RISE TO THE CHALLENGE: LENZING & LITRAX

Two heads are better than one



Choosing the right fibre from the Lenzing portfolio to add more value to the blend with natural bamboo L1 was critical.

Lenzing/Elisabeth Grebe

Austria-based cellulose fibres producer Lenzing and Swiss developer of natural and sustainable fibres and additives Litrax recently launched a combination of their products after more than two years of talks and tests. Lenzing's contribution is its wood pulp-based cellulose fibre Tencel, while its partner has contributed Litrax-1 natural bamboo stem fibres (different from bamboo-derived viscose) to the blend. However, the development process presented several challenges that took cooperation and persistence from both companies to iron out.

These challenges were clear right from the start, according to Lenzing project manager, Pedro Gonçalves. "When Lenzing and Litrax agreed to proceed with this project many doubts were raised," he explains. "Natural bamboo L1 [Litrax-1] was a new fibre so no-one knew its properties in terms of textile processing."

This initial problem led to several others. Mr Gonçalves continues: "Natural bamboo L1 has characteristics associated with all natural fibres [variability in quality, affected by external factors such as weather, fluctuating price and so on] and the process that is used to obtain the fibre is similar to that of linen [separating fibres from the stalk of the plant before spinning], which brought us some advantages and disadvantages.



Litrax has overcome a range of technical challenges to offer its Litrax-1 natural bamboo fibre to complement Tencel.
Litrax

On the other side, choosing the right fibre from the Lenzing portfolio to add more value to the blend with natural bamboo L1 was a critical point, from a technical point of view."

According to Felix Stutz, president of Litrax, the two companies first made contact in 2007, but were not ready at that point to get started on the project. However, a friendly relationship was established and the collaboration commenced in late 2008. The primary challenge from Litrax's point of view, was establishing whether Lenzing was interested in adding its own viscose bamboo to its list of products, or would eventually be ready to promote a blend of natural fibre bamboo with one of its cellulose fibres such as Tencel or Modal.

"Once we talked about viscose bamboo we saw that producing it was ecologically not very sound," Mr Stutz says. "So we started to create an alternative product for the world market. Natural bamboo is sexy in the market at the moment but is still eco-friendly."

Problems multiply

Once they had defined that natural bamboo was the way forward, the two firms could see that the next challenge would be a technical one. Bamboo fibres are irregular, ranging from around four to five microns in diameter to about 50 microns. "This is a very large spectrum in fineness," Mr Stutz explains. "We were laughed at two years ago because the [bamboo] fibre was so thick you could make a carpet out of it. It took us a while to get the right fineness, and we're still experimenting with it."

Meanwhile, the Lenzing fibres only had one fineness level of 1.7 tex. Therefore, the two companies found themselves with an irregular fibre on one side and a regular, very thin, one on the other. "Mixing a thin and thick fibre is very tricky," Mr Stutz says. The main problem, he explains, is finding a way of spinning them because of the effects of gravity. However, the company managed to find four spinning partners who were able to spin the special bamboo yarn. They are currently creating a range of worsted and ring spun yarns. "We asked spinners in the US, India, etc, but they were not able to do it so we are working with European partners," he says.

The next stage was to define what was spinnable and what wasn't. The two firms found that if they wanted to use natural bamboo in the blend, as opposed to viscose bamboo, they could only spin with worsted yarn. The blend ratio for the worsted yarn could be between 0% and 100%. However, in ring spinning and air jet spinning the problem was more pronounced. The maximum amount of L1 that could be used was 30-40% and the rest would need to be cotton, Tencel or other fibres.

