



Fashioning waste milk into fibres



Summary

QMILK®, based in Germany, has developed an innovative process to produce a high-value, organic, textile fibre from the waste milk from dairies. The QMILK® fibre is manufactured through a resource efficient, zero-waste process using no chemical additives. The resulting biopolymer fibre offers the potential for numerous high-value applications and can be freely modified for a range of markets. This case study explains how this young, innovative business has transformed a problematic waste stream into a valuable feedstock for the future of fibre production. For more information about QMilk, visit this [website link](#).



Key Facts

- Milk-based organic fibre
- Zero waste manufacturing process
- Provides a high-value market for waste milk from dairies
- Potential applications in fashion, home textile, automotive, cosmetic and medical markets

Fibres from waste milk

QMILK® has developed an innovative process to produce a high-value, organic textile fibre from milk that is no longer suitable for human consumption.

Based in Hannover, Germany, QMILK® uses casein, a protein that makes up about 80 percent of milk protein content. The casein is produced from the raw milk from dairies that is no longer tradable and cannot legally be used as food.

Although the milk is no longer suitable for consumption, it still contains ingredients with high-value potential. QMILK® realises the potential of these ingredients by producing a biopolymer fibre which can be used in a wide variety of applications, including fashion, home textiles, automotive and medical applications.

The process explained

The milk needs to be sour in order to separate the protein. QMILK® sources this in powder form through its dairy suppliers. It works with dairies that have existing capabilities to evaporate the milk into powder form, paying them for this feedstock. The powder is collected and supplied into the QMILK® process.



The powder is heated with water and natural additives. The water is used as a plasticizer. This produces a dull-white, dough-like mass. The production process, which has been operational since 2014, is akin to a large noodle making machine.



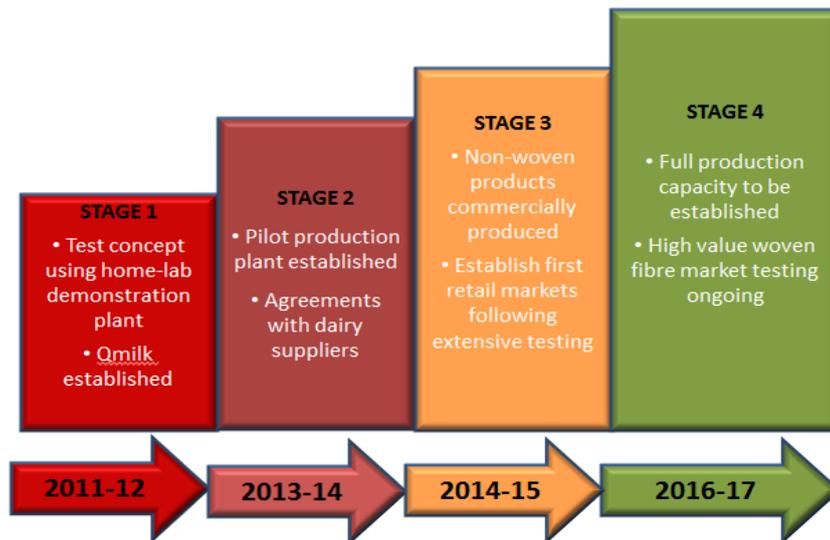
The casein mix is pressed in a continuous extrusion process through a specially shaped spinneret.



Since the process temperature is 80°C, the special properties of the milk can be maintained. The extruded filaments are dried naturally before being cut into individual fibres.

Naturally nature

‘Naturally nature’, is the moto of the QMILK® founder, Anke Domaske. The business vision is to leave a cleaner world for future generations. QMILK® production has been developed to be a zero waste process, using no chemical additives. The fibre product is entirely biodegradable and can be recycled into soil improver as part of any composting process. The process is also resource efficient. For the production of 1 kg of fibre, QMILK® needs only 5 minutes production time, 2 litres of water and a maximum temperature of 80°C.



Timescales

It has taken a number of years to progress Qmilk from an idea into a commercial business. Founder, Anke Domaske, came up with the innovation in 2010 when searching for chemically untreated clothing for her stepfather.

Anke started working with milk proteins as a solution by experimenting in her kitchen. The necessary equipment was bought in a grocery store for around €200. This enabled Anke to establish a home-based lab through which to refine the idea into a proto-type product.

It has taken another five years to get to the point where Qmilk is finalising its production capacity and negotiating with high-value end-markets. Qmilk will have its first fully commercialised, 1000tpa capacity, plant operating at full production in 2017.

Since 2011, Qmilk has had to go through various stages, including establishing a pilot plant through which to upscale the original DIY lab and perfect the production process. Qmilk has engaged in extensive product testing, research into feed-stock availability and supply, engagement with raw material suppliers, working with partners to establish collection infrastructure, and engagement with potential clients across woven and non-woven yarn markets.

During this period, the Qmilk team has won numerous awards for innovation, including the "Bio-based Material of the Year" and Innovation Award at the International Conference on Bio-based Materials. All of this has helped to raise the profile of the business from a small start-up, to a leading, disruptive innovator in the fibres market.



Milk fibre markets

The QMILK® biopolymer fibre offers the potential for numerous applications and can be freely modified. It is naturally antibacterial and ideal for people that suffer from textile allergies. Fabrics made from QMILK® fibre provide high wearing comfort and a silky feel. The organic fibre is tested for harmful substances and dermatologically tested for skin and body compatibility. The consumer receives a product with natural and ecological value.

QMILK® is still an early-stage commercial business and is in the process of exploring partners across a range of markets,

including end-users based in the UK. The key markets QMILK® is currently working within are, primarily, the fashion and home textile markets, but also automotive, cosmetic and medical.

What next for QMILK?

QMILK® is working to fully establish partnerships within the markets described above. The business works collaboratively with leading brands on product-related development through its patented technologies and technical specialists. These products are then gradually brought to market. In parallel, the business is also working to ensure it has the production capacity to meet initial demand. QMILK® is finalising its 1000tpa facility in Hannover to this end. QMILK® currently sub-contracts the milk powder collection and requires the dairy suppliers to convert the sour milk into powder themselves. Within the next three years, QMILK® wants to have established its own collection infrastructure and a facility to convert milk to powder.

QMILK® has the potential to process other sources of dairy waste, but is focussed on sour milk until it is fully established commercially.

There are no immediate plans to establish manufacturing facilities in the UK, but QMILK® is very open to working with dairies

based in the UK to convert their waste milk in to high-value biopolymer fibre.



“The prevailing ‘make-use-dispose culture’ is not sustainable and that is why Qmilk aims to avoid waste from the value chain and reduce pressure on the environment. Waste milk may not be fit for human consumption, but we have shown that this resource can still be used in high-value markets.”Anke Domaske, Founder QMILK®



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