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Approaches to Sustainable practices in Textile & Clothing – Academia & Covid

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Abstract

Since the beginning of civilizations, textiles have been an integral part of our daily life. Textiles industry has become one of the most polluting and endangering the eco-system for sustainable development. Sustainable fashion is a major challenge ahead for future generations and the textile industry. Adopting sustainable fashion and textiles can play a crucial role to accomplish sustainable development goals. In this regard eco-friendly textiles, processing, methods and practices should be adopted to sustain for future without disturbing the ecosystem. Academic institutions can be a good platform for the awareness & adoption of sustainable practices and fashion.

Introduction

Since the beginning of civilizations, textiles have been an integral part of our daily life. It is one of objects, which is too close to our body and in daily routine. Fabrics look easy and simpler in its first look we see, but never think or imagine its processing. Textiles we wear or carry goes through different processes to achieve the finished quality in end. Textiles sector adds on to high pollution content to our ecosystem through its highly polluting processes. In last seventy to hundred years, we have used and in practice with lot of inorganic materials for the production of textiles and its processing. These practices have challenged our future sustainability and buzz alarm to our ecosystem. It is time to think with a fresh approach towards sustainability of textile sector. Sustainability defines to meet present needs of society and economy without compromising the future ahead. Sustainable textiles are eco-friendly textiles made of natural organics materials and processed through eco-friendly techniques. Academia can play a crucial role for the awareness of sustainable practices to save the ecosystem from future crisis. The young talents nurturing in institution can carry forward these sustainable practice to future industry and will impart to preserve the ecosystem in future ahead.

Sustainable Textiles and Ecosystem

Sustainable textiles are basically textiles made from natural and organic materials. Their development and manufacturing is not harmful to ecosystem. In last century, the industrialization has developed the industry to an extent, which in turn made damages and devastated ecosystem. Our industrial development in last few decades has challenged the future and risks to mother earth. Textiles industry is one of the most pollution-emitting sectors. Thousand of chemicals are used for the manufacturing process of textiles and clothing to achieve the finished end quality. After processing these dyes, inks, finishing agents and other allied process chemicals are drained to rivers and earth beds.

This practice of drainage adds on to high water pollution in water bodies and air through emission of gases produced during biochemical reactions. Studies have shown results that prolonged usage of chemically processed textiles is not good to our health and skin. Water and air pollution from textile sector is a risk to flora, fauna and agriculture sector. This in turn is a threat for our ecosystem and sustainability. To preserve the ecosystem and our future, we have to tackle and finish the practices we started few decades ago and make a fresh approach for our earth and its ecosystem for the future generations. But this task of sustainable practices is not instant and quick process. We have to research and find alternate solutions to initiate & adapt new process, methods and techniques for sustainability to preserve ecosystem and gradually avoid methods, materials and techniques, which are harmful and had compromised the eco-health.

We are using hundreds of chemical unknowingly and being innocent in our daily life for textiles and clothing as a consumer. We as a consumer must be aware that, what we are using is really good for our health and earth? Consumer awareness can be a good tool to tackle this sustainability agenda. Consumer can be any one of us – academician, entrepreneur, students, parent and children.Research and innovations in textile sector for eco-friendly textiles and fashion is looking for new methods, process, materials and production techniques that will serve and safe guard our future to sustain society and economy in long run. Billion dollars textile and fashion industry needs to give impetus to research and innovation to review damages happened to ecosystem in past and present and revive with eco-friendly production and development practices. We have to transform our economy from flow economy to circular economy by adopting closed loop production techniques and methods.

