A combination of polyester and an unusual natural fibre has allowed surfwear brand Finisterre to base a new lining system for its weatherproof jackets on biomimetics.

Biomimetics – alpacas go surfing

When, about a year ago, Cornwall-based surfwear brand Finisterre decided to look for new insulation technology for its weatherproof jackets, head of design, Tom Podkolinski, found his thoughts turning to natural materials and to biomimetics.

Sustainability is one of the main drivers for Finisterre. The UK company launched its first product in 2002 after founder, Tom Kay, became disillusioned with some aspects of the sport he loved. He talks now of seeing "a complete lack of innovation" among apparel manufacturers addressing the market then, and of "a complete lack of regard for the environment". He set up his own company to do the opposite: make the best technical apparel it could with minimal environmental impact.

That means assessing each garment, not just for the effect its production has on the planet, but also taking into account the implications of aftercare, which in the surfwear space centres on odour removal, something that's much easier if you include natural fibres in your garment manufacture. There was an irresistible attraction in all of this for Tom Podkolinski, who has a lifelong passion for natural history, and his enthusiasm for the whole Finisterre project is unmistakable.

In his time with the company so far, he has increased the product range from one item to six (four jackets and two sweatshirts), but he still has a strong conviction that the company's commitment to sustainability must begin at his desk, with design.



Finisterre's Storm Track weatherproof jacket. From next year the company will use a new biomimetic lining system based on alpaca yarn.

Finisterre



It was as part of his efforts to put sustainability at the heart of his design philosophy that he started considering biomimetics as a new way of insulating Finisterre's jackets.

He explains that, with the 100% polyester insulation that his company has been using until now, you often start to lose loft after three or four years. Longevity of the products is another important aspect of the Finisterre philosophy; it wants its customers to keep and wear the jackets and tops for as long as possible. It already offers to repair any product that becomes damaged through wear and tear, and is even looking into the possibility of setting up a refurbishment service to renew the effectiveness of older garments.

In this context, it made sense to experiment a little to see if a natural product could work better. Down insulation was the first one Mr Podkolinski considered, but surfwear brands have to think carefully about moisture and if down gets wet it also loses its effectiveness. Next he looked at wool but decided it weighed too much for his needs (Finisterre also wants the jackets to be as light as possible; there would have been a real possibility, with wool, of putting more weight into the lining than any other component). So he started researching other animal fibres.

Unusual request

"We came up with alpaca," he says. "I was reading more and more about these animals and found a woman in the US who was breeding them. Eventually, I managed to persuade her to shave one of them and send me the hair."

To be able to create a fabric that would work well as insulation, he realised that there was a need to fix the alpaca fibre in place so as to avoid "fibre migration"—and a loss of insulation—during a garment's lifetime. One of the solutions he looked at was the process of needle-punching the alpaca fibre into a thin polyester scrim.

"After testing, we found that not only was it very warm, but when coated in DWR (durable water repellent) material, it also became very waterproof," he explains, acknowledging the help he has received in drawing up the new insulation solution from technical partner Nikwax Waterproofing. "A cross-section of the fabric showed a remarkable resemblance to animal fur, with the polyester scrim on one side acting like a skin, and the alpaca fibre lofting away on the other side like fur."

The biomimetic lining's ability to act like animal fur revolves around two key points. First, Finisterre has found that brushing the pile creates a "hydrophobic fuzz". This enhances the lining's waterproofness without adding any extra weight. The second factor is density gradient; the two materials in the lining have different densities and it's important to put the one with the higher fibre density, in this case the polyester, closer to the body.

Once again, this mimics the way animal fur works. As you sweat, moisture droplets collect in the face of the fabric, and the more you sweat the larger the droplets become. Because the treated fibres are hydrophobic, the droplets will move away from them, and away from the body.



Yarn from the alpaca—a small llama-like domestic animal from the Andes—is soft, warm and comes naturally in a variety of colours.

Viridae

"All combined, this gives you an incredibly breathable waterproof fabric that moves more moisture away from the body the harder you work," Mr Podkolinski continues.

His plan is to begin replacing the polyester lining in Finisterre jackets with the new system next year. But he wants to do more with the hair of the small llama-like domestic animal from the Andes. He has now found a breeder close to company headquarters in Cornwall to work with, and a partner elsewhere in the United Kingdom to knit the yarn to his specification; he is excited about future possibilities.

He describes alpaca yarn as "not as strong as wool, but beautifully soft, warm and light". Because it comes naturally in a variety of colours, there is no requirement to bleach or dye it. Mr Podkolinski has also begun experimenting with blends involving alpaca and other natural fibres.

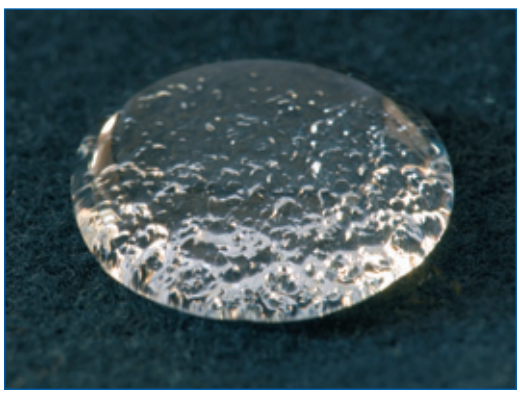
The first mixes he's looked at are alpaca and hemp, and alpaca and coloured organic cotton. Just to say a quick word about the coloured cotton, it's something fibre producers in China and Brazil, to name only two countries, have been working on for a few years now. By cross-breeding cotton plants, they have succeeded in producing natural fibre in a range of greens and browns (in China), and also ruby red (produced by farmer Renato Gadelha in the village of Bonsucesso in Paraíba state in Brazil).

Organic cotton is in very short supply, worldwide, with much bigger companies than Finisterre fighting for a share, so the work Tom Podkolinski had done with it so far has been on a small scale. He's excited about the hemp combination though. "Hemp makes up into incredible fabric," he says. "It's light and durable. I'd like it if it were easier to grow hemp in the United Kingdom, but because of the association with cannabis, it's not so simple. Fortunately, we are able to bring industrial hemp in quite easily from other countries and we're working with a supplier in Romania at the moment."

Finisterre's garment construction also takes place in an interesting setting, from a sustainability point of view. When we talk about sustainability, we often focus only on the effect of a business on the planet, but commitment to sustainability is also about the relationship between a company and human society.

It's interesting, then, to note that this company's two best-sellers, the Storm Track and Humboldt jackets, are made, not in a standalone factory, but in a special facility attached to a convent in Colombia. The nuns there run a programme to help street-women build a new life for themselves, offering them a home, an education and a job.

It's an exciting story, but one that will have to wait until next year for us to tell it properly. It's important to point out right away, however, that Colombia's closeness to large alpaca herds is just a coincidence.



Moisture droplets move away from the hydrophobic fibres in the lining.

Finisterre