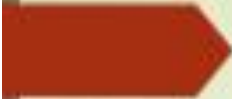





Cotton Fiber

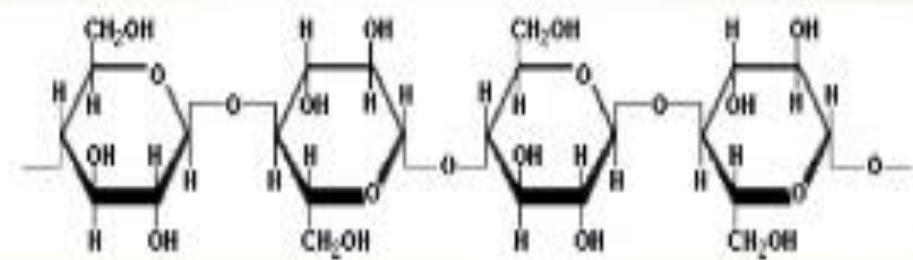


Introduction

- 
- Cotton referred to as the “King of fibers” is most important textile fiber in the world.
 - Cotton is a vegetable fiber which surrounds the seeds of the cotton plant.
 - Cotton has been cultivated for more than 5000 years.
 - Cotton plant belongs to the family “**GOSSYPIUM**”.

Introduction

The cotton fiber is made up of countless cellulose molecules. Cotton is removed mechanically from the seed bolls by the cotton ginning. The ginned cotton is then pressed into bales and sent to the factories to be spun into yarns.



Botanical description

Botanical characters:

- ✓ Cotton plant is an annual or perennial shrub reaches upto the height of 2-6 feet.
- ✓ The flowers are large and showy. They are borne singly in the axils of leaves. The fruits are capsule, called balls.
- ✓ Each fruit has 3-5 locules and each locule contains about 9 seeds. The seeds are covered by long, thick, white or cream coloured **surface hairs known as lint or short. The lint forms the commercial cotton.**
- ✓ There are long threads, made up of cellulose

Cultivation and Harvesting: Cotton is a subtropical crop cultivated on black alluvial soil of Deccan plateau.

- ✓ It grows best in the areas with rain fall ranging from 30 inches to over 100 inches and temperature between 21°C to 45°C.
- ✓ Cultivated varieties of cotton are mostly annual.
- ✓ Raw cotton is picked directly from burst capsules. Picking is generally done by hands. A cotton crop is harvested in 3 or 4 pickings.



Species of Cotton

There are four commercially-grown species of cotton:

Gossypium hirsutum – upland cotton, native to Central America, Mexico

Gossypium barbadense – known as extra-long staple cotton, native to tropical South America

Gossypium arboreum – native to India and Pakistan

Gossypium herbaceum – cotton, native to Southern Africa

Varieties/Types of Pak Cotton

- MNH-93 *(Cotton of Punjab region)*
- NAYYAB-78 *(Cotton of Sindh region)*
- Organic Cotton
- BCI Cotton

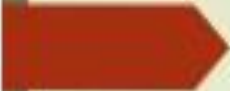
Organic Cotton:

It is generally understood as cotton grown from non genetically modified plants, that is *”to be grown without the use of any synthetic agricultural chemicals such as fertilizers or pesticides”*



➤ Ecological footprint

- Cotton covers **2.5%** the world's cultivated land yet uses **16%** of the world's insecticides, more than any other single major crop.
- Chemicals used in the processing of cotton pollute the air and surface waters.
- Residual chemicals may irritate consumers' skin.
- Decreased biodiversity and shifting equilibrium of ecosystems due to the use of pesticides.



➤ Advantages

- Protecting surface and groundwater quality (eliminating contaminants in surface runoff)
- Reduced risk in insect and disease control by replacing insecticide with the manipulation of ecosystems
- Conservation of biodiversity
- Eliminate the use of toxic chemicals used in cotton

Properties of Cotton Fiber

1. Fiber Surface and Color: Lustrous/ Creamy White color

2. Tensile Strength:

Tenacity – 3-5 gm/denier

Strength = 40, 000, 20,000 lb per square inch

3. Elongation: Not easily stretch

Elongation at Break – 5-10 %

4. Elastic Properties: Rigid/ Less Flexibility

At 2% Extension ----- 74% Recovery

At 5% Extension ----- 45% Recovery

Properties of Cotton Fiber

5. Specific Gravity: 1.54

6. Effect of Moisture:

Standard Humidity = 8.5 %

7. Effect of Heat: Excellent Resistance

8. Effect of Age: Small loss of strength when stored

9. Effect of Sunlight: Gradual loss of strength when exposure to sunlight, major effect by Ultra-violet light.

10. Effect of Acids: By hot dilute and cold concentrated acids

Properties of Cotton Fiber

11. Effect of Alkalis: Excellent Resistance

12. Effect of Organic Solvents: Dispersed by Copper Complexes and Concentrated 70% Sulphuric acid

13. Chemical Properties:

Cellulose = 94%

Remaining Composition:

