

On the Significance of the Application of Environmentally Friendly Fabrics to the Sustainable Development of the Clothing Industry

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Abstract: In recent years, environmental protection has received great attention from all walks of life, and economic development is no longer pursued at the expense of the environment. Against this backdrop, various industries have actively responded to the call of China's environmental protection policies and carried out their work adhering to the modern concept of environmental protection, and so has the clothing industry. As a carrier of culture and fashion, the sustainable development issue of the clothing industry has become increasingly prominent. To meet consumers' pursuit of a healthy and environmentally friendly lifestyle, the clothing industry should clarify the value of environmentally friendly materials, minimize the use of chemical raw materials in the production process, and reduce environmental pollution. Based on this, the innovative application of new environmentally friendly materials in modern clothing can reduce its environmental pollution and enhance the environmental friendliness of modern clothing design, thereby promoting the sustainable development of the clothing design industry. This article aims to provide useful references and inspirations for the sustainable development of the clothing industry by systematically analyzing the types, characteristics of environmentally friendly fabrics and their application status in the clothing industry.

Keywords: Environmentally Friendly Fabrics; Clothing Industry; Sustainable Development.

1. The Choice for the Sustainable Development of the Clothing Industry

Since the Industrial Revolution, the global environment has been deteriorating continuously, and the harmonious coexistence between humans and nature has gradually lost balance. With the frequent occurrence of climate anomalies and the increasing depletion of natural resources, environmental protection has become an urgent issue faced by all industries worldwide, posing a severe challenge to the sustainable development of various industries. Against the backdrop of the continuous advancement of the green ecological concept in modern society, the concept of green development has become the leading one in the current relationship between the environment and development. The clothing industry is a very important livelihood industry[1-3]. However, behind the huge economic benefits generated by the clothing industry are very serious problems such as environmental pollution and resource waste. At present, on a global scale, the clothing industry, as the second largest polluting industry, should attach great importance to the application of environmentally friendly materials, which is the key to the sustainable development of this industry.

2. The Significance of Environmentally Friendly Fabrics to the Sustainable Development of the Clothing Industry

2.1. Reducing Environmental Pollution

The clothing industry occupies a large proportion in the industrial field. In the traditional fabric production process, a

large amount of chemical raw materials are needed. During the production process, any improper operation may lead to the leakage of chemical substances, seriously polluting the soil and water resources. Moreover, the fabric is difficult to degrade after being discarded, further exacerbating the environmental pollution problem, which is contrary to the current concept of sustainable development. In contrast, in the production process of environmentally friendly fabrics, the use of chemical raw materials can also be significantly reduced, and most of the selected raw materials are mostly biodegradable and can decompose relatively quickly in the natural environment, reducing environmental pollution. This transformation can reduce the pollution of the clothing industry to the air, soil and water resources, and is a positive protection of the ecological environment.

2.2. Increasing the Added Value of Clothing Products

In the current social context, consumers' environmental awareness is increasing day by day. In the process of choosing clothing products, modern consumers, in addition to considering basic factors such as style and comfort, pay more attention to the healthiness, environmental friendliness and fashion sense of the products. Environmentally friendly fabrics are in line with this market demand. Most environmentally friendly fabrics are made from natural or renewable resources, which can minimize environmental pollution during the production process and ensure harmlessness to the human body while in use, which is in line with the concept of a healthy lifestyle pursued by modern people. Therefore, choosing environmentally friendly fabrics based on actual needs, the produced clothing products can enhance their own quality and market competitiveness, meet consumers' multiple needs for health, environmental

protection and fashion, and thus effectively increase the added value of the products.

2.3. Establishing a Good Brand Image

In the context of the green economy era, the factors for measuring enterprises are more diverse. The social responsibility and environmental awareness of enterprises can reflect their comprehensive competitiveness to a certain extent. In the development process of the clothing industry, if environmentally friendly fabrics can be selected, it can further meet the needs of consumers and show the social responsibility and environmental awareness of the enterprise itself. By actively selecting and promoting environmentally friendly fabrics, enterprises can establish a good brand image in the market and demonstrate their commitment to environmental protection and sustainable development[4-6]. This positive brand image can enhance the social reputation of the enterprise, increase consumers' recognition of the enterprise, bring more economic benefits to the enterprise's future development, and meet the needs of continuous development in the future.

