

Fibre to Fabric

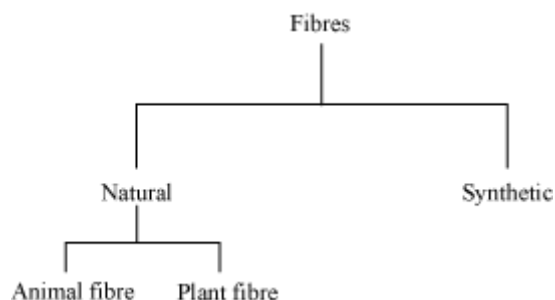
Natural and Synthetic Fibres

We see cloth or fabric all around us. Our clothes, bed sheets, school bags, curtains are all made up of fabric. Ask your mother to give you a silk sari. Now, take a pair of jeans and compare its texture with that of the sari. **Can you tell why your jeans is rough and hard, while the silk sari is smooth and soft?**

Fabric is basically obtained from fibres. Fibres are long filamentous-like structures that can be rolled together to form threads. They can be obtained from a wide variety of sources. Depending on the origin of a fibre, it can be classified as natural or synthetic.

The fibres obtained from plants and animals are called natural fibres. Examples of natural fibres include cotton, jute, wool, and silk. On the other hand, those made artificially, using chemicals, are known as synthetic fibres. Rayon, nylon, acrylic, and polyester are examples of the same.

Natural fibres can further be classified as plant fibres and animal fibres. As their names suggest, fibres obtained from plants are called plant fibres, while those obtained from animals are called animal fibres. Cotton and jute are examples of the former, while silk and wool are examples of the latter.



Natural fibres

The fibres obtained from the living world are called natural fibres. These can be obtained from both plants and animals. Fibres such as cotton and jute are obtained from plants.

Wool and silk are of animal origin. Wool is primarily obtained from sheep and goat. However, it can also be obtained from yak, camel, and rabbit. Silk is obtained from the cocoon of the silkworms that live only on mulberry trees.



Since a very long time, natural fibres have been used by humans to make fabrics. Synthetic fibres came into the picture about a century ago and revolutionised the textile industry.

Synthetic fibres

Man-made fibres are known as synthetic fibres. They are made by carrying out reactions between various chemicals. Synthetic fibres are not easily affected by micro-organisms and have more strength than natural fibres. Rayon, nylon, acrylic, and polyester are examples of synthetic fibres.

Interesting Fact:

In the olden times, warriors used to wear armours that were not made up of fabric. The armours were made up of small pieces of metals joined by thin metal wires. Metals were used because the purpose of the armours was to protect the warriors from weapons such as swords and arrows.



Obtaining and Processing of Cotton and Jute Fibres

We know that fabrics are obtained from fibres. Also, fibres are of two types, natural and synthetic. Cotton and jute are natural fibres and are obtained from plants. Here, we will discuss how these two fibres are obtained and how they are processed to make fabrics.

Cotton

Cotton is a soft fibre that is obtained from the cotton plant. It is widely cultivated in the entire world. The conditions that are best for its cultivation are black soil and a warm climate. In India, cotton is primarily cultivated in Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, and Tamil Nadu.

Cotton is obtained from the fruit of the cotton plant. After the fruit matures, the boll bursts and the cotton seeds covered with cotton fibres can be seen. Before cotton can be used to make threads or clothes, it first needs to be separated from the cotton seeds around which the cotton fibres are present. The process by which this is done is known as ginning. In this process, seeds are separated from cotton by combing.



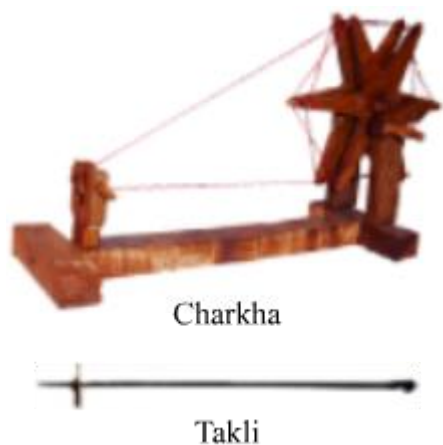
INTERESTING FACT

A cotton field looks like a snow-covered region when the cotton is ready for harvesting.