Protein = 1-1.5%

Pectin = 1%

Mineral substances = 1%

Wax = 0.5%

Small amount of organic acids, sugars, pigments = 2%

Uses of cotton

1. Cotton is used in the manufacture of cotton fabrics, tyre fabrics, threads, carpets, cordages, twine,
2. Unspun cotton is used for stuffing purposes. It is also used in plastic, rayon, explosive and cellulose industries etc.
3. Cotton seed-oil is also extracted from the seeds which is used in cooking and various other purposes.

JUTE: *Corchorus capsularis* and *C. olitorius*

Family: Tiliaceae

Distribution:

Jute is probably a native crop of **Malaysia** or **Sri Lanka**, but presently it is entirely an Indian crop.

Other jute producing countries are Bangladesh, China, Thailand, Vietnam, Myanmar, Former USSR, Brazil, Chile, Peru, Cuba and Egypt.

In India, Jute is mainly produced in West Bengal, Bihar, Assam and Orissa

Botanical characters

- ✓ Jute plants are tall, slender, annual shrubs which attain a height of about 8 to 10 feet.
- ✓ Flowers are yellow and showy. The fruits are pods.
- ✓ *Corchorus capsularis* plants possess round pods whereas *C. olitorius* has long pods.
- ✓ The commercial jute fibres are the bast fibres obtained from the secondary phloem of stem.



(a)



(b)



(c)



(d)

Cultivation and Harvesting

- Jute is a crop of warm and humid climate where temperature ranges from 24°C to 35°C.
- It is grown on light, sandy, deltaic loam soil which periodically receives fertile silt from flood waters.
- soil is found in north-east India where it is successfully cultivated as a winter crop (**Rabi Crop**).
- The crop is harvested within three or four months after planting. Reaping is done when pods begin to ripen. Harvesting is done by simply cutting the plants near the surface.

Processing of jute: Retting

Retting:

- The stems are retted in gently flowing, deep, clear and soft water for few days (15-20 days) to rot out the softened gummy tissue.
- When retting is complete, 8 or 10 stems are taken out of water. and their root ends are beaten to separate the fibres.
- The fibres are then wrapped around the fingers and the long stems are agitated over the surface of water till the fibres completely separate from the gummy tissues.
- The fibres are then washed in water and stacked on clean ground.
- **The fibres:** Jute fibres are actually the bast fibres obtained from the secondary phloem of stem. They are very long pale-yellow in colour, stiff and lignified. Some fibres are about 6 to 10 ft long. They have a silky luster.
- In spite of all disadvantages the jute fibres are preferred because they are cheap and can be easily spun.

USES

1. Jute is used for manufacturing packing clothes, gunny bags, wool and potato sacs.
2. Jute fibres are also used for making twine, carpets, curtains, coarse cloth and ropes.
3. The fibres are also used in the preparation of grease-proof paper which is in great demand in confectionery and other industries for wrapping greasy materials.
4. The fibres are mixed with wool for making cheap blankets

Coir : *Cocos nucifera*

- **Family: Palmae**



Introduction

- Coir is a versatile natural fiber extracted from husk of the coconut fruit.
- The word "coir" comes from the Malayalam word "kayar" which means "to be twisted".
- Coir also called as "Golden Fibre"
- Coir fibers are found between the hard, internal shell and the outer coat of a coconut.
- Global annual production – 3,50,000 metric tons

Continued..

- India and Sri Lanka produces 90% of total global production.
- Major coconut growing states in India :
Kerala, Tamil nadu, Karnataka, AP, Maharashtra, Goa, Orissa.
- About 6.4 lakh persons get employment out of which 80% are women.
- Exports from this industry are 70 crores annually.

MAJOR COCONUT / COIR PRODUCING STATES/ UTs



KERALA
TAMILNADU
KARNATAKA
ANDRA PRADESH
ORRISA
ASSAM
WESTBENGAL
TRIPURA
GOA
MAHARASHTRA
PONDICHERY
AND. & NIC. ISLS
LAKSHADWEEP

Types of coir

➤ **White fibre:**

The white fibre is extracted from young coconuts or immature coconuts.