3. Types of Environmentally Friendly Fabrics

3.1. Colored Cotton

Colored cotton refers to the cotton fibers that naturally have colors after harvest from cultivation. This peculiar phenomenon can be traced back to the Ming and Qing dynasties in China's historical records. However, due to the coarse and short texture of the colored cotton fibers at that time and the poor spinnability, they have not been effectively developed and utilized for a long time. In recent years, colored cotton has attracted attention from relevant people all over the world. Colored cotton does not require chemical bleaching, scouring and other processing during the textile application process and does not cause any pollution to the

environment. It is recognized worldwide as a pure natural "zero pollution" green ecological textile. The cultivated colored cotton has various colors such as light yellow, purple-pink, pink, cream white, coffee, green, gray, orange, yellow and iron red. This cotton fiber can be directly used for knitting and weaving after spinning and is widely used in various garments. It has the characteristics of softness, comfort, breathability, soft color and simple style. Colored cotton is a star product with great development potential in the international textile and clothing market in recent years.

3.2. Tencel

Tencel fiber, as an innovative fiber, is a new type of fiber carefully manufactured from natural plant wood pulp such as coniferous trees through an advanced solvent spinning process. It accounts for a large proportion in environmentally friendly fabrics. (Figure 1). In the production process, the toxic substance carbon dioxide used in viscose fibers is replaced by the organic solvent N-methylmorpholine-N-oxide. At the same time, this solvent can be recycled and the utilization rate can reach more than 99.5%. Because it solves the problem of pollution to the environment caused by toxic gases and sewage in the production of cellulose fibers, it is called green fiber or environmental protection fiber[7-8]. Tencel fiber combines the advantages of chemical fiber and natural fiber. It has both the comfort of cotton and the drape of viscose, as well as the strength of polyester and the hand feel of silk. At present, Tencel has been commercialized in both woven and knitted fabrics. In the aspect of woven fabrics, the produced denim has the characteristics of wrinkle resistance, non-deformation and high strength. High-end Tencel fiber shirt fabrics, suit fabrics and casual wear fabrics have a silk-like texture, are soft and comfortable, and have good breathability. Knitted fabrics are widely used in casual wear and underwear and other fields, meeting the needs of different consumer groups and are deeply loved by the public for their diversity and comfort.

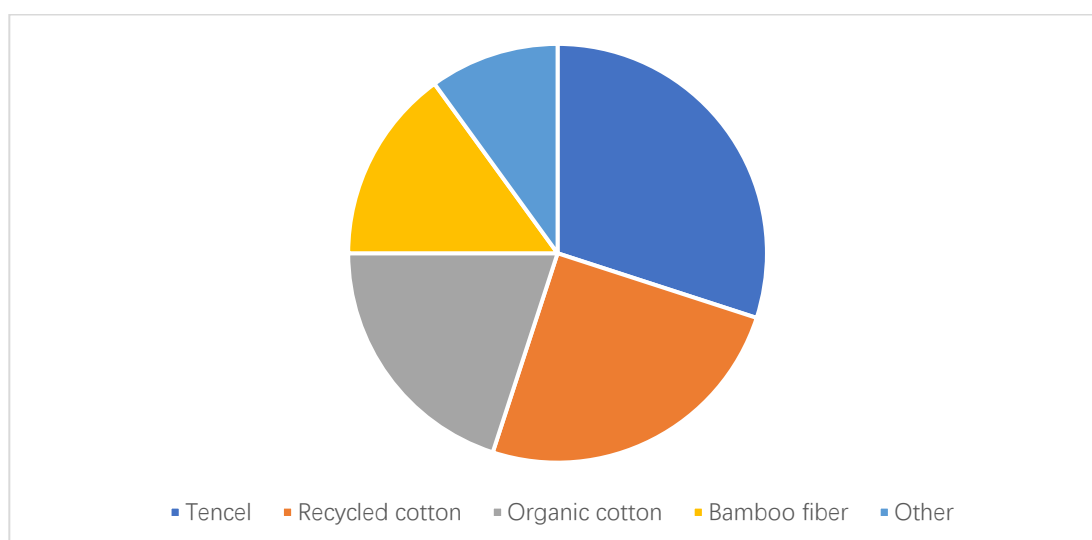


Figure 1. Proportion of Various Types of Environmentally Friendly Fabrics

3.3. Natural Dye Fabrics

Natural dyes refer to pigments directly extracted from nature. They are widely distributed in the stems, leaves and fruits of plants, as well as in animals and minerals. Among them, plant dyes have become the main source of natural dyes

due to their wide variety and rich colors. These dyes are environmentally friendly and have a unique natural charm. In addition to the natural hue, some plant dyes such as madder, indigo and turmeric have the functions of insect prevention and sterilization. Coupled with the special effect and natural aroma of the color of the dyed fabrics of plants, they are loved

by many consumers. Natural dyes in nature are particularly suitable for dyeing natural fibers, and the color is uniform, natural and has good fastness. During the processing, the residual liquid produced by natural dyes is easy to be biodegraded and does not cause pollution to the environment, so it is regarded as an ideal choice of green dyes. However, despite its significant advantages, under the current technical conditions, there are still certain limitations and challenges to achieve mass production.

