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Drink it wear it: Sustainable coffee fabric

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Abstract

What if we could make new textiles from your trash? Imagine wearing a dress which is made using the leftover coffee grounds from your morning coffee (Fig 1.)? This future may be closer than you think. The textile industry has been implementing new technologies and developing new fibers which are both innovative and better for the industry from a social and environment sustainable point of view for some time now. Which should come as no surprise, considering the fashion industry is considered to be one of the most polluting industries in the world. Textile innovation is the direct link to the next step in ensuring the entire industry becomes more sustainable.

Keywords: Textile innovation, coffee fiber, recycled fiber, sustainable fiber

Introduction

Fabrics made from coffee ground fiber, seaweed, and pineapple leaves or recycled plastic bottles are as important as they are the foundation of the fashion industry's greener future.

The textile industry has been implementing new technology and developing the fiber which is innovative and better for the industry in terms of social and environmentally sustainable point of view.

The textile industry is linked with the next step to ensure the entire industry becomes more sustainable. Majority of the resources used textile industry as a raw material has mainly obtained from natural sources like cotton, jute, linen, etc. (Fig 2).



Fig 1: Coffee Fabric



Fig 2: Coffee Beans and Fabric

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The coffee grounds used to create the yarn are taken and recycled from some of the world's largest coffee vendors, like Starbucks. In this way, the company gives a second life to coffee grounds which would have otherwise ended up in Trash.



Fig 3: Coffee Grounds

"There is never a need to waste time and energy to produce the essential S Cafe raw material, as there is always coffee being consumed, therefore there will always be coffee grounds to be collected and used,".

A company of Singtex industries discovers the way to use the coffee ground into wearable textile-like yarn which can further be converted into fabric.

Singtex industrial cop. a world-renowned Taiwanese company is known for the production of functional fabric. Singtex has successfully developed a new eco- friendly product that uses the fiber made from the waste of coffee ground.

Singtex successfully invented the eco-friendly coffee yarn in 2008, which was made from plastic bottles and coffee grounds, this green, high-tech yarn is environmentally friendly, deodorizing, and fast-drying, UV-resistant and has many different applications.

The resulting coffee yarn is multi-functional and can be used in a variety of products, from outdoor and sports performance wear to household items used every day. Singtex has always set its sights on becoming a world-class eco-friendly functional textile company. It strives to create better and more eco-friendly products without compromising on sustainable development.

Roasting coffee beans is the most fascinating stage of making it into a beverage. One can literally taste the enchanting aroma that roasting coffee beans can create but also contributing to the main component which is producing coffee ground.

Processing of Coffee Fiber



Fig 4: Coffee Beans



Fig 5: Coffee Grounds



Fig 6: Batches



Fig 7: Yarn



Fig 8: Fabrics



Fig 9: Apparel

3.1 Preparation material with coffee residue

The term 'material with coffee residue' includes microencapsulated backed coffee residue, microencapsulated coffee essential oil, microencapsulated fragrance organic compound which is extracted from coffee residue. Coffee essential oil could be extracted from the coffee bean. Then backed coffee residue or coffee essential oil was microencapsulated.

3.2 Cleaning or sieving of coffee residue or raw material

The coffee bean waste is rinsed in clean water and then dried, in that case, a ground particle having a size of 20 to 100 micron. Then the ground mixture is sieved. The resultant composition can be sieved into different fine particle sizes between 80 - 100 um.

3.3 Removal of organic contents from material with coffee residue

The sieved mixture treated with some solvents to remove the organic contents from the mixture. The extraction of fat is carried out in sox let type extractor with ethyl ether. After the fatty acid has been removed, the aqueous solution containing water-soluble constituents is evaporated to reduce the pressure and extracted with absolute alcohol for removal of glycerol.

3.4 Preparation of carbonized particles

The mixture from the above 3 steps is collected and carbonized using carbonization. For example, pyrolysis is the process in which coffee mixture is heated, decomposed and eventually converted into the desired product in the presence of air. Pyrolysis includes carbonization, charcoal processing, gasification, activated carbon processing. The carbonization of coffee raw material is done in the presence of chemicals such as zinc chloride, magnesium chloride, calcium chloride or phosphoric acid.

3.5 Mixing of material with carbonized material to form a mixture

3.6 Blending the mixture with the polyester chip in a weight ratio of 1:9 to produce a master batch

In this process ground particle and polymer chip (such as PP, Nylon or PET) in the weight ratio of 1:9 are blended to prepare master batch. Alternatively, 75 per cent of carbonized particles and 25 per cent the material with coffee fragrance are blended into polymer chip (such as PP, Nylon or PET) to make master batch.

3.7 Drawing of Yarn from master batch.

4. Characteristics of Coffee Fibre

4.1 Fast Drying

The main important feature of s cafe technology, coffee

ground fiber is having faster drying capacity that means it continuous moves moisture away from the skin to the outer surface of the fabric. S.Cafe fabric diffuses the body moisture wicks it away from the body to the atmosphere. It is not a temporary kind of finish in the fabric, this feature being permanent will never wash out.