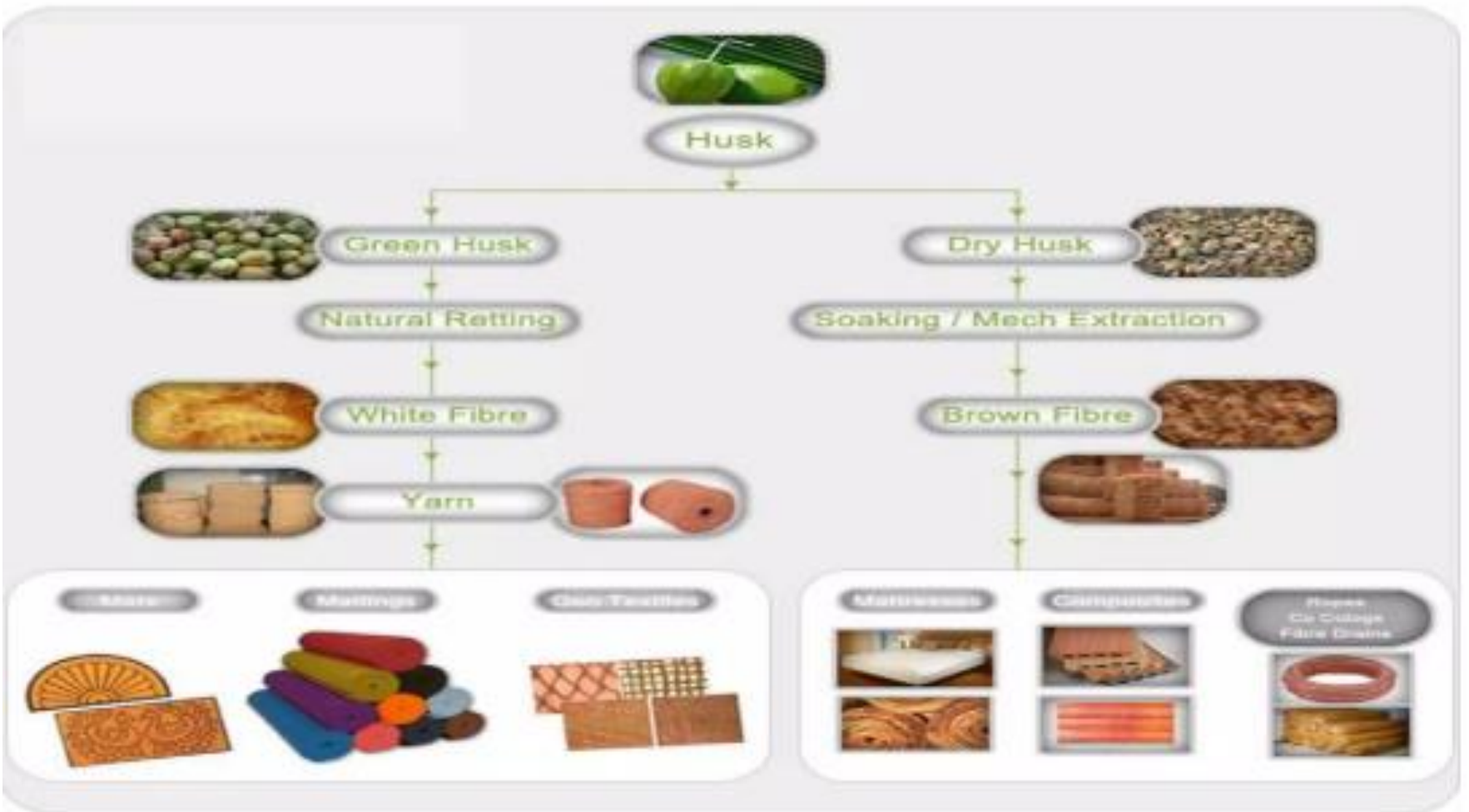
White coir is used in Mats, Geo-textiles and Matting's

➤ **Brown fibre:**

The brown fibre is from mature coconuts, and it tends to be more stiff and unyielding.

Brown coir is used in Brushes, Doormats, Mattresses and Ropes

Production Process



Products



Coir Ropes



Coir Mats



Coir Tiles



Coir Matting's for Cricket Pitches



Coir Baskets



Coir pots



Coir Fiber Discs



Coir plates

Coir Plate



Coir Bench



Coir cushions



Coir Hand bags



Coir pith



Plant Climbers



Coir Geotextiles




Coir Matting's for Roof Surface Cooling



Acoustic Barriers

Uses of coir

- Brown coir is used in brushes, doormats, mattresses and ropes.
- White coir is used in mats, geo-textiles and matting's.
- To prevent the soil from migrating on river banks and hillsides.
- Coir is also useful to deter snails from delicate plantings.

- 
- Coir is also used as a substrate to grow mushrooms.
 - Coir is also used for insulation and packaging.
 - Coir is being used as a noise prevention solution located along highways and other high-traffic roads, in offices and around sporting areas in Netherlands.
 - Coir pith can be utilized as the fertilizers.



Thank

you