New developments in bamboo, flax and hemp fibres are being presented as ecological alternatives to traditional cotton.

New generation natural fibres

Every so often, a team of engineers, entrepreneurs and designers sets its mind on reintroducing, or revamping, natural fibres. The research and development that most often goes into synthetics can, when applied to traditional fibres, lead to innovative products. This seems to be the case for two additions to the available palette of natural fibres. Norwegian start-up Nånkåtån is working on introducing a new generation of bamboo fabrics, similar to lyocell, but drawn from bamboo wood pulp. In North America, Naturally Advanced Technologies has developed a new manufacturing process for linen and hemp bast fibres and is in the process of bringing Crailar flax to market via a selection of well-known brands. Both of these companies are marketing their developments as alternatives to cotton.

Yet not all initiatives of this type have favourable outcomes. Looking to take advantage of the bamboo trend, the at-the-time Swiss company Litrax invented a new, non-viscose bamboo fibre extraction process by breaking down the stem of the plant, producing what some call "mechanical" bamboo as opposed to "viscose" bamboo. A difficult task that Litrax is now close to giving up as European markets continue to suffer from a gloomy economic environment. Litrax CEO, Felix Stutz, hasn't altogether abandoned new textile technologies. He has moved his headquarters to Hong Kong and is launching a new service that he believes will provide innovative synthetic fibres to a larger audience.



Norwegian company Nånkåtån is developing non-cotton jeans fabrics with and without stretch.

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Linen, or flax, blossoms in a distinctive delicate blue shade. The crop grows best in cool weather, in Canada and th US, potentially generating off-season income for growers. Crailar promotes it as a possible rotational complement to wheat, peanut, and cotton plantations.

Crailar

Bamboo Monocel

In development for the past seven years, Nånkåtån's monocel yarn is what the company's promoters call "third generation" regenerated bamboo cellulose. The monocel technique used to make the "non-cotton" fibre is similar to lyocell processing. The company claims to use a single organic compound, called N-Methylmorpholine-N-oxide (NMMO), which is recycled and reused in a closed loop system. No harmful chemicals are released to the environment and the process involves reduced water consumption compared to cotton. Jonny Kristiansen, CEO, says the company tested different types of wood pulp and found bamboo to have the highest potential. "Bamboo is god's gift to the planet," says Mr Kristiansen, citing the many advantages of the plant: "it grows fast, needs neither pesticides nor fertilisers, the root feeds the soil instead of depleting it, and it doesn't compete with major food crops, as the extraction of bamboo shoots is necessary for optimal forest management."

Nånkåtån has set up a fully traceable supply chain, working with certified farmers and pulp producers (FSC, Eco-Cert, OCIA, Oeko-Tex 100, GB/T28001, ISO 9001 and 14001) that provide the raw material to a pilot plant located near Shanghai, in China, which supplies the fibre to make the Monocel yarn.

Compared to cotton, Nånkåtån, which translates as 'non-cotton', claims superior resistance in wet and dry states. The company plans to develop fabrics for three main end-uses: bed and bath linens for hotels and hospitals, uniforms for administrations and fashion. The Monocel yarn can be knitted and woven. "It is ideal for skin-close knits and can be used in jeans too," says Mr Kristiansen, who has worked in the denim industry for companies such as Diesel and Sixty Group (Miss Sixty, Energie).

Nånkåtån has already presented a range of knits, including fine jerseys. The yarn can be blended with other natural fibres including wool, cashmere, silk, linen and hemp and can also be used with Lycra. The first collection is being launched for spring-summer 2013.

Ultimate flax

Crailar, developed by Naturally Advanced Technologies (NAT), a company founded in Vancouver, and now based in Victoria, Canada, and also incorporated in Portland, Oregon, is scaling up production for a market release in spring-summer 2013. The company founders, Jason Finnis and Larisa Harrison, dreamed of developing a new bast fibre after making hemp-based apparel in the 1990s under the name Hemptown. With the help of the Canadian National Research Council, they spearheaded new research on hemp and linen fibre production processes. This led to the identification of a new enzymatic process that breaks down the lignin, the adhesive which binds the bast fibres in the stem of the plant. After



Crailar flax fibre ready for blending with cotton on conventional cotton wet or dry spinning machines.

