed?, Procedure, Preparation of Paths and Slope, Seeds and Sowing, Seed Germination, Seed Vigour, Seed Viability, Longevity, Seed Dormancy, Types of Dormancy, Seed Treatment, Seed Treatment for Breaking Dormancy, Spacing for Seed Sowing, Crop Establishment Techniques, Nursery Techniques, Nursery Site, Nursery Methods,

Ideal Seedling, Seeds and Sowing, After Care, Optimum Age and Pulling out of Seedlings, Dapog Nursery, Dry Nursery, Nursery Techniques for Tobacco, Planting Techniques For Field Crops, Rotation, Random or Bulk Planting, Planting Under irrigated Condition (Garden Land), Sowing Techniques, Method of Sowing

## 6. MEDICINAL PLANTS: PRESENT AND FUTURE

Market Scenario of Medicinal Plants , Domestic Market, Global Market, Export, Standards and Quality Control, Constraints, New Hopes For Herbal Market, Challenges Ahead, Future Strategy For Medicinal Plants, Development of Medicinal Plant Sector, Products Standardization, Globalization of Ayurveda and Medicinal Plant Sector

## 7. CLASSIFICATION, IDENTIFICATION AND NAMING OF MEDICINAL LANTS

Scientific And Botanical Systems of Classification, Taxonomic Groups, Kingdoms, Divisions of Kingdom Plantae, Variety Versus Cultivar, Rules in Classification, Other Classification Systems (Operational), Seasonal Growth Cycle, Kinds of Stems, Common Stem Growth Forms, Classification of Fruits, Botanical Classification, Fleshy Fruits, Other Operational Classifications, Classification of Vegetables, Life Cycle, Edible or Economic Parts, Adaptation, Botanical Features, Classification of Ornamental Plants, Herbaceous Ornamental Plants, Growth Cycle, Flowering, Foliage, Other Operational Classifications, Woody Medicinal Plants, Shrubs, Trees, Vines, Classification Based on Hardiness (Adaptation)

## 8. PROPAGATION OF MEDICINAL PLANTS

Why Plant Propagate, Knowledge of Plants, Some Complexities, Hardiness Affects Propagation, Objectives of The Nursery, Classification of Nurseries, Broad Classification, Classification based on the Irrigation Facilities, Site For Nursery, Selection of Site for the Nursery, Ecological Factors, Competition, Social Factors, Biological Factors, Organization and Development of Nursery, General Considerations, Economic and Cultural Considerations, Nursery Production, Propagation by Seed (Sexual Propagation), Asexual/ Vegetative Propagation, Important Components of a Nursery, Seed Beds/Nursery Beds, Mother Plants, Pot Yard, Packing Yard with Raised Platform for Loading and Unloading, Office, Store, Important Nursery Operations, Field / Bed Preparation and Eradication of Competing Vegetation, Lay Out of Beds and Leveling, Mixing of FYM, Sowing, Sowing in Beds, Sowing in Polybags/Pots, Time of Sowing , Pricking, Irrigation, Weeding and Hoeing, Manures and Fertilizers, Lifting of Plants from Nursery, Use of Greenhouse for Nursery Production, Definition of a Greenhouse, Advantages of a Greenhouse, Disadvantages, Classification of the Greenhouses, Types of Greenhouses (Designs), Rootstocks For Fruit Plants, Propagation Through Cuttings, Preparation of Cuttings, Planting of Cuttings, Effects of the Plant Growth Regulators on Rooting of Cuttings, Mist Propagation, Multiplication of Evergreen Fruit Plant Through Cuttings, Multiplication of Forest Plants Through Cuttings, Propagation Through Layering, Propagation Through Grafting, Propagation Through Budding

## 9. PESTS AND PEST MANAGEMENT IN MEDICINAL PLANTS

Caution, A Healthy Plant, What is Pest?, Control of Pests, Ecological Pest Management, Cultural Control, Sanitation, Tillage, Application of Mammals and Soil Amendments, Habitat Diversification, Crop Rotation, Trap Cropping, Intercropping, Strip Farming, Time of Planting, Water Management, Crop Competition, Physical and Mechanical Control, Manual Control, Burning, Flooding, Biological Control, Increasing the Effectiveness of Bio-control, Conservation of Biodiversity, Conservation of Natural Enemies, Biopesticides, Types of Biopesticides, Biochemical, Microbial, Botanicals, Some Preparations from Botanicals, Pongam (*Deris indica*),