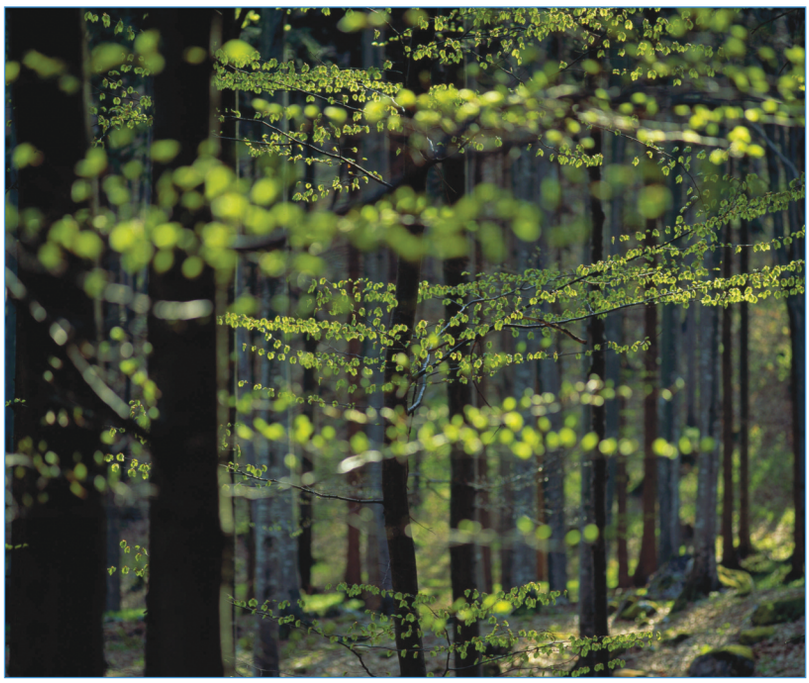
"In worsted you can mix it with Tencel, merino, or silk; any long-staple fibres. In ring spinning Tencel is the number-one choice and extra large cotton is second," Mr Stutz reveals. "The challenge was basically to define the ratio. The blend ratio is 20% Litrax 1 bamboo and 80% Tencel. It took us half a year to work that out. Not because of the time involved in the laboratory trials, but because of the process of doing the yarn, then the knit, then the weave and the logistical times."

Choosing the right materials

A further complication cropped up when deciding which enzymes should be used during processing. Mr Stutz points out that there are many enzyme "cocktails" on the market - some that are very expensive and some that are less so. Again, the two companies needed to decide which were the right products, the appropriate temperatures to use and the best ratio to get the desired results. The same issues surrounded the choice of raw materials. "You have to choose the right age of bamboo plant taken from the right climate," he says.

He believes bamboo will face the same market scenario as cotton in ten years' time. If fibre companies blend different types of cotton, for example Egyptian cotton and Pima cotton, they can end up in trouble when they arrive at the finishing process, "It's the same if you take bamboo that is two years old and blend it with bamboo that is four years old. The same laws are applicable."

Litrax currently sources its bamboo from Taiwan and China. It is also available in parts of Europe, for example Hungary, northern Spain and northern Italy where the climate conditions are perfect and the bamboo produced, according to Mr Stutz, is sometimes better quality than the material his company currently uses. He adds that there are 1,200 species of bamboo ranging from plants as small as mown grass to others that are 20 metres high, offering many different possibilities in terms of end application. Furthermore, it is more



Tencel—made from wood pulp cellulose—and bamboo are both ecologically sound.

Lenzing/Markus Renner

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Figure 1

FIGURE 1

engineered fiber › unique hydrophilicity properties › **high-speed wicking**



Figure 2

FIGURE 2

special cross-section › increased surface › **improved wicking**



Figure 3

FIGURE 3

micro channels › capillary effect › **mechanical wicking**



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sustainable than cotton, including organic cotton, he believes. He says cotton uses a "terrible" amount of water and describes it as an "ecological catastrophe".

Both Tencel—made from wood pulp cellulose—and bamboo are ecologically sound. Bamboo can be grown and regrown, and Tencel is taken from trees grown on certified tree farms. He is careful to point out that the bamboo species used for textile applications have nothing to do with the ones eaten by pandas. "Treehuggers always try to find a reason to complain, but when it comes to the facts they usually hide. You have to have courage and money to pick one material. I'm proud of what we stand for and am proud to have initiated the project," the Litrax president says.

Putting it to the test

The two partner companies have presented their blend to a selection of textile experts and non-experts to be compared with a blend of linen and Tencel, both in a 20-80 ratio. The consistent response, according to Mr Stutz, was that the L1 and Tencel blend felt cooler on the skin as well as being lighter and smoother on the surface. The typical bobbles and irregularities found in linen were not present in the blend. Furthermore, the dyeing process offered smooth results. "The overall quality and stability of the knit is really wonderful," Mr Stutz says. "It has helped to eliminate the typical viscose bamboo problem. If you wash that 20 times the form is not stable. But the bamboo, being a flax-type fibre, helps to stabilise it."

The end result has come as a surprise to some, according to Mr Gonçalves. "This project has been an interesting challenge since the beginning, because we could never count on anything as certain until we had made it," he explains. "We could only start to think about the type of knits to produce after we checked the yarn quality that we had spun. At each step of the project we were surprised with extremely good results." He reiterates the superior stability of the blend compared with the linen-Tencel blend, as it is much more regular. "Also the knitted samples with a blend of natural bamboo L1 are much softer than the ones with linen," he adds. The end result, he says, is a fabric with a soft, crimpy handle.

Looking back, both companies say they would do nothing differently if they were to start this project over again.

