

Natural Fibers Handbook with Cultivation & Uses

Author:- NIIR Board of Consultants & Engineers

Format: paperback

Code: NI154

Pages: 560

Price: Rs.1275US\$ 125

Publisher: NIIR PROJECT CONSULTANCY SERVICES

Usually ships within **5** days

Natural fibers production, processing and export are vital to the economies of many developing countries and the livelihoods of millions of small scale farmers and low wage workers. Almost all natural fibers are produced by agriculture, and the major part is harvested in the developing world. It is convenient to classify natural fiber in two ways; morphologically, according to the part of plant from which they are obtained and practically according to the uses to which they are put, which in turn depend on their properties. From the view point of the uses vegetable fibers may be classified into following groups; textile fibers, cordage fibers, brush and mat fibers, stuffing and upholstery materials, paper making materials etc. Fibers from the view point of the part are classified as hair fibers, leaf fibers, woody fibers, bast fibers, etc. The use of fibers for paper making differs completely from their use in textiles, in that in papermaking it is ultimate fiber cells which are used; thus in papermaking process consists in breaking down the strands of fiber into the ultimate fibers. Jute, the most important textile fiber apart from cotton, is obtained from two species of corchorus(white jute) and *C.olitorius*L. (tossa jute). Farmers around the world produce a wide variety of natural fibres, planting crops and rearing animals. Plant fibres may be from the plant fruit (e.g. cotton), stems (e.g. flax and jute) or leaf (e.g.sisal). Natural fibres are generally considered more environment friendly than synthetics in their production and disposal. However, there is great variation depending on the fibre and the growing conditions. Many chemicals are used to contain pests and weeds. Chemicals are also used in the processing and dyeing which can lead to water contamination. Processing of some natural fibers can lead to high levels of water pollutants, but they consist mostly of biodegradable compounds, in contrast to the persistent chemicals, including heavy metals, released in the effluent from synthetic fiber processing. Farming and production of natural fibres also plays a significant role in eradicating poverty as an important source of farming income and contribution to food security in developing countries. Demand for natural fiber composites are largely driven by increasing environmental awareness. Due to low cost, low density, acceptable specific properties, ease of separation, enhanced energy recovery, CO2 neutrality, biodegradability and recyclable properties, natural fiber use in composites is gaining as demand grows for component materials that are durable, reliable, light weight, with mechanical properties better than those of traditional materials. Total global natural fiber composite market expected to grow at 11% CAGR.

Some of the fundamentals of the book are the occurrence and nature of vegetable fibres, conditions necessary for growing flax, mulberry family (moraceae), lime family (titliaceae), experiments on mechanized production of jute, mallow family (malvaceae), kenaf production in various other countries, the use of unretted kenaf ribbons for sack manufacture, pea family (leguminosae), sterculia family (sterculiaceae), agave family (agavaceae), structure of the sisal

industry, narcissus family (amaryllidaceae), lily family (liliaceae), pineapple family (bromeliaceae), fibres from other species of musa and a related genus, brush making fibres, etc.

The book contains process and other parameters for the manufacturing of fibers arrive from natural sources. Due to eco friendly nature there is very good domestic and export potentiality for natural fiber. This is very useful book for new generation entrepreneurs, consultant institutional libraries, and existing units.

1. INTRODUCTION

The Occurrence and Nature of Vegetable Fibres

Bast Fibres

Leaf Fibres

Fibre Identification

Testing of Fibres

Chemical Analysis

Fibre Fineness and Commercial Use

2. FLAX FAMILY (LINACEAE)

Flax (*Linum Usitatissimum*)

Conditions Necessary for Growing Flax

Varieties

Cultivation

Harvesting

Pulling

Drying

Retting

Dew Retting

Water Retting

Warm Water Retting

Leaching

Double Retting

Aerated Retting

Green Flax

Scutching

Flax in the U.S.S.R

Flax in Belgium

Flax in Other Countries

China

Japan

Egypt

India

Australia

New Zealand

Kenya

Uganda

Grading of Flax

Properties of Flax

Trade

3. MULBERRY FAMILY (MORACEAE)

Hemp (*Cannabis Sativa*)

Botany

Breeding Experiments
Cultivation
Harvesting
Yield
Retting
Breaking and Scutching
Hemp in China
Hemp in Chile
Quality of Hemp
Properties and Uses of Hemp

4. LIME FAMILY (TITLIACEAE)

Jute (*Corchorus Capsularis* and *C. Olitorius*)
Cultivation
Soil
Preparation of the Soil
Sowing
Varieties
Harvesting
Retting
Extraction of Fibre
Cost of Production
Jute in Brazil
Jute in China
Production in Taiwan
Experiments on Mechanized Production of Jute
Varieties
Cultivation
Harvesting
Ribboning
Scutching
Retting
Washing
Drying and Storage
Sorting and Grading
Production of Jute in Other Countries
Burma
U.S.S.R
Borneo
Malaya
Philippines
Thailand
Nepal
Vietnam

