IJARETY

International Journal of Advanced Research in Education and TechnologY (IJARETY)

Volume 11, Issue 1, January 2024

Impact Factor: 6.421

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

International Journal of Advanced Research in Education and TechnologY(IJARETY)

| ISSN: 2394-2975 | www.ijarety.in| Impact Factor: 6.421 | A Bi-Monthly, Double-Blind Peer Reviewed & Referred Journal |

|| Volume 11, Issue 1, January 2024 ||

Organic Environment Friendly Garment Industry

Dr. Gagan B. Khanna

Dept. Of Garment Production & Export Production, BND Govt. Arts College, Chimanpura, Shahpura, Jaipur, Rajasthan, India

ABSTRACT: People are becoming more conscious about the products they are buying and how these products are made. That's why manufacturers are creating styles crafted from sustainable resources. From sport shirts to fleece to accessories, eco friendly products are a welcome alternative that are designed to work in harmony with nature. When you purchase a product that is organic, recycled or produced in an environmentally friendly manner then you have voted with your dollars and helped create a demand for alternative products. Eco Friendly products is a fledgling part of the apparel industry it will take time to make it to the mainstream in a more profound way, but as time goes on more products will be available for the environmentally conscious consumer.

Eco Friendly Clothing is all the rage these days and with the goings on in the world, economy and our daily lives eco friendly apparel makes sense. Organic clothing and recycled clothing are nice ways to treat out earth in a friendly manner and at the same time be fashionable and hip with your friends. The styles available range from plain white t-shirts, polo shirts and hats made of bamboo, and apparel created with recycled plastic bottles. As with anything there are downsides to eco friendly clothingsuch as it a little more expensive for consumer, but when compared to theupside the argument for more organic clothing is strong. I am quite sure as this catches on the prices will come down.

KEYWORDS-organic, eco-friendly, garment, textile, industry, consumer, environment

I.INTRODUCTION

Eco Friendly Apparel is designed for healthy, active lifestyles and people who care about the environment and society enough to be conscious of the impact their clothes have on the rest of the world. Each of us leaves a footprint behind while we live our lives on planet earth and it is truly thoughtful to try to leave it as you found it. We as a species have a long way to go concerning the health of the earth. Just think that every little act does count and it does add up over time. We can reverse the downtrend in the degradation of humanities greatest possession-planet earth.

Made from natural and fair trade materials like soy, organic cotton, bamboo, and leather alternatives, clothing and accessories are Eco conscious, socially responsible and stylish at the same time. Be kind to our planet buy eco friendly clothing.[1,2,3]

Types of clothing

Bamboo fabric is created from the bamboo pulp. It does not need chlorine to bleach it and it can be dyed easily with minimal water requirements. Fabrics that do not dye easily are often treated with harsh chemicals and much more water, so an organic fabric that dyes easy is generally better for the environment.

Organic cotton is much more environmentally friendly than the traditional variety as it uses no pesticides, herbicides, or insecticides during the growing cycle. There are many growers of this crop, and the number is steadily increasing.

Recycled Fleece has many benefits for the environment and economy. Benefits include lessening of our dependence on oil (foreign oil),reduces discarded clothing, and is generally thought to create less air, water and soil contamination. When a polyester garment reaches a landfill where they incinerate some of the garbage, polyester will create toxic emissions that will pollute the air-recycling of these garments reduce that toxic emission. Major sources for recycled polyester are discarded plastic bottles.

The textile industry is considered as the most ecologically harmful industry in the world. The eco-problems in 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 a toxin that swells into our

ecosystem. During the production process controlling pollution is as vital as making a product free from the toxic effect. The utilization of rayon for clothing has added to the fast depleting forests. Petroleum-based products are harmful to the environment. In order to safeguard our environment from these effects, an integrated pollution control approach is needed. Luckily there is an availability of more substitutes.

DISCUSSION

Hemp, wool, organic cotton, soy silk, bamboo fabrics, jute, corn fiber etc are considered as eco-friendly fabrics due to their availability from nature with out any harmful effects of chemical or toxics. Moreover, as compared to other synthetic fibers they are available in a cheaper rate.

Textile chemical processing is shifting to undeveloped countries due to easy availability of low-cost labor and minimum eco-restrictions. This is also because of various manufacturing processes undertaken by developed countries and awareness about the related health hazards amongst these people. However, such measures though may be beneficial for the employer, but they are unsafe for the society and therefore their control is very much needed. So, various functions related to the textile industry which are considered as major factors for eco-friendliness are mentioned below:

Cultivation of cotton

Cotton cultivation requires large amount of pesticides, fertilisers and water. With the increasing use of cotton, 22.5 percent of insecticides are used globally for it. Subsequently, this increasing use of cotton requires approximately 257 gallons of water for one T-shirt. Pesticides are biologically active chemical compounds, which curtail the growth of organism like bacteria, fungus, algae, insects, etc. Averting the augmentations of these unwanted organisms improve the crop yield make the quality of fibre better. Water if utilized in too much quantity in irrigation of cotton, can increase the salinity of land and thereby decrease its fertility.[4,5,6]

Spinning

In the spinning process, individual fibres float in the air and thus pollute the atmosphere in the spinning department. Such floating fibres are dangerous to human beings who inhale it. To minimize the effect of these floating fibres or impurities, the humidified air which is scattered in the spinning department is filtered so as to remove these floating impurities from the air.

