



## Commercial Products Related to Sericulture and Their Uses

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Sericulture, also known as silk farming, involves the rearing of silkworms for the purpose of silk production. It is an ancient practice that dates back to the Neolithic period in China around 2700 BCE. Today, it continues to thrive as a significant agro-industry in many parts of the world thus contributing not only to the textile industry but also to various sectors including pharmaceuticals, cosmetics and agriculture. This article focuses into the commercial products derived from sericulture, their applications and the corresponding prices of these products in the global market.

### 1. Silk: The Primary Product of Sericulture

Silk is undoubtedly the most well-known product derived from sericulture. Silkworms, primarily *Bombyx mori* L., produce cocoons of silk which are harvested and processed into textiles. Silk production involves several stages including the cultivation of mulberry trees (the primary food source for silkworms), rearing the larvae, spinning the silk and finally weaving it into fabrics.

#### Types of Silk:

- **Mulberry Silk:** The most common and high-quality silk produced by *Bombyx mori* L.
- **Tussar Silk:** Produced by wild silkworms, it has a coarse texture but is highly durable.
- **Eri Silk:** Known for its soft texture, it is primarily produced in India and Thailand.
- **Muga Silk:** A rare silk produced in Assam (India) known for its natural golden colour and hold GI tag.

#### Uses of Silk:

Silk is primarily used in the fashion and textile industry to create clothing, upholstery, drapes and other fabric products. However, its applications extend beyond fashion including:

- **Medical Uses:** Due to their biocompatibility and strength, silk fibers are utilized in sutures, wound dressings and as scaffolds in tissue engineering.
- **Cosmetics:** Silk proteins are utilized in skincare products for their moisturizing properties.
- **Industrial Uses:** Silk is also used in parachutes, bike tires and in the production of some luxury bedding products.

#### Price of Silk Products:

The price of silk varies depending on its type, quality and source. As of recent data

- **Mulberry Silk:** Ranges between \$40 to \$100 per kilogram.
- **Tussar Silk:** Priced around \$30 to \$80 per kilogram.
- **Eri Silk:** Usually costs between \$20 to \$50 per kilogram.

- **Muga Silk:** Considered a premium silk, it can cost between \$120 to \$200 per kilogram.

**Silk Fabrics:** Finished silk products such as fabrics depending on the weave and design, range from \$20 to \$500 per yard with premium designs fetching higher prices in the luxury fashion market.

## 2. Silkworm Pupae: A By-product with Nutritional Value

In many silk-producing countries especially in Asia, silkworm pupae are considered a delicacy and are consumed for their high protein content. Beyond human consumption, they are also used in animal feed.

### Uses of Silkworm Pupae:

- ❖ **Human Food:** In countries like China, Thailand and Korea, silkworm pupae are boiled, fried or dried and consumed as a high-protein snack.
- ❖ **Animal Feed:** Silkworm pupae are processed into animal feed for poultry, fish and livestock due to their high nutritional value.
- ❖ **Oil Production:** Silkworm pupae are rich in oil particularly linoleic acid which has applications in cosmetics and food supplements.

### Price of Silkworm Pupae Products:

- ❖ **Dried Silkworm Pupae (for human consumption):** \$10 to \$50 per kilogram, depending on the region and quality.
- ❖ **Animal Feed:** Processed silkworm pupae for animal feed costs around \$5 to \$15 per kilogram.
- ❖ **Silkworm Oil:** A niche product, it is priced around \$50 to \$200 per liter based on purity and extraction methods.

## 3. Sericin: A Silk Protein with Commercial Applications

Sericin is a protein that is removed from silk fibers during the process of silk production. It is often discarded as waste but recent advancements have shown that sericin has valuable applications in pharmaceuticals, cosmetics and biotechnology.

### Uses of Sericin:

- ❖ **Cosmetics:** Sericin is known for its moisturizing and anti-aging properties thus making it a key ingredient in skincare products such as lotions, creams and serums.
- ❖ **Medical Uses:** Sericin is used in wound dressings, drug delivery systems and as a biomaterial for regenerative medicine due to its biocompatibility.
- ❖ **Textile Industry:** In some cases, sericin is reintroduced into silk fabrics to improve texture and give the fabric a lustrous appearance.

### Price of Sericin Products:

- ❖ **Sericin Powder:** Typically priced at \$100 to \$300 per kilogram depending on purity and extraction techniques.
- ❖ **Cosmetic Products Containing Sericin:** Creams and lotions with sericin as an active ingredient are sold between \$30 to \$200 depending on the brand and concentration of sericin.
- ❖ **Medical-Grade Sericin:** Higher purity sericin for pharmaceutical applications can cost upwards of \$500 per kilogram.

