

Some Naturally Sourced Unknown Fibres Used In Textiles

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Abstract:

Fibres are the main raw material for any of the textile materials. The main properties of the textile material are directly determined by the fibre quality and type of fibres from which they have been developed. There are many fibres and origin of fibres which you may have never heard of. They are generally used in special end uses and/or for special quality material. Although a strict definition of high performance fibres does not exist, the term generally denotes fibres that give high values in use in a range of application. It commonly refers to fibres with some unique characteristics that differentiate them from commodity fibres such as cotton, wool, polyester and acrylic fibres. They are just special fibres or high performance fibres that have technical use. Here we have mentioned some of the fibres which have been almost unknown to the world and thereby neglecting its special uses.

Introduction:

Over the last 5 years the global fibre market has moved further into global commodity market. In the last 20 years a dramatic rise in biotechnology innovations is leading to an escalating number of low-cost and effective biotechnology solutions in textile processing and discovery of exciting new fabrics. This change is redefining and accelerating global trade patterns as all levels of high value chain. The development of special fibre is the consequence of merging fundamentals scientific and technical knowledge, as there is quest of high performance fibres. These special fibres usually provide the potential for accessing new technology. These fibres have high tenacity, high strength to weight ratio, high elasticity as well as durability and comfort. Over all world textiles is running a race to achieve hi-tech fibres.

1. ALPACA:

Alpaca is a natural fleece fibre harvested from domesticated member of the sheep family from the South American camelid family. The Alpaca numbers around 3 million heads worldwide from different nations of North America, Australia and New Zealand. Shorn annually, an Alpaca approximately produces 3 kg of fibres per individual.



Alpaca Fibres



Yarns spun from alpaca fibres

Types of Alpaca: There are two types of Alpaca,

- 1) Huacaya, which produce a dense, soft, spongy, crimped sheep like fibre.
- 2) Suri, with silky pencil-like locks, resembling dreadlocks but without matted fibres which is prized for their longer and silkier fibres. These fibres are often said to be less cold hardy than Huacaya.



Huacaya



Suri

Properties of alpaca fibre:

1. It is a light or heavy in weight, depending upon it is spun.

2. It is a soft, durable, luxurious and silky natural fibre.
3. It is stronger than sheep's wool and provides excellent insulation.
4. While similar to sheep's wool, it is warmer, not prickly and has no lanolin (a wax secreted by the glands of wool-bearing animals) which makes it hypoallergenic.
5. Alpaca is naturally water repellent and difficult to ignite.
6. Huacaya, an alpaca that grows soft and spongy fibre, has natural crimp, thus making a naturally elastic yarn well-suited for knitting.

Uses and production:

Of the South American camelid, the Alpaca is the only one whose fleece is used in any quantity for spinning yarns for fashion applications. The primary end use is knitwear, but it is also woven into cloth for clothing accessories such as shawls and stoles and rugs. It is also used for many purposes, including making clothing such as bedding, hats, mitts, scarves, gloves and jumpers. There is also a growing market for outdoor sports clothing made from alpaca, due to its lighter weight and better insulation during cold weather.

Annual input of alpaca wool in Peru, the main producer, is estimated at around 6,500 tonnes. Around 80% is shipped as fleece to textile makers (China, Germany and Italy), earning export income of around \$50 million per year. The main purchaser of alpaca has begun importing to create domestic fibre industry.

2. ABACA

Abaca is a species of banana grown as a commercial crop in the Philippines. Abaca is a leaf fibre, composed of long slim cells that form part of the leaf's supporting structure. Also known as Manila hemp, abaca is extracted from sheath around the trunk of the abaca plant widely distributed in the humid tropics. This plant has great economic importance and grows up to 13-22 feet. So basically, Abaca is a leaf fibre, extracted from the stalk of the plant and is composed of long slim cells that form part of the leaf's supporting structure. It is a long fibre with length up to 3 metres.