Eco-friendly Textiles and Fashion – Materials, Methods & Techniques

For centuries conventional natural textile materials - cotton, silk and wool are used in manufacturing of fabric and apparels. With the growing demand post World War 1 & 2 man-made materials – nylon, acrylic and polyesters etc. dominated the textiles sector. In last few decades use of man-made materials and new fast production techniques were adopted ignoring the environmental concerns and challenging the ecosystem.With SDG (Sustainable Development Goals) of UNESCO, boosting research in the area of textiles has innovated new and durable material for textile production. We knew few materials in textile sector like hemp, banana fibre and others. With SDG-UNESCO impetus in the areas of textile fibre R&D has come up with new materials innovation for sustainable textiles. These new ages material can be alternative to conventional textile and man-made textile materials. (Figure-1)

Figure 1 Eco-friendly Textiles and Fashion, Photo Courtesy: Author

New Age Future Textile Materials – Natural

Sr. No.	Material	Properties	Production & Processing	End Uses
1	Hemp Fibre	antibacterial, durable and resilient	Fast growing plantations, Require less water, herbicides and pesticides Restricted production due to ban on growing Cannabis sativa except China	Apparels, Home Furnishing and active wears
2	Coffee Grounds	Blended yarn has excellent natural anti-odour qualities, in addition to UV ray protection and a quick drying time	Easy to source from coffee makers and vendors	Multi-functional yarn for outdoor products, home furnishing and sport wears
3	Banana Fibre	World's strongest natural fibre, more highly durable and biodegradable. Better spin ability, fineness and tensile strength	Made from the stem of the banana tree	Outdoor and home textiles product and alkaline treated woven fabric softened can be used for apparels
4	Nettle Fibres	Strong and flexible using hybrid plantations and spinning techniques versatile, warm in winter and cool in summer	can be grown with far less water and pesticides than cotton	Apparels, Home Furnishing and active wears
5	Pineapple Fibres -	Alternative to leather – look alike leather, strong, versatile, breathable, soft and flexible, easy to cut and stitch	Made from pineapple leaves, by product of manufacturing used as biomass/fertilizers	Fashion products – apparels, home textile, accessories
6	Lotus Fibres	Stain-resistant, light weight, soft, silky and extremely breathable	Processing is quite complex but in large scale production is feasible	Used for apparels and home textiles
7	Water Hyacinth – Eichhornia Fibre	Blended fibre – good strength Good to clean polluted water as plant	Easy to grow and find in marshy and wet lands Can be blended with other yarns	Apparels and home textiles
8	Bamboo Fibre	Good in strength, flexibility, moisture retention, lustre	Easy to grow and source, blending give good result, New methods required to process fibre – Eco-friendly approach	Apparel and home textiles

These above mentioned fibres are used for production of fashion products in India & Abroad by some companies and promoting for more commercial purpose. Use of natural and sustainable materials must be encouraged for production of textiles and fashion products.

Production Process and Techniques

Dyeing, Printing, Spinning and Production: Usage of natural dyes must be encouraged to avoid pollution. Though colour fastness of natural dyes is an issue, but with the course of time in last decade researches has come with better results and improving. Research and development in quality enhancement innovation and usage practices must be encouraged by both public and private sector. Natural dyes and its dyeing process should be practiced through training module by academia and industry. Many of companies have increased the use of natural dyes under CSR and Eco-friendly drive & ventures. Some old and new entrepreneurs have forayed into the production of natural dyes to save the environment under SDG agenda.Processing of new age textile fibres mentioned above being is under production by some NGO's, designer, brands and academic institutions for future sustainability. R&D activities in this area is underway to discover new innovation for making better economy and safe society.Reforms in production planning and process are required considering the environmental concerns without compromising ecosystem health. Production and manufacturing units should follow strict norms and comply with them for sustainable development.Emission of pollutants must be controlled and some of such practices should be avoided in textile industry. More and more recycling techniques should be invented and adopted.

Closed loop production methods should be encouraged and practiced in industrial units across the supply chain. Closed loop method is to reuse some waste materials created during production activities for other additional products making or recycle process production.For example *Nike uses closed loop production method for making some of its shoes styles.

