Dyeing is the process of imparting colors to a textile material. Natural dyes are friendly and satisfying to use. They are obtained from sources like flowers, leaves, insects, bark roots etc. however, they are not readily available and involve an extraction process. With the advancement of chemical industry, all finishing procedures of textile materials have been growing constantly and, sustainable and ecological production techniques have become extremely crucial.

This is a single book which has information related to extraction of dyestuff from 19 common flowers, weeds, bark or leaves and its application on cotton silk and wool fabrics for textile industry.

The Handbook describes the step wise methodology of extraction, mordanting, dyeing with photos of the actual plants part used for extraction of Natural dye. Shade cards have been incorporated so that the full gamut of colors can be visualized from each dyestuff.

Major contents of the book are nature of material to be dyed, history of natural dyes, promotion of natural dyes, sources of natural dyes, mordanting the textiles for natural dyeing, quality standards for vegetable dyes, methods of dye extraction, dyeing methodology, chemistry of dye, some recent publications on natural dyes. This handbook is designed for use by everyone engaged in the natural dye manufacturing and explains different methods of dye extraction. Also contains addresses of machinery suppliers with their photographs.

It will be a standard reference book for professionals, entrepreneurs, those studying and researching in this important area.

About Author

The Author Dr. Padma S Vankar, works as Principal Research Scientist, in Facility for Ecological and Analytical Testing (FEAT) at Indian Institute of Technology, Kanpur. She has been engaged in the screening and characterization of newer natural dyes for the past 10 years. She also works in the area of designing synthetic strategies for Eco-friendly dyes using microwave heating system. Using innovative technology for natural dyeing has been her main emphasis. The author has conducted several workshops throughout India in order to popularize natural dyeing.

Contents
PART I

1. HISTORY OF NATURAL DYES
Promotion of Natural Dyes
Sources of Natural Dyes
Constitutional Aspects
Requisites of a True Dye
Types of Dye
Chemical Entities Responsible for Colors
Classification Based on Chemical Nature
Classification Based on Colors
Classification Based on Colors

2. BASICS OF NATURAL DYEING
Advantages of Natural Colors/Vegetable Dyes
Natural Dyeing Principles
1. Nature of Material to be Dyed
2. Measurements of Mordants and Dyestuffs
3. Temperature
4. Agitation
5. Natural Dyes are Unpredictable
6. Wet Fibers Look Darker
7. Rinsing
8. Using Natural Dyes
Mordanting
Mordants
Mordanting of Cotton
Preparation of Fabric for Dyeing
Modifier
pH
Safety Measures Required in Natural Dyeing
Disposal of Mordants and Dyes
Vat Dye
Overdyeing

3. MORDANTING THE TEXTILES FOR NATURAL DYEING
Treatment of Fabric Before Dyeing
Methods of Mordanting
Common Mordants used in Natural Dyeing

4. STANDARDIZATION OF VEGETABLE DYES
Quality Standards for Vegetable Dyes

5. METHODS OF DYE EXTRACTION
Methodology
Subcritical Water Extraction

PART II

Al
Alkanet
Balsam
Bougainvillea
Canna
Carthamus
Cassia Fistula
Cineraria
Cosmos
Eucalyptus Bark
Osbeckia Chinensis
Parkia Javanica
Pomegranate
Sappan Wood
Tectona Grandis
Terminalia Arjuna
Tulsi

6. DYEING METHODOLOGY
Materials
Selection of Plant Sources for Dye Extraction
Extraction of Colorants
Aqueous Extraction
Solvent Extraction
Equipment used for Dyeing and Analysis of Dyed Fabric and their Principle
Sonicator
Ultraviolet and Visible Spectrophotometer
Fourier Transform Infra Red Spectroscopy
Gas Chromatograph Mass Spectrometer
Inductively Coupled Plasma Optical Emission Spectrometer
Gas Chromatograph
Xenoster
Wash Wheel
Perspirometer
Crock Meter
Material to be Dyed
Specification of the Fabric
Physical Characteristic of Cotton
Chemical Composition of Cotton Fiber
Chemicals and Reagents Used
Methodology
Preparation of Cloth For Dyeing
Desizing
Scouring
Bleaching
Treatment of Fabric Before Dyeing
Pre Mordanting
Post Mordanting
Dyeing
Assessments Of Eco Friendliness
Assessment Of Antimicrobial Properties

