

## **Waste Management Issues in Textile Industry**

**S. AISHWARIYA**  
Assistant Professor

Department of Textiles and Clothing, Avinashilingam University for Women, Coimbatore (T.N.) India

### **ABSTRACT**

This paper complies the different types of textile wastes and the life cycle impact of synthetics is reviewed. In current scenarios, waste management is the key to widening business opportunities globally to meet and sustain in the export norms. Market for recycling is ever growing and this paper discusses on the recycled product and its market. The hazard nature of the wastes, the possible solution in the latest technical textiles are explained. The alternative fashion and people's readiness are also elaborated. The special focus is given to Oeko textiles and its importance in the current and future Textile and Fashion trends.

**Key Words :** Eco-friendly textiles, Sustainability, Recycling, Textile wastes

### **INTRODUCTION**

#### **Global textile industry :**

Textile industry plays a vital role in the Indian economy and constitutes nearly 30% of India's exports. Globalization of Indian textile industry makes it necessary to analyze its production techniques, procedures and product qualities to satisfy all international eco-standards. In different textile production processes, steps should be taken to ensure that these processes are done chemically, but do not create any toxic effects (Aishwariya and Amsamani, 2012). For making sure that the effluent created complies with the standards set by effluent control authorities, appropriate changes in recipes should be made, effluent treatment plants should be set and re-use of effluent wherever viable should be made. Any effort to decrease this cost should not be made by diluting' eco-standards. Suitable audit system should also be introduced by textile units, which ensure that eco-standards are realized (Koch and Domina, 1999).

Waste management is the biggest threat of twentieth century. Some of the interesting recycling technologies and sustainable textile brands are focused in this paper. Different types of post-production wastes are expelled to the ecosystem rather than being explored for recycling

alternatives. Scenario is more alarming with the post-consumer waste, where fabrics are thrown in landfill and pollute the ecological balance of the ground and air by contaminating them, in due process of decomposition (Hawley, 2006 and Wang, 2017). The shift towards greener alternatives and production methods are the key areas of research today which are discussed in this paper.

#### **Alarming textile wastes :**

Pre-consumer and post-consumer are two categories of waste that are released into the ecology. The old used clothing is mostly discarded in the landfills or incinerated (burnt away). The deposit in landfill can cause serious effect to the humans and ecology. Toxic gases and other greenhouse gases are released due to decomposition. The landfill space is reduced. It is reported that eighty million apparels are made every year. In the United states, 5% of waste (13 million tonnes) disposed consists of textiles out of which only 15% is recycled and rest is dumped in the landfills. In Canada, 10% clothing is sold by charity houses (like Goodwill) where the old dresses are collected and the remaining 90% is sent to recycling company among which 35% is made into rugs. Whereas UK government tries to re-use and recycle the entire textile wastes into their main stream apparel lines

(Charter and Polonsky, 2017, Raut *et al.*, 2016 and Keune, 2017).

Durables, semi-durable and disposables are the common categories in textile. They may be used in different purpose but end of the life cycle it reaches the landfill as a pollutant at the end of its life cycle. But just like the butterfly from moth, recycling technique intervene and try to cycle the product to be made into a product suitable for the desired end use. In the recent times, "Donate your gently used clothing items" is a phrase that is used to collect the old textiles from consumers. By using such strategy and excavating textiles before reaching landfill, the process of recycling begins. Primarily, sorting is done where the zippers and buttons are removed. Then based on the need for dyes and fibre types, the collected material was grouped. Coloured fabrics and white fabrics will be separated based on the end use. Dyed fabrics are usually not coloured again and mostly sent to the next step of shredding. In case of neutral colours like white, black and grey, they are collected and sorted separately. In few cases a common dye colour is applied at the spinning stage to ensure a uniform shade in the resultant product (Hawley, 2014, Keune, 2017 and Dissanayake and Perera, 2016).



A report published by the Environmental Protection Agency (EPA) of United States, reports that each person discards 32 kilograms of textiles in their lifetime 15% are recycled and 85% are thrown in landfill. Material recycling is done for materials that has fibres derived from natural origin. Wool for example, is one among the frequently recycled fibre. Old wool is often mixed with virgin wool to make new products. Sometimes the yarns are unravelled from the fabric, wound and then blended into a new yarn (Radhakrishnan, 2015). This can be done using the recycled yarn or it can be made by blending with another fibre to obtain required property in finished fabric. Further weaving or knitting can be done using the

yarn and the short fibers that came up from processing can be made into non-wovens. The popular technologies include thermal bonding, needle punching, resin bonding, composite making or any method of non-woven technology (Aishwariya and Amsamani, 2012 and Schneider, 2016).

### Green production :

Sustainable clothing has huge potential and growing market share with very good business opportunities. More researches are done in creating new products and techniques and reduce the carbon foot print. World-wide sorting of the disposed wastes is given attention. Collecting bins in retail outlets and public areas has kindled the spirit of safe disposal among the consumers. Plethora of options are available in this eco-system which can be a wonderful option for a greener path for future.