Cotton fibres obtained by the process of ginning are then spun into yarns. **The process by which yarns are obtained from fibres is known as spinning.**

Many simple instruments were used in the olden days to make yarns from cotton. Two such instruments are takli and charkha. The use of charkha was made popular by Mohandas Karamchand Gandhi during the Indian freedom struggle. He discouraged Indian people from buying the clothes produced in Britain with the help of machines and asked them to wear clothes made of khadi (homespun cotton). Nowadays, spinning is done with the help of machines. These machines are very fast and efficient.



The given animation summarizes the whole process of processing of cotton.

Jute

Jute is a fibre that is obtained from the jute plant. It is soft and shiny, and can be spun into threads. Like cotton, jute is also obtained from a plant. However, unlike cotton, it is not obtained from the fruit, but from the stem of the jute plant. In India, jute is mainly cultivated in West Bengal, Bihar, and Assam during the rainy season.

When the jute plant is in the flowering stage, it is harvested. After harvesting, its stems are kept submerged in water for a few days. During this period, the stem of the plant rots and the fibres (present in the stem) remain. **The process by which fibres are obtained from the stem of the plant is known as retting.** These fibres can then be separated from the non-fibrous matter by hand. This process

is known as stripping. After the fibres are separated, they can be spun into yarns and fabrics can be made from these yarns.



Obtaining Fabrics from Yarns

Once yarns are obtained from fibres, they can be used to make fabrics by various methods. Here, we will discuss the two most important methods by which fabrics can be obtained from yarns. These two processes are:

1. Weaving, and
2. Knitting

Weaving

The process by which two sets of yarns are arranged together to obtain a fabric is known as weaving.

Weaving is done by using looms. These looms can either be powered by electricity (powerlooms) or powered by hand (handlooms). A handloom and a powerloom are shown in the given figures.



Handloom



Powerloom

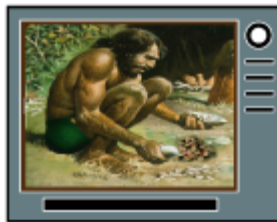
Knitting

Have you seen anybody knitting a sweater? If you have, then you would know that though knitting can be done using more than one yarn, the minimum number of yarns required for knitting is one. **Hence, the process in which fabric can be obtained from only one yarn is called knitting.** If you pull a loose thread coming out of a knitted fabric (such as sweaters and socks), then you will observe that the whole fabric can be untangled by pulling this single thread. This shows that the whole fabric is made from a single yarn. Like weaving, knitting is also be done by both methods, i.e., by hand and by machines.



Advancements in the Clothing Industry

Have you seen programs on the National Geographic and the Discovery Channel? If you have, then you would have come across programs detailing the lives of the primitive man. Do you know how the primitive humans used to cover themselves? They used tree leaves, barks, and animal skin as their garments.



As humans became more civilised, they started to weave, making mats and baskets with the help of dry grass and twigs. Then, they learnt to make yarns from animal fleece, vines, and cotton.



Cotton



Animal Fleece

In ancient India, the people used to wear fabrics made up of cotton that was cultivated along the banks of the river Ganga. Today, India is one of the largest producers of cotton. In ancient Egypt, both cotton and flax (a plant, like cotton, which also provides natural fibres) were cultivated along the banks of the river Nile. Stitching was not known at that time and people used to wear the complete fabric around their body.

With scientific progress and the invention of the sewing machine, stitched clothes gained popularity. The invention of the sewing needle was a milestone for the textile industry.



It is interesting to note that natural fibres have been used for apparels and fashioning homes for thousands of years. The use of wool dates back to over 4,000 years. In comparison, man-made fibres or synthetic fibres are relatively new, being only about a century old.