7. CHEMISTRY OF DYE
Basic Concept of Dyes Color
Relation Between Color and Constitution
Characterization of Natural Dyes
Solubility Studies
1. Thin Layer & Column Chromatographic Studies
2. Ultra Violet-visible Spectrophotometric Studies
3. Fourier Transform â€“ Infra-red Studies
4. High Performance Liquid Chromatographic Studies
5. Gas Chromatography â€“ Mass Spectro-photometric Studies

Mordants used in Dyeing
Mordant
Tannins and Tannic Acid
Metal Salts or Metallic Mordants
Oil Mordants
Techniques used for Dyeing
Mechanism of Dyeing
Fastness Properties
Fastness Properties of Dyed Materials
Evaluation of Eco-friendliness
Companies Selling through Natural Dyes through Internet
Estimates of Dye Requirements
Some Important Natural Dyes
Blue Dyes
Red Dyes
Yellow Dyes

8. SOME RECENT PUBLICATIONS ON NATURAL DYES BY THE AUTHOR
1. Dyeing Cotton, Silk and Wool with Brassica Oleracea or Purple Cabbage
   Introduction
   Vegetable Chosen
   Studies on Cotton, Silk and Wool
   Chemicals Used
   Nature of the Colorant
   Extraction of Colorant
   Optimization of Extraction Condition
   Extraction Amount and Time Required
   Extraction Temperature
   pH of Extraction Medium
   Mass to Liquor Ratio
   Determination of pKa
   Chemical Characterization of the Colorants
   Treatment of Fabric before Dyeing
   Dyeing
   Color Measurements
   Results and Discussion
   References
2. Dyeing Wool Yarn with Hibiscus Rosa Sinensis (Gurhhal)
   Abstract
   Introduction
   Materials and Methods
   Materials
   Flower Color Chosen
   Studies on Wool
   Chemicals Used
   Methods
   Extraction of Colorant
   Scouring of Wool
3. Sonicator Dyeing Cotton and Silk with Ixora Coccinea Flower

Abstract

Keywords

Introduction

Materials and Methods

Materials
Flower Color Chosen
Substrates
Chemicals
Methods
Extraction of Colorant
Preparation and Optimization of Aqueous Extract of Ixora
Chemical Composition of the Colorant
Scouring of Cotton and Silk
Mordanting
Dyeing
Measurement of Color Strength
Optimization of Mordants with K/S and Color Hue Changes
Results and Discussion
Fastness Properties
Conclusion
References

4. Dyeing with Celosia Cristata Flower on Modified Pretreated Wool

Introduction

Flower Colour Chosen
Studies on Wool
Chemicals Used
Extraction of Colourant
Pretreatment
Mordanting
Dyeing
Chemical Composition of the Colorant
Results and Discussions
References

5. Dyeing Silk and Wool with Plumeria(Pink) Flower

Abstract

Keywords

Introduction

Materials and Methods

Materials
Flower color chosen
Substrates
Chemicals
Methods
Extraction of colorant
Preparation and Optimization of Aqueous Extract of Pink Plumeria
Chemical Composition of the Colorant
Scouring of Cotton, Silk and Wool
Mordanting
Dyeing
Sonicator Dyeing
Measurement of Color Strength
Optimization of Mordants with K/S and Color Hue Changes
Results and Discussion
Fastness Properties
Conclusion
References
6. Dyeing Cotton, Silk and Wool with Cayratia Carnosa Gagn. or Vitis Trifolia
Introduction
Fruits Chosen
Studies on Cotton, Silk and Wool
Chemicals Used
Extraction of Colorant
Pretreatment
Mordanting
Dyeing
Chemical Composition of the Colorant
Measurement of Color Strength
Fastness Properties of Dyed Fabrics
Results and Discussions
References
7. Dyeing with Nerium Oleander Flower on Pretreated Wool
Introduction
Materials and Methods
Materials
Flower Color Chosen
Studies on Wool
Chemicals Used
Methods
Extraction of Colorant
Scouring of Wool
Mordanting
Dyeing
Measurement of Color Strength
Chemical Composition of the Colorant
Results and Discussion
Fastness Properties
Conclusion
References
8. Dyeing Terricot and Cotton Fabric with Lac Dye in Sonicator
Abstract
Introduction
Extraction
Dyeing Properties of Lac Dye
Results and Discussion
References
9. Commercial Viability of Dyeing Cotton with Aqueous Extract of Lawsonia (Heena) Using Ecofriendly
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.


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.