

ITMA 2019 - New developments in Fibers, Yarns and Fabrics

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ABSTRACT

This paper highlights new developments in fibers, yarns and fabrics from the ITMA 2019 show, which took place in Barcelona, Spain. Fiber and yarn chapter was launched in 2011 in response to industry demands for a comprehensive, one-stop sourcing platform for textile and garment manufacturers and since then this chapter has been growing. For ITMA 2015, this chapter included another subchapter on recycled fibers and yarns to support textile and garment industries commitment to sustainability. In the 2019 show, this chapter was expanded to include an innovative fabrics section as part of the yarns and fibers chapter. The fiber, yarn and fabric chapter offered innovative and eco-friendly raw material solutions to support these industries with a large focus towards recycling, waste reduction, and production efficiency. This paper highlights the sustainability initiatives exhibited by various companies in this chapter at ITMA 2019.

Introduction

According to a new report from Grand View Research, the global textile market was valued at US\$ 925.3 billion in 2018 and is projected to reach approximately US\$1.2 trillion by 2025 at a CAGR (Compound Annual Growth Rate) of 4.24%. Within this growth, the textile yarn market is estimated to be worth US\$12.6 billion by 2020 (Markets and Markets). As the global textile industry continues to grow, it is generating greater demand for raw materials, novel application, and new production processes.

The fiber and yarn sector is an integral part of the textile and garment industries. To stay competitive, these industries are striving for continuous improvement and therefore are constantly looking for innovative solutions to meet the changing demands and industry standards. These standards are mainly geared towards sustainable solutions such as recycling, waste reduction,

production efficiency, and closed loop production. With increasing involvement from governments, these standards are now becoming very crucial for trade and businesses.

It is obvious that sustainability is a rising concern of brands, equipment and fabric manufacturers, and consumers. The industry is still very recycled-centric, which is clearly not enough. There has been more push for water savings, durability, waste management, and reducing emissions, water pollution, and carbon foot print. The yarns, fibers, and fabrics chapter at ITMA 2019 offered a very crucial component of the textile industry as more industrial and fashion companies look for innovative and sustainable materials. The 2019 ITMA continued the focus on recycled fibers and yarns and in addition offered the latest range of sustainable textile fibers and yarn solutions to meet industry needs.

Sustainable Solutions

Second to oil, the textile industry is one of the largest contributors to harmful environmental effects. According to the UN Partnership on Sustainable Fashion¹, it is responsible for approximately 10% of greenhouse gas emissions and 20% of wastewater production globally. As a result, the necessity for textile companies to alter their approach to manufacturing and production is drastically increasing. This was prevalent at the ITMA 2019 show where across the board companies aimed to showcase range of fibers and yarns as new innovative solutions to address creating a more sustainable systems. The aim of this paper is to highlight the two major sustainability initiatives exhibited by various companies – Circular Fashion and Closed Loop system.

Circular Economy (Circular Fashion)

Today's current textile industry follows a linear economic structure with a very short lifespan: it is sourced, produced,

and ultimately thrown away. This economic structure, although fast, is very inefficient, unsustainable, and detrimental to the environment. Recently, reuse economy has gained a lot of attention to tackle this situation. This platform provides an improvement to the linear process by reusing the textiles that were produced over and over again. However, this kind of cycle eventually has to end when the textile can no longer be repurposed or recycled and ultimately ends up in the landfill like a linear economy. This type of economic structure is referred to as a circular economy or circular fashion which not only addresses the ability to extend the life of a product, but also protects the environment at the same time. In a circular fashion industry, every aspect of the production process is pushed to be circular, ethical, and ultimately environmentally friendly and sustainable. This includes recycling of materials, biodegradable solutions, ethical sourcing of raw materials, and more efficient manufacturing and production processes.

