

BAMBOO – AN ALTERNATIVE FOR ECOFRIENDLY TEXTILES

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ABSTRACT

With the growing demand for the environmental friendly products, bamboo fiber can become an alternative to the ecofriendly textiles. Bamboo has its natural organic status as there is no need to use any pesticides or nutrients to grow the plant and with less water utilization. This article explains the manufacturing process of bamboo fibers, properties of bamboo fibers, and uses of bamboo fibers, challenges faced by bamboo fiber manufacturing and market trends.

Key word: *Bamboo fiber, Cellulose fiber Eco fabric, Green living.*

1. INTRODUCTION

With the growing demand for more comfortable, healthier and environmentally friendly products, efforts in research and development activities in the textile industry have focused on the utilization of renewable and biodegradable resources as well as environmentally sound manufacturing processes in textiles [1]. Bamboo fiber is one of the new developments. Bamboo is fast growing and unlike cotton which is widely used cellulose fiber, there is no need to use any pesticides to grow the plants.

Bamboo fiber is obtained from the bamboo plant, which is an abundant and cheap natural resource. Bamboo grows in tropical climates and is harvested after 3 - 4 years. Bamboo is widespread throughout Asian countries, and the bamboo fiber used in textile applications is obtained from *Phyllostachys heterocycla pubescens*, a species known as Moso bamboo.

HISTORY OF BAMBOO FIBER

Process of bamboo fiber developed in 2nd half of the 19th century. The earliest record of U.S patents regarding Bamboo textiles made by Philipp Lichtenstadt in 1864. [2]. Regenerated cellulosic bamboo fibre was first manufactured in 2002 by Hebei Jigao Chemical Fibre Co. Ltd. in China [3].

2. EXTRACTING BAMBOO FIBER

There are two types of processing methods to obtain the bamboo fiber. Mechanical processing and chemical processing

2.1. Mechanical processing:

This is the natural method of obtaining the bamboo fiber. In this process the woody parts of the bamboo plant are crushed and then natural enzymes are used to break the bamboo walls into a soft mass so that the natural fibers can be mechanically combed out and spun into yarn. This process is time consuming and expensive. This method is used to produce traditional textile fabrics. Bamboo fiber processed by this method also leaves the antimicrobial properties in the fiber. [4]

2.2 Chemical processing:

This is the most commonly used method to produce bamboo fiber. This method is similar to viscose method used to produce viscose rayon. This process removes the antibacterial properties and the natural “micro-pores” in the fiber structure of the natural bamboo fiber. Although chemical processing is not environmental friendly but it is preferred by many manufacturers as it is a less time consuming process. [5]

2.3 Nanotechnology bamboo charcoal fabric:

Greenyarn LLC manufactures nanotechnology bamboo charcoal fabric. In this method bamboo is dried and heated at 800°C until it becomes bamboo charcoal. Nano particles were made by using this charcoal and then these Fine bamboo carbon nanoparticles are added into cotton (rayon), polyester or nylon fiber. [6]

3. PROPERTIES OF BAMBOO FIBER

- Anti-bacterial: 3 times more effective than Cotton Products. Fabric made from 100% bamboo fiber exhibits good anti – bacterial compared to the fabric made from 100% cotton [10]
- UV protection : Bamboo is a natural nanocomposite made up of lignocellulosic fibers, where celluloses is embedded within the lignin and hemicelluloses matrix. Bamboo consists of about 30% lignin which acts as a natural UV protector. However this depends on the processing method. Best results can be achieved by mechanical processing.[12]
- More antistatic than other types of fabric. 12 times more effective than Cotton Products
- Natural deodorizing property. 30 % improvement in Comparison with Cotton Products
- Soft feel – Softer and smother than the cotton fabric
- High level of breathability, for the cross-section of bamboo fibres is filled with various micro-gaps and –holes
- Fabric garments make people feel extremely cool and comfortable in hot conditions
- Strong durability, stability and tenacity
- Thermal regulation - feel cool during hot days, they also have great insulating effect of maintaining temperature in the cold.
- Hygroscopic: 60% improvement in Comparison with Cotton Products
- Excellent wicking properties

4. END USES OF BAMBOO BASED TEXTILES

Due to its high antibacterial properties of bamboo based non-woven has wide prospects in the field of hygiene materials such as sanitary napkin, masks, mattress, food-packing, bags. And woven and knitted fabrics has great prospects in medical textiles, like gauge, surgical gowns, sanitary materials

Due to its high breathability, bamboo based fabrics are great choice for intimate apparel, socks

Due to properties like soft feel, deodorizing and etc bamboo fabrics are great choice infant wear, Home furnishings, and bathroom products like Bed sheets, pillow covers, towels, bathrobes etc.

5. CHALLENGES WITH BAMBOO BASED TEXTILES

- Processing costs are 30-40% higher than cotton
- Consumer knowledge and awareness is minimal compared to Organic cotton, even though bamboo is naturally organic and delivers best comfort than the cotton
- Fast fashion: short shelf life, by the time consumer look for bamboo fabric, they are out from shelves
- Government regulations: in India such as the Indian Forest Act, Forest Conservation Act, Forest Rights Act, etc., may need to be modified to improve the production

6. MARKET TREND

Environmental awareness of consumer, new Green living trend, and the consumer lookout for ecofriendly and organic products, Bamboo products are the new kings of the green and environmentally friendly retail market. The global eco fiber market is expected to reach USD 93.27 billion by 2025 [13]. And Bamboo fiber has the great potential to report its share along with organic cotton.

7. CONCLUSION

Bamboo fibers has promising future, due to its sustainability and excellent properties. In no time bamboo fabric has the potential to become an alternative to the cotton.

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