4. The Application of Environmentally Friendly Fabrics in the Clothing Industry

4.1. Displaying the Original Style of Fabrics

In the field of clothing design, designers always carry out clothing design of different styles using various environmentally friendly materials on the basis of keeping the original clothing form unchanged, reflecting the texture of clothing materials. These environmentally friendly materials are not only environmentally friendly, but also have their own characteristics and rich textures, providing designers with a broad creative space. Just as the Japanese clothing master Issey Miyake said, "I always drape the fabric on my body and let the fabric tell me what design to do." He knows that each fabric has its unique language, and the designer's task is to listen to these languages and then use the inherent characteristics of the material to transform it into magnificent clothing art. His famous Miyake Pleats are the natural pleats formed after the folding of clothing materials. In life, the

pleats of clothing will affect the appearance, but the designer exaggerates the pleats and creates a unique artistic beauty, reflecting the original beauty of the material.

4.2. Choosing Natural Materials as Much as Possible

With the increasingly severe global environmental problems, people's awareness of ecological protection is gradually enhanced. As a new clothing concept, environmentally friendly clothing is gradually entering people's vision. From the perspective of protecting the ecological environment, environmentally friendly clothing uses natural animal and plant materials as raw materials, and avoids the use of substances that damage and pollute the environment such as chemical printing and dyeing raw materials and resins from raw material production to processing. Natural materials not only have the characteristics of being renewable and degradable, but also do not have adverse effects on the environment and human health by not producing harmful substances[9-10]. For example, colored cotton is the color of the cotton fiber itself after planting and harvesting. Colored cotton does not require various processing during the application process and is recognized as a pure natural green ecological textile in the world. This pure natural and pollution-free characteristic has enabled colored cotton to gain wide recognition worldwide and has become the most potential product in the market. Common natural materials and their characteristics are shown in Table 1.

Table 1. Common Natural Materials

Natural materials	Characteristics
Organic cotton	One of the most natural fabrics, no chemicals used in production, all natural pollution-free. From an ecological point of view, organic cotton farming uses 62% less energy and 88% less water than conventional cotton
Organic flax	Similar to hemp in terms of sustainability, the fabric is ultra-light and breathable, and it requires little fertilizer, pesticides and irrigation to grow, but yields are not high
Colored cotton	The color of the face fiber itself is planted and harvested without various technological treatment. Pure natural green ecological textiles have the characteristics of comfort, antistatic, good moisture permeability, green environmental protection and so on
wool	Animal fiber, good warmth, strong air permeability, good moisture absorption, but need to pay attention to insect control and maintenance
cotton	Plant fiber, high yield, soft and comfortable, good air permeability, moisture absorption, easy to clean and maintenance, is one of the common clothing fabrics

4.3. Utilizing Recyclable Materials

Against the backdrop of the continuous improvement of global environmental awareness, Chinese clothing brands are also actively exploring the road of green transformation. Among them, two major brands in the down jacket manufacturing field, "Bosideng" and "Snow Flying", have set a model in this regard. The lining of the down jacket adopts a kind of green environmental protection fabric. This fabric is a new type of environmental protection material jointly manufactured with the American DuPont Company and can be quickly degraded. After recycling, it can be made into other

materials to reduce material waste and achieve sustainable development. Li Ning cooperated with a Japanese fiber manufacturer to use a new type of fabric and launched an environmentally friendly series of clothing. This fabric is recycled polyester fiber, which is recycled through high-tech means to realize the recycling of resources. (Figure 2). If consumers wear the clothing old or do not want to wear it, they can recycle it again, thus forming a virtuous cycle system and effectively reducing environmental pollution, reflecting the brand's high sense of responsibility for environmental protection.