Pongam Leaf Extract, Pongam Kernel Extract, Poagam Cake Extract, Pongam Oil Spray, Pongaut â€” Neezn Oil Extract, Pongam, Aloe and Neem Extract, Tulsi or Basil (Oscimum app), Preparation of Tulasi Leaf Extract, Aloe spp., Aloe - Notchi Extract, Melfa azadircta (Neem), Preparation of Melia Extracts, Neem EC, Custard apple (Annona spp), Custard Apple Leaf Extract, Custard Apple, Calotropis, Tobacco Extract, Custard Apple, Neem, Chilli Extract, Vitex Leaf Extract, Vitex, Aloe Extract, Vitex, Pongam, Castor, Calatropis Extract, Sweet Flag in Pest Control, Rhizome Extract, Seed Treatment with Rhizome Powder and Cowâ€™s Urine, Poison nut, Agave, Neem, Pongam Extract, Garlic, Preparation of Garlic Extracts, Sweetflag (Acorus calamus) for General Disease Resistance and Increasing Germination, Use of Mint in Seed Treatment for Increasing Crop Growth and Yield, Use of Neem for Pest Management, Uses of Neem, Neem for Pest Control, Methods of Application, Water Extraction, Hexane Extraction, Formulations, Additives, Practical Methods for Preparations, Control of Stored Grain Pest, Use of Neem Extract, Preparing Crushed Neem Seed, Neem to Control Stem Borers on Young Plants, Extracting Neem oil, Controlling Bruchid Beetles in Stored Beans, Control of Soil-borne Pests, Neem Water Extract for Plant Protection, Water based Neem Spray to Control Cutworms, Cowâ€™s Urine in Pest Management, Cowâ€™s Urine for Resistance to Leaf Spot Disease, Symptoms of the disease, Treatment, Caution, Cowâ€™s Urine for Increasing Yield, Use of Milk for Resistance to Tungro Virus, Symptoms of Tungro Virus Attack, Growth Regulator or Kunapajala for Yield Increase, HOST RESISTANCE, Ecological Management of Pest, Other Related Approaches, Integrated Pest Management, Biologically Intensive Pest Control (BIPM)

#### 10. AJMALICINE (RAUBASINE): A MEDICINALLY IMPORTANT ALKALOID FROM CATHARANTHUS ROSEUS (VINCA ROSEA)

Introduction, Chemistry of Ajmalicine, Production of Ajmalicine, Plant Tissue Culture and Biosynthesis, Analytical methods

#### 11. AMLA

Distribution, Part Used, Medicinal Properties and Uses, Cultivation and Propagation, Soil and Climate, Nursery Raising and Planting, Weeding and Hoeing, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Chemical Constituents, Major Constituents, Other Constituents, Leaves, Fruit, Active Constituents, Yield, Economics, Home Remedy

#### 12. ASHOK

Common Name, Distribution :, Part Used, Cultivation, Soil And Climate, Nursery Raising And Planting, Thinning And Weeding, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Economics

#### 13. ASHWAGANDHA

Regional Names, Distribution, Part Used, Medical Properties & Uses, Cultivation & Propagation, Soil and Climate, Land Preparation, Nursery Raising and Planting, Thinning and Weeding, Manure/Fertilizer, Irrigation, Harvesting /Post Harvesting, Chemical Constituents, Major Constituents, Other Constituents, Active Constituents, Structure Of Withaferin A and Withanone., Analytical Profile, Thin-layer Chromatography, Yield, Substitutes/Adulterants, Economics (2003), Home Remedy

#### 14. BAEL

Distribution, Part Used, Medicinal Properties And Uses, Cultivation & Propagation, Soil and

Climate, Nursery Raising and Planting, Manure/Thinning and Weeding, Irrigation, Harvesting/Post Harvesting Operation, Chemical Constituents, Major Constituents, Other Constituents, Active constituents, Analytical Methods, Thin Layer Chromatography, Yield, Substitutes/Adulterants, Economics, Home Remedy, Dose,