Sizing

In the sizing function, starch is used in sticky paste form to the yarn to enhance its strength and abrasion resistance. The starch paste consists of preservations in order to protect it from the attack of microorganisms. Some preservatives like pentachlorophenol, which are obtained from phenolic and/or chlorinated compound, possess a toxic effect on human skin. Hence, such preservations should be avoided. Utilizing a synthetic starch decreases the use of such preservations, thereby decreasing the health hazards likely to occur because of phenolic and/or chlorinated preservative.

Loom shed

There are two types of pollutants created by the loom shed, namely floating particles like fibrous substances and size particles and noise pollutions. If proper measures are not taken during the weaving operations, oil stains are formed. Before textile chemical processing, these oil stains are removed in subsequent gray folding department by applying stain remover. Hence, measures are taken to lessen oil stains in the cloth and probably the application of carbon tetra chloride based products should be avoided in stain remover and other textile products.

Textile processing regarded as non-eco-friendly

Use of chemicals like potassium dichromate, sodium hypochlorite or peroxide and sodium hypochlorite in the preparation process of desizing, scouring and bleaching with their related wash-off stages, produces heavy Biological Oxygen Demands (BOD) in the effluents. Chlorine is not used in bleaching because it creates halogenated organic substances, of which some are suspected to be carcinogenic, e.g., chloroform.

Table-1 indicates that the maximum use of water and production of Biological Oxygen Demand (BOD) in effluent process-houses of composite mills comes from desizing, scouring and bleaching procedures.

For decreasing BOD, it is recommended to choose the size recipes offering a low COD (Chemical Oxygen Demand) and BOD value. A change from pure starch to synthetic starch decreases BOD because of starches by approximately 90 per cent.

Wool industry uses chlorine based compounds for anti-shrinking dealing, and such practice also generates toxic

effluent. For removing rust stains in bleaching, before bleaching the cloth is treated with oxalic acid. The oxalic acid is lethal to aquatic organisms and it increases COD and BOD to a significant level.

Peroxide bleaching requires a stabilizer to ensure identical and monitored bleaching during the bleaching operation. Optional stabilizers such as Aminio Tri Methylene Phosphoric Acid (ATMP), Hydroxy Ethy!idine Disphosphonic Acid (HEDA), Diethylene Triaminc Penta Methylene Phosphoric Acid (DTPMP) and Ethylene Diamine Tetra Methylene Phosphoric Acid (EDTMP) are also being suggested as peroxide stabilizers.

Dyeing

German legislation consumer goods ordinance states that, "No articles of dresses (textiles, shoes, leather) and bed linen can be put in trade, if they have been colored with azo dyes that can release one of the twenty named amines". Currently the list has been extended to 24 amines. The prohibition includes a variety of other commodity goods like leather components for furniture, seat covers, etc. The prohibited amines have been categorized as amines of the MAK Group-III A 1 and III A 2.

MAK Group III AI: (workplace exposure): Carcinogenic amines: Benzidine, 4-chloro-o-toluidine, 2-naphtylamine and 4-aminodiphenyl.[7,8,9]

MAK Group III A 2: These materials are tested only on animals and they have been proved carcinogenic. A variety of amines in these types are: a-toluidine, o-dianisidine, o-tolidine, o-aminoazotoluene, p-chroanneline, 3, 3' dichlorobenzidine, 2-amino-4-nitrotoluene and 2, 4-toluylene diamine. This group also includes materials that may perhaps produce health hazards.

Some dyes form carcinogenic amines on reduction in dyeing and hence they require to be strictly evaded as per stipulation in a number of countries, considerably for increase of BOD/COD and hence, these dyes also need to be avoided for use in dyeing. Most of the known producers have stopped making and marketing dyes creating carcinogenic amines.

High fastness direct dyes should be chosen in such a way that applying copper or chromium salts in their dyeing is avoided. Cationic dye fixing agents utilized for direct dyes and reactive dyes should have low formaldehyde content and low BOD. During reactive dyes the use of urea needs to be lessened. Instead of extremely contaminated sodium sulphide other agents such as hydrol or hydroxyl acetone should be used while dyeing with sulphur dyes.

In polyester dyeing, the carriers and leveling agents utilized should not be supported with chlorinated or phenolic composites. Carriers supported with chlorobenzene are highly toxic and more or less carcinogenic. The leveling agents that contain chlorobenzene as well as per chloroethylene or trichloroethylene are carcinogenic compounds, and therefore they should be avoided.