Iran
Peru
Miscellaneous Countries
Sorting and Grading of Jute
Uses of Jute
The Jute Trade
Triumfetta Species
Honckenya Ficifolia

Funga Fibre (Cephalonema Polyandrum)

5. MALLOW FAMILY (MALVACEAE)

Knaf (Hibicus Cannabinus)

Varieties

Sowing

Harvesting

Growth Phases

Retting

Pests and Diseases

Kenaf in India

Kenaf Production in Various Other Countries

Argentina

China

Egypt

Guatemala

Haiti

Italy

Mexico

Mozamibque

North Africa

Papua and New Guinea

Peru

Southern Rhodesia

Spain

Thailand

South Africa

Economics of Kenaf

The Use of Unretted Kenaf Ribbons for Sack Manufacture

Properties of Kenaf

Roselle (Hibiscus Sabdariffa)

Fibres From Other Species of Hibiscus

Urena Lobata

Cultivation

Retting

Yields

Distribution

Labour Requirements in Fibre Preparation

Grading of the Fibre

Properties and Uses

Trade

Abutilon Species

Sida Species

Pavonia Species

Thespesia Species

Miscellaneous Fibre Plants of the Malvaceae

6. NETTLE FAMILY (URTICACEAE)

Ramie (Boehmeria Nivea and its Var. Tenacissima)

Varieties

Soils and Growing Conditions

Planting

Harvesting

Yields
Replanting
Fibre Extraction
Degumming
Problems of Ramie Degumming
Drying
Ramie in China
Varieties in China
The Ramie Industry in Japan
Varieties Grown
Pests and Diseases
Grading of Ramie in Japan
Spinning of the Fibre
Ramie in Taiwan
Ramie in Brazil
Ramie in Other Countries
Uses of Ramie Fibre
Properties of Ramie
The Trade in Ramie
Other Fibre Yielding Plants of the Urticaceae

7. PEA FAMILY (LEGUMINOSAE)

Sunn or Sunn Hemp (*Crotalaria Juncea*)
Varieties in India
Growing Conditions
Harvesting and Yield
Retting
Washing and Stripping
Preparation of Hanks
Cleaning and Dressing
Grading
Cost of Production
Sunn Hemp in Ceylon
Properties and Uses of Sunn Hemp
Trade and Prices
Spanish Broom (*Spartium Junceum*)
Sesbana aculeata

8. STERCULIA FAMILY (STERCULIACEAE)

Abroma Augusta
Cultivation
Harvesting
Yields
Fibre Extraction
Properties of the Leaf

9. THE MECHANIZED PRODUCTION OF STEM FIBRES

Large Labour Requirements of Non Mechanized Production
Advantages of Mechanized Production
Harvesting Mechanically
Ribboning Machines
Problems of Ribboning
Drying

Retting
Washing
Costs of Mechanized Production

10. AGAVE FAMILY (AGAVACEAE)

Agave Species
Botany
Fibre Yields of Various Species
Breeding Experiments With Agave Species
Nature of the Fibres in the Agave Leaf
Sisal (Agave Sislana)
Cultivation
Climate and Soil
Preparation of the Land
Planting
Fertilizers
Harvesting
Yields
Decortication and Decorticating Machines
Flume Tow
Structure of the Sisal Industry
Drying
Artificial Drying
Brushing
Grading
Baling
Labour Requirements for Sisal Production
Production in Other Countries
Properties of Sisal
Uses of Sisal
Trade
Henequen (Agave fourcroydes)
Cultivation
Harvesting
Decortication
Drying
Uses
Trade
Cantala (Agave Cantala)
Cultivation
Harvesting
Retting
Uses
Trade
Agave Letonae
Fibres from other Agave species

11. NARCISSUS FAMILY (AMARYLLIDACEAE)

Furcrea Species
Mauritius Hemp (Furcrea Gigantea Var. Willemettiana)
Yields
Extraction of the Fibre
Retting

Uses of the Fibre in Mauritius
Properties of the Fibre
Furcraea Gigantea
Furcraea Cabuya
Furcraea Macrophylla
Furcraea Andina
Furcraea Humboldtiana
Furcraea Cubensis
Curculigo Species