#### 15. BELLADONNA

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses,

#### 16. BHUMI AMALAKI, COMMON NAMES

Distribution, Part Used, Cultivation, Soil And Climate, Nursery Raising & Transplanting, Weeding, Manure/Fertilizer, Irrigation, Harvesting/Post-harvesting, Economics:,

#### 17. BRAHMI

Regional Names, Part Used, Medicinal Properties & Uses, Cultivation & Propagation, Soil and Climate, Land Preparation, Transplanting, Manure/ Fertilizer, Irrigation, Weeding, Harvesting/Post-harvesting, Chemical Constituents, Major Constituents, Other Constituents, Active Consti-tuents, Analytical Profile, Bacoside A Solution, Calibration Curve, Test Solution, Procedure, Yield, Substitute/Adulterants, Economics, Home Remedy, Important Formulation,

#### 18. CHANDAN

Common Names, Distribution, Part Used, Cultivation, Soil and Climate, Nursery Raising and Planting, Thinning and Weeding, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Yield, Average Heartwood Formation Per Tree, Economics

#### 19. CINCHONA

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses

#### 20. CORKWOOD TREE

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses,

#### 21. CULTIVATION AND UTILIZATION OF DUBOISIA SPP. IN INDIA

Introduction, Botany, Soil and Climate, Propagation, Weed Control, Harvesting, Hybrids of Duboisia, Chemistry, Utilization

#### 22. CULTIVATION OF AMMI MAJUS LINN, IN INDIA

Introduction, Cultural Practices, Harvesting, Rotation

#### 23 CULTIVATION OF DIOSCOREA COMPOSITA HEMSL.: A POTENTIAL SOURCE OF DIOSGENIN JAMMU

Propagation, Propagation by Seeds, Propagation from Tubers, Tuber Dormancy, Transplanting and After Care, Tissue Culture Method, Interspecific Hybridisation, Spacing, Supporting System, Nutrient Requirement, Weed Control, Pests and Diseases, Intercropping, Harvesting, Diosgenin Content and Tuber Yield, Physiological studies, Distribution of Diosgenin during Different Times of the Year, Effect of Position of Planting Piece, Effect of Shade, Physiological Analysis of Growth, Clones, Effect of Growth Regulators and Micronutrients, Post Harvest Treatment for yield Improvement, In initiation Temperature, Incubation Period, Inoculum Concentration, Age of Culture, Seasonal effect on RLA-5 Activity, Effect of RLA-5 on Mixture of Clones, Acknowledgements.

## 24. CULTIVATION OF RUTIN BEARING EUCALYPTUS SPECIES

Harvesting, Extraction of Rutin, Conclusions

## 25. CHIRATA

Common Names, Distribution, Part Used, Cultivation, Soil and Climate, Nursery Raising and Planting, Weeding and Hoeing, Manure/Fertilizer, Irrigation, Harvesting/Post-harvesting, Economics

## 26. DATURA

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses

## 27. EFFECT OF LIGHT VS DARK ON SEED GERMINATION OF PODOPHYLLUM HEXANDRUM ROYLE

Introduction, Materials and Methods, Results and Discussion, Acknowledgement, Summary

## 28. ERGOT OF RYE

History and Geographical Distribution, Botany, Genetics, Propagation, Cultivation of Rye, Soil and Climate, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Inoculation of the Crop, Harvesting and Processing, Chemistry and Uses

## 29. FOXGLOVE

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses

## 30. GILOE

Common Names , Distribution: Part Used, Cultivation, Soil and Climate, Nursery Raising And Planting, Weeding and Hoeing, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Economics

## 31. GINSENG

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Irrigation, Fertilizers and Manures, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses

### 32. GUDMAR

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation, Soil and Climate, Nursery Raising and Planting, Weeding and Hoeing, Manure and Fertiliser, Irrigation, Harvesting/Post-harvesting, Chemical Constituents, Major Constituents, Other Constituents, Active Constituents, Analytical Profile, ECONOMICS (2003)

### 33. GUGGAL

Regional Names, Distribution, Part Used, Properties & Uses, Cultivation & Propagation, Soil and Climate, Nursery Raising and Planting, Thinning and Weeding, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Chemical Constituents, Major Constituents, Other Constituents, Active Constituents, Yield, Substitutes/Adulterants, Economics, Home Remedy, Important Formulation