With regards to the direct, vat, sulphur and reactive dyes, dyeing processes need huge amount of salt to achieve good exhaustion of dye-bath. This leads to an increase in the dissolved salts in effluent water. Therefore, new dyes are being made, which would need less salt dilution for achieving dye fixation.

Printing

As in the case of dyeing, in printing too, colors chosen should be non-toxic and not based on forbidden amines. Dyes with high fixation properties and modified printing process requiring fewer washouts are recommended to be applied in printing. Use of kerosene in pigment printing has been significantly decreased, but it should be totally removed.

The use of urea has also been lessened by substituting it with other ingredients and modifying the printing methods. Citric acid in disperse prints should be substituted by optional chemicals. For nylon fabric printing phenol is utilized to a considerable extent, therefore it is suitable to replace it by diethylene glycol. Application of formaldehyde based on fixers for enhancing fastness of pigment prints should be limited so as to decrease free formaldehyde in final fabric.

Finishing

Chemical formaldehyde based cross-linking agents applied to cellulosic textiles for crease resistance and dimensional stability are the most toxic chemicals. Free formaldehyde may be discharged from resin-finished fabrics either because of un-responded formaldehyde in the product in cross-linking or while storage of the finished fabrics. Many countries set various tolerance limits for free formaldehyde according to the end use of the treated fabrics or garments. Presence of formaldehyde in the atmosphere and in waste-water is regarded as

| ISSN: 2394-2975 | www.ijarety.in| Impact Factor: 6.421 | A Bi-Monthly, Double-Blind Peer Reviewed & Referred Journal |

|| Volume 11, Issue 1, January 2024 ||

highly toxic and to overcome this trouble, formaldehyde scavengers (chemicals which neutralise toxic effects of formaldehyde) are to be used.[10,11,12]

Among the various procedures, finishing presumes significant importance because the value addition is understood by functional finishing of cotton in fabric or garment form to reveal advantageous properties. Some of the most important finishes are easy care, durable press, wrinkle-free finishes, softening and enzyme/ bio-finishing.

Approaches for eco-friendly practices

Any organized approach to move production towards clean production should have the following steps:

Prevent: To 'prevent' is to give up a process or product in favor of noticeably improving the environmental situation.

Decrease: This 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.

Re-utilise: Re-utilisation of 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.

Recycle: This recycling of natural fibres is achievable, but it has a limitation of application because of natural degradation. Synthetic fibres can be recycled by melting down and regranulating 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.

Eco-factors

With respect to clothing textiles, the phrase 'ecology' can be classified into three groups:

1) Production ecology, which includes:

.Cultivation and harvesting of natural synthetic fibres.

.Production of regenerated and synthetic fibres.

.Production of yarns, twisted threads and fabrics.

.Finishing.

Garment production by using fertilizers, growth regulators, crop protection agents like pesticides and a range of textile chemicals, auxiliaries and finishing agents.

2) User Ecology, which is related to the clothing textiles and the substances that give them beauty and performance characteristics during application.

3) Disposal Ecology, which refers to the disposal of textiles after application i.e., to-recycling composting, dumping or incinerating in a manner that ascertains the least probable environment effect.

The related factors for eco-standards are:

Formaldehyde, pesticide, carcinogenic dyestuff, skin neutrality, heavy metal content, -pH, fastness to perspiration.

Eco-Iabelling

Eco-standards and eco-Iabels 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-Iabels particular standards should be set, i.e., these measures are developed on analysing 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 as described below:

OEKO- TEX Standard 100:

For research and testing in the field of textile ecology, the OEKO- TEX standards were given by the Austrian Textile Research Institute and the German "Hohenstein Research Institute".

The OEKO-TEX standards have described a variety of norms and limit values for different classes. They can be described as follows:

.Product class I: Defined for babies and infants up to two years of age.

.Product class II: This class is defined for textiles that come into direct contact with the skin and cover a large

part of its surface, during usage.
.Product class III: The class includes textiles which do not come into direct contact with the skin or cover only a small part of its surface during application.
.Product class IV: This class covers furnishing materials which are used for decorative purposes.[13,14,15]
MST (Markenzeichen Schadstoffgeprufter Textile):

This is a product label, which is to be used for products that are made in Germany and referring only properties of textiles.
Trademarks for textile tested harmful substances:

MUT: This is a trademark for textiles that are made by environmentally sound protection methods (VVUT). It needs acquiescence of certain rules in their manufacture.

GUT: This eco-Iabel was established by well-known companies in European carpet industry. GUT exists for "Gemeinschaft Umweltfreundlicher Teppichboden." It is an association for environmentally friendly carpets with an objective of maximizing textile floor-coverings and their protection cycle.
GuW: It is a seal of Eco-friendly Furnishing Fabric Association.

CLEAN FASHION: It is an Eco-Iabel introduced by private companies related to textiles.

STEILMANN: This is an Eco-Iabel of the most prominent German Textile Company.

GREEN COTTON: A label based on an internal evaluation system that considers social, ecological and toxicological values.

