

BAMBOO - THE NATURAL, GREEN AND ECO-FRIENDLY NEW-TYPE TEXTILE MATERIAL OF THE 21ST CENTURY

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The fashion world is constantly seeking and latching onto new materials. The folk fashion craze spurred demand for natural, handmade-looking textiles that exude warmth, while synthetic fabrics with a sleek look have also recently been popular. One of the hot items is fabrics made from traditional Japanese materials, such as bamboo and washi (handmade Japanese paper). Bamboos are a primitive sub family of grasses that include over 70 genera and 1,200 species worldwide. They are native to all continents except Europe, Antarctica and the Arctic. In the spotlight at the Tokyo Spring and Summer collection was a series of coats and pants made of fabric containing bamboo fibers. Bamboo fiber clothes have actually been showing up in department stores and women's boutiques. Bamboo is now being made into a fiber that has wonderful characteristics. Bamboo fibers are the newest thing to hit the textile arena. An exclusive manufacturing process makes it possible to create a highly breathable, absorbent fabric entirely from bamboo fiber. Clothes made of this fabric sell for around the same price as ordinary clothes and have a distinctive softness and cool, light texture.

Key words: Application of fabric, Bamboo fibres, Bamboo processing Properties of bamboo.

INTRODUCTION

Bamboo grows more rapidly than trees and starts to yield within four to five years of planting. Bamboo can be selectively harvested annually and non-destructively. The establishment of a bamboo plantation requires a minimal capital investment and builds upon the inherent plant-cultivation skills of local farmers and foresters. Bamboo is excellent for restoring degraded lands and protecting against soil erosion. Bamboo may easily be intercropped with vegetables. The whole bamboo plant is beneficial for rural livelihood.

Facts about Bamboo

- Bamboo is the fastest growing woody plant on this planet
- A viable replacement for wood
- An enduring natural resource
- A critical element of the economy
- An essential structural material in earthquake architecture
- A renewable resource for agro forestry products

- A soil conservation tool
- An ancient medicine
- Integrally involved in culture and the arts
- A food source
- A landscape design element

BAMBOO IN TEXTILES

Bamboo textiles have many fantastic properties that combined make this a truly amazing fabric. It is breathable and cool, has a nice lustre; extremely soft; fast water absorption performance; and anti-bacterial. Because the cross-section of bamboo fiber is filled with various micro-gaps and micro-holes, bamboo cloth has much better moisture absorption. Bamboo cloth can quickly absorb and evaporate human sweat. Bamboo cloth is an indulgence with its wonderful silky softness. Bamboo fabric is naturally antibacterial. Bamboo fabric successfully avoids pilling and shrinkage problems. Bamboo fibers are quickly emerging now in the fashion world. The fabric woven with bamboo yarn is light, almost

translucent, and softer than cotton. It has a natural sheen that feels like silk or cashmere, but has the advantage of being machine-washable. This natural fiber is hypoallergenic, absorbent and fast-drying. It is naturally anti-bacterial and will not hold odour. Like other natural fibers, it allows the body to breathe as the fabric absorbs the sweat away from the body. It also is the most sustainable of the natural fibers. Because of its natural antibacterial properties, it needs no pesticides. It is also 100% biodegradable.

Bamboo fabric is not widely known, but considering these benefits, there is a considerable and growing market for bamboo fabric products.

BAMBOO FABRIC PROCESSING

Bamboo fiber fabric production flow is as below:

Bamboo - thick pulp - fine pulp - bamboo fiber - bamboo yarn - fabric.

Bamboo fiber is a kind of regenerated cellulose fiber, which is produced from raw materials of

bamboo pulp. Firstly, bamboo pulp is refined from bamboo through a process of hydrolysis-alkalization and multi-phase bleaching. It is then processed and is turned into bamboo fiber. Repeated tests have proven that it has a strong durability, stability and tenacity. The thinness and whiteness degree of bamboo fiber is similar to classic viscose.

Bamboo can be spun purely or blended with other materials such as cotton, hemp, silk, Lyocell (Tencel), Modal, cotton chemical fiber and so on.

After Hi-Tech processing, bamboo fiber is thinner than hair. It has a round and smooth surface. Thus it is not rough against human skin.

Dyeing and Finishing of Bamboo Fabric

Light serging, enzyme de-sizing, moderate bleaching and semi-mercerizing should be applied to the bamboo fabric during its dyeing and finishing process by avoiding drastic conditions and using small mechanical tension.

- **Serging:** moderate condition.
- **De-sizing:** should be consolidate, de-sizing rate should be over 80%.
- **Scouring:** pure bamboo normally needs no scouring; sometimes it may require washing with a little alkaline soap. The scouring process should be carried out in case the fiber blend contains cotton. When pure bamboo fabrics are scoured, the alkali should not be over 10g/l but should be applied in accordance with the thickness of fabrics.
- **Bleaching:** the processing should be made in terms of the specification and thickness of fabrics.
- **Mercerizing:** the fabrics of bamboo fibers are normally not subjected to mercerizing due to their sound lustre and bad anti-alkaline properties.

