

# Eco-Textiles : Path to Sustainable Environmental Development

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## Abstract

Textile industry is considered as the most ecologically harmful industry in the world. The Eco Problems in the textile industry occur during some production processes and are carried forward right to the finished product. In the production process like bleaching and then dyeing, the subsequent fabric makes toxic substances that swell into our ecosystem. During the production process controlling pollution is as vital as making a product free from toxic effects. The utilization of rayon for clothing has added to the fast depleting forests and opened the door to the development of natural sustainable fibers like organic Cotton, Hemp and Bamboofibers. Petroleum-based products are harmful to the environment. In Order To safeguard our environment from seeffects, an integrated pollution control approach is needed. Luckily there is an availability of more substitutes. Textile industry has heavy impact on the environment as the current practices are unsustainable; and companies, environmentalist and consumers are looking at strategies for reducing the textile carbon footprint. So, there is need to produce the textile materials which are eco-friendly through using different processes like enzyme technology, plasma technology, supercritical carbon-dioxide dyeing or foam technology etc.

**Keywords:** Textile Industry, Eco-textiles, Sustainable process, Eco Friendly.

### Introduction

Indian textile sector has been enjoying rich traditional reputation the world market for number of decades. The Growth of this Industry Term of its output and export tends substantiates this. In the recent years it has been the victim of many challenges that have come up in the context of industrialist. One of the most challenges problems for the human race today is the environmental problem. As a result ,individuals, business organizations, the judiciary and the government all over the world have recognized the need of Eco-friendly textiles so to avoid or reduce environmental issues. Industries, on a global basis ,have to decide to modify their technology and production process in order to have an environmental friendly output to satisfy their customer needs. Textile industry is committed to produce eco-friendly manner and processed under eco-friendly limits are known as Eco textiles. Its is simple practice of every day life that makes India an effectively Eco-friendly nation .Environmentally friendly are synonym used to refer to good sand services, laws, guidelines and policies considered to inflict minimal or no harm on the environment. For good environment health people should engage in eco-friendly activities and should begin to look into more Eco friendly ways of living and doing business. There are many ways to be eco-friendly i.e .Use of low impact dying ,a free dyeing and bio processing of textiles etc.

According to a Upadhaya & Dedodiya (2011) "The Population that is allergic to chemicals will grow to 60% by the year 2020." According to Madhur (2009) Global consumption of fresh water is doubling every twenty years. Mills discharge millions of gallons of effluent each year ,full of chemicals such as formaldehyde (HCHO) ,chlorine, heavy metals and others, which are significant cause of environmental degradation and human illness. The mill effluent is also of ten of a high temperature and pH, both of which are extremely damaging. The Eco -Problems in During bleaching and dyeing the subsequent fabric makes a toxin that swells into our ecosystem. Controlling pollution is as vital making as making a product free from the toxic effect. There is need to produce the material in eco-friendly.

### Objective of the Study

To balance our economic, environmental and social needs, allowing prosperity for now and future generations

### Fabric Finishing Stage

#### Bleaching

In Europe hydrogen peroxide is used for bleaching as chlorine-based bleach is toxic and has negative effects on the immune system and reproductive system. This kind of bleaching is not permitted in Germany and has largely been substituted by other methods throughout the rest of Europe, but the practice is still common worldwide.



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**Dyeing**

Before 1956, the majority of clothes were dyed using natural dyes – but technological changes, industrialization and population growth brought about a rapid increase in textile production due to the amount of land needed to grow the dyes, natural dyes could no longer fulfill the demands. Modern dyes are based on petrochemicals, non-renewable resources and there are many risks to human health and the environment from modern dyes.

**Eco-Friendly Fibers****Organic cotton**

Organic cotton is much more environmentally friendly than the traditional variety. Organic cotton is grown using methods and materials that have a low impact on the environment. Organic production systems replenish and maintain soil fertility, reduce the use of toxic and persistent pesticides and fertilizers, and build biologically diverse agriculture. Organic cotton production provides an alternative to grow cotton without chemicals (Kumar, 2007).

**Bamboo**

The great thing about bamboo clothing is that, not only it is soft and comfortable, but it also has some great environmental benefits. Bamboo clothing is said to be softer than cotton, with a texture more like that of silk or cashmere. It also absorbs moisture quickly. It actually draws moisture away from skin, so it is perfect for summer months as well as for vigorous activities such as playing sports.

Bamboo plants can grow successfully without any fertilizers or pesticides. Bamboo grows very fast, it does not require a lot of water to grow, also it is very hardy plant – it can survive drought and flood conditions. Bamboo plants release a lot of oxygen into the air. A grove of bamboo releases 35% more

oxygen than an equivalent stand of trees. Bamboo is very earth friendly plant. It can reduce soil erosion and desertization. It can actually improve soil-quality in degraded and eroded areas. Bamboo clothing is 100 percent biodegradable.