ECO MARK: This is an Indian eco-Iabel.

Function of ISO 14000
The ISO 14000 series of international standards have been made to tackle issues dealing with environment today. The main aims of ISO 14000 are:
.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.

Eco-management

In India each state has its own pollution control authority. This authority mainly deals with water pollution by textile industry. The aim is to ensure that the effluent water being discharged into city sewage, stream, river or sea is not harmful to human, animal or plant life. In order to get the parameters of effluent water to suitable standards, the effluents are treated by effluent treatment plant.

For controlling air and noise pollution in India, the pollution control authorities have taken subjective steps. It can be stated that basically no steps are taken by pollution control authorities to control air and noise pollution in textile industry.

In the case of toxicity of textile products, the awareness is increasing in India due to rigid rules and regulations being set up by developed countries. It has forced Indian producers to fulfill these rules and regulations for attracting exporters.

In eco-management systems followed in textile industry, water utilized for washing is re-used. Also the caustic soda used in mercerisation is recovered and re-used.

Water pollution
Textile industries use the maximum amount of water. In the industries, water is contaminated with different chemicals and auxiliaries, which are used for producing textile goods. These chemicals are non-biodegradable

and their elimination before releasing the water is important. The polluted water is unsafe for fauna and flora due to high temperature, odors, turbidity, colors and toxic chemicals.

Controlling water pollution:

Water pollution is controlled by treating the effluent water in three ways:

a. Primary treatment includes neutralization and elimination of suspended solids by sedimentation, flotation, flocculation and coagulation techniques.

b. Secondary treatment process is done by the presence of micro-organism developed at the surface of sewage, sludge in the presence of chemical nutrients such as urea and super phosphates.

c. Tertiary treatments include:

Chemical oxidation: Some inorganic from insolubles precipitate over restricted ranges of pH.[16,17,18]

Carbon oxidation: Activated carbon has a surface area, which can absorb a huge quantity of organic materials. Use of carbon can be reactivated; it is extremely useful in eliminating the pigments and dyes, which cannot be eliminated by coagulation. Several limits of various wastes in water are given in Table 2.

Management system

For putting into practice the various measures for eco-friendly process of textile unit, the management has to finalize its clear-cut eco-policy. It should recognize that for proper implementation of these measures additional cost would be involved. As in the case of other costs there should be constant attempts to decrease these eco-costs, but at the expense of eco-standards the textile unit needs to maintain.

Textile industry plays a vital role in the Indian economy. It constitutes nearly 30 per cent 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. 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. The process of management should be designed in such a way that proper control on choosing and purchase of input materials are inbuilt in the system itself. The cost of effluent treatment is measured as inevitable. 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.

III.RESULTS

Welcome to the world of sustainable fashion where eco-friendly materials take center stage! It's no secret that our planet is in dire need of some TLC, and the fashion industry has taken notice. In recent years, big brands like NIKE have stepped up their game by committing to using only eco-friendly materials in their products. But what exactly are these materials, and how are they beneficial? In this blog post, we'll explore the use of organic cotton, hemp, and bamboo in sustainable fashion while taking a closer look at consumer demand and overall trends in Europe. So sit back, relax, and let's dive into the world of green fashion together!

What are eco-friendly materials and which big brands are 100% committed?

Eco-friendly materials are those that have minimal impact on the environment, from their production to disposal. The use of these materials is essential in promoting sustainable fashion, which aims to reduce the negative effects of the fashion industry on our planet.

Many big brands have recognized this need for sustainability and have taken steps towards a more eco-conscious approach. Among them is Adidas, committed to using recycled polyester and sustainably sourced cotton. Another brand is Levi's, who has pledged to reduce water usage by 50% in its denim production process.[19]

Nike has also incorporated sustainable practices into its manufacturing processes, such as using recycled polyester in some of their products. They have even gone further with their "Move To Zero" initiative which includes commitments like powering Nike-owned facilities with renewable energy sources by 2025.

Other brands that prioritize eco-friendliness include H&M conscious collection made from organic cotton and bamboo; Patagonia who uses recycled nylon and polyester; Stella McCartney who promotes vegan leather alternatives.

These leading brands set an example for others within the industry, demonstrating how it's possible to produce quality clothing while reducing environmental damage. By choosing clothes made from eco-friendly materials and supporting sustainable fashion brands we can all contribute towards creating a healthier planet for future generations.

The benefits of using eco-friendly materials used by NIKE

NIKE, one of the world's leading sportswear brands, is committed to using eco-friendly materials in its products. By doing so, NIKE has not only contributed to conserving our planet but also gained several benefits.