However, some cases are found in order to increase their absorbance capacity to dyestuff.

- **Dyeing:** Ideally active dyestuffs are used during dyeing process alkali should not be over 20g/l, temperature should not be over 100° C. During drying process, low temperature and light tension are applied.
- **Yarn dyeing:** the alkali should not be over 8g/l in yarn dyeing.

PROPERTIES OF BAMBOO FABRIC

Bamboo fiber has many excellent properties that make it ideal for processing into textiles. What people find most surprising is that bamboo fabric is exceptionally soft and light, almost silky in feel. This makes it breathable and cool to wear. It is also incredibly hydroscopic; absorbing more water than other conventional fibers such as cotton and polyester.

Bamboo fabric is more antistatic than other types of fabric and also tends to perform better when it comes to odours- it has a natural deodourising property.

Bamboo fiber has a thinness degree and whiteness degree close to normal finely bleached viscose and has a strong durability, stability and tenacity. It stands abrasion and possesses the qualities that make it perfect to spin. The yarn and cloth made by bamboo fiber are labeled first-class quality in all aspects of quality standards. It is characterized by having good hydroscopic properties, excellent permeability, soft feel, easiness to straighten and dyeing and splendid colour effect of pigmentation. It is also an environment-friendly raw material that enjoys a splendid prospect for application as its predecessor wood pulp fiber. Meanwhile cloth made by the mixed texture of bamboo fiber and cotton or other raw materials also boasts the same superior property. Towel and bathrobe made of bamboo fiber

have a soft and comfortable feel and a special lustre. When dyed, it is sparkling and beautiful. It also has the strength of steel.

Bamboo fabric is a natural textile made from the pulp of the bamboo grass. Bamboo fabric has been growing in popularity because it has many unique properties and is more sustainable than most textile fibers. Bamboo fabric is light and strong, and has excellent wicking properties. The use of bamboo fiber for clothing was a 20th century development, pioneered by several Chinese corporations.

Bamboo fiber resembles cotton in its unspun form, a puffball of light, airy fibers. To make bamboo fiber, bamboo is heavily pulped until it separates into thin component threads of fiber, which can be spun and dyed for weaving into cloth.

Anti-bacteria: 3 times effect than Cotton Products

Anti-static: 12 times effect than Cotton Products

Hygroscopic: 60% improvement in Comparison with Cotton Products

Deodorization: 30 % improvement in Comparison with Cotton Products

● **Antibacterial**

Bamboo can thrive naturally without the use of pesticides as it is seldom eaten by pests or infected by pathogens. Scientists have found that bamboo contains a unique anti-bacteria and bacteriostasis bio-agent named "bamboo kun". This substance is maintained in the finished bamboo fabric as it is bound tightly to the bamboo cellulose molecular structure. Bamboo fabric has excellent natural functions. It is both anti-bacterial and deodourising in nature. Japan Textile Inspection Association found that even after bamboo fabric had been washed fifty times; it still possessed excellent anti-bacterial and bacteriostasis functions. Its test result showed that over 70% of bacteria incubated on bamboo fibre fabric did not survive.

Bamboo fiber's natural anti-bacterial function differs greatly from that of chemical antimicrobial, which latter often tends to cause skin allergy when added to apparels.

● **Green and Biodegradable**

Bamboo grows quickly, requiring few farming inputs and no pesticides. When compared to other fibers such as cotton, it is far more sustainable. Cotton requires huge amounts of water and extensive use of pesticides - that pollute the environment. Bamboo takes up more greenhouse gases and releases more oxygen and does not need replanting, or fertilisers and its roots are very good at stabilising erosion prone soil.

It produces natural and eco-friendly fiber without any chemical additives. More importantly, bamboo fiber is a unique biodegradable textile material. As a natural cellulose fiber, bamboo fabric can be 100% biodegraded in soil by micro organisms and sunlight. The decomposition process does not cause any pollution in the environment. "Bamboo fiber comes from nature and completely returns to nature in the end". Bamboo fiber is praised as "the natural, green and eco-friendly new-type textile material of the 21st century".

● **Protection from Ultraviolet Radiation**

With the badly deterioration of atmosphere, pollution and the destruction to the ozonosphere, the ultraviolet radiation arrives the ground more and more. Long time exposure to ultraviolet irradiation will cause skin cancer. But the apparels made from bamboo fiber can absorb ultraviolet radiation in various wavelength, thus lessening the harm to human body to the maximum extent.

● **Breathable and Cool**

Bamboo fabric has an unusual level of breathability, making it incredibly cool and comfortable to wear. This is because the cross-section of the

bamboo fiber is filled with various micro-gaps and micro-holes; it has much better moisture absorption and ventilation. With this unique microstructure, bamboo fiber apparel can absorb and evaporate human sweat very quickly. Bamboo fabric garments make people feel extremely cool and comfortable in hot conditions.

