Natural Fibres
Contents

• Natural fibres
• Cotton
• Jute
• Hemp
• Linen
• Sisal
Natural Fibre

- **Natural fibers** are fibers that are produced by plants, animals, and geological processes.
- They can be used as a component of composite materials, where the orientation of fibers impacts the properties.
- Natural fibers can also be matted into sheets to make paper or felt.
Cotton

- **Fiber type**: Cellulose fiber
- **Source**: Sea Island cotton, Gossypium herbaceum
- **Characteristics**: Soft, Lightweight, Absorbent
- **Typically used in**: Towels, Socks, Tents, Denim, Fishing Nets, Bookbinding, Coffee Filters, Cotton paper
- **Commonly available in**: India, United States, Australia, Brazil
- **Brand names**: Pima cotton, Egyptian cotton, Cotton Lisle, Supima cotton
- **Length**: 1 – 6 cm
Introduction

• **Cotton** is a soft, fluffy staple fiber that grows in a boll, or protective case, around the seeds of the cotton plants of the genus *Gossypium*

• The fiber is almost pure cellulose. Under natural conditions, the cotton bolls will increase the dispersal of the seeds.

• The plant is a shrub native to tropical and subtropical regions around the world, including the Americas, Africa, Egypt and India.

• The fiber is most often spun into yarn or thread and used to make a soft, breathable textile.
Production

Cotton Spinning Machinery

- **Cotton-spinning machinery** refers to machines which process (or spin) prepared cotton roving into workable yarn or thread.
- Cotton spinning machinery was installed in large factories, commonly known as cotton mills.
- As part of the Industrial Revolution cotton-spinning machinery was developed to bring mass production to the cotton industry.
Cotton Gin

- A **cotton gin** is a machine that quickly and easily separates cotton fibers from their seeds, enabling much greater productivity than manual cotton separation.
- The fibers are then processed into various cotton goods such as linens, while any undamaged cotton is used largely for textiles like clothing.
- The separated seeds may be used to grow more cotton or to produce cotton seed oil.
Cotton Picker

- The **cotton picker** is a machine that automates cotton harvesting in a way that reduces harvest time and maximizes efficiency.
Properties

• Comfortable to wear
• Natural, cellulosic fiber
• Made from the cotton boll
• Absorbs water and “breathes”
• Slow to dry
• Resists static electricity build-up
• Wrinkles easily
• Can be damaged by prolonged exposure to sunlight
• Long staple cotton (such a Supima, Pima, Egyptian, and Sea Island) can be woven into smooth, almost silky fabrics.
Jute

• **Jute** is a long, soft, shiny vegetable fiber that can be spun into coarse, strong threads.

• It is produced primarily from plants in the genus *Corchorus*.

• Jute is one of the most affordable natural fibers, and second only to cotton in the amount produced and variety of uses.
Origin

• Major jute growing countries are India, Pakistan and Bangladesh accounting for 90 per cent of the global production.

• Other countries of considerable importance are Brazil, Mexico, China, Egypt, Sudan, Sri Lanka, Middle East, Taiwan and parts of tropical Africa and Asia.

Importance

• Jute (Corchorus capsularis and C.olitorius) ranks second in importance, next to cotton as a natural fibre and occupies important place in Indian economy.
• Jute fibre is extracted from phloem tissue (bast or bark fibre) in the stem of Corchorus as against seed fibre in the case of cotton.

• Of all the textile fibres, jute is the cheapest and is extensively used in the manufacture of packing material for agricultural and industrial products.
Jute Trade

JUTE TRADE

- Jute trade is currently centered around the Indian subcontinent.
- Bangladesh is the largest exporter of raw jute, and India is the largest producer as well as the largest consumer of jute products in the world.
- Nearly 75% of jute goods are used as packaging materials, burlap (Hessian), and sacks. Carpet Backing Cloth, the third major jute outlet, is fast growing in importance.
Hemp

- **Hemp**, or *industrial hemp*, is a strain of the *Cannabis sativa* plant species that is grown specifically for the industrial uses of its derived products.
- It is one of the fastest growing plants and was one of the first plants to be spun into usable fiber 10,000 years ago.
Origin

• Hemp originated in Central Asia. Hemp cultivation for fibre was recorded in China as early as 2800 BC.

• It was practiced in the countries of Europe early in the Christian era, spreading throughout the rest of Europe during the Middle Ages.