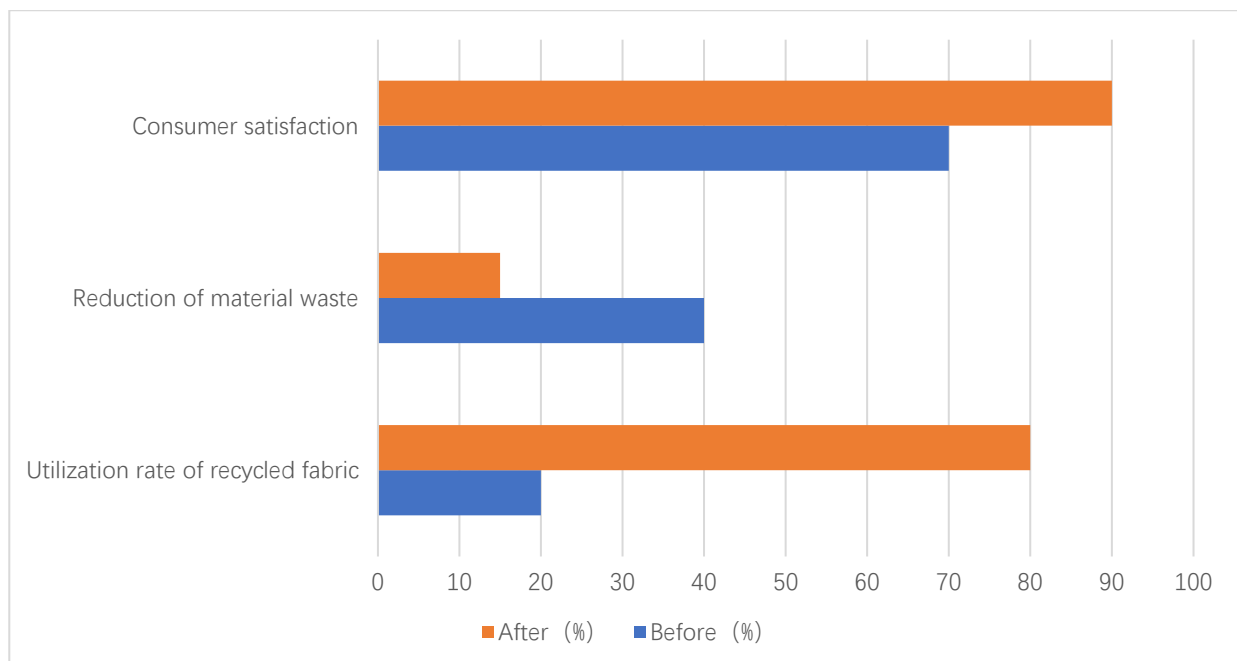


Figure 2. Changes Before and After Li Ning's Cooperation with Japanese Fiber Manufacturers

4.4. Promoting Environmental Protection Materials

In the technological wave of the 21st century, people's awareness of sustainable development and environmental protection is increasing. Traditional fabrics are facing challenges due to the possible environmental pollution and resource consumption problems. To meet the requirements of sustainable development, various new environmentally friendly materials have emerged, posing new requirements for the development of the clothing industry. New types of green and environmentally friendly fabrics such as milk protein fiber, chitin fiber, bamboo fiber, soybean fiber, corn fiber, pineapple fiber and luminous fiber are emerging in an endless stream and are receiving increasing attention[11]. The emergence of these new types of green and environmentally friendly fabrics has enriched the creative materials of clothing designers and also inspired more design concepts related to green, environmental protection and sustainability. When choosing clothing, consumers have also begun to pay more attention to the environmental protection attributes of the fabrics. Clothing made of new fiber raw materials is therefore favored and at the same time promotes the transformation of the clothing industry, which is in line with the concept of green and sustainable development.

5. Conclusion

In order to ensure the sustainable survival of mankind on the earth, we must attach great importance to environmental protection and fully protect the earth's ecological environment, which is the foundation of our survival. The clothing industry has become the second largest polluting industry in the world, and its impact on the global environment is huge, especially in terms of clothing fabrics. Therefore, it is very necessary to strengthen the environmental protection and rectification of the clothing industry. Both fabric producers and clothing manufacturers should promote the sustainable development of enterprises under the concept of environmental protection. Affected by objective factors, at present, some managers of clothing enterprises have not deeply realized the importance

of environmental protection and still take maximizing economic benefits as the main goal. However, with the enhancement of environmental protection awareness of the whole society, through the joint efforts of all parties to promote the popularization and application of environmentally friendly fabrics in the clothing industry, we will contribute to achieving the global environmental protection and sustainable development goals.

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