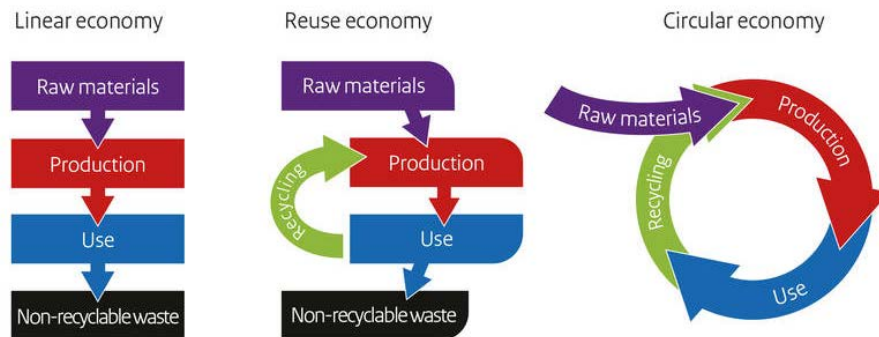


Figure 1: From a Linear to a Circular economy (<https://www.government.nl/topics/circular-economy/from-a-linear-to-a-circular-economy>)

During the ITMA 2019 show, it was apparent that companies emphasized their Circular Fashion initiatives by showcasing their efficient manufacturing and production processes through reduced emissions, waste, water, chemicals and energy usage and also by finding ways to biodegrade materials after consumer use in order to fully close the loop. Various companies were able to ensure the

credibility of their products through the use of eco-labels. Some eco-labels that showed up throughout the show pertaining to circular fashion included the bluesign® standard, GOTS, EU Ecolabel, Oeko-Tex® standard 100, and the Global Recycled Standard.

The bluesign® standard provides a means of pre-testing and analyzing all components required to manufacture a

¹ <https://unfashionalliance.org/>

product before those components go into production. By analyzing the environmental footprint of these components initially, it helps to eliminate sources of harmful environmental contamination from the very beginning. The GOTS certificate, or the Global Organic Textile Standard, ensures that the fibers going into production are organic, the production is ethical both on an environmental and social level, and that the consumer will receive a responsibly made product. The EU Ecolabel is a label that identifies products that were made with the environment in mind for manufacturing

processes, distribution methods, and safe disposal capabilities. Oeko-Tex® standard 100 is a certification system for all aspects of the manufacturing and production process. It helps safeguard the consumers and environmental health by ensuring that no harmful chemicals are utilized during the production process. The Global Recycled Standard is provided to companies who utilize recycled content in their products. This label certifies that the recycled material used is traceable, environmentally friendly, and labeled correctly.



Figure 2: Eco-labels (Left to right) - bluesign® standard, GOTS, EU Ecolabel, Oeko-Tex® standard 100, and the Global Recycled Standard

Archroma Life Enhanced is a company that provides “safe, efficient, and enhanced” textile chemical solutions. Their chemicals are bluesign® approved, GOTS certified, bio based, PFC free, Formaldehyde free, and metal free. By certifying their products with eco-labels and utilizing sustainable practices, Archroma is able to effectively protect the environment against harmful waste water and also save valuable natural resources.

Another chemical company, Clariant, demonstrated their sustainability initiatives by introducing dope dyed yarns that use 98% less energy and 99.9% less water compared to package dyed yarns. In addition, they introduced new functional Additive Masterbatches such as: Fluorine free Hydrophobic and Anti-Soil Masterbatches for Polyester, Chain Extender Masterbatches to help recycling of Polyester, and Soft Touch Masterbatches for Polypropylene, Polyester, Polyamide and PLA fibers, filaments and nonwovens.

DBT fiber promoted sustainability in their long and short staple spinning processes

with the aim of optimizing the environmental and social impact through their sustainable business model in a circular economy. Their Eco Fiber green action solutions utilizes a photovoltaic system with a capacity of more than 650 kW generating savings in CO₂ emissions equivalent to 390 tons/year. In addition, their geothermal plant has eliminated the use of fuels and therefore is contributing to the ecosystem by eliminating any type of polluting emissions into the atmosphere. They have a system to recover waste materials from their manufacturing processes and recycle 100% of all packaging materials.

In response to the need for environmental awareness, Nylstar showcased their sustainable NATEO Program with zero water pollution, water-saving and recycling initiatives under the Meryl® brand. Meryl® NATEO provides a platform to create polyamide yarns that provide an eco-friendly alternative to cotton and addresses recycling options and reduces water, chemical, and energy use. Under the umbrella of Meryl®