1. Eco-friendly materials are sustainable and biodegradable. Using such materials reduces waste and pollution caused by synthetic fabrics that take years to decompose. This contributes to reducing carbon emissions significantly.
2. Eco-friendly production methods consume less energy and water than traditional manufacturing processes. NIKE uses recycled polyester made from plastic bottles for their shoes which saves 30% more energy compared to virgin polyester.
3. Consumers are becoming increasingly environmentally conscious and prefer buying from companies with a green agenda. Using organic cotton or other natural fibers in clothing production shows social responsibility towards the environment while meeting consumer demands for sustainability.
4. Gaining customer loyalty through ethical practices like using recycled materials or improving working conditions for factory workers; businesses can also cut costs because they require fewer resources when implementing eco-friendly practices.
5. Gaining certification from an eco-friendly certification body can increase brand credibility and help to attract environmentally conscious consumers. NIKE has been certified by the Forest Stewardship Council (FSC) and the Water Efficiency Alliance (WEA).require fewer resources when implementing eco-friendly practices.

4 methods of using eco-friendly materials in sustainable fashion

There are several methods for using eco-friendly materials in sustainable fashion that brands can adopt to minimize their carbon footprint and promote environmental sustainability.

1. Use of organic cotton, which is grown without synthetic fertilizers and pesticides. The process of cultivating organic cotton uses less water than conventional cotton farming, making it an ideal eco-friendly material.
2. Using hemp fabric, which has gained popularity in recent years due to its durability and versatility. Hemp is also a highly sustainable crop that doesn't require much water or land resources to grow.
3. Bamboo fiber is another popular eco-friendly material used in sustainable fashion because it's naturally anti-bacterial and moisture-wicking. It grows quickly without the need for chemical pesticides or fertilizers, making it an excellent choice for environmentally-conscious consumers.
4. Recycling post-consumer waste into new fabrics is yet another practical method of promoting sustainability in fashion design. Brands can reuse discarded materials like plastic bottles or old clothing items to create new textiles with minimal carbon emissions.

Designing clothes with longevity in mind rather than just following fast-fashion trends promotes the use of eco-friendly materials since they tend to be more durable and long-lasting. By creating timeless pieces from high-quality fabrics that stand the test of time, brands can reduce waste while still satisfying consumer demand for fashionable clothing options made from ethical production practices.

Consumer demand on eco-friendly materials used in sustainable fashion

Consumer demand for eco-friendly materials used in sustainable fashion is on the rise. More and more people are becoming aware of the negative impact that fast fashion has on the environment, and they are looking for alternative options.

One reason for this increased demand is because consumers are starting to understand how their choices affect the environment. They recognize that their buying habits can make a difference, and are therefore seeking out products made from eco-friendly materials like organic cotton, hemp, and bamboo.

This trend is due to an increase in transparency within the fashion industry. Consumers now have access to information about where their clothes come from, who makes them, and what materials they’re made with. This level of awareness allows consumers to make informed decisions when it comes to purchasing sustainable clothing.

Social media also plays a role in driving consumer demand towards eco-friendly materials in sustainable fashion. Influencers and bloggers often showcase outfits that use these types of fabrics which inspire followers to adopt similar lifestyles.

| ISSN: 2394-2975 | www.ijarety.in| Impact Factor: 6.421 | A Bi-Monthly, Double-Blind Peer Reviewed & Referred Journal |

|| Volume 11, Issue 1, January 2024 ||

What is the overall trend in the fashion industry in Europe

As the world becomes more aware of our impact on the environment, it's clear that sustainable fashion is no longer just a trend but a necessity. The use of eco-friendly materials like organic cotton, hemp and bamboo is becoming more prevalent in the fashion industry as big brands are committing to using sustainable practices.

Consumers too are beginning to demand eco-friendly clothing options, putting pressure on retailers to offer more sustainable choices. In Europe specifically, we're seeing an increase in small independent designers who prioritize ethical production and environmentally friendly materials.

While there's still work to be done in making sustainable fashion truly mainstream, it's encouraging to see progress being made towards a greener future for the industry. And with increased awareness and consumer demand driving change, we can hope for even greater strides towards sustainability in fashion moving forward.[20]

V.CONCLUSION

The fashion industry is known for being one of the most polluting industries in the world, with high levels of greenhouse gas emissions, water pollution, and waste generation. We can present the whole issue of pollution through the following five segments.

Fast Fashion

Fast fashion is a business model that produces inexpensive clothing quickly in response to the latest trends and demand. This model encourages consumers to buy more clothes and dispatch them quickly, resulting in much more waste.

Synthetic Materials

Many clothing items are made from synthetic fibres like polyester, acrylic, and nylon, derived from non-renewable resources like petroleum. The production of these materials requires a lot of energy and emits large amounts of greenhouse gases.

Water Usage

The fashion industry is a significant consumer of water, with some estimates suggesting that it takes 2,700 litres of water to produce a single cotton T-shirt. Without water, washing, dyeing and finishing are impossible in the textile industries. The water used in textile production is often polluted with chemicals, dyes, and other harmful substances. Sometimes the water is not adequately treated and is discharged into the river directly.

Chemicals and Dyes

The production of different types of textiles like yarn, fabric, and clothing involves using chemicals and dyes, which can be toxic and pollute water and the environment. The dyes are used to dye the textile, and chemicals are used to fix and finish it.

