

Clothing and TEXTILES

UTAH STATE UNIVERSITY COOPERATIVE EXTENSION PROGRAMMING

An Introduction to Natural Fibers

The natural living world provides food, fiber, timber, and absorbs waste contributing to the well-being of humanity and sustainability of our future. Today, consumers are provided with a variety of choices when it comes to the fibers they choose to buy and use.

Since the 1960's man-made fibers have revolutionized the industry, but provided competition to the natural fibers that are produced from various plant and animal sources. According to the Food and Agriculture Organization (FAO, 2009), synthetic fibers such as acrylic, nylon, polyester, and polypropylene have replaced natural fibers traditionally used in clothing and home furnishings. Over 30 million tons of natural fibers are produced annually (FAO, 2009). With the high volume of production, the natural fiber industry provides income and food security to millions of people around the world who produce, process, and transport the raw materials that are woven into fabrics for clothing and household items (FAO, 2009). Further, in many developing countries, crops such as cotton, jute, and sisal are of major economic importance.

Beyond the economic importance evident in the production, processing, and export of natural fibers, there are other benefits to the utilization of these fibers. For individuals and families, natural fibers can be utilized as a healthy, responsible, sustainable, and fashionable choice for clothing and home furnishings (FAO, 2009).

Fibers that make up fabrics used in everyday life can be best understood as the building blocks of textile and clothing goods. The durability and success of fabrics used in clothing and home furnishings depend on the fiber used. Fibers resemble a fine, hair-like structure that is able to withstand the rigorous manufacturing required from design to distribution (Cohen & Johnson, 2010). For thousands of years individuals and families have been using natural fibers for clothing, cording, home furnishings, and much more.

The sources of natural fibers can be organized into two basic categories: cellulosic and protein (Neilson, p. 38). Cellulosic fibers are plant based and include cotton, linen, henequen, jute, and sisal. Protein fibers come from animals and include silk, wool, and leather.

Cotton, flax, wool, and silk fibers are the most commonly used natural fibers found in the apparel and home textile markets (Cohen & Johnson, 2010, p. 36).

Cotton

Considered the world's most popular fiber, cotton has been around since 5,000 B.C. originating from Mexico. Because of its durability and softness, cotton is used in all types of clothing and household items. Found in the tropical regions of Africa, the Americas, and Asia, cotton grows on the seed of a variety of plants found in the genus *Gossypium* (FAO, 2009). Attached to the seed of the cotton plant, cotton is a seed fiber (Cohen & Johnson, 2010, p. 36).



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FIBER & FABRIC
BASICS

Natural Fibers, continued

Cotton is favorable for use in clothing and home furnishings due to the strength and abrasion resistance of the fiber. As a hydrophilic fiber, it absorbs moisture quickly and dries quickly cooling the wearer in hot climates. Because of its strength and hydrophilic properties it is considered a wash and wear fabric. Cotton's hydrophilic properties make it easy to clean because it absorbs water and detergent during washing. Cotton is also a popular choice throughout the world because it is relatively inexpensive. It has a soft hand and does not create static.

Cotton does have some qualities that are unfavorable. It has low resiliency and does not quickly spring back into shape if it is distorted, which causes stretching or wrinkling (Cohen & Johnson, p. 27). Cotton is often found blended with fibers of high resilience, such as polyester, for this reason. Cotton can also shrink when laundered and its hydrophilic qualities make it susceptible to mildew. Cotton fabric creates a high level of lint because the short fibers pull out of the fabric easily.

Flax

Flax fibers are bast fibers and come from the stem of the flax plant. The fiber is called linen after it is processed into fabric (Cohen & Johnson, p. 37). Flax is the oldest domestically produced fiber and was used in the great civilizations of Greece, Rome, and Egypt (Neilson, p. 40).

Linen has many favorable qualities, including strength, crisp appearance, a luster that increases with use, a natural hand, and it is hydrophilic but dries quickly. Linen is often used for warm weather clothing because of its breathability and its quick drying nature. Table linens and wall-

paper are also common end uses of linen (Cohen & Johnson, p. 38). Because flax fibers are the length of a flax plant stem, the fibers are long and do not pull out of fabric easily and cause lint (Neilson, p. 41).

There are several qualities that make linen less than favorable for some applications. It is highly susceptible to mildew and silverfish and can decompose when exposed to prolonged sunlight. It also has a rough hand, which some find unappealing. Linen also wrinkles easily and the creases are difficult to remove. Linen also stretches when it is wet and has poor recovery (Neilson, p. 42).

Wool

Wool is made from the hair fibers of sheep. Wool is an animal fiber and is mainly composed of protein. It is a medium weight fiber and is found in cream, brown, and black colors. Wool has been a major economic component of past civilizations. Mesopotamia was a huge producer of wool. In the Mediterranean, wool was a common good used for trading and it was used for both common items and luxury goods. Since the industrial revolution and the advent of manufactured fibers, the use of wool has been in decline (Neilson, p. 45).

Wool is favorable because it accepts dye well and it has good drape. It also resists flame, odors, wrinkles, soils, water, and grease stains. Wool also is hydrophobic, which makes it an excellent insulator. Wool is a "warm" fabric because the fibers are naturally crinkled and create air pockets when it is woven together. (Cohen & Johnson, p. 40). Wool is dimensionally stable and it blends well with other fibers.

Wool is unfavorable because it is often expensive. It also may irritate skin, and can shrink. Wool can pill and shed as it is used

Natural Fibers, continued

and can smell unpleasant when it is wet (Neilson, p. 47). Wool is also susceptible to moths and loses strength when wet. When wool is exposed to friction and moisture, it can begin to felt. Felting occurs when wool fibers interlock and they cannot return to their original positions. It is typically undesirable except in certain applications (Cohen & Johnson, p. 40).

Silk

Silk is rumored to be discovered by a Chinese princess in 2640 B.C. Silk filaments come from the cocoon of a silk worm and can be as long as 1,600 yards. The two basic types of silk are cultivated silk and wild silk. Cultivated silk comes from silkworms that are raised in a controlled environment and eat a diet of only mulberry leaves (Cohen & Johnson, p. 38). Wild silk, or tussah silk, is produced by silkworms which exist in the wild and eat oak leaves. Wild silk is darker in color and coarser in texture than cultivated silk. Before silk is spun into fabric, it typically goes through a process called "degumming" where a sticky substance called sericin is removed from the silk. If the silk has not been degummed it is known as raw silk (Neilson, p. 44).

Positive characteristics of silk include its dry, cool hand, excellent drapability, and versatility. It also is dimensionally stable, accepts dyes well, and is the thinnest natural fiber (Neilson, p. 44). Silk has high luster and a luxurious hand (Cohen & Johnson, p. 38).

Negative properties of silk are its poor abrasion resistance, inability to resist wrinkles, and expensive price range. Silk also tends to yellow as it ages and can be damaged by prolonged exposure to the sun. Silk is difficult to preserve, even in climate controlled environments (Cohen & Johnson, p. 39).

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Sources

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