Properties:

- Abaca is prized for its great mechanical strength, buoyancy and long fibre length which range up to 3 metres.
- The best grades of abaca are fine, lustrous; light beige in colour and very strong.
- It is considered the strongest of natural fibres, being three times stronger than sisal fibre.
- It is also biodegradable and sustainable.
- It is resistant to saltwater damage i.e. decomposition.
- It has lower decomposition in both dry and wet states.
- It contains low amount of natural wax in it.
- One of the interesting features of this fibre is that the production of abaca fibre uses an estimated 60% less energy than production of glass fibre.

Uses and production:

Abaca was widely used for ship's rigging and pulped to make sturdy manila envelopes. Its fibres are particularly resistant to saltwater. Hence it is commonly used for fishing nets. It is mainly used in production of tea bags and meat casings. It is also used as a substitute of bark which was once a primary source of cloth. In addition it is also considered as an excellent raw material in the processing of security and high quality paper, diapers, napkins, machinery filters, medical textiles (aprons, caps, gloves from nonwovens) and electrical conduction cables as well as some 200 other finished products. Japan's yen banknotes contain up to 30% abaca. Mercedes Benz has used a mixture of polypropylene thermoplastic and abaca yarn in automobile body parts.



The production of abaca fibre uses an estimated 60% less energy than production of glass fibre. The world's leading abaca producer is the Philippines. More than 80% of modern abaca production comes from Philippines. This crop is also cultivated in other South-east Asian countries like Ecuador and Costa Rica. In 2007, the Philippines produced about 60,000 tonnes of abaca fibre while Ecuador produced 10,000 tonnes. World production of this fibre is valued at around \$30 million a year. Almost all abaca produced is exported mainly to Europe, Japan and the U.S.A.

3. CASHMERE

Cashmere wool usually simply known as cashmere is a natural hair fibre obtained from the animal skin. The only source of cashmere is Kashmir goat (*Capra hircus laniger*), native to Himalayas. Its fine undercoat hair is collected by either combing or shearing during the spring moulting season. After sorting and scouring, the fibres are cleaned of coarse outer hairs. US standards have set an average fibre diameter for cashmere of no more than 19 microns, and top quality fibre is just 14 microns.

**Properties:**

- 1) This fibre has natural crimp, allowing it to spin into fine, lightweight fabrics.
- 2) Cashmere has small air spaces between the fibres, which makes it warm without weight.
- 3) The thin cuticle cells on the surface of this wool make it more smooth and lustrous.
- 4) Cashmere wool is smoother than regular wool.
- 5) Garments produced from this wool provide excellent insulation.

Uses and production:

Cashmere is luxurious, rare and expensive: spun and woven, the annual fibre production of six Kashmir goats is enough to make a cashmere sports jacket. The fabric is widely used as sweaters because of its warmth and in babywear because of its softness. It is also used as blazers, coats, jackets and underwear. Coarser cashmere is used for rugs and carpets.

China has become the world's largest producer of raw cashmere and their part is estimated to be around 10,000 metric tonnes per year. The annual world clip is estimated to be between 15,000 and 20,000 metric tonnes. Ultra-fine cashmere or Pashmina still produced by communities in Kashmir, India, but its rarity and high-price in the region; make it very hard to source and regulate quality. It is estimated that on an average yearly production per goat is 150 grams (about 1/3 lb.). Nowadays Cashmere manufacturers in Europe, North America and Japan are campaigning for stricter controls on labelling of cashmere garments to protect their industries.

4. YAK FIBRE:

Yak is an animal fibre which is referred to as coat fibre produced by Yaks, a long haired bovine mainly found in the Himalayan region, The Tibetan plateau and some areas of Mongolia and Central Asia. Yak fibre has similar properties to other animal fibres, including breathability and static-resistance, but has been proven to

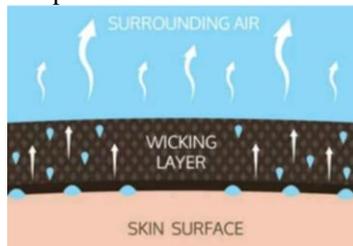
outperform sheep wool in a number of areas. It exists in several colours, including shades of grey, brown, black and white.