Transportation

The global nature of the fashion industry means that clothes are often transported long distances, resulting in significant carbon emissions. The chain includes manufacturers, buyers and distributors. And to maintain the chain, different types of transportation systems are used. In this way, transportation causes the pollution of the environment.

What is Eco-Friendly Practices?

Eco-friendly practices in the fashion industry refer to sustainable and environmentally conscious methods of designing, producing, and selling clothing, footwear, and accessories. These practices aim to reduce the environment pollution by the fashion industry and promote sustainable and ethical fashion.

7 Best Eco-Friendly Practices in The Fashion Industry

Many efforts are underway to promote sustainability in the industry and reduce its environmental impact. Now we will discuss how to introduce Eco-friendly practices in the fashion industry.

1. Sustainable Materials in Fashion

Sustainable materials in fashion are materials that are produced in an environmentally responsible way and have a lower environmental impact than traditional materials. These materials are often made from natural and renewable resources or recycled materials and are designed to be more durable and long-lasting than conventional materials. Here are some examples of sustainable materials in fashion:

Organic Cotton

Organic cotton is grown without harmful pesticides and fertilizers, making it a more environmentally friendly option than conventional cotton, which uses much more pesticides and fertilizers. However, it has some drawbacks, like less production, more life cycle, and cost; consciousness is growing among consumers about the use of organic cotton products.

| ISSN: 2394-2975 | www.ijarety.in| Impact Factor: 6.421 | A Bi-Monthly, Double-Blind Peer Reviewed & Referred Journal |

|| Volume 11, Issue 1, January 2024 ||

Hemp

Hemp is a durable and sustainable fibre that requires less water and fewer pesticides than traditional crops like cotton. It can be used to make fabrics and other fashionable products. It is heat resistor, breathable and has anti-bacterial properties.

Recycled Polyester

Recycled polyester is made from post-consumer plastic bottles, packets and other waste materials. It has a lower carbon footprint than traditional polyester and reduces waste by shifting plastic from landfills. The apparel or other products made from recycled polyester bears a specific logo so consumers can easily recognize it.

Tencel

Tencel is a fibre made from renewable raw materials like beech wood. It requires less water and energy than conventional materials and is biodegradable. Its manufacturing process is the same as viscose or rayon fibre. It is 100% biodegradable, has good absorbency, and an impressive nano-fibril structure results in a smooth surface.

Pinatex

Pinatex is a sustainable material made from pineapple leaf fibres. It is an alternative to leather products like bags, shoes, wallets, watch bands, and seat covers. It reduces waste by utilizing pineapple waste. It is also low in cost.

Linen

Linen fibre is a sustainable textile fibre derived from the stems of the flax plant (Linum usitatissimum). Flax is a plant that has been used for thousands of years to produce fabric and clothing due to its strength, durability, and natural beauty.

Linen fibres are longer and more substantial than cotton fibres, making them famous for high-quality clothing and household textiles. Linen fabrics are breathable, absorbent, and calm, making them ideal for warm weather or people who tend to overheat at night.

2. Water Conservation in Fashion

Water conservation in fashion refers to implementing measures to reduce the amount of water used in textile production and minimize water pollution. The fashion industry is a significant consumer of water, with textile production requiring large amounts of water for dyeing, finishing, and washing. Here are some examples of water conservation practices in the fashion industry:

Low-Water Dyeing

Implementing low-water dyeing techniques, such as air or foam dyeing, reduces the amount of water used in the dyeing process. These techniques also reduce the chemicals and energy required in the dyeing process. This reduces the water pollution.

Waterless Textile Processing

Waterless textile processing techniques, such as laser cutting, laser washing in denim eliminate the need for water in finishing and cutting processes, reducing water usage and waste.

Closed-Loop Water Systems

Closed-loop systems help mitigate the environmental impact of water usage by reducing the demand for freshwater resources and minimizing wastewater discharge. It can reduce water usage by up to 90%.[18,19,20]

Water Stewardship

Adopting water stewardship practices, such as implementing water-saving technologies and monitoring water usage, helps fashion brands to reduce their water footprint and promote responsible water management.

3. Renewable Energy in Fashion

Renewable energy in fashion refers to using clean and sustainable energy sources, such as solar, wind, or hydroelectric power, to power fashion companies' manufacturing, distribution, and retail operations.

Renewable energy sources are an important part of sustainable practices in the fashion industry. They help reduce greenhouse gas emissions, minimize environmental impact, and promote a more sustainable future.

Here are some examples of how renewable energy can be used in the fashion industry:

Solar Power

Manufacturing companies can install solar panels in their manufacturing facilities and warehouses to generate electricity from the sun. This reduces reliance on fossil fuels and minimizes greenhouse gas emissions. The machinery employed with raw material production cannot run through solar panels. Still, they can run the low energy-consuming options like lights, or fans can run with solar panels.