### 34. HENBANE-BLACK

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses

### 35. HERACLEUM CANDICANS WALL.-A POTENTIAL SOURCE OF XANTHOTOXIN

Introduction, Germination Studies, Vegetative Propagation, Agrotechnological Studies, Germplasm Evaluation, Conclusion

### 36. INDIAN ALOE

Plant Description, Crop Production and Management, Uses, Chemical Studies, Conclusion and Prospects

### 37 IPECAC

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses,

### 38. IRIDOIDS AND SECOIRIDOIDS OF THE GENUS SWERTIA

### 39. ISABGOL

Common Names, Distribution, Part Used, Cultivation, Soil And Climate:, Land Preparation, Nursery Raising And Planting, Weeding and Hoeing, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Yield

### 40. ISOLATION AND EVALUATION OF VALEPOTRIATES FROM INDIAN VALERIAN

Introduction, Isolation of Valepotriates, Evaluation of Drug, U.V. Spectrophotometry, Colorimetry or Densitometry, Densitometric Method, Titration Method

### 41. JATAMANSI

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation , Soil and Climate, Nursery Raising and Planting, Manure/Fertilizer, Irrigation and Weed Control, Harvesting/post-harvesting, Chemical Constituents, Major Consti-tuents, Other Constituents, Active Constituents, Analytical Profile, Substitute/Adulterants, Economics, Home Remedy

#### 42. KALIHARI

Common Names , Distribution , Part Used, Cultivation, Soil And Climate, Nursery Raising And Planting, Weeding & Hoeing, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Yield:, Economics

#### 43. KALMEGH

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation, Soil and Climate, Nursery Raising and Planting, Thinning and Weeding, Manure I Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Chemical Constituents, Major Constituents, Other Constituents, Active Constituents, Yield, Substitute/Adulterants, Economics

#### 44. KESAR

Regional Names, Part Used, Medicinal Properties and Uses, Cultivation and Propagation, Soil and Cultivation, Land Preparation, Nursery Raising And Plantation, Irrigation, Manure/Fertilizer, Thinning and Weeding, Harvesting/Post Harvesting Operation, Chemical Constituents, Major Constituents, Other Constituents, Active Constituents, Substitutesia-dultrants, Home Remedy

#### 45. KOKUM

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation , Soil and Climate, Nursery Raising and Planting, Thinning and Weeding, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Chemical Constituents, Major Constituent, Other Constituents, Yield, Economics, Home Remedy

#### 46. KUTH

Common Names, Distribution, Part Used, Cultivation, Soil And Climate, Planting, Irrigation, Manure/Fertilizer, Harvesting/Post-harvesting, Yield, Economics

#### 47. KUTKI

Common Names, Distribution, Part Used, Cultivation, Soil and Climate, Nursery Raising and Planting, Manure/Fertilizer, Irrigation, Weeding, Harvesting/Post-harvesting, Yield, Economics

#### 48. LIQUORICE

History And Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses,

#### 49. MAKOY

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation,

Soil and Climate, Nursery Raising and Planting, Weeding and Hoeing, Irrigation, Harvesting/ Post-harvesting, Chemical Constituents, Major Constituents, Other Constituents, Active Constituents, Structures of Solamargine, Thin Layer Chromatography, Economics, Home Remedy

#### 50. MAYAPPLE

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Chemistry And Uses

#### 51. MEDICINAL YAM

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses,

#### 52. MULETHI

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation , Soil And Climate, Nursery Raising And Planting, Thinning And Weeding, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Chemical Constituents, Major Constituents, Other Constituents, Active Constituents, Thin Layer Chromatography, Yield, Substitutes/Adulterants, Economics (2003), Home Remedy

#### 53. MUSALI SAFAID

Common Names, Distribution, Part Used, Cultivation, Soil And Climate, Nursery Raising And Planting, Manure/Fertilizer, Irrigation, Weeding, Harvesting/Post-harvesting, Yield, Economics,

#### 54. OPIUM POPPY

History And Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases And Insect Pests, Chemistry And Uses

#### 55. PASHAN BHEDA

Common Names, Distribution, Part Used, Cultivation, Soil and Climate, Nursery Raising and Planting, Weeding & Hoeing, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Yield, Economics,