Yak in Himalaya

Properties of yak fibre:

- It provides excellent warmth at ambient temperatures of minus degrees Celsius which is 10-15% warmer than comparable merino wool.



- All wools naturally resist static but yak wool is particularly good at it which means yak garments are far less likely to spark or cling to the body.
- It has another property of breathability, means it is able to absorb moisture and release it into the air. This avoids sweaty feel often felt when wearing synthetic fibres.
- Yak wool is anti-microbial, so it won't attract the small microbes that live off sweat and build up on the surface of certain other fibres.
- One largely unknown quality of yak wool is its strength. Individual tests have shown yak to have a higher strength than sheep wool of same diameter.

Uses and production:

Because of its strength and coarse nature, the hairs are typically carded and then spun worsted. Using multiple plies the guard hairs are then braided into ropes, halters and belts or weaved into very durable rugs and bags. The long hair that grows on the legs and the ends of the body are used to make ropes for tying up the tent. People also use yak fibre to make cloaks and short jackets. After the developments, this fibre is also used in clothing and suiting, knitted garments and blankets.



Since the mid-20th Century experiments on the material have been carried out encouraging the interest of the garment industry in yak wool, where its exotic nature and favourable performance characteristics make it an attractive to wear.

In west Sichuan, China, 34% of the animal fibre comes from yak hair alone. In 2012, the famous luxury brand Louis Vuitton introduced yak wool to their home and décor collection. There are also a number of small brands such as Khunu that specialize in the production of yak wool clothing.

5. CORN FIBRE

Corn is a natural fibre obtained from corn produced by the Poly Lactic Acid (PLA) which is fermented from the corn amyllum. This fibre has similar characteristics to polyester staple fibre while it has lustre similar to silk. The fibre is extracted from the cornsilk (the fine thread-like styles on an ear of maize as shown in the figure).



Properties of corn fibre:

- It has low flammability and smoke generation.
- Its flexibility and curl recovery is very good so that the fabric has good shape retention and fast crease recovery.
- The fibre also has high strength which is same as normal poly fibre, so its use is very broad.
- Some of the other features include high melting point and high crystallization degree.
- It can be recycled into fertilizer and is decomposable.
- One of the major drawbacks of corn fibre is that it is too stiff, rigid and frail.
- Also it is biodegradable.

Uses and production

Some tests show that corn knitted fabric does not stimulate skin and it is beneficial and comfortable to wear. Corn fibre has already threaded its way into some winning outfits produced by designers across the globe. Corn fibre is used in many different apparel applications such as contemporary sports and casual wear t-shirts, fleece and jeans. This fibre can also be used in new fibrefill blends for thermal wadding that offers unique natural insulation properties. The versatility of corn fibre allows it to be created as furnishing and home textiles such as pillows, duvets, blankets, quilts, carpets, draperies, upholstery and in office wall panelling. In nonwovens, wipes and feminine hygiene products are produced using this fibre.

In the production of corn fibre, U.S.A, China and Brazil have topped the list. There's a tremendous growth in the production of this fibre since last 10 years. This fibre is available both in spun and filament forms in a wide variety of counts from micro denier to for the finest lightest fabrics to high counts for more robust applications. The production of corn fibre means less greenhouse gases are added to the atmosphere.

Scope

To produce those fabrics, yarn and fibre, manufacturers currently are experimenting with a variety of Bio-based products that offer a threefold market appeal – one is that the products are derived from a natural renewable resource, secondly, they are more eco-friendly and lastly, are less dependent on petroleum based ingredients. These natural fibres have emerged as a promising alternative to synthetic fibres. Although these fibres don't seem to obsolete any time soon, but they will serve as a fresh, fun and environmentally friendly alternative to cotton and other natural fibres. Stringent environmental legislation and consumer awareness are driving the transition to the bio-based economy and models of sustainable development which offer high perspectives for natural fibre markets. As the popularity of the natural fibres in industrial uses expands there are new opportunities for hard fibres to reach high end value markets. The scope of possible uses of the future natural fibres is enormous.

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