Silk: The Queen of Fibres

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ABSTRACT

Silk, often referred to as the "queen of fibres," is one of the most luxurious and sought-after natural materials in the world. Known for its shimmering appearance, smooth texture, and remarkable strength, silk has captivated humanity for thousands of years. India has the unique distinction of being the only country in the world that produces all the five known commercial silks viz., mulberry, tropical tasar, temperate (oak) tasar, eri and muga. India's traditional and culture-bound domestic market and incredible array of silk fabrics and costumes that reflect geographic specificity, has aided the country's rise to the top on the silk sector. India is the largest consumer of silk in the world.

INTRODUCTION

"Silk" the most beautiful of the natural fibres is acclaimed as the "Queen of Fibres". Silk is the only truly mystery and adventure. It is also a highly valuable textile fibre having unique technical and user-friendly characteristics. The "Queen of Fibres" has remained unmatched in her beauty, feel and other user-friendly properties. Silk is a continuous protein fibre produced by the silkworm so as to form its cocoon.

Silk is produced by the larvae of several months. These larvae live on mulberry leaves and each tiny larva consumes an extremely large number of leaves. Raising of these insects is a laborious job. The larva attaches itself to a specially constructed straw frames, rears its head, and begins to spew the silk liquid, which hardens on contact with air. The larva spins by moving its head in a figure eight motion and contrasts the cocoon from the

outside in. As it spins, the larva decreases in size, and upon completion of cocoon it charges into dormant pupa. Except for those to be used for breeding, the cocoons are subjected to heat; which kills pupa. These cocoons can be stored until unreeled in preparation for yarn manufacturing (Maurya *et al*., 2017).

History of Silk

The possibility of making cloth from the filament that the silkworm spins into a cocoon was first discovered in China about 2600 B.C. Legends tell us that a cocoon accidently dropped into a cup of tea that a Chinese princess was having in her garden. It began to unravel giving her the idea to use it as a yarn. For this, she had been prepared a hot liquid to soften it and loosened the fibre. Then the princess pulled and drew away it from the cocoon as a continuous strand. Another story cites Empress Si-ling-chi as the first producer of silk fibre, from which she made a silk robe for her husband. From antiquity until the more recent establishment of the Chinese Republic, she was venerated as the Goddess of the Silkworm. The Chinese who first cultivated the silkworm and developed a silk industry endeavored to keep the source of the raw material secret. Their silk fabrics were highly priced Caravans carried silk into the Near East where they were traded for hundreds of years. It is believed that silk was introduced into Europe by Alexander the Great in the fourth century B.C.

As the desire for the silk fabrics expanded, the interest in its production also increased. About three thousand years after its original discovery the secret was stolen out of China. The earliest mention of silk fabrics is attributed to ancient India and is thought to have been brought to other parts of the world by the Aryans, along with the horse. The symbol for silk was already part of the written language in China around 2600 BC and fragments of ancient silk fabrics have been found and dated back to around 1500 BC. Aristotle first mentions silk in Western culture around 300 BC but it was not until the "Silk Road" trading routes were established around 100 AD did silk become abundant in the West.

Different types of silk

Broadly, there are four types of silk. They are Mulberry silk and non-Mulberry silk namely Tasar (tropical and temperate/oak), Eri and Muga (Singhee, 2022). The silk produced by feeding mulberry leaves are called Mulberry silk. Non-Mulberry silk is cultivated in the forests and are also called as Vanya Silk. India is the only country producing all the four types of silk (Figure 1).

Mulberry Silk: The bulk of the commercial silk produced in the world comes from this variety and often silk generally refers to mulberry silk. Mulberry silk comes from the silkworm, *Bombyx mori* L. which solely feeds on the leaves of mulberry plant. These silkworms are completely domesticated and reared indoors. In India, the major mulberry silk producing states are Karnataka, Andhra Pradesh, West Bengal, Tamil Nadu and Jammu & Kashmir which together accounts for 90 % of country's total mulberry raw silk production.

Tasar Silk: Tasar (Tussah) is copperish colour, coarse silk mainly used for furnishings and interiors. It is less lustrous than mulberry silk, but has its own feel and appeal. Tasar silk is generated by the silkworm, *Antheraea mylitta* which mainly thrive on the food plants Asan and Arjun. The rearings are conducted in nature on the trees in the open. In India, tasar silk is mainly produced in the states of Jharkhand, Chattisgarh and Orissa, besides Maharashtra, West Bengal and Andhra Pradesh. Tasar culture is the main stay for many a tribal community in India.

Eri Silk: Also known as Endi or Errandi, Eri is a multivoltine silk spun from open-ended

cocoons, unlike other varieties of silk. Eri silk is the product of the domesticated silkworm, *Philosamia ricini* that feeds mainly on castor leaves. Ericulture is a household activity practiced mainly for protein rich pupae, a delicacy for the tribal. Resultantly, the eri cocoons are open-mouthed and are spun. The silk is used indigenously for preparation of chaddars (wraps) for own use by those tribals. In India, this culture is practiced mainly in the north-eastern states and Assam. It is also found in Bihar, West Bengal and Orissa.

