

ENVIRONMENT SUSTAINABILITY AND GREEN ECONOMY IN FASHION

Mr.K.Sivasankaran, Assistant Professor, Department of Costume Design and Fashion,
G.Venkataswamy Naidu College, Kovilpatti, Tamil Nadu, India.

Abstract: The fashion industry with its ever changing trends has had a big role to play in polluting the environment. But with growing awareness among the consumers, many apparel manufacturers have switched to employing eco-friendly methods of production. Sustainable fashion or eco-fashion is a revolution to enhance the consumer's awareness of social and environmental concerns on the clothing manufacturing sector. Sustainable fashion is part of the larger trend of sustainable design where a product is created and produced with consideration to the environmental and social impact it may have throughout its total life span. Sustainable fashion can best be brought in by creating sustainably designed products which increase the longevity of a garment. The essential thing of sustainability is the product manufactured should contain the elements which have to be 100 percent biodegradable. In this study the recent developments and future prospects in sustainability and green economy in fashion is discussed. Especially this paper highlight the recent innovations in sustainability fashion products like fabric manufactured from the byproduct of tea in Iowa state university, a yarn from ordinary gelatin that has good qualities similar to those of merino wool fibers even having more water resistant property etc.,

Keywords: recent developments, sustainable fashion.

Introduction:

Fashion is a means to express one's ideas, culture and values, interests and personality. Fashion has been evolving since the 19th century when Charles Fredrick Worth had labels sewn into garments that he created. Even though fashion has evolved through decades of constantly creating demands by being stylish and fascinating, its impact on the environment is becoming increasingly hazardous. Being one of the biggest players in the global economy, the fashion industry holds the responsibility to protect and save the environment and its precious resources. Insatiable and increasing demands are putting undue pressure on the environment. Consumers and clothing manufacturers are becoming aware of the harmful consequences and are trying for alternative technologies to protect the environment. So, sustainable fashion is today's needed one who manufacturing fashion garments and clothing. This paper focuses such products in recent years.

Environmental impacts:

Clothing production has enormous environmental impacts – for example, cotton is the world's most polluting crop, responsible for 25% of all pesticide use in the world each year, hundreds of thousands of cases of chemical poisoning and massive damage to the environment. The issues of workers' rights and animal welfare also loom large when deciding on truly green options in clothing. But there is plenty you can do to reduce the impact of your clothing. For a start, it's worth thinking about how much you really need and want – whether your clothes are giving you the satisfaction the shops and adverts seem to promise. There are also plenty of opportunities to reuse and reclaim clothing, whether you want to buy secondhand and vintage clothes yourself, or just to channel your own unwanted or worn out items into the many reuse and recycling streams on offer. Finally, we offer some links and ideas for more sustainable fabrics for your new-bought clothing. Many of the online shops sell environmentally-friendlier and there are some specialist suppliers.

Environmental impacts – different Fabrics:

Different fabrics have different impacts, depending on what they're made of:

Nylon and polyester:

Made from petrochemicals, these synthetics are non-biodegradable as well, so they are inherently unsustainable on two counts. Nylon manufacture creates nitrous oxide, a greenhouse gas 310 times more potent than carbon dioxide. Making polyester uses large amounts of water for cooling, along with lubricants which can become a source of contamination. Both processes are also very energy-hungry.

Rayon (viscose):

This is another artificial fibre, made from wood pulp, which on the face of it seems more sustainable. However, old growth forest is often cleared and/or subsistence farmers are displaced to make way for pulpwood plantations. Often the tree planted is eucalyptus, which draws up phenomenal amounts of water, causing problems in sensitive regions. To make rayon, the wood pulp is treated with hazardous chemicals such as caustic soda and sulphuric acid.

Cotton

Natural fibres have their problems, too. Cotton is the most pesticide intensive crop in the world: these pesticides injure and kill many people every year. It also takes up a large proportion of agricultural land, much of which is needed by local people to grow their own food. Herbicides, and also the chemical defoliants which are sometimes used to aid mechanical cotton harvesting, add to the toll on both the environment and human health. These chemicals typically remain in the fabric after finishing, and are released during the lifetime of the garments. The development of genetically modified cotton adds environmental problems at another level. Organic cotton is quite another matter.

Wool:

Both agricultural and craft workers in the UK suffer from exposure to organophosphate sheep dip.