### Role of STEP :

Sustainable Technology Education Project defines eco-fashions as clothes "that take into account the environment, the health of consumers and the working conditions of people in the fashion industry." Clothes and accessories that meet such criteria are usually made using organic raw materials, such as cotton grown without pesticides, or re-used materials such as recycled plastic from old soda bottles. Eco-fashions don't involve the use of harmful chemicals and bleaches to color fabrics-and are made by people earning fair wages in healthy working conditions. Moving to an environmentally-friendly lifestyle, one of the key elements to consider is fashion and in the current scenario stimulates Top Fashion Designers Turn Eco-Friendly Fabrics into Haute Couture (Khalili *et al.*, 2017).

There are sites that sell natural, recycled vegan textiles which using cork, bamboo, wood, hemp and fine wood. These are used to develop amazing texture on a range of accessories like sun glass, watch, bag, bracelet,



case, jewellery and t-shirts. Personal fashion accessories like earing, hair band, neck piece, stole, fabric belt, scarf, carpets, table mats, door mats, coasters, lace, tassels and fringes applied wall hangers, art pieces for wall, purse, pouch, hand bag and many more are also evolving into the accessory market.

The retail stores are now giving the purchased product in brown bags. Many companies are working on changing every possible product into green. Some have achieved into making clothing hangers from man-made to organic. Fashion shows that has organic fibres on limelight. Fashion, textiles and clothing have now shifted the focus to green path. It is evident that many fashion shows nationally and internationally are being conducted for the upliftment of new generation fibres like jute, soya, corn, organic cotton, bamboo, recycled PET as denims (Sülar *et al.*, 2016 and Bongarde and Shinde, 2014).

### Sustainability in Textiles and Fashion :

Designer Lucy Tammam has taken initiatives to make Ahimsa silk style lines. The silk made using live worms, and not killing them. Internet has some beautiful creations of Ryan Jude Novelline garment made using old books. The prisoners in Europe has launched a label called "Heavy eco" with their recycled garments. S. café is a brand that manufactures yarn from coffee beans and greatly helps in creating clothing that can mask body odour. It dries faster than cotton and much appreciated in outdoor clothing.

Eco-standards and eco-Labels are quickly started to have significance in arrange to have a successful expert and market promotion in the apparel and textile industry. For the delivering eco-Labels particular standards should be set, *i.e.*, these measures are developed on analyzing the product's whole lifecycle beginning with the selection of raw materials progressing through the stages of production, packaging, distribution, use and disposal after utilization. Some of them are OEKO- TEX Standard 100, MST, MUT, GUT, GuW, CLEAN FASHION, STEILMANN, GREEN COTTON, ECO MARK and ISO 14000. Due to the lack International standard for this term, the International Standards Organization (ISO) deemed it too vague and insignificant (Zander *et al.*, 2017).

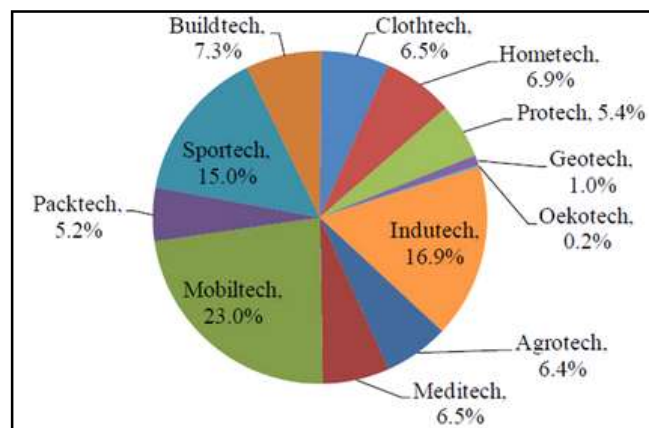
### Alternative solution to pollution :

Chemical/ petroleum-based products are very cheap compared to naturally sourced fibers. This is the reason

for the synthetic fabrics to be available at a lower cost, which is an important driving force for purchasing more. It in turn is a key factor for increase of landfill dumping with textiles in the last decade. Bio-based fibres from alternative source also reduce the impact on ecosystem by reducing the greenhouse gases by sixty per cent. These serve as a means to enrout the pollutant into a useful product. The advantages of such eco-friendly fibres are that they are renewable, use less chemicals, bio-degradable, sustainable, eco-friendly and also reduce carbon foot print (up to 75%). These textiles when disposed to the environment has the potential to degrade and release explosive green-house gases like methane and leachate. The former plays a key role in polluting the ground water and further water bodies. Composting and vermicomposting are the only very successful technology to handle organic wastes (Aishwariya and Amsamani, 2012 and Sülar *et al.*, 2016).

### Eco-label :

OEKO- TEX standards were designed and formulated by the Austrian Textile Research Institute and the German Hohenstein Research Institute for research and testing in the field of textile ecology. The standards have described a variety of norms and limit values for different classes. They have separated each groups like Class I – IV that come for infants to two year baby, textiles that touch skin and doesn't touch the skin and home textiles. Many certifications focus on themes that suggest protection of natural resources, reduction and abatement of waste and emission, constant improvement in environmental performances, efficiency in process by application of the best available technology, compliance to national and international environmental laws and convention.