**Rare Eco-friendly Fibers****Stinging Nettle Fiber**

This fiber is obtained from the Brennessel plant which naturally resist to vermin and parasites. It can be grown without pesticides and herbicides and with very little fertilization as the minerals do not get leached out of the ground. The environment friendly process requires the plant stems to be cut and left on the field for retting. Retting is exposure to rain, moisture and sun to facilitate the removal of fibre from the woody tissue. Then the straw is collected, pressed into bales and placed in a barn to dry. Fiber is separated from the stem mechanically, e., by removing the wood from the fiber. The fibers are then cleaned by combing. They can be mixed with organic cotton and spun into yarn. Nettle fiber is stronger than cotton and finer than liner fibre. They can be made into a wide range of woven as well as knitted fabrics. Due to its fine weft and glossy look, nettle fabrics were very popular in middle ages but lost its position to inexpensive cotton.

**Pineapple Fiber**

One of the eco-friendly fibers gaining fast popularity is the pineapple fibre, the pina fiber. It is extracted from the pineapple leaves by hand scraping, decortication or retting. Decortication uses a motorized machine with blades to scrape off the pulp in order to separate the fiber. The fibers are hand spun into ivory-white coloured and naturally glossy fabric. Pineapple fiber is lightweight, soft, shining, transparent and a little stiff fabric used for making clothes having elegant looks.

**Milk Protein Fiber**

These fibers are used to make yet another healthy and eco-friendly yarn – the milk yarn. Milk is watered and then skimmed. With the help of bioengineering technique, protein spinning fluid is made. Wet spinning process converts this fluid into high grade textile fibre. The skin friendly milk yarn goes to make glossy fabric similar in appearance to silk fabrics that have antibacterial

and anti-fungal properties too. Their hygroscopic character makes them one of the finest moisture management fabrics. They can be blended with a number of fibres to get many characteristics – blending with bamboo gives cool fiber and with wool fiber provides a thermal protective fiber.

**Banana Fiber**

The banana fiber is extracted by hand stripping and decortications. Thus is 100% eco-friendly fiber. This fiber looks like bamboo fiber and ramie fiber. It is strong, shiny, lightweight and biodegradable. It can even absorb moisture very efficiently. With its qualities getting popular, the fashion industry is now fast adopting this fibre for making various fashion clothing and home furnishings.

**Steps Towards Sustainable Textiles****Sustainable Processing of Textiles**

Number of sustainable practices has been implemented by various textile processing industries such as eco-friendly bleaching; low impact dyes, also bioprocessing of textiles. Bio-processing can simply be defined as the application of living organisms and their components to industrial products and processes, which are mainly based on enzymes. Bio-processing also offers the potential for new industrial processes that require less energy, less water and less effluent problems with effective results. Enzymatic desizing, enzymatic scouring, enzymatic bleaching and bio polishing and enzyme based softeners are few examples of bio-processing of textiles.

Eco-wash laundering system consists of a plastic disc with ceramic pellets. The activated ceramic pellets inside the disc are agitated within the machine to release ions. These ions reduce the surface tension of the water, allowing it to penetrate the fabrics and release the dirt. The result is clean clothes without the risk of chemicals damaging the garments. While caring the fabrics – sunshine instead of bleach. Lemon juice and sunshine powerful combination for stubborn stain

**Eco Fashion**

Designers have made a difference by understanding the theoretical, technical and practical considerations of the entire production process of a product, collaborating with technologists, scientists, growers, manufacturers and marketing departments, understanding the performance

and aesthetic qualities that are high on the consumer agenda. A new concept of 'Eco-fashion' has emerged in the last few years. Eco-fashion refers to stylized clothing that uses environmentally sensitive fabrics and responsible production techniques. The non-profit Sustainable Technology Education Project (STEP) defines Eco-fashion as clothes "that take into account the environment, the health of consumers and the working conditions of people in the fashion industry." Swapnil Shindya, a designer said "Designers should revive Eco-fabrics. Internationally there is a lot of demand for eco-friendly clothing line. So, India should revive its potential and make the best of Eco-fashion."

**Khadi**

Making of khadi is eco-friendly since it does not rely on electric units and the manufacturing processes do not generate any toxic waste products. It is light and soft, making it comfortable to wear. Its weave creates air pockets which make it cool in summers and warm in winters.