Manufacturing processes

Getting from fibre to cloth – bleaching, dyeing, and finishing – uses yet more energy and water, and causes yet more pollution.

- **Dyeing** alone can account for most of the water used in producing a garment; unfixed dye then often washes out of garments, and can end up colouring the rivers, as treatment plants fail to remove them from the water. Dye fixatives – often heavy metals – also end up in sewers and then rivers.
- Cloth is often **bleached** using dioxin-producing chlorine compounds.
- And virtually all polycotton (especially bedlinen), plus all ‘easy care’, ‘crease resistant’, ‘permanent press’ cotton, are treated with toxic **formaldehyde** (also used for flameproofing nylon).

Other materials

Other materials used in clothing and shoes include:

- **Leather** (with polluting tanning and dyeing processes, as well as intensive farming impacts and animal rights issues).
- **PVC** – a notoriously toxic material.
- **Harmful solvents** – used e.g. in glues and to stick plastic coatings to some waterproof fabrics.

Sustainable Fashion:

Sustainable fashion, also called eco fashion, is a part of the growing design philosophy and trend of sustainability, the goal of which is to create a system which can be supported indefinitely in terms of human impact on the environment and social responsibility. It can be seen as an alternative trend against fast fashion.

Recent Developments in Sustainable Fashion products:**1. Fabric Out of Milk, Tea, and Coffee Beans:**

Milk, tea and coffee tend to stick together...but not like this. As the high-tech sector is taking off in making fashion more sustainable, other, more-humble, technologies are just as innovative -- and really, really cool. Case in point: Food products being turned into wearable commodities.

German microbiology-student-turned-designer Anke Domaske uses milk to make an "Eco Milk Fiber" called **QMilch**. High-tech sports clothing company **Virus** uses recycled coffee beans for their Stay Warm line of cold-weather performance apparel. And the genius **Suzanne Lee**, fashion designer and TED Senior Fellow, has been making fabric and vegetable leather out of...get this...the fermented tea, **kombucha**.

**2. Yarn from slaughterhouse waste:**

Over the past few years, there has been increased demand for natural fibres produced from renewable resources using environmentally friendly methods. Wool fibre in particular has experienced a renaissance in performance sportswear made of merino wool. And a few years ago, a young entrepreneur in Germany started making high-quality textiles from the milk protein casein.

New use for waste product

Now Philipp Stössel, a 28-year-old PhD student in Professor Wendelin Stark's Functional Materials Laboratory (FML), is presenting a new method for obtaining high-quality fibres from gelatine. The method was developed in cooperation with the Advanced Fibers Laboratory at Empa St. Gallen. Stössel was able to spin the fibres into a yarn from which textiles can be manufactured.

Gelatine consists chiefly of collagen, a main component of skin, bone and tendons. Large quantities of collagen are found in slaughterhouse waste and can be easily made into gelatine. For these reasons, Stark and Stössel decided to use this biomaterial for their experiments.

Coincidence helps provide a solution

In his experiments, Stössel noticed that when he added an organic solvent (isopropyl) to a heated, aqueous gelatine solution, the protein precipitated at the bottom of the vessel. He removed the formless mass using a pipette and was able to effortlessly press an elastic, endless thread from it. This was the starting point for his unusual research work.

As part of his dissertation, Stössel developed and refined the method, which he has just recently presented in an article for the journal *Biomacromolecules*.

The refined method replaces the pipette with several syringe drivers in a parallel arrangement. Using an even application of pressure, the syringes push out fine endless filaments, which are guided over two Teflon-coated rolls. The rolls are kept constantly moist in an ethanol bath; this prevents the filaments from sticking together and allows them to harden quickly before they are rolled onto a conveyor belt. Using the spinning machine he developed, Stössel was able to produce 200 metres of filaments a minute. He then twisted around 1,000 individual filaments into a yarn with a hand spindle and had a glove knitted from the yarn as a showpiece.

Attractive luster

Extremely fine, the individual fibres have a diameter of only 25 micrometres, roughly half the thickness of a human hair. With his first laboratory spinning machines, the fibre thickness was 100 micrometres, Stössel recalls. That was too thick for yarn production.

Whereas natural wool fibres have tiny scales, the surface of the gelatine fibres is smooth. "As a result, they have an attractive luster," Stössel says. Moreover, the interior of the fibres is filled with cavities, as shown by the researchers' electron microscope images. This might also be the reason for the gelatine yarn's good insulation, which Stössel was able to measure in comparison with a glove made of merino wool.