#### 56. PIPPALI

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation, Soil and Climate, Land Preparation, Nursery Raising and Planting, Thinning and Weeding, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Chemical Constituents , Major Constituents, Other Constituents, Active Constituents, Analytical Profile, Thin Layer Chromatography, Yield, Substitutes/Adulterants, Economics, Home Remedy,

#### 57. PRODUCTION OF COLCHICINE FROM GLORIOSA SUPERBA SEEDS

Introduction, Plant Source, Description of Plant, Extraction Method, Chemistry and Structural

#### 58. QUINGHAO

History and Geographical Distribution, Botany, Genetics, Soil And Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting And Processing, Chemistry and Uses

#### 59. RASAUT

Common Names, Distribution, Part Used, Cultivation:, Soil and Climate, Nursery Raising and Planting, Thinning and Weeding, Manure/Fertilizer, Harvesting/Post Harvesting Operation, Economics

#### 60. SAFED MUSLI

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation, Soil and Climate, Nursery Raising and Planting, Vegetative Propagation, By Seeds, Manure/Fertilizer, Irrigation, Weeding, Harvesting/Post-harvesting, Chemical Constituents, Economics (2003)

#### 61. SAPROPHYTIC PRODUCTION OF ERGOT ALKALOIDS

Introduction, Methods for Isolation and Selection, The Degeneration Phenomenon, The Improvement of Strains By Mutation, The Maintenance of Strains, The Strains, Other Symbols Are:, The Cultivation Techniques, Concluding Remarks

#### 62. SARPAGANDHA

Common Names, Distribution, Parts Used, Cultivation, Soil And Climate, Nursery Raising & Planting, Manure/Fertilizer, Irrigation, Weeding, Harvesting/Post-harvesting, Yield, Economics

#### 63. SENNA

Common Names, Distribution:, Part Used, Cultivation, Soil And Climate, Land Preparation, Nursery Raising and Planting, Thinning and Weeding, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Yield, Economics

#### 64. SERPENTWOOD

History And Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture And Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses,

#### 65. STUDIES ON MEDICO-ETHNOBOTANY

Diversity, Domestication and Utilization of Picrozhiza Kurroa Royle Ex Benth., Introduction, Morphology and Drug Description, Ethnobotanical Observations, Traditional and Modern Use, Adulterants, Distribution, Availability and Ecological Status in Himalaya, Diversity And Domestication, Germplasm Evaluation At Srinagar, Gulmarg And Verinag, Germplasm Evaluation At Kud, Jammu Hills, Seed Germination, Clonal Propagation, Kutkin Content In Domesticated Stock, Chemical Composition, Pharmacological Studies, Results And Discussion, Conclusion, Acknowledgements

## 66. TECHNOLOGY OF PODOPHYLLOTOXINS

Introduction, Podophyllum Aglycones, Commercial Method of Isolation of Podophyllotoxin, Podophyllum Glycosides

## 67. TROPICAL PERIWINKLE

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Diseases and Insect Pests, Chemistry and Uses

## 68. TULSI

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation, Soil and Climate, Land And Preparation, Nursery Raising and Planting, Weeding and Hoeing, Manure/Fertilizer, Irrigation, Harvesting/Post Harvesting Operation, Chemical Constituents, Major Constituents, Active Constituents, Analytical Profile, Yield, Substitutes/Adulterants, Economics, Home Remedy

## 69. VAI VIDANG

Regional Names, Distribution, Part Used, Medicinal Properties & Uses, Cultivation & Propagation, Soil And Climate, Nursery Raising And Planting, Manure/Fertilizer, Weeding, Irrigation, Harvesting/ Post-harvesting, Chemical Constituents , Major Constituent, Other Constituents, Active Constituents, Yield, Substitutes /Adulterants, Home Remedy

## 70. VALERIAN

History and Geographical Distribution, Botany, Genetics, Soil and Climate, Propagation, Interculture and Weed Control, Fertilizers and Manures, Irrigation, Harvesting and Processing, Chemistry and Uses

## 71. VATSNABH

Regional Names, Distribution, Part Used, Cultivation & Propagation, Soil and Climate, Nursery Raising And Planting, Manure/ Fertilizer, Irrigation, Weeding, Harvesting/Post-harvesting, Chemical Constituents , Major Constituents, Other Constituents

## 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.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study,

Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various 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.

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