Wind Power

Wind turbines can be used to generate electricity for fashion companies, particularly those located in windy areas. This clean and renewable energy source does not produce greenhouse gas emissions.

Hydroelectric Power

| ISSN: 2394-2975 | www.ijarety.in| Impact Factor: 6.421 | A Bi-Monthly, Double-Blind Peer Reviewed & Referred Journal |

|| Volume 11, Issue 1, January 2024 ||

Some fashion companies can also use hydroelectric power to generate electricity. This involves harnessing the power of moving water from rivers or waterfalls to turn turbines and generate electricity.

Energy Efficiency

Fashion companies can also improve their energy efficiency by using energy-efficient lighting and appliances, implementing energy management systems, and reducing energy waste.

4. Circular Fashion

Circular fashion refers to designing, producing, and consuming clothing in a closed-loop system that minimizes waste and maximizes the use of resources. It aims to create a circular economy for fashion, in which products are reused, repaired, and recycled rather than disposed of after a single use.

Here are some examples of circular fashion practices:

Design for Circular

Designing products with circularity in mind using recyclable or biodegradable materials and creating easily disassembled products for reuse or recycling. Such as, we can reuse polyester fibre called recycled polyester, in clothing. You can find the recycled polyester fibre tag on the garment label made from recycled polyester.

Product Life Extension

Extending the life of products through repair, refurbishment, or upcycling reduces waste and extends the product's useful life, such as we can use different clothing to make rugs.

Rental and Resale

Offering rental and resale options for clothing, allowing products to be used by multiple customers, reducing the need for new products, and minimizing waste. Such as, second-hand garments are sold in poor economic countries.

Recycling and Upcycling

Recycling materials to create new products, such as turning discarded fabrics into new garments or upcycling products by repurposing them into new designs.

Waste Reduction

Reducing waste by using modern cutting technologies that maximize fabric utilization, creating products on demand, and minimizing leftover fabric waste.

5. Eco-Friendly Packaging

Eco-friendly packaging in fashion refers to using sustainable and environmentally-friendly materials and practices for packaging fashion products. Traditional packaging materials, such as plastic and paper, can have a significant environmental impact due to their production, use, and disposal. Eco-friendly packaging in fashion aims to minimize this impact and promote more sustainable packaging practices.

Here are some examples of eco-friendly packaging practices in fashion:

Biodegradable Materials

Using biodegradable materials, such as corn starch or plant-based plastics, for packaging instead of traditional plastic materials such as PVC. These materials break down naturally and do not harm the environment seriously.

Recyclable Materials

Use recyclable materials, such as paper or cardboard, instead of polybag packaging. These materials can be reused or recycled after use, reducing waste and promoting a circular economy.

Minimal Packaging

Using minimal packaging for fashion products, such as reducing the amount of paper, plastic, or other materials used, reduces waste and minimizes environmental impact. You may find unnecessary hang tags or plastic clips in the apparel packaging, which the manufacturers may avoid.

Sustainable Production

Using sustainable production methods for packaging, such as using renewable energy sources like solar panels or reducing the amount of water and energy used in production systems.

Branding and Marketing

Using eco-friendly packaging as part of the brand's marketing and communication strategy promotes the company's commitment to sustainability and environmental responsibility. This packaging may be indicated through a recycling logo.

6. Slow Fashion

Slow fashion is a movement that promotes sustainable and ethical fashion practices by prioritizing quality over quantity and encouraging consumers to buy and wear clothing for extended periods. It is the antithesis of fast fashion, which focuses on producing cheap, trendy clothing quickly and on a large scale.

| ISSN: 2394-2975 | www.ijarety.in| Impact Factor: 6.421 | A Bi-Monthly, Double-Blind Peer Reviewed & Referred Journal |

|| Volume 11, Issue 1, January 2024 ||

The slow fashion movement aims to create a more sustainable and ethical fashion industry by promoting the following practices:

Sustainable Materials

Using sustainable materials, such as organic cotton, BCI cotton or recycled polyester, and natural dyes from plants or animals, have a lower environmental impact than traditional materials that slow down fast fashion.

Ethical Production

Prioritizing fair labor practices and ethical production methods, such as safe working conditions, fair wages, and transparency in the supply chain.

Quality over Quantity

Focusing on producing high-quality, timeless designs made to last rather than having trendy, disposable clothing that is quickly discarded. We should never forget that quality costs less.

Local Production

Supporting local and small-scale production, reducing the environmental impact of transportation, and promoting local economies. For example, American clothing demand can be reduced by its local fashion houses.

Consumer Education

Educating consumers about sustainable fashion practices and the environmental and social impact of the fashion industry. This should be the first on the priority list.[17,18]

7. The Role of Technology in Creating Eco-Friendly Fashion

Technology is vital in creating eco-friendly fashion by enabling fashion brands to use sustainable materials and production methods, reducing waste, and improving supply chain transparency. Here are some examples of how technology is used in creating eco-friendly fashion:

Sustainable Materials

Technology is being used to develop new sustainable materials, such as plant-based materials, recycled fibres, organic fibres, and biodegradable fabrics. Innovations in material science and technology make it possible to create sustainable alternatives to traditional materials, reducing the fashion industry's environmental impact. Now a day, the use of organic cotton and recycled polyester in clothing has lightened the hope of consciousness both in the fashion industry and the consumers.