## 4. Silk-Based Biomaterials in Medicine

Silk's unique properties of strength, biocompatibility and biodegradability have made it an increasingly popular material in biomedical applications. Silk fibroin, a protein found in silk is particularly valuable in this context.

### Uses in Medicine

- ❖ **Sutures:** Silk sutures are one of the oldest and most reliable materials for surgical stitching.

- ❖ **Tissue Engineering:** Silk scaffolds are used to support cell growth in tissue engineering thus aiding in the repair of damaged tissues.
- ❖ **Drug Delivery Systems:** Silk-based nanoparticles are used to deliver drugs in a controlled and targeted manner.
- ❖ **Regenerative Medicine:** Silk hydrogels are being developed to support the regeneration of tissues such as skin, cartilage and bones.

#### **Price of Silk Biomaterials:**

- ❖ **Silk Sutures:** Range between \$10 to \$30 per pack depending on the gauge and length.
- ❖ **Silk Fibroin for Tissue Engineering:** Biomedical-grade silk fibroin is priced around \$500 to \$2000 per kilogram depending on purity and intended use.
- ❖ **Silk Nanoparticles for Drug Delivery:** Prices vary widely depending on the application but can range from \$500 to \$3000 per gram in research settings.

### **5. Silkworm Gut: A Traditional Material for Fishing and Surgery**

Silkworm gut is a product traditionally used in the production of fishing lines and as a medical suture material. Though largely replaced by synthetic materials, it still holds niche markets.

#### **Uses of Silkworm Gut:**

- ❖ **Fishing Lines:** Historically, silkworm gut was prized for its strength and thinness thus making it an excellent material for fishing lines.
- ❖ **Sutures:** In the past, silkworm gut was used in surgery as a suture material, though it has been largely replaced by synthetic alternatives.

#### **Price of Silkworm Gut:**

- ❖ **Fishing Line:** Vintage or specialty silkworm gut fishing lines are considered rare and are priced around \$50 to \$200 for short lengths.
- ❖ **Surgical Sutures:** Medical-grade silkworm gut sutures, though rarely used today were priced between \$20 to \$100 per pack.

### **6. Silk-Based Textiles: Modern Innovations and Trends**

With advancements in textile technology, silk is now being blended with other fibers or treated with innovative techniques to enhance its properties thus leading to new applications in both fashion and industry.

#### **Innovations in Silk Textiles:**

- ❖ **Blended Fabrics:** Silk is blended with fibers like cotton, wool and synthetic materials to create fabrics that combine the best properties of both materials. These fabrics are used in high-end fashion, upholstery and even sportswear.
- ❖ **Smart Textiles:** Researchers are developing silk-based smart textiles that can change colour, regulate temperature or have built-in sensors for health monitoring.
- ❖ **Silk Denim:** A novel blend of silk and denim creates a softer, more luxurious version of the classic fabric.

#### **Price of Silk Textiles:**

- ❖ **Blended Silk Fabrics:** Typically range from \$30 to \$200 per yard depending on the blend and the quality of silk used.
- ❖ **Smart Silk Textiles:** While still in the experimental phase, smart silk textiles are expected to cost upwards of \$1000 per garment due to the technology involved.
- ❖ **Silk Denim:** Priced around \$50 to \$150 per yard depending on the brand and specific blend.

### **7. Cosmetic Products Containing Silk Proteins**

The use of silk proteins in cosmetics has grown significantly in recent years. Silk proteins, particularly sericin and fibroin are valued for their ability to retain moisture, protect the skin and enhance skin elasticity.

**Uses in Cosmetics:**

- ❖ **Moisturizers:** Silk proteins are used in lotions and creams to improve skin hydration.
- ❖ **Anti-Aging Products:** The protein's ability to enhance collagen production makes them popular in anti-aging serums and creams.
- ❖ **Hair Care:** Silk proteins are also used in shampoos and conditioners to strengthen hair and improve its texture.

**Price of Silk-Based Cosmetics:**

- ❖ **Skincare Products:** Sericin-based creams and serums are priced between \$50 and \$300 depending on the concentration and brand.
- ❖ **Haircare Products:** Shampoos and conditioners with silk proteins are sold between \$20 and \$100 per bottle depending on the brand.

**Conclusion**

Sericulture has far-reaching implications beyond its traditional role in silk production. The products derived from silkworms and silk processing—ranging from textiles to biomaterials, cosmetics and even nutritional supplements—play crucial roles in various industries. While silk remains the cornerstone of sericulture, by-products such as sericin, fibroin and silkworm pupae have carved out significant niches in the medical, pharmaceutical and food industries. The prices of these products vary widely reflecting their application, quality and rarity thus making sericulture a multifaceted and valuable industry. As technological innovations continue to expand the potential uses of silk and its derivatives, the commercial landscape of sericulture is poised for even greater growth in the future.