Natural dyes are dyes or colorants derived from plants, invertebrates, or minerals. The majority of natural dyes are vegetable dyes from plant sources. Dyeing is the process of imparting colors to a textile material. Different classes of dyes are used for different types of fiber and at different stages of the textile production process, from loose fibers through yarn and cloth to completed garments. There are technologies that manufacture the pigments for plastics, rubber and cosmetics. Therefore; dyes and pigments have a vast area of applications and have a huge demand in industry. Contrary to popular opinion, natural dyes are often neither safer nor more ecologically sound than synthetic dyes. They are less permanent, more difficult to apply, wash out more easily, and often involve the use of highly toxic mordant. Of course, the colour possibilities are far more limited; the color of any natural dye may be easily copied by mixing synthetic dyes, but many other colors are not easily obtained with natural dyes. However, some mordant are not very toxic, and the idea of natural dyestuffs is aesthetically pleasing. Applying natural dyes in your fabric production using enzymes will reduce your production cost and improve control. There are various kind of natural dyes; quinonoid dyes, cyanine dyes, azo dyes, biflavonyl dyes, omochromes, anthraquinone, coprosma gesus etc. The use of natural dyes in cloth making can be seen as a necessary luxury to trigger off a change in habits. Dyes which stand out for their beauty and ecological attributes would never be employed on just any material but on noble fabrics such as wool, silk, linen or cotton, made to last more than one season. Market value will benefit from consumer preferences for environmentally friendly products, which will support consumption of high performance dyes and organic pigments.

This book basically deals with the use of carotenoids as food colours, bianthraquinones and related compounds, intermediate degradation products of biflavonils, dyestuffs containing nuclear sulphonically and carboxylic acid groups, quinonoid dyes, cyanine dyes, optical whitening agents, natural dyes for food, stability of natural colourants in foods effect of additives, pyrimidine pigments, the total synthesis of the polyene pigments, red pigment from geniposidic acid and amino compound, effect of acid and amine on the formation of red pigment from geniposidic acid, effect of the substituted position of amino group and chain length of amino compound etc.

Due to pollution problems in synthetic dyes and pigments industry, the whole world is shifting towards the manufacturing of natural dyes and pigments. The present book contains techniques of producing different...
natural dyes and pigments, which has huge demand in domestic as well as in foreign market. It is hoped that entrepreneurs, technocrats, existing units, institutional libraries will find this book very useful.

Contents

1. Ommochromes
   Distribution
   A. Ommatins
   B. Ommins
   Isolation and Purification
   A. Ommatins
   B. Ommins
   Structure of the Ommochromes*
      Xanthommatin
      Ommatin D
      Rhodommatin
      Ommin A X
   Biogenesis
2. Bisdehydrocanthaxanthin
3. Carotenoids Field
   Carotenoid Biogenesis
   Carotenoid Total Syntheses
   The use of Carotenoids as Food Colours
4. Black pigments
   Animal Pigments
      Melanins
      Sclerotization
   Plant Pigments
      Humic acids
      1,8-Dihydroxynaphthalene polymers
5. Anthraquinone
   Plant Pigments
   Insect Pigments
6. Coprosma genus
7. Blanathraquinones and related compounds
   Skyrin
   Oxyskyrin
   Skyrinol
   Iridoskyrin
   Rugulosin
   Luteoskyrin and Rubroskyrin
   Lumiluteoskyrin
   Flavoskyrin
   Biogenesis
8. The Biflavonyl Pigments
   The First Investigations
   The Work of Nakazawa on Ginkgetin
   The Work of the Bristol Group
   On Ginkgetin and Isoginkgetin
   The Work of Kariyone and Kawano on
   Sciadopitysin, 1956
Further Work of Brispol Group on Ginkgetin and Sciadopitysin
The Work of Kawano on Sciadopitysin and GINKGETIN, 1959
The Synthesis of Ginkgetin Tetramethyl ether, Nakazawa, 1959
The Structure of Ginkgeting
The Structure of Isoginkgetin
The Structure of Kayafyavone
The Structure of Sotetsufuflavone
Summary of Biflavonyl Structures