Uses

• It is strong and durable and is used for cordage (cords or ropes used in ship sailing)—e.g., twine, yarn, rope, cable, and string—and for artificial sponges and such coarse fabrics as sackin (burlap) and canvas.
• In **Italy** some hemp receives special processing, producing whitish colour and attractive lustre, and is used to make fabric similar to **linen**.

• Hemp fibre is also used to make bioplastics that can be recyclable and biodegradable, depending on the formulation.

• The edible seeds contain about 30 percent oil and are a source of **protein**, **fibre**, and **magnesium**.

• Shelled hemp seeds, sometimes called hemp hearts, are sold as a health **food** and may be eaten raw.

• Sprinkled on salads or blended with fruit smoothies.
HEMP IS THE STRONGEST NATURAL FIBRE IN THE WORLD. IT’S KNOWN TO HAVE OVER 50,000 DIFFERENT USES!

**TEXTILES**
- Clothing
- Diapers
- Handbags
- Denim
- Shoes
- Fine Fabrics

**INDUSTRIAL TEXTILES**
- Rope
- Canvas
- Tarps
- Carpeting
- Netting
- Caulking
- Moulded Parts

**BUILDING MATERIALS**
- Oil Paints
- Varnishes
- Printing Inks
- Fuel
- Solvents
- Coatings
- Fibreboard
- Insulation
- Acrylics
- Fiberglass Substitute

**PAPER**
- Printing
- Newsprint
- Cardboard
- Packaging

**FOODS**
- Hemp Seed Hearts
- Hemp Seed Oil
- Hemp Protein Powder
- EFA Food Supplements

**BODY CARE**
- Soaps
- Shampoos
- Lotions
- Balms
- Cosmetics
Linen

• Linen is a textile made from the fibers of the flax plant.
• Linen is laborious to manufacture, but the fiber is very strong, absorbent and dries faster than cotton. Garments made of linen are valued for their exceptional coolness and freshness in hot and humid weather.
Origin

• Linen comes from the **flax** plant, which grows all over the Central Asia.

• Flax is a tall, reed-like plant, with long fibers which make it easy to spin into thread. It has lovely blue flowers.

• We can pick the plants, and then leave them to soak in a tub of water or a stream until the hard outside stem rots away and leaves the long, soft fibers underneath. People call this **retting** the flax.
Properties

• Linen fabric feels cool to touch, a phenomenon which indicates its higher conductivity.

• It is smooth, and gets softer the more it is washed.

• However, constant creasing in the same place in sharp folds will tend to break the linen threads.

• This wear can show up in collars, hems, and any area that is iron creased during laundering.

• Linen has poor elasticity and does not spring back readily, explaining why it wrinkles so easily.
Uses
Sisal

- Sisal is a species native to southern Mexico but widely cultivated and naturalized in many other countries.
- It yields a stiff fibre used in making various products. The term sisal may refer either to the plant's common name or the fibre, depending on the context.
Sisal Fibre

• Sisal fibre is fully biodegradable, green composites were fabricated with soy protein resin modified with gelatin.

• Sisal fiber, modified soy protein resins, and composites were characterized for their mechanical and thermal properties.

• It is highly renewable resource of energy.
Origin

• Sisal is the Hard vegetable fibres.
• There are many varieties of the plant throughout the tropical and sub-tropical world.
• Both Mexico and China are now large importers of sisal fibre, than growers.
• Today Brazil is the major world producer of sisal at some 50-60,000 tons from a high of 130,000 tons only 5 years ago.
Properties

• Sisal Fiber is exceptionally durable with a low maintenance with minimal wear and tear.
• It is Recyclable.
• Sisal fibers are obtained from the outer leaf skin, removing the inner pulp.
• Sisal fibers are Anti static, does not attract or trap dust particles and does not absorb moisture or water easily.
• The fine texture takes dyes easily and offers the largest range of dyed colours of all natural fibers.
Uses

• Sisal is used commonly in the shipping industry for mooring small craft, lashing, and handling cargo.

• It is also surprisingly used as the fibre core of the steel wire cables of elevators, being used for lubrication and flexibility purposes.

• It is used in automobile industry with fiberglass in composite materials.

• Other products developed from sisal fiber include spa products, cat scratching posts, lumbar support belts, rugs, slippers, cloths and disc buffers.

• Sisal is used by itself in carpets or in blends with wool and acrylic for a softer hand.