Muga Silk: This golden yellow colour silk is prerogative of India and the pride of Assam state. It is obtained from semi-domesticated multivoltine silkworm, *Antheraea assamensis*. These silkworms feed on the aromatic leaves of Som and Soalu plants and are reared on trees similar to that of tasar. Muga culture is specific to the state of Assam and an integral part of the tradition and culture of that state. The muga silk, an high value product is used in products like sarees, mekhalas, chaddars, etc.

Properties of Silk

Silk has many qualities which sets it apart from other fibres.

- Silk is a lustrous fibre. It has an elegant luster of pearl. This comes from the multilayered, prism like structure of fibroin, which diffuses light.
- Silk filament is a continuous thread of great tensile strength measuring from 500 to 1500 metres in length, with a diameter of 10-13 microns.
- Silk absorbs ultraviolet rays and thus protects the skin.
- Silk is strong. It is finer than human hair yet is as strong as an iron wire of the same diameter.
- Silk has good absorbency, low conductivity and dyes easily. The colours take on a bright sparkle. Silk can absorb an amazing 30% of its dry weight in moisture, giving it similar properties to wool. This makes it a comfortable year-round fibre to wear.
- Silk is highly resistant to mould and mildew. It is also resistant to moths and dust mite. It thrives in water, although detergents and perspiration can break down the fibre.
- Silk is warm to touch but without weight and also warm to wear. It breathes so can be used as a summer fibre, but makes for light weight insulation in the cold. It has been used for glove liners and sleeping bag inners for extra warmth.
- Silk is a fine fibre so when silk is subject to abrasion making it unsuitable for high rub areas like carpets or regularly used furniture.
- Silk is very elastic fibre. It can stretch 10% to 20% without breaking.
- Silk resists creasing and can be combined with other fibres like wool to help knits return to their original shape.
- Silk is a very good fibre to use as a warp. If nothing else, it is the soft, warm handle which sets it apart (https://ugcmoocs.inflibnet.ac.in/assets/uploads/).

Care of silk

- Care of silk is similar to caring for wool. So, wash gently in luke warm water.
- Pure silk and water are quite compatible. It does not go mouldy even after long periods of being damp. If there is a large amount of gum left, this can begin to ferment and give off an odour, but the smell should wash away.

- Never use bleach on silk fabrics. Always handle with care.
- Never wring or rub them. Squeeze or allow to drip dry.
- Do not expose silk for large lengths of time to sunlight. It will break down the fibres over time. Preferably dry flat away from direct sunlight.
- During washing, shrinkage may occur due to the fibre absorbing moisture. Preferably, the fabric should have been pre-shrunk but pressing on a silk heat setting should return it to close its original size.
- It has a natural elasticity which does not hold creases well. So, start with a dry iron on the silk setting, preferably while the garment is still a little damp. Steam can be used on heavier silks, but could cause puckering and shrinkage on finer fabrics. Make sure it does not leave a shiny finish. It is safer to iron with a cloth or on the wrong side. But do not iron silk velvets.
- Silk can be dry cleaned. But any silk with an embossing or moiré finish, if the dirt is oily or greasy, go and visit a professional dry cleaner.

Importance of Silk

Silk holds immense cultural, economic, and environmental significance:

- **Cultural Heritage**: Silk has played a crucial role in the cultural identity of many societies, influencing art, fashion, and traditions.
- **Economic Impact**: The silk industry provides livelihoods for millions of people worldwide, particularly in rural areas. It contributes significantly to the economies of producing countries.
- **Sustainable Practices**: With increasing awareness of ethical and sustainable practices, many silk producers are adopting environmentally friendly methods, such as organic sericulture.

Uses of Silk

Apparel fabrics: Wedding dresses, sarees, shawls, underwears, formal dress etc.

Accessories: Scarves, squares, gloves, ties, hats, artificial flowers, ribbons, handbags and umbrellas etc.

Household textiles: Drapes, wall coverings, carpets, lampshades and bed clothes etc.

Industrial textiles: Sewing threads, embroidery threads, typewriter ribbons, racing bicycle tyres, parachutes etc.

Art: Silk is used in painting and traditional crafts, such as silk-screening and embroidery etc.

Electronic industry: used as insulation coils for wireless receivers and telephones etc.

Medical uses: used in suture materials and medical dressings etc.

CONCLUSION

Silk is known as ‘Queen of fibres’, a title well-deserved by the virtue of its association with royalty. Silk is more than just a luxurious fabric; it embodies a rich history and a profound connection to culture and tradition. Its unique properties and diverse applications make it an invaluable resource. As we continue to appreciate and explore the world of silk, it is essential to support sustainable practices in silk production to ensure that this timeless fabric remains a cherished part of our heritage for generations to come.

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Figure 1. Different types of silk