Intermediate Degradation Products of Biflavonyls
Optical Inactivity of the Biflavonyls
The Structure of Hinokiflavone
Natural Occurrence of Biflavonyls
9. Azo dyes
10. Dyestuffs
Introduction
Primary Products for VS-Dyestuffs
  1. Methods of preparation
  2. Reactions
Processes for the Manufacture of VS-Dyestuffs
Fastness and Dyeing Properties of VS-Dyestuffs
  1. VS-Dyestuffs free from nuclear sulphonie and carboxylic acid groups
  2. Dyestuffs containing nuclear sulphonie and carboxylic acid groups
Summary
11. Disperse dyes
Light Fastness
Gas Fastness
Sublimation Fastness
Wash Fastness
Structural Modifications Leading to All-Round Fastness
12. Quinonoid dyes
13. Cyanine dyes
Chemistry of 2, 3-Dichloro-1,4-Naphthoquininone (I)
Chemistry of Chloranil (II)
Vat Dyes from Chloranil
Benzodipyrocolinequinones Pyrrocolinequinones,
Unsymmetrical Dipyrocolinequinones and Naph of Uranopyrrocolinequinones
2-alkylamino-(arylamino)-3-chloro-1, 4-naphthoquinones And Di-3-(2-chloro-1, 4-naphthoquinonyl)-alkylamines And Arylamines
Cellulose Acetate Dyes From (i) And (ii)
Synthesis Of Non-coplanar Quinonoid Dyes
14. Fluorescent brightening agents
15. Optical whitening agents
Introduction
Physical Considerations of Fluorescence and Optical Whitening
Chemical constitution of Optical Whitening Agents
  1. Stilbene derivatives
  2. Benzidine derivatives
  3. Benzthiazole, benzoazole and benzimidazole derivatives
4. Coumarins
5. Pyrazolines
6. Other types

Some Specific Applications of Optical Whitening Agents
1. Soaps and detergents
2. Textile applications
16. Natural dyes for Food

Natural Colourants
Natural Colours Presently Used in Food
Methods of Improving Natural Colourants

Novel Sources of Natural Colourants
Microbial Sources
Animal Sources
Plant Source

General Reviews
Colourants from By-products
Gardenia Extracts
Other Sources

Feasibility of Novel Sources

Stability of Natural Colourants in Foods Effect of Additives
Ascorbic Acid and Derivatives
Effect of Metal Ions
Effect of Neutral Salts
Effect of Organic Acids
Photoprotection
Miscellaneous Additives

Conclusion

Stable Forms of Natural Colourants Found in Vivo
Stabilised Forms Of Natural Colourants Flavonoids

Chemical Features Affecting Stability
Self association
Complex formation
Copigmentation
Condensation
Chemical modifications

Porphyryns
Others

17. Pyran Pigments : I. Flavones and Flavonols
Flavones
Chrysin (IV)

General Methods of Synthesis of Flavones
A. From Aromatic Diketones
B. From o-Hydroxyacetophenones
C. From o-Hydroxychalkones
D. From Phenols