Crailar

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developing the process on hemp, the company switched to flax, the plant from which linen comes, deemed a more promising direction.

The enzymatic process produces a single-filament yarn, which the company calls an "ultimate fibre", that has a micronaire of approximately 5.7 to 6.2, compared to traditional linen that can measure up to 30 microns and cotton, which has a micronaire of around 4.5. Crailar differs from traditional linen in that it is produced as a staple fibre (shipped in lengths of 1.25 to 1.50 inches), making it suitable for blends with cotton. Fibre processing, in wet and dry spinning, is done on cotton machinery.

Recently granted its own denomination as a generic flax fibre by the US Federal Trade Commission (FTC), Crailar is said to offer a number of benefits when compared to cotton. In a 20% flax blend with cotton, Crailar fabrics are said to reduce shrinkage by up to 50% and require 10% less dyestuffs to achieve the same density of colour as a pure cotton fabric. "Linen picks up moisture like a synthetic," says Jay Nalbach, Crailar's chief marketing officer.

Crailar is currently being tested by Hanes in T-shirts (80% cotton/20% flax), by PVH in wovens, and by Levi's in denims (woven by Cone Mills). NAT has also entered into a partnership with Austrian cellulose producer Lenzing to develop



Nånkåtån has introduced a range of Monocel blends combining it with Sorona (top/middle) and Thermocool (bottom).

Nånkåtån



Modal and Tencel blends. Nonwovens are another area of research. Looking to make Crailar a true alternative to cotton, NAT sells the fibre at a price suited to the mass market popularity it would like to reap.

The handle of finished products made with Crailar flax are said to be virtually indistinguishable from 100% cotton fabrics. This is why NAT applied for a new fibre designation. Though the fibre is made from linen, "we are not delivering a linen-like fibre," says Mr Nalbach. "Consumers have certain expectations with regards to linen that Crailar doesn't provide."

Like Nånkåtån, Crailar manufacturing is based on a traceable supply chain. A pilot plant in South Carolina is running and the company plans to have it fully operational by January 2013. NAT is currently working to persuade cotton growers to plant flax on their unused lands during winter months. The company does not plan to add an organic variety, preferring that "available organic land be used for food crops".

Bamboo trials and tribulations

While NAT claims that many investors are keen to see Crailar flax blossom into a new low environmental impact fibre, Felix Stutz, who has developed a mechanical-process bamboo fibre is losing faith in the market potential of his innovative and difficult-to-produce "natural" bamboo fibre. "The industry and retailers talk a lot about developing organic and bio-sourced products, but it's all talk and no action," he says, adding that he is tired of explaining the difference between bamboo viscose and Litrax bamboo. Now based in Asia, Litrax has shifted its focus to providing specialty master batches to extruders on an open-source basis. Felix Stutz sees this as a way to offer an alternative to large-scale fibre producers. Litrax is currently offering five functional properties, including warming, cooling, UV protection, deodorising and antibacterial master batches in polyester, polyamide, polypropylene and acrylic.

The distinctive properties of Nånkåtån's Monocel yarn, as a soft high-tech regenerated cellulose product and of Crailar, also soft and smooth, may help them avoid the difficulties met by Litrax, whose specific type of bamboo fibre is neither soft nor pliable and can only be used in blends with other fibres. With Nånkåtån and Crailar, consumers may not even realise that they are wearing non-cotton or cotton-blend garments. In addition, these two fibres aspire to appeal to a broad market base (T-shirts, jeans, home linens), as opposed to the ambitions of Litrax to enter the collections of high-end organic fashions and home linens.



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