3D Printing

3D printing technology creates prototypes and samples, reducing the need for physical prototypes and minimizing waste. It also allows for more precise production, reducing material waste. Already some countries are using this technology in their fashion industry.

Digital Design and Printing

Digital design tools and digital printing technology are being used in many textile industries to reduce the amount of fabric waste during production. Digital printing allows for more accurate and efficient use of fabric, minimizing wastewater and reducing the environmental impact of the production process.

Supply Chain Transparency

Technology improves supply chain transparency, allowing brands and consumers to trace the origin of materials and products, ensuring ethical and sustainable production practices.

Recycling and Upcycling

Technology is being used to develop new recycling and upcycling methods, allowing for the creation of new products from recycled or upcycled materials. This reduces waste and promotes a circular economy for fashion.

By adopting eco-friendly practices, the fashion industry can reduce its environmental impact and promote a more sustainable and ethical future for fashion production and consumption. Consumers can also play a role by making informed choices about the clothing they purchase, supporting sustainable and ethical fashion brands, and prioritizing quality over quantity.[19,20]

REFERENCES

1. "What Does 'Sustainable Fashion' Actually Mean?". British Vogue. April 19, 2021. Retrieved October 24, 2023.
2. ^ "Destination Zero: seven years of Detoxing the clothing industry" (PDF). Greenpeace. Retrieved September 30, 2020.
3. ^ "Greenpeace Calls Out Nike, Adidas and Puma for Toxic Clothing". Reuters. August 9, 2011. Retrieved September 30, 2020.

| ISSN: 2394-2975 | www.ijarety.in| Impact Factor: 6.421 | A Bi-Monthly, Double-Blind Peer Reviewed & Referred Journal |

|| Volume 11, Issue 1, January 2024 ||

4. ^ Niu, Baozhuang; Chen, Lei; Zhang, Jie (November 2017). "Punishing or subsidizing? Regulation analysis of sustainable fashion procurement strategies". Transportation Research Part E: Logistics and Transportation Review. 107: 81–96. doi:10.1016/j.tre.2017.09.010.
5. ^ "Increasing Green Credentials beyond Greenwash" (PDF). Retrieved November 22, 2021.
6. ^ Dahl, Richard (June 2010). "Green Washing: Do You Know What You're Buying?". Environmental Health Perspectives. 118 (6): A246-52. doi:10.1289/ehp.118-a246. PMC 2898878. PMID 20515714.
7. ^ Neuman, Salla (2019). "Sustainability in fashion production – How are the pioneers doing it?". www.theseus.fi.
8. ^ Anon (1991). "Textiles and the Environment". International Textiles. 726: 40–41.
9. ^ Anon (1993). "Rethinking Ecology". Textile View. 24: 201–207.
10. ^ Meadows, Donella H. (1982). The Limits to growth : a report for the Club of Rome's project on the predicament of mankind. Universe Books. ISBN 0876631650. OCLC 977611718.
11. ^ [a b c d] Fletcher, Kate (2008). Sustainable fashion and textiles: design journeys (2nd ed.). London; Washington, DC: Earthscan. ISBN 9780415644556.
12. ^ "Lynda Grose – PIONEERING ENVIRONMENTAL STANDARDS FOR THE CLOTHING INDUSTRY – CE NEWS". CE NEWS. Archived from the original on March 12, 2017. Retrieved March 11, 2017.
13. ^ "Don't Buy This Jacket, Black Friday and the New York Times - Patagonia". November 25, 2011.
14. ^ Hethorn, Janet; Ulasewicz, Connie, eds. (2008). Sustainable Fashion: Why Now?. Fairchild Books.
15. ^ [a b] Gwilt, Alison; Timo Rissanen (2011). Shaping Sustainable Fashion. Earthscan.
16. ^ S. Walker; J. Giard, eds. (2013). The Handbook of Sustainable Design. Bloomsbury.
17. ^ Fletcher, Kate; Mathilda Tham, eds. (2015). Routledge Handbook of Sustainability and Fashion. Routledge.
18. ^ Niinimaki, Kirsi (2018). Sustainable Fashion in a Circular Economy. Aalto ARTIS Books.
19. ^ Rissanen, Timo and Holly McQuillan (2018). Zero Waste Fashion Design. Bloomsbury.
20. ^ Gardetti, Migel Angel & Ana Laura Torres (2013). Sustainability in Fashion and Textiles. Greenleaf.

International Journal of Advanced Research in Education and Technology

ISSN: 2394-2975

Impact Factor: 6.421

www.ijarety.in editor.ijarety@gmail.com