Water-resistant fibres

Gelatine's major drawback is that its water-solubility. Stössel had to greatly improve the water resistance of the gelatine yarn through various chemical processing stages. First he treated the glove with an epoxy in order to bond the gelatine components more firmly together. Next, he treated the material with formaldehyde so that it would harden better. Finally, he impregnated the yarn with lanolin, a natural wool grease, to make it supple.

As he completes his dissertation over the coming months, Stössel will research how to make the gelatine fibres even more water-resistant. Sheep's wool is still superior to the gelatine yarn in this respect. However, Stössel is convinced that he is very close to his ultimate goal: making a biopolymer fibre from a waste product.

Three years ago, the researchers applied for a patent on their invention. Stössel explains that they have reached the point where their capacity in the laboratory is at its limit, but commercial production will only be possible if they can find partners and funding.

3. Clothing made from tea byproduct:

Instead of soil and seeds, each plastic bin contains a gel-like film consisting of cellulose fibers -- a byproduct of kombucha tea -- that feeds off a mixture of vinegar and sugar. The film is grown by using a symbiotic colony of bacteria and yeast (SCOBY). Young-A Lee, an associate professor of apparel, merchandising and design at Iowa State, says the properties of this SCOBY film are similar to leather once it's harvested and dried, and can be used to make clothing, shoes or handbags.

**Future prospects of sustainable fashion products:**

The global biodegradable superabsorbent material market is expected to reach US\$ 190 million by 2024, according to a new report by Grand View Research, a US based market research and consulting company.

Significant usage of bio-based, high-performance absorption polymers in adult incontinence products, disposable diapers, and agriculture applications is likely to boost the industry growth over the forecast period. Feminine hygiene sector is also anticipated to provide unique opportunities for these environment-friendly polymers over the next few years, according to the report.

Conclusion:

Products that are organic, recycled or produced in harmony with nature, form the base of eco friendly clothing. Apart from being gentle on the Earth, eco friendly clothing is fashionable enough for 'showing off' and plus it is unique among other clothing. Organic clothing also represents a return to safe and sustainable practices. In future, sustainable fashion products have good scope in the market. Designers should learn how to envision the future rather than aim to merely meet the needs of the present. We have to understand that sustainable development and building change is a long term commitment, not a short-term "add-on": it has to be based on strategic thinking and commitment at all levels to transform the current design processes, manufacturing systems and even economic thinking and fashion consumption. When the real transformation happens, it will offer long-term benefit for the company, but in the short term, it is not easy to make profit. It is important to see ahead, open your mind and envision creatively and bravely the future of sustainable fashion.

References:

- <http://www.fibre2fashion.com/industry-article/7688/future-of-fashion?page=2>
- <http://www.fibre2fashion.com/industry-article/7718/sustainable-fashion-welcome-revolution?page=4>
- <http://www.fibre2fashion.com/industry-article/7716/sustainability-essential-strategy-for-the-fashion-industry?page=2>
- <http://www.jute-industry.com/jute-eco-friendly-fiber.html>
- <http://www.fibre2fashion.com/industry-article/1709/impact-of-textiles-and-clothing-industry-on-environment?>
- file:///E:/fashion%20sustainability/10%20awesome%20innovations%20changing%20the%20future%20of%20fashion%20_%20TreeHugger.html

- [file:///E:/fashion%20sustainability/Biodegradable%20SAP%20market%20to%20reach%20US\\$%20190%20million%20by%202024.html](file:///E:/fashion%20sustainability/Biodegradable%20SAP%20market%20to%20reach%20US$%20190%20million%20by%202024.html)
- <file:///E:/fashion%20sustainability/Clothing%20made%20from%20tea%20byproduct%20could%20improve%20health%20of%20fashion%20industry%20--%20ScienceDaily.html>
- <file:///E:/fashion%20sustainability/Yarn%20from%20slaughterhouse%20waste%20--%20ScienceDaily.html>
- <https://shop.aalto.fi/media/attachments/1ee80/SustainableFashion.pdf>
- <http://sustainable-clothing.blogspot.in/2009/03/sustainable-clothing-conclusion.html>
- http://naturalhealthcare.ca/eco_and_environmentally_friendly_fashion.phtml#.WGvIm1V97IU
- <file:///E:/fashion%20sustainability/Sustainable%20Clothing%20Solutions.html>

