

Cleaning up fast fashion: can it be done?

A study by Aalto University has revealed that the fashion industry accounts for 10 per cent of global pollution and textile production generates a staggering 92 million tonnes of waste per year. In a bid to tackle this problem, a fresh wave of tech-led disruptors are attempting to clean up the world of fast fashion.

Counting the environmental cost

The textile industry negatively impacts the environment in a variety of ways; two key areas include the use of potentially polluting chemicals and energy-intensive production methods. For natural fibres, such as cotton, the environmental impact begins in the field, due to the use of mechanised irrigation systems to keep crops watered in countries where water supplies are already depleted. Synthetic fertilisers are also used to optimise yields, despite the fact that one tonne of nitrogen fertiliser emits greenhouse gas emissions equivalent to nearly seven tonnes of CO₂.

Regardless of whether natural or synthetic fibres are being used, dyeing and finishing processes also have a significant environmental impact, using potentially hazardous chemicals in large volumes that are often washed away in wastewater, or released into the atmosphere impacting biodiversity and potentially causing respiratory disease.

Becoming more circular

Due to the costs associated with implementing cleaner technology and practises, the pathway to a circular textile economy is currently being led by smaller tech-led innovators, rather than the bigger players. Many of these smaller companies are involved in the development of new fibre recycling technologies, such as finding ways to deal with impurities by separating out polyester blends or innovating cleaner dyeing methods. For example, DyeRecycle, a spinout from Imperial College London, has developed a circular chemical technology to decolour textile waste and reuse old dyes.

Innovative steps

An analysis of recent patent-filing activity in Europe, conducted by Withers & Rogers, has shed light on some of the cutting-edge innovation involved in developing a circular textile economy, with much of the innovation activity focused on cleaning up production processes and facilitating recyclability.

The Aalto University Foundation has a European patent (EP3577271) pending for a process that converts waste textile material into new fibres while limiting the use of harmful chemicals. This process involves cooking waste material in a liquor to remove lignin, which results in a pulp that can be dissolved and spun into new cellulose fibres.

Other innovators are looking to clean up the processes involved in textile recycling by reducing the environmental impact of polymer separation. For example, UK-based Worn Again has a patent (GB2560726) pending for a process that

involves fewer energy-intensive steps for recycling textiles. The method described in the patent application involves the use of an ionic liquid, which is used as part of an adaptive solvent system to separate out the polymers.

Focusing on fibres

Cotton is a widely used raw material in the manufacture of yarns, but its cultivation requires the use of a large amount of water. Spinnova has been granted a European patent (EP2753738) for an innovative method of producing a fibrous yarn without using a large quantity of water, which involves eliminating the need to produce a paper first.

Headquartered in the Netherlands, Flocus is attempting to side-step the use of cotton altogether by working out a way to extract spinnable kapok fibres from the kapok tree. With a patent application (EP3887579) pending, Flocus has developed a means of separating out the longest and cleanest kapok fibres which are suitable for spinning and adjusting their moisture content so they can be blended with a fibre base.

The innovation curve

With so much interest in cleaning up the textile industry and the world of fast fashion, innovation activity is gathering pace. This makes it even more important than usual that disruptors apply for patent protection at an early stage to protect their innovations from copycats and prevent competitors from beating them to market.

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