

Class 7 Chemistry Fibre to Fabric

Introduction

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We know that fibres can either be obtained from plants or animals and are known as natural fibres. Jute, cotton is the commonly known natural fibres obtained from plants whereas wool, silk are the commonly known natural fibres obtained from animals.



Fig. Cotton shirt (left) and a jute bag (right)

Wool is obtained from the fleece of animals possessing hairy fibres on their body whereas silk is obtained from the cocoon of silk moth.

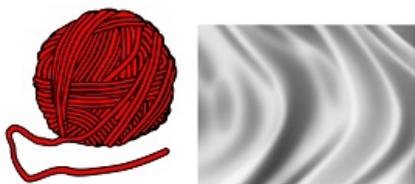


Fig. Wool (left) and silk (right)

This fibre obtained from natural sources undergoes further processing, dyed into several attractive colours and designs before being used by people.

Wool

The hair present in the body of animals traps the air in between the hairy fibres. The trapped air being a poor conductor of heat prevents the flow of heat from their body to the cold surroundings and vice versa thereby makes these animals feel warm.

Wool is obtained from the hairy animals like sheep, goat, yak and many other animals. Coarse beard hair and fine soft under-hair close to the skin are the two types of fibres forming the fleece of these animals.



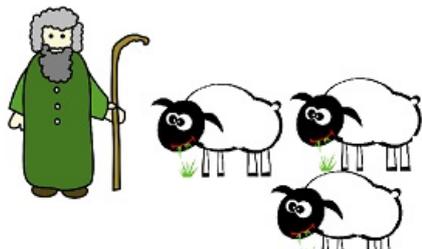
Fig. Sheep (top left), goat (top right) and yak (bottom)

Some other popularly used wool are as follows:

- Yak wool is popularly used in Tibet and Ladakh.
- Angora wool obtained from angora goats, found in hilly regions such as Jammu and Kashmir. The under fur of Kashmiri goat is soft. It is woven into fine shawls called Pashmina shawls.
- The fur (hair) on the body of camels is also used as wool.
- Llama and Alpaca, found in South America, also yield wool.

Rearing and breeding of sheep

To get the best quality wool it is first necessary to select the best quality wool yielding parent. This process of selecting parents in order to obtain good quality wool in their offspring is termed as selective breeding.



The sheep are taken out for grazing. They are also fed on a mixture of pulses, corn, jowar, oil cakes and minerals to ensure good yield of wool. Once the reared sheep develops a thick growth of hair, hair is shaved off for getting wool.

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Processing fibres into wool

Processing fibres into wool

Step I: The first step is the removal of the fleece of the sheep along with a thin layer of skin. This process is termed as shearing. The hair provides woollen fibres that are then processed to obtain woollen yarn.



Step II: The sheared fleece is systematically washed in tanks in order to remove the grease, dust and dirt. This is known as scouring.



Fig. Scouring in tanks

Step III: The scoured hair is then sorted and sent to a factory where hair of different textures are separated or sorted.

Step IV: Here the small fluffy fibres, called burrs, are separated from the hair and the hair is scoured again and dried. The wool is then ready to be drawn into fibres.

Step V: The fibres are dyed into various vibrant colours because the natural colour of the fleece is black, brown or white.



Fig. Dyed fibres of wool

Step VI: The fibres are then straightened, combed and finally rolled into yarn. The longer fibres are made into wool for sweaters whereas the shorter fibres are spun and woven into woollen cloth.

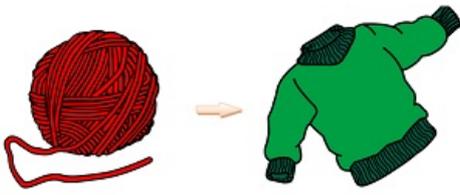


Fig. The woollen fibres rolled into yarn is used to weave sweaters

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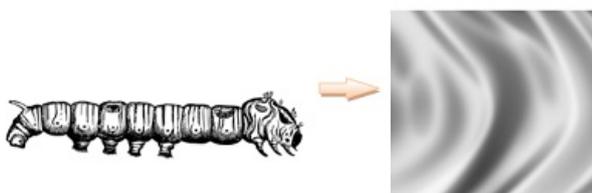
Silk