Several measures are taken to shift the aspects of production to sustainability. Every company that focus on exports and expanding its market to more number of consumers must adopt a safe product development technique. The key items are discussed as below:

a. Prevent (Avoid) is to give up a process or product in favour of noticeably improving the environmental situation. Avoiding the use of petro-chemical in producing a fibre can help in reducing the landfill pollution in future caused by non-degradable raw material used in production.

b. Decrease (Reduce) can be attained by reducing the pollutant load, exhaustion and fixation of dyes close to 100 per cent and responding to water and energy requirement. In the recent studies, liquid carbon-di-oxide is used in textile wet processing to reduce the consumption of water. This reduction of water helps not only in using less water but also in creating less effluent.

c. Re - utilize (Reuse): The dye bath is a vital deliberation under the pressure of dwindling resources. This has now turned into pragmatism because of addition of new auxiliaries, modern filter technology and spectrophotometers that calculate the substance of the dye in the dye bath accurately. The yarn from old garments are reused to be made into a new garment in a new stylish way.

d. Recycle : This recycling of natural fibers is achievable, but it has a limitation of application because of natural degradation. Synthetic fibers can be recycled by melting down and re-granulating with or without applying fresh granules. This perhaps is most acceptable to 'green' organizations but is limited due to lack of uses for the material recycled. International brands like Nike and Pantagonia are involved into producing clothing that are made from recycled clothing. The new apparels created are made by recycling the old garments (Schneider, 2016 and Zander *et al.*, 2017).

### Conclusion:

Waste is now seen as a wealth potential. When it is a fact that plastics and other inorganic wastes are a serious threat and unmanageable issue to be handled, huge tonnes of organic waste going to the landfill is heart breaking. Whenever there is a balance lost in nature there is a calamity and the affected humans never think of them being the reason, in the first place. The paper has explained the significance of the textile industry, its waste management and future bio-based possibilities that can

be an alternative. Further researches in utilising the organic waste can motivate many sustainable measures that help for a better future.

### REFERENCES

- Aishwariya, S. and Amsamani, S. (2012). Evaluating the efficacy of compost evolved from bio-managing cotton textile waste. *J. Environ. Res. & Development*, **6**(4).
- Bongarde, U.S. and Shinde, V.D. (2014). Review on natural fiber reinforcement polymer composites. *Internat. J. Engg. Sci. & Innovative Technol.*, **3**(2) : 431-436.
- Charter, M. and Polonsky, M.J. (Eds.) (2017). Greener marketing: a global perspective on greening marketing practice. Routledge.
- Charter, M. and Polonsky, M.J. (2017). Achieving Sustainability: Five Strategies for Stimulating Out-of-the-Box Thinking Regarding Environmentally Preferable Products and Services. In Greener Marketing (pp. 72-83). Routledge.
- Dissanayake, G. and Perera, S. (2016). New Approaches to Sustainable Fibres. In Sustainable Fibres for Fashion Industry (pp. 1-12). Springer, Singapore.
- Hawley, J.M. (2014). Textile Recycling. In Handbook of Recycling (pp. 211-217).
- Hawley, J.M. (2006). Textile recycling: A systems perspective. In Recycling in textiles. Woodhead Publishing Limited, UK.
- Keune, S. (2017). Co-designing with plants. Degrading as an overlooked potential for interior aesthetics based on textile structures. *The Design J.*, **20**(sup1) : S4742-S4744.
- Khalili, P., Tshai, K. Y. and Kong, I. (2017). Natural fiber reinforced expandable graphite filled composites: Evaluation of the flame retardancy, thermal and mechanical performances. *Composites Part A: Appl.Sci. & Manufacturing*, **100** : 194-205.
- Koch, K. and Domina, T. (1999). Consumer textile recycling as a means of solid waste reduction. *Family & Consumer Sci. Res. J.*, **28**(1) : 3-17.
- Radhakrishnan, S. (2015). Environmental Communication and Green Claims of Textile Products. In Handbook of Sustainable Apparel Production (Vol. 375, No. 398, pp. 375-398). ROUTLEDGE in association with GSE Research.
- Raut, P.B., Moore, M.M., Rothenberg, L., Devine, G. and Leonas, K. (2016). Green Apparel Consumption: An Empirical Examination of Behaviour versus Attitudes.
- Schneider, J.S. (2016). Design of biobased and biodegradable-compostable engineered plastics based on poly (lactide).

Michigan State University.

Sülar, V., Oner, E., Devrim, G., Aslan, M., and Eser, B. (2016). A comparative study on performance properties of yarns and knitted fabrics made of biodegradable and conventional fibers. *Fibers & Polymers*, **17**(12) : 2085-2094.

Wang, X.L. (2017). The Study of Classifying Recycling of City Waste Textile and Garment. *DEStech Transactions on Engineering and Technology Research*, (oect).

Zander, N.E., Gillan, M. and Sweetser, D. (2017). Composite Fibers from Recycled Plastics Using Melt Centrifugal Spinning. *Materials*, **10**(9) : 1044.

\*\*\*\*\*