Flavonols
The Wessely-moser and Related Rearrangements of Flavones
The Formation of Salts by Flavones and Flavonols
The Reduction of Flavones
Isoflavones
The Synthesis of Isoflavones
18. Pyran Pigments : II. Anthocyanins and Anthocyanidins
   Cyanidin (III)
   The Synthesis of Anthocyanidins
   The Synthesis of Anthocyanins
   Color Reactions of The Anthocyanidins and Anthocyanins
   Anhydrobases
      Carajurin (XCIX)
      Dracorubin (CXXV)
19. Pyran Pigments : III. Xanthones
   Ravenel (II)
   Mangostin (XI)
   Pyran Pigments : IV. Rottlerin
   Pyran Pigments : V. Brazilin and Mematoxylin
   Brazilin (XXXII)
   Hematoxylin (XL)
   Trimethylbrazilone (XLI)
   Brazilein (LXXIX, R - H)
   The Synthesis Of Brazilin
   Pyrrole Pigments : I. The Porphyrins
      Hemin (cxxxvii)
   The Synthesis of Dipyrrylmethenes
   The Synthesis of Porphyrins
      The Structure of Hemin
   Pyrrole Pigments : II. Chlorophylls
      Pheoporphyrin, Chloroporphyrin, and Phylloerythrin
      The Vinyl Group in Chlorophyll
      The Structure of Chlorophyll
      Position of the Phytyl Group in Chlorophyll
      The Phase Test
   Allomerization
   Approaches to the Synthesis of Chlorophyll
   Chlorophyll-b
   Bacteriochlorophyll
20. Pyrrole Pigments : III. The Bile Pigments
   Bilirubin (XXXII)
      Verdins
      Violins
      Bilenes
      Bilanes
      Stereochemistry and Tautomerism
      Complex Salts of the Bile Pigments
   Pyrrole Pigments : IV. Prodigiosin
21. Pyrimidine Pigments : The pterins
   The Gmelin Reaction
   Pterorhodin
22. Quinonoid Pigments
   Benzoquinonoid Pigments
      Perezone (XII)
      Polyporic Acid (XIV)
      Astromentin (XXVIII)
      Phoenicin (LXI)
   Napthaquinonoid Pigments
      Lapachol (LXXI)
Eleutherin (CXXI)
Alkanin and Shikonin (CXLIX)
Anthraquinonoid Pigments
Helminthosporin (CLVIII)
Kermesic Acid (CLXI)
Skyrin (CLXXVIII)
Extended Quinone Pigments
The Aphin Pigments
Erythroaphin-fb (CCXVI) or (CCXVII)
Hypericin (CCXXV)

23. Polyene Pigments
Bixin (X) and Croceting (XI) the Carotenes
b-Carotene (LV)
Lycopene (LXXIII)
The Total Synthesis of the Polyene Pigments
Combination of Units in the Order C19 + C2 + C19
Combination of Units in the Order C16 + C8 + C16
Combination of units in the Order C14 + C12 + C14
Combination of Units in the Order C10 + C20 + C10
The Dehydro - Retrodehydrocarotenoids Epoxides
and Furanoid Oxides

24. Anthocyanins from Indian varieties of Grapes
Material and Methods
Extraction
Purification
Total anthocyanins
Separation
Partial hydrolysis of anthocyanin
Aglycone and sugar
Acyl moieties
Spectral measurements
Thin layer chromatography
Results and Discussion
Recovery of anthocyanin
Separation of pigments by paper chromatography
Absorption spectra of pigments
Partial hydrolysis of anthocyanins
Aglycones
Sugar identification
Acyl moieties

25. Red pigment from Geniposidic Acid and Amino Compound
Materials and Methods
Preparation of geniposide (GS) and GSA solution
Preparation of other iridoid compounds
Enzyme and reagents
General method of preparation of pigment
Evaluation of pigment
Identification and quantification of carbon dioxide
HPLC and NMR measurement
Structural relationship of iridoids to red pigment production
Acidity and evolution of carbon dioxide
Time course of enzymic reaction
Acidity and atmosphere on the reaction
HPLC monitoring of the pigment formation from GAA and α-alanine
NMR monitoring of the pigment formation from GAA and methylamine
Results and Discussion
The relationship between the evolution of carbon dioxide and reaction pH
The process of formation of red pigment
Molecular mass and colour evaluation of red pigment derived from GAA and α-alanine
NMR spectroscopy of red pigment formed from GAA and methylamine
Monitoring of the reaction by NMR
The formation mechanism of red pigment

26. Effect of Acid and Amine on the formation of Red Pigment from Geniposidic Acid

Materials and Methods
Preparation of geniposide (GS)
Preparation of geniposidic acid (GSA) solution
Enzyme and reagents
General procedure for the red pigment formation
Evaluation of pigment
Kind of acid
The concentration of organic acid
The substituted position of amino group and chain length of amino compound
Kind of amino compound
Results and Discussion
Effect of acidz
Effect of the substituted position of amino group and chain length of amino compound
Kind of amino compound

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 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.