**Environmental Damage****Textile dyeing and finishing**

The textile dyeing and finishing industry has traditionally generated large volumes of waste and has been a large consumer of energy. A large proportion of the environmental issues affecting the industry are related to the use and discharge of water. Washing from dyeing and rinsing operations may produce hot, alkaline, highly saline and highly coloured effluent. Other environmental issues requiring consideration is energy. Chemical usage, solid wastes, emissions to atmosphere, contaminated land, noise, hazardous materials, groundwater and other environmental issues particular to the location. In order to impart the required functional properties to the fibre or fabric, it is customary to subject the material to different types of physical and chemical treatments. Finishing can lead to high levels of pollutants and wastes, e.g. the moth proofing agents most commonly used – pyrethrins – have a high degree of insect toxicity. If this material is over-applied, does not adhere well to the fibre or washes off in post treatments, the resulting wastes can be highly contaminated with pyrethrins. Heavy metals in finishing treatments and other contaminants such as fluorides used for flame proofing can also lead to contamination of wastewater that is difficult to treat.

**Dyestuffs**

Dyes have many different and complex chemical structures and there is a large range of products in commercial use. Some reactive dyes are recognized respiratory sensitizers and breathing in respiratory sensitizers can cause occupational asthma. Some dyes can cause similar allergic skin reaction. Certain reactive, vat and disperse dyes are recognized skin sensitizers. A number of dyes based on the chemical Benzedrine are thought to cause cancer. Perhaps the most prevalent health problems associated with dyeing and finishing processes arise from exposure to chemicals acting as irritants. These may cause skin irritation, itchy, stuffy nose, and sneezing. They include formaldehyde-based resins, ammonia, acetic acid, some shrink resist chemicals, optical whiteners, soda ash and bleach.

**Eco Labels**

Consumers are becoming increasingly concerned with the adverse impacts of industrial pollution on the environment and their health. Mounting pressure on industry to adopt more eco-friendly manufacturing processes has led to an increased demand, particularly in the textile sector, for manufacturers to have a Eco-label for their products. In addition to assisting the entry to new markets and maintaining existing ones, obtaining an Eco-label can also generate financial savings through process optimization and reduced consumption of raw materials, reduce processing time, improve environmental performance and improve working conditions. The 'Cradle to grave' approach to environmental management will include consideration of the recyclability and reusability of the textiles after the products have finished their natural life.

**Conclusion**

Economic development, which aimed at increasing the production of goods and services to meet the needs of a rising population, puts greater pressure on the environment. In the initial stages of development, the demand for environmental resources was less than that of supply. Now the world is faced with increased demand for environmental resources but their supply is limited due to overuse and misuse. Sustainable development aims at promoting the kind of development that minimises environmental problems and meets the needs of the present generation without compromising the ability of the future generation to meet their own needs.

**References**

1. Blackburn, R.S. (2005). *Biodegradable and Sustainable fibres*. Woodhead publication Textile Series No 47.
2. Chavan, R.B. (2001). *India Textile Industry—Environmental Issues*, *Indian Journal of Fibre Textile Research*. 26(6):11-21
3. Christie, R.M. (2007). *Environmental Aspects Of Textile Dyeing*, Heriot-Watt University
4. Green, R. (2010). *Eco-friendly clothing*. *Indian Journal of Fibre and Textile Research*. 32(3):23-29.
5. Guifang, W., Han, K. and Salmon, S. (2009). *Applying Enzyme Technology for Sustainable Growth*. *Asian Textile Journal*. 78(12): 95-98.
6. Horrocks, A.R. (2004). *Ecotextile A Way forward for sustainable development in textiles*, University of Bolton, UK.
7. Jadhav, C. Abhishek, A. (2009). *Eco-Friendly Substitution Textiles*. *International Textile Bulletin*, 5:12-30.
8. Karpagam, M. (2001). *Environmental Economics: A Textbook*. Sterling Publishers, New Delhi.
9. Kumar, R.S. (2007). *Organic cotton: A route to eco-friendly textiles*, *Indian Textile J.* (November issue).
10. Kumar, S. & Goweri, K. (2010). *Eco-textiles*. *The Textile Magazine*. 11:16-20.
11. Marwaha, S. (2006). *Eco-Friendly Fibres*. *Asian Textile journal*. 5: 58-62.
12. Nadiger G.S. (2001). *Aizoban, econorm and testing*. *Indian Journal of Fiber And Textile Research*. 26(6):55-60.
13. Rajagopalan, R. (2005). *Environmental Studies: From Crisis to Cure*. Oxford University Press, New Delhi. SCHUMACHER, E.F. *Small is Beautiful*. Abacus Publishers, New York
14. Wang, Y. (2006). *Recycling in textiles*. *Wood head Textile Series No.50*