Silk

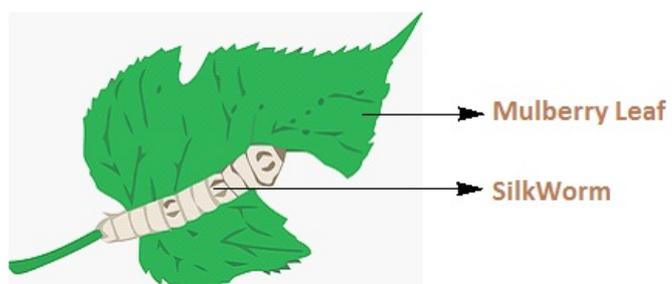
Silk fibre is obtained from the cocoon of the silk moth. The rearing of silkworms to obtain silk is termed as sericulture. The silk fibres so obtained are weaved to make silk cloth.



Fig. A silk saree



Tassar silk, mooga silk, kosa silk are the most commonly known silk varieties. The most common silk moth among all is the mulberry silk moth which is soft, lustrous, and elastic and can be dyed in to beautiful colours.



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Life cycle of silkworm

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The female silk moth lays eggs. The larvae also known as caterpillar or silkworm hatches out from the egg and grows in size. As soon as the caterpillar gets ready to develop into pupa, it first weaves a net to hold itself and swings its head from side to side in the form of the figure of eight (8).

During these movements the caterpillar secretes fibre made of a protein that hardens on exposure to air and becomes silk fibre. The caterpillar soon covers itself completely by a covering of silk fibres known as cocoon. The further development of the moth continues inside the cocoon. Silk fibres are used for weaving silk cloth.

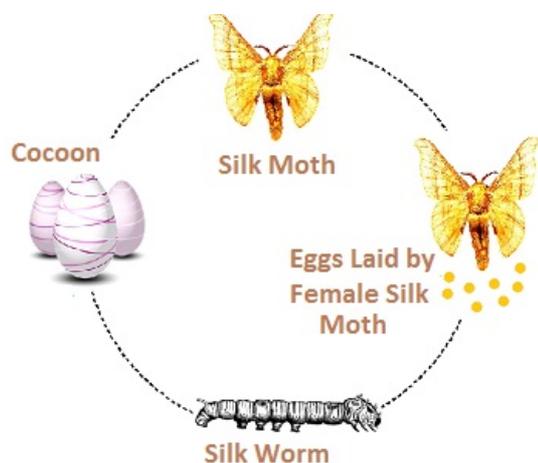


Fig. Life history of silk worm

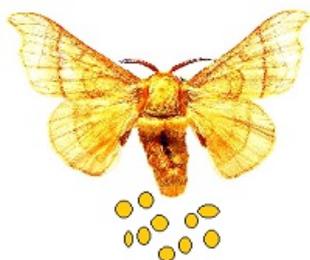
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Processing of cocoon to silk

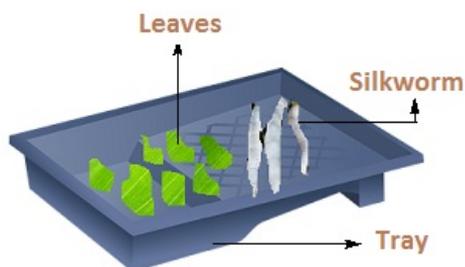
Processing of cocoon to silk

Step I: The first step towards obtaining silk is rearing of silkworms done when mulberry trees bear a fresh crop of leaves.

- The hundreds of eggs laid by female silk moth are stored carefully on strips of cloth or paper and are then sold to silkworm farmers where the eggs are kept under hygienic and suitable conditions of temperature and humidity for their proper growth.



- They are then warmed to a suitable temperature. This enables the larvae to hatch from eggs. The larvae also known as caterpillar or silkworms are kept in bamboo trays and are served with freshly chopped mulberry leaves. They eat day and night and increase a lot in size.



- After 25 to 30 days, the silkworms stop eating and move to a tiny chamber of bamboo in the tray having small racks or twigs to spin cocoons. The silkworm spins the cocoon inside which further development into the silk moth takes place.



Step II: The second step towards obtaining silk is the processing of silk. The pile of cocoons used to obtain silk fibres are kept under the sun or boiled or else exposed to steam to separate the silk fibres. This process is known as reeling the silk and is done using machines which unwind the threads or fibres of silk from the cocoon which are then spun into silk threads, and are woven into silk cloth by weavers.



Fig. Boiling cocoon (left) and reeling of silk (right)