● **Water Absorbent**

In textile form, bamboo retains many of the properties it has as a plant. Bamboo is highly water absorbent, able to take up three times its weight in water. In bamboo fabric, this translates to an excellent wicking ability that will pull moisture away from the skin so that it can evaporate. For this reason, clothing made of bamboo fiber is often worn next to the skin.

● **Deodourisation**

Bamboo also has many antibacterial qualities, which bamboo fabric is able to retain, even through multiple washings. This helps to reduce bacteria that thrive on clothing and cause unpleasant odours. It can also kill odour causing bacteria that live on the skin, making the wearer and his or her clothing smell less. In addition, bamboo fabric has insulating properties and will keep the wearer cooler in summer and warmer in winter. The versatility of bamboo fabric makes it an excellent choice for clothing designers exploring alternative textiles, and in addition, the fabric is able to take bright dye colours well, drape smoothly, and star in a variety of roles from knit shirts to woven skirts. Because of its deodourisation properties, it also makes this fabric ideal for cloth nappy making, reducing the smells that would result when hemp is used in nappies.

● **Soft Feel**

Bamboo fabric is very soft and can be worn directly next to the skin. Many people who experience allergic reactions to other natural fibers, such as wool or hemp, do

not complain of this issue with bamboo. The fiber is naturally smooth and round without chemical treatment, meaning that there are no sharp spurs to irritate the skin.

APPLICATIONS OF BAMBOO FABRIC

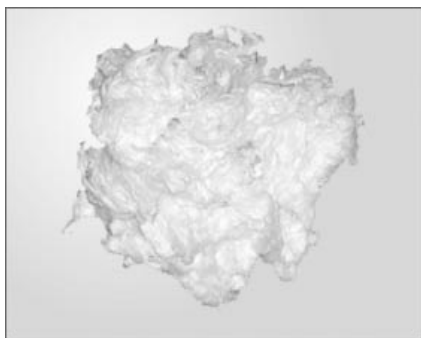
Bamboo fibers are the newest thing to hit the textile arena. Bamboo is now being made into a fiber that has wonderful characteristics. It has been said to feel like a cross between cashmere and silk. It has fluidity like silk or rayon and a softness of hand like cashmere. This fabric is naturally antibacterial and eco-friendly. Bamboo is a renewable resource and the manufacturing of the yarn is done in an environmentally friendly way. This fabric breathes and is cooler than cotton in warm weather. Bamboo fabric will be coming out in many designer lines soon. Hand woven bamboo is the perfect compliment!

Clothes made of this fabric sell for around the same price as ordinary clothes and have a distinctive softness and cool, light texture. The fabric is highly versatile; other garments, such as blouses and tank tops, are also available. Other applications include bathrobes and towels, foot mats, mats, bed clothes, underwear, close-fitting T-shirts, and stockings.

Bamboo fabrics are made by pure bamboo fiber yarns, which have excellent wet permeability, moisture-vapour transmission properties, soft feel, better drapery, and easy dyeing to achieve splendid colours. It is a newly founded, green fabric. Bamboo fabric products include sweaters, bath-suits, mats, blankets, towels, nappies (diapers), underwear and other lingerie, all types of clothing, and linen.

Sanitary applications

Bamboo sanitary materials include bandage, mask, surgical clothes, and nurses' wears and so on. The bamboo fiber has natural effects of



sterilization and bacteriostasis, therefore it has incomparably wide foreground on application in sanitary materials such as sanitary towel, gauze mask, absorbent pads, food packing and so on. In the medical scope, it can be processed into the products of bamboo fiber gauze, operating coat, nurse dress, etc. Because of the natural antibiosis function of the

bamboo fiber, the finished products need not require any artificial synthesized antimicrobial agent, so it won't cause the skin allergy phenomena, and at the same time, it also has competitive prices in the market.

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COMPANY NEWS

CRODA ACQUIRES ICI'S UNIQEMA BUSINESS IN INDIA

Following the acquisition by Croda International Plc of ICI's Uniqema business worldwide, the Indian business of Uniqema (formerly a division of ICI India Ltd) has now completed the necessary statutory formalities and merged with Croda Chemicals (India) Pvt Ltd – already a registered company in India.

The formal transfer between ICI India and Croda Chemicals (India) Pvt Ltd took place on 5 January 2007 at the company's site in Navi Mumbai.

Croda's speciality chemicals are sold to a wide range of industries including:

Textiles: fibre finishes, textile auxiliaries, apparel processing

Consumer care: personal care, health care and nutrition, home care

Functional specialities: polymer additives, leather treatments, emulsion explosives, food services and products, lubricants, oil field chemicals, agrochemicals, tissues and paper treatments.



Seated, left to right: Mr Chris Nottingham, Director, Croda Chemicals (India) Pvt Ltd and Mr M R Rajaram, Executive Director, ICI India Ltd. Standing: Mr Sunil Shah, Director, Croda Chemicals (India) Pvt Ltd, Dr Annoottam Ghosh, Managing Director, Croda Chemicals (India) Pvt Ltd, Mr R Guha, Company Secretary, ICI India Ltd and Mr Ravi Sachdev, General Manager (Legal) ICI India Ltd.

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