NATEO water saving program, there have been several innovations regarding more sustainable dyeing alternatives and creating yarns that look and feel like cotton. Meryl® Ecodye is a dyeing solution that provides excellent color fastness and color take-up while eliminating the need for water during the dyeing process. This is done through a dope dyeing method in which the color is added to the polymer dope before extrusion. Meryl® Cotton 66 is a yarn that was made in response to the environmental damage being done by the cotton farming industry. This yarn looks and feels like cotton and eliminates the need for large amounts of water and agricultural chemicals that is required for cotton farming. Meryl® Eco Denim is a technology that eliminates up to 11 liters of water per pair of jeans made. Meryl® wash less solution, known as Meryl® Skinlife, is a silver ion based antimicrobial treatment that eliminates odors while maintaining a balanced environment for the skin and therefore it doesn't require frequent launderings. In zero water pollution program, they have developed variety of performance yarns under Meryl® touch without using any topical chemical treatments to either the yarn, fabric or garment.

Antex's Ynviron product, which is a recycled dyed yarn solution, significantly reduces harmful greenhouse gas emissions, saves energy, reduces water consumption, and conserves natural resources.

Beaulieu International Group introduced their UltraBond staple fiber that doesn't require latex or other binders in nonwoven applications. This product allows for a significant decrease in water consumption which results in a 93% reduction in energy usage, and reduces CO2 emissions by over 35% without the addition of any other agent.

Lenzing, the world leader in producing environmentally friendly wood pulp based fibers, showcased their EcoVero™ fibers that

allow for 50% less emissions than other viscose fibers in the industry. Another product Tencel™ x Refibra™ was introduced which is a combination of cotton textile scraps and wood pulp. This product is 100% bio derived, compostable and biodegradable, and results in overall 95% reduction in water used.

S. Vilarrasa S.A., who manufactures open end spun yarns, introduced their recycled cotton which was produced from pre-consumer cotton garment waste. This replaces the necessity of using virgin cotton which reduces water use, agricultural chemicals, and garment dyes. Vilarassa's recycled cotton yarn allows for 4800 kg less water used, 16.5 kg less chemicals, 233.8 kg less CO2 emissions, 3500 kg less water contamination, and 500kw.h less energy consumption. They have the Global Recycled Standard certificate that ensures their recycled material is verified.

Closed Loop

Based on the most recent statistics provided by the EPA², there were 16,030 thousand US tons of textiles generated in 2015. From this, 10,530 thousand tons of textile waste was landfilled and only 2,450 thousand tons were recycled. This waste does not only impact the environmental condition on land, but it also contributes significantly to synthetic waste polluting the oceans and microfiber pollution in the water. Every year over 8 million metric tons of plastic waste enters the ocean³. ITMA 2019 showcased several companies in the fibers, yarns and fabrics chapter that addressed a closed loop production system through recycling and waste reduction.

The Sustainable Innovation Award, which was first established at the ITMA 2015 show, aims to encourage companies to address textile sustainability by coming up with innovative solutions. This year's award went to the denim company Candiani SpA's Re-Gen, a "circular denim" fabric created from regenerated and recycled raw materials.

² <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/textiles-material-specific-data>

³ <https://oceanconservancy.org/trash-free-seas/plastics-in-the-ocean/>

This fabric is comprised of 50% Tencel™ x Refibra™ Lyocell made of pulp from cotton scraps and wood pulp using Lenzing's efficient closed-loop process and the other 50% consists of post-industrial Candiani recycled cotton waste. Alongside the recycled components of the material, the chemicals and dyes used are also environmentally friendly. Additionally, Refibra™ technology incorporates fiber identification, so there is transparency in the supply chain. In awarding Candiani's Re-Gen product, it highlighted the need for companies to move towards utilizing more sustainable raw material sources and obtaining a closed loop system through methods such as recycling both industrial and consumer waste.

Seaqual™ stood out in its mission to reduce the amount of waste currently in the ocean and entering the ocean. Seaqual™ develops 100% recycled marine plastic fiber by partnering with local fishermen to help collect the waste for the fiber. They claim that "for every kilo of Seaqual™ fiber created, they remove 1 kilo of trash from the ocean." Meryl® fibers by Nylstar are also created with waterways and the ocean in mind. Meryl's NATEO program ensures that their high tenacity fibers allows for zero micro plastic entering the environment. In addition, their recycling program offers two products; Meryl® Recycled fibers re-uses post production waste to create a new raw material, and Meryl® Pure is deigned to be 100% recyclable by incorporating natural stretch in order to eliminate need of elastane for stretch in garments.