- A dye-coloring process for Air soles allows 99% of recoverable dye water to be recycled
- All Air sole innovations designed since 2008 are composed of at least 50% recycled manufacturing waste.
- Today, Nike Air Manufacturing Innovation facilities divert more than 95% of manufacturing waste from landfills — that's 51 million pounds of materials (the equivalent of nearly 10 Olympic-size swimming pools) from May 2016 to 2017 alone.
- The new Nike Air Max 270 Air sole boasts one of the largest, tallest, and most visible cushioning systems to date and contains more than 70% recycled manufacturing waste.
- The Vapor Max Air sole, which contains more than 75% recycled material, has allowed Nike to remove the need for a foam mid-sole.
- Nike has also launched the 'Nike Waste Minimum Program'

This kind of closed loop supply chain minimal waste practices and planning is necessary for both larger and smaller organizations to initiate from now onward to control carbon emissions and reduce wastage in production. Usage of natural dyeing and printing is prevalent in our traditional textiles for many centuries and still some families carrying this heritage forward. Dabu printing is practiced in Western Indian for last few centuries. Dyeing with natural dyes is common practice since our ancient times in Asia and India.

Academia and Covid – Sustainable Approach

During Covid crisis academic institution were shut down and our young manpower under training was badly hit. Students in fashion and textiles academia were not able to work with their practical modules of design, coloring, dyeing and printing. They all were stuck in home and were not able to get materials required to perform their design work during online sessions. To solve this crisis, we at our institution for students of B.Design – Fashion Design initiated the practice of natural sustainable materials to overcome the shortage of materials - colors and dyes. All these renewal and eco-friendly materials are available in and around us, but do not realized their potential.

For last few years we are practicing usage of natural dyes, inks and paste to dye and print fabrics and surfaces in our studio by faculty of fashion design. This approach enabled students to finish their module of dyeing and coloring at home during Covid crisis. They all prepared their project work - fabric samples by dyeing with herbal dyes - turmeric, marigold, heena, ratonjot, haritaki (harada), onion peels, beetroot and some other herbs available at home by pre-mordanting process. They were also given guidelines for process to prepare water color inks at home for use in design drawing and illustrations.

All batch of 37 students performed it and were so encouraged to perform it and finish their project. (Figure 2) This hands on practice have infused a fresh approach towards natural and sustainable production and development. We also dye yarns with natural colors for weaving. We have initiated use of alternate organic materials for batik and surface texture development on fabric and papers in our studios and enabling our young students/designer to understand, respect nature and have responsibilities towards ecosystem of its sustainability. By product of natural dyes is used for other product development like ink making for kalamakari & drawing and soap making. Making of mineral colors is also initiated for preserving our ecosystem.For clothing care we are guiding our students to avoid usage of strong detergents and use organic based cleaner and soaps. As strong detergent contains non-biodegradable chemicals that pollute our water bodies and create foam in rivers that disturbs aquatic ecosystem. Chemical drained in rivers also kill aquatic plantation that cleans water pollution. (Figure 3 and 4)

Figure 2 Student Project Samples with natural dyes at Home during Covid Crisis, Photo Courtesy: Author

Dyed with Turmeric | Dyed with Haritaki& Marigold | Dyed and print with Leaf

Figure 3 Fabric samples – eco prints and dyes, Photo Courtesy: Author

Figure 4 Kalamkari in process with natural dyes in studio, Photo Courtesy: Author

Conclusion

To safeguard billion dollar textile & fashion industry and our future on this earth planet, we all need to thing with fresh approach taking the responsibility and initiate new & innovative methods for sustainability. Fashion and textile sector has initiated such practices and method using eco-friendly materials & methods. Many companies across the world are adopting these eco-friendly production methods to secure the future and sustaining society. Designer/ brands in India and other countries are supporting and promoting methods to control wastage, recycle waste material, energy saving methods, water wastage controlling procedure, reversible methods, organic cultivation for fiber crops, controlling and avoiding synthetic chemical for dyeing, printing and other finishing procedure. Digital printing is used to control water wastage.Closed loop production, reselling and recycling can be good approach to control wastage and contributing to preserve ecosystem. It is not only textile industry to initiate sustainable approaches, we all have to start thinking with fresh approach to overcome the challenges, damages we have created in past for planet earth. In this area academic institutions can play an important role to transform the approaches to look ahead and work together with industry to innovate new sustainable methods.

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