4.2 Odour control

Nano-sized coffee granules are permanently embedded in the fiber. These coffee particles absorb the odour. Further fabric made from coffee fiber helps to absorb the odour from our body which produced throughout the day.

4.3 UV protection

Cafe coffee ground provided with huge microscopic pores which create long-lasting natural and chemical-free shield for fiber or yarn or fabric, which reflects UV rays and provide comfortable outdoor experience.

4.4 Eco-friendly

Cafe technology utilizes recycled coffee grounds that otherwise would have gone to landfill, expanding the recycling of coffee gives value to the waste.

5. Environmental Merits of Coffee Fiber

Coffee is one of the world's most popular drinks, as a result of this most of coffee ground is discarded into the environment as waste but Singtex is now collecting the waste grounds from the drinks giant turns into sportswear.

The manufacturing of a new product does not require high temperature for carbonization, so its manufacturing process is more efficient. More important point is that the process does not use hazardous chemical as well.

However, it is a new discovery to totally enhance the life cycle of the coffee industry and make the waste more valuable.

The manufacturing process of coffee fiber involves the use of chemicals which are non-toxic in nature, hence they do not create harm to the environment.

The manufacturing of a new product does not require high temperature for carbonization, so its manufacturing process is more efficient. More important point is that the process does not use hazardous chemical as well.

Instead of focusing on the end-product test, the blue sign is one standard association which analyses all input in producing products from raw material to the chemical component, to water and energy resources.

The blue sign is one textile standard association, these blue sign standards analyze all input in producing an article from raw material to the chemical component, to water and energy resources.

The blue sign standard is dedicated to protecting consumers and reducing the environmental impact by minimizing the waste and emission and reducing resources usage. It designed to solution for reducing the environmental impact.

6. Major environmental benefits using coffee ground fiber.

100% biodegradable and eco-friendly.

200% fast-drying capacity.

7. Applications

7.1 Apparel Textile

Coffee fiber can be used in apparel Textile like clothing, it can be used in active wear, T-shirts and even sports bras. As the coffee fiber offers 200 per cent faster-drying capacity, it

can be used for manufacturing sports cloth. Eco-Friendly fabric can be washed easily without the need of any detergents.

7.2 Home furnishings

The coffee ground fiber was used primarily in clothing, but this material can be used as part of the structures in the interior design for coffee shop and home furnishings.

7.3 Athletic wear

Roasted coffee has natural deodorizing properties so that fabric made from coffee yarn has great application in Athletic wear. Which is designed to soak up the sweat. Apart from this, it is found that coffee fiber is faster drying and serve as UV shield, hence fabric gives a perfect match for athletic wear.

8. Conclusion

The resulting coffee yarn is multi-functional (Ref Fig 10.) and can be used in a variety of products, from outdoor and sports performance wear to household items used every day. The coffee grounds used to create the yarn are taken and recycled from some of the world's largest coffee vendors, like Starbucks. Globally, coffee production is estimated to be responsible for upwards of 23 million tons of waste per year. In this way, second life to coffee is given which would have otherwise ended up in the trash. "There is never a need to waste time and energy to produce the essential as there is always coffee being consumed, therefore there will always be coffee grounds to be collected and used," adds the brand. In addition, garments made can also be composted at the end of their life, ensuring they do not go to waste in one of the world's landfills and used to grow more coffee, giving it a circular lifecycle.



Fig 10. Multifunctional Use of Fabric

In this context, innovative fabrics such as coffee fiber, leather from pineapple leaves or fabrics made from milk, seaweed or recycled bottles are just a few examples of the growing union between technology and fashion to become the basis of an industry struggling to evolve towards a greener future.

9. References

1. <https://www.fibre2fashion.com/industry-article/8379/coffee-ground-fibre-a-most-worthwhile-fibre#:~:text=of%20Coffee%20Fibre-,S.,%2C%20light%2C%20flexible%20and%20breathable.>
2. <https://fashionunited.uk/news/fashion/sustainable-textile-innovations-coffee-ground-fibre/2017061624856>
3. <https://mtixinternational.com/2019/09/textiles-made-from-coffee-grounds/>
4. https://www.vice.com/en_us/article/78m7mz/this-taiwanese-company-makes-clothes-out-of-coffee-grounds

5. <https://www.the-sustainable-fashion-collective.com/2017/07/12/new-opportunity-coffee-waste-sustainable-fabrics>
6. <https://fashionunited.uk/images/201706/r/810/4Sustainableeo4.jpg>
7. https://static.fibre2fashion.com/articlresources/images/84/8379/4_files/image002.jpg
8. https://static.fibre2fashion.com/articlresources/images/84/8379/2_files/image002.jpg