Infinited displayed an innovative recycling solution not only for pre and post-consumer textile waste, but also for cardboard scraps and agricultural waste. Their waste material is separated, turned into a liquid and then spun into a high performance fiber. This system allows them to reduce their water usage by 20,000 liters per kg of cotton and greatly lowers their CO2 emissions.

Antex's YNVIRON product aims to reduce energy consumption and environmental impacts through the recycling

of post-industrial and post-consumer waste and coloring the fiber via a dope dyeing solution. The waste that is collected is shredded, melted, and extruded before being turned into a chip for further processing.

Haksa Tekstil Eco-Friendly fabrics utilizes recycled raw materials from pre-production textile waste to create an environmentally friendly yarn that in turn saves billions of liters of water, saves thousands of tons of cotton fiber, and reduces thousands of tons worth of chemical contamination entering the environment. The waste used can be combinations of cotton, polyester, Repreve®, acrylic, and wool.

Lenzing creates wood pulp derived fibers while reducing water, CO₂, and chemical emissions. Their fibers include EcoVero™ viscose fiber, Tencel™ lyocell and modal fibers, Refibra™ fiber which is a combination of cotton textile waste and wood pulp, and Veocel™ which is a combination of cotton scraps and wood pulp for nonwoven purposes. Lenzing also offers an EcoDisperse application that allows lyocell fibers to be flushable and biodegrade and EcoColor which dope-dyes modal fibers resulting in long lasting color in the fibers. To ensure that all waste is utilized in the production process, Lenzing utilizes a biorefinery to repurpose any leftover wood materials. These include Biobased Acetic Acid, Furfural, Magnesium Lignosulfonate, Soda Ash, Sodium Sulphate, and Xylose. These co-products of Lenzing, which are all biobased, can be utilized in the food, animal food, pharmaceutical, cosmetic, chemical, and textile industry for various applications. Similar to Lenzing, Kelheim Fibers presented their specialty viscose fibers which are made of 100% cellulose. This allows their fibers to be completely biodegradable. They work with CanopyStyle to make sure they don't source wood from ancient or endangered forests.

Another trend shown in this chapter of ITMA 2019 was finding ways to make biodegradable alternatives to synthetic materials currently used in the Textile market. Nan Ya displayed their GREENONE product which is a biodegradable polyester filament. Through testing it was shown to be

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able to biodegrade in landfills into CO₂, CH₄, and soil matter in approximately 98 days. This material can be combined with their recycled polyester, heavy metal free polyester and a biopolyester.

Oerlikon introduced a new fiber production technology for the full recycling of POY and FDY filaments via a process of homogenization drying, extrusion, pre-filtration, the BBE vacuum filter, pelletizing and downstream melt application. Their process allows for all the spinning waste to be directed back into production.

Global raw materials' provider in Belgium, Beaulieu, displayed range of fibers, yarns and technical textiles that can replicate any type of staple fiber spinning technology, using different type of polymers and additives, and different type of cross sections. These high tenacity staple fibers HT8 offer unique high tensile strength without compromising on elongation.

The Woolmark Company showcased their cradle to cradle initiative to evaluate the impacts of their products have on the environment in order to ensure that they contribute to a sustainable and circular economic structure. To measure the sustainability of the products cradle to cradle assesses the materials health, reuse capabilities, renewable energy, carbon emission contribution, water usage, and social impact. Woolmark works with

Australian wool to research, develop, certify, educate the community, and provide quality wool products for the textile industry. Since wool is an inherently sustainable natural fiber that is 100% biodegradable, it doesn't negatively impact the environment. Woolmark is an advocate for conducting life cycle assessments to assess a product's environmental impact from the beginning of its life to the end. This includes how the material was sourced, the manufacturing process, the products use, and the disposal of the product.

Conclusions

The textile industry is one of the largest contributors to harmful environmental effects and generating waste in the eco-system. As a result, the necessity for textile companies to alter their approach to manufacturing and production is drastically increasing. Therefore, one of the main themes at ITMA 2019 was focused specifically to provide an integrated platform of eco-friendly solutions including recycling, waste reduction, and pollution reduction/prevention. This theme was evident across the board as companies showcased a range of their fibers and yarns to address sustainability issues. There were no revolutionary innovations in fiber and yarns as the large focus this ITMA was focused on recycling, waste reduction, and production efficiency to meet the industry needs.

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