

Silk Fibers

Silk fibers are protein-based, so like wool the source is an “animal”—a silkworm. The protein is called *fibroin* which is “extruded” from the silkworm and “spun” around its body. The extruded and solidified solution is called a *filament*. The filament is “glued” together with a substance called *sericin*. The silkworm follows the typical caterpillar stages that you may have learned about when you were a child.

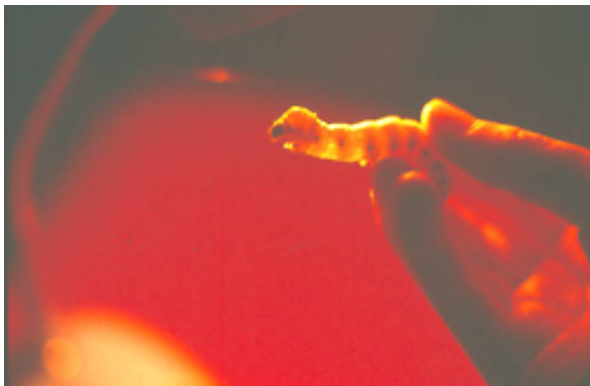


This print illustrates the silkworm cycle:

1. Moth laying eggs, 2. Worm three days old, 3. Worm 10 days old, 4. Worm continues to grow, 5. Worm fully grown, 6. Cocoon after worm spins it, 7. Cross-section showing chrysalis inside the cocoon, 8. Moth develops and emerges to lay eggs and start the cycle again.

Science History Institute, Public domain, via Wikimedia Commons

https://commons.wikimedia.org/wiki/File:Life_cycle_of_a_silkworm_from_egg_to_moth_-_DPLA_-_2f77d2d5eff44d5b14a55e47dec2687d.jpg (Retrieved 4/20/26)



Cultivated silkworm



Wild silkworm

K. LaBat photo collection



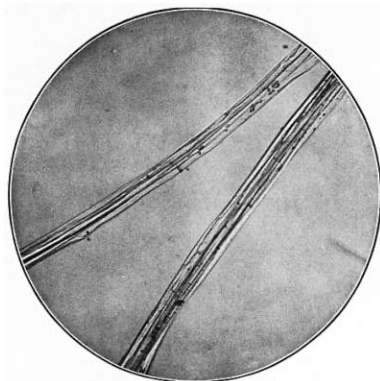
Silk “reeling”



Silk from many reeled cocoons are spliced together

K. LaBat photo collection

Cultivated silk is a controlled manufacturing process used to produce the smooth, lustrous fabrics we think of as silk. For cultivated silk production, a specific silkworm (*bombyx mori*) is fed a diet of mulberry leaves, cocoons are emersed in warm water, and the silk is “reeled” or unraveled. The worm is killed in the process, because the manufacturer wants to have the longest fiber possible from each cocoon. If the cycle continues and the moth eats its way out of the cocoon, the long fiber (*filament*) is broken. Some silkworms are selected to survive to produce the next harvest. *Raw silk* is made by leaving some sericin, which has a yellowish tint, on the fibers. *Wild silk*, as the name indicates, is made from silk collected from silkworms grown in the “wild”—the silkworm is larger than the cultivated type and usually eats oak leaves. Wild silk has a rough, textured surface. *Dupioni silk* is created when two or more silkworms extrude filaments that randomly touch and bond forming a *slub* (“lump”) along the intertwined fibers. The slubs along the filaments provide texture to a fabric. Thailand is known for production of a variety of silk fabrics that are branded as *Thai silk*.*



Photomicrograph by Anonymous - 1911
Encyclopædia Britannica volume 10,
 Plates I & II after page 310,
<https://www.gutenberg.org/files/35561/35561-h/35561-h.htm#ar125>, Public Domain,
<https://commons.wikimedia.org/w/index.php?curid=80591697>

A photomicrograph of a silk fiber shows a long filament with some irregularities, but no roughness, like wool with a “scaley” surface. When silk fibers are sliced to examine their cross-

sections, irregular triangle shapes can be seen through the microscope. That shape gives silk its characteristic “luster” as light is reflected in a diffuse manner.

Silk Properties

Silk properties are determined by its protein make-up and its characteristic length, cross-section, and surface texture (cultivated is smooth, wild silk is textured).

Cultivated Silk Properties

Diffused light reflection from a smooth triangular cross-section and long filament length.

Hygroscopic (tends to absorb moisture from air): Silk feels comfortable in warm temperatures, especially compared to synthetic fibers used in fabrics to mimic silk.

Good dye acceptance: Silk readily absorbing dyes. The property is especially evident in cultivated silk fabrics. The property of diffusely reflecting light provides the “luster” or “glow” along with rich colors.

Weaker wet: Silk, like wool, is weaker wet. Care labels often specify “dry clean only” or “hand wash only.”

Damaged by chlorine bleach and alkali: Like wool, the silk protein is sensitive to alkali (detergent) and chlorine bleach. Use hydrogen bleach instead of chlorine bleach. If hand washing, use a mild soap.

Heat sensitive: Use caution when pressing a silk fabric. A press cloth is recommended.

Static charge build-up in low humidity: Like wool fabrics, silk fabrics can build up an electric charge resulting in garments that cling to the body. A sprayed on application like “Static Guard” can be used to attract moisture to the fabric, limiting static charge build-up.

Mildew susceptible: Make sure that silk fabric products are completely dry before storing them.

Naturally biodegradable: Silk is a natural protein fiber that is biodegradable. Soil microorganisms will eventually break down the fibers in 100% silk fabrics without releasing harmful toxins. Finishes may delay or prevent the fiber from breaking down.

***To Learn More about Thai Silk:** International Sericultural Commission, United Nations Reg. No. 10418. <https://inserco.org/en/thailand>