12. LILY FAMILY (LILIACEAE)

New Zealand Flax (Phorium Tenax)
Production of Phormium in New Zealand
Varieties
Propagation
Cultivation
Diseases, etc.
Harvesting
Stripping
Washing & Bleaching
Scutching
Baling and Grading
Advantages and Disadvantages of Phormium Production
Production and Costs
Phormium Tenax in Argentina
Phorium Tenax in South Africa
Phorium in Other Countries
Properties of Phorium Fibre
Trade
Sansevieria Species
Propagation and Cultivation
Lily Family (Liliaceae)
Extraction of the fibre
Production in Mexico
Other Countries
Yield
Properties
Yucca And Some Relatives

13. PINEAPPLE FAMILY (BROMELIACEAE)

Pineapple Fibre (Ananas Comosus)
Cultivation
Production in the Philippines
Production in Other Countries
Extraction by Machine
Pita Fibre or Silk Grass (Aechmea magdalenae)
Harvesting
Yield
Caroa Fibre (Neoglazovia variegata)
Fibre From Other Members of the Bromeliaceae

14. BANANA FAMILY (MUSACEAE)

Abaca or Manila Hemp (Musa Textilis)

Varieties
Cultivation
Propagation
Diseases and Pests
Harvesting
Extraction of the Fibre
Grading of the Fibre in the Philippines
Production of Abaca in Central America
Cost of Producing Abaca
Production in Borneo
Abaca in Malaya
Canton And Pacol Fibres
Properties of Abaca
Uses
Trade
Fibres From Other Species of Musa and a Related Genus

15. PALM FAMILY (PALMAE)

Coir or Coconut Fibre (*Cocos nucifera*)
Collection of Fruit
Removal of Husks
Retting
Production of Coir Yarn
Grading of Yarn
Costs of Production
Cost of production of Fibre and Yarn
Mattings
Bristle or Coco Fibre
Dyeing of Coir Fibre
Mattress Fibre and Combings
Production of Coir Fibre in India
Production in the Philippines
Machine Extraction of Coir Fibre
Properties of Coir
Trade
Crin Vegetal (*Chamaerops humilis*)
Botany
Distribution
The Industry in Morocco
Extraction of the Fibre
Uses of the Fibre
Technical Characteristics
Trade
Tucum Fibre (*Bactris Setosa*)
Date Palm Fibre (*Phoenix Dactylifera*)
Doum Fibre (*Hyphaene Thebaica*)

16. BOMBAX FAMILY (BOMBACACEAE)

Kapok (*Ceiba Pentandra*)
Soils
Propagation
Yields
Harvesting

Hulling
Drying
Removal of Seeds
Baling
Kapok in India
Collection of the Floss
Preparation
Grading
Baling
Properties of Kapok Fibre
Uses of Kapok

17. MILKWEED FAMILY (ASCLEPIADACEAE)

Akund Floss (*Calotropis Procera* and *C. Gigantea*)

Yields

Preparation

Grading and Packing

Trade

Uses

Kendyr Fibre (*Apocynum Venetum*)

Asclepias Species

18. BRUSH MAKING FIBRES

Fibres Used in Earlier Times

Properties required in Brush Making Fibres

Bahia Piassava (*Attalea funifera*)

Botany and Germination

Collection and Preparation of the Fibre

Properties and Uses

Para Piassava (*Leopoldinia Piassaba*)

West African Piassava (*Raphia Hookeri* and *R. Graolis*)

Madagascar Piassava (*Vonitra Fibrosa*)

Mexican fibre (*Agave lecheguilla*)

Harvesting and Extraction of the Fibre

Cleaning and Grading

Uses

Jaumave Fibre (*Agave Funkiana*)

Coco Fibre (*Cocos Nucifera*)

Palmyra or Bassine Fibre (*Borassus Flabellifer*)

Kitool Fibre (*Caryota Urens*)

Gomuti Fibre (*Arenga Saccharifera*)

Broom Root (*Muhlenbergia Macroura*)

Italian Whisk (*Sorghum Vulgare*)

Palmetto Fibre (*Sabal Palmetto*)

19. PAPER MAKING FIBRES

Properties for Paper Making

Treatment for Conversion into Pulp

Wood

Esparto Grass

Collection from Wild Plants in North Africa

Production in Spain

Treatment and Uses

Straw
Bamboo
Bagasse
Other Materials

20. MISCELLANEOUS FIBRES

Toquilla (Carludovica Palmata)
Preparation For Making Panama Hats
Weaving and Bleaching
Alpinia Chinensis
Polygala Gomesiana And Other Sources or Rope, etc.

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.

NIIR PROJECT CONSULTANCY SERVICES, 106-E, Kamla Nagar, New Delhi-110007, India.
Email: npcs.india@gmail.com Website: NIIR.org

Fri, 21 Mar 2025 00:36:30 +0000