



» all

BY BERNE BROUDY

Natural

THE PROS AND CONS
OF NATURAL FIBERS,
PLUS A RUNDOWN
OF THE VARIOUS
MATERIALS BEING MADE
INTO FIBERS.

» **A**LTERNATIVE, NATURAL, RENEWABLE FIBERS ARE A quickly growing sector of the outdoor marketplace. They add texture, a hand that varies widely, and many are petroleum-free. Manufacturers are choosing alternative fibers for both aesthetic and altruistic reasons. While worthy, moving from the decision to go natural to actually going natural can be both complicated and confusing.

This guide to natural fibers offers a brief look at the pros and cons of going natural and a glimpse at the future of natural fibers.

SUPPLY AND DEMAND

According to the Organic Trade Association (OTA), organic fiber sales rose approximately 23 percent in 2003, bringing organic fibers in the marketplace to 0.04 percent of total marketplace fibers—and leaving lots of room for growth. OTA conservatively projects this growth to continue at a minimum of 11 percent to 18 percent per year over the next four years. The goal of the non-profit Organic Exchange is to have 10 percent of the world's cotton certified organic by 2013. The current brand commitment totals one percent of the world's supply by the end of 2007. It expects organic cotton supply and demand to grow continuously and significantly in 2005, with more relative growth on the demand side.

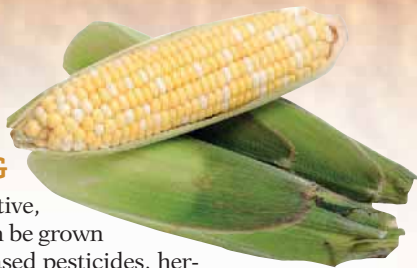
“Alternative fibers are not a trend; they are here to stay,” said Richard Ziff, Of the Earth president, a group that will showcase some of the first certified organic sources of bamboo, soy, hemp and other fibers to the industry in 2005.

Ziff identifies the main obstacle to alternative fiber use as supply and demand cooperation. “There is more organic cotton available than people recognize,” Ziff said. “There are farms that could literally convert overnight to producing organic cotton. After producing it for three years, the farm can be certified ‘organic.’ But they need committed orders. And buyers need to know that their supply quality and quantity is guaranteed. Integrity is a big issue in this business. You have to know your sources.”

The Organic Exchange, which was created to help manage and coordinate organic cotton supply and demand, is focused on creating environmental and social benefits through the expansion of organic agriculture.

“More brands have stepped up this year and bought organic cotton,” Rebecca Callahan-Klein, executive director of the Organic Exchange, said. “And many brands are adding more depth to their offerings. It’s bringing supply and demand into sync.”

But synchronizing supply and demand are not the only challenges.



SOURCING & PROCESSING

The advantage of some alternative, renewable fibers is that they can be grown without the toxic petroleum-based pesticides, herbicides and defoliants used to grow conventional cotton. While renewable fibers by definition don't use petroleum as raw material, there are often hidden consequences and impacts created by their use. For example, bamboo, which is one of the hot new fibers in the marketplace, is currently wild harvested. It's fast growing, grows in low-grade soils and doesn't require irrigation. These are all pros for choosing bamboo. However, as the use of bamboo increases, it's likely that wildcrafting bamboo will not be sustainable and that it will impact Panda habitat. In addition, bamboo processors won't admit how the environmental effects of processing bamboo compares to the effects of processing other fibers. This leaves manufacturers with half a story, which isn't enough. How green is bamboo really? We simply don't know yet.

"For us to use bamboo, environmentally it has to be equal to or better than Tencel," said Jill Vlahos, environmental analysis director for Patagonia. "Tencel production is a closed loop system. All solvents remaining after processing are reused; none go into the waste stream. Most processors won't talk to us about bamboo processing. They say it's a proprietary process. We need disclosure, and the information we get has to reveal true environmental advantages for us to consider the fiber."

GETTING CERTIFICATION UP TO SPEED

One issue with certified organic fibers is that organic certification applies to farming and raw fiber only, and does not consider processing. This will change soon as the recently adopted OTA organic certification standards for sheep to sweater, cotton to sweater, hemp to sweater, etc. are applied. Those standards will be taken into the field in 2005. For fibers without harvesting or processing certifications, the onus still lies on the manufacturer to work with trustworthy suppliers willing to make full disclosure.

And not everyone is on the same page with certification standards. iZWool International, an Australia-based wool producer and user, said that while it is starting to use some organic fibers, it is trying to take into consideration factors that the organic certification has not.

"We are developing a holistic production model," Stuart Adams, director of iZWool, said. "Environmental, social, cultural and economic values all need to be transparent and sustainable. We are at work on a fair-price program. I am a firm believer that unless we pay our farmers a fair price, they will rape and pillage the land, and be encouraged to do so by the likes of Monsanto, Cargill, etc."

Organic and sustainable fiber consultant Anne Gillespie said that organic and sustainable fibers will become successful because organic food has transformed the term "organic" into a buzzword that consumers are finally beginning to understand.

"Let's not let perfection be the enemy of the good," Gillespie said. "Organic is a good thing. And more initiatives need to be taken along these lines."

IT IS WORTH THE EFFORT

Though alternative fibers can complicate the production process, manufacturers continue to pursue them.

"Alternative fibers are interesting. They have diversity of performance characteristics, and by using a selection of fabrics, we diversify our impact instead of concentrating it," Patagonia's Vlahos said.

"We're always looking for something different," said Barry Barr, Kavu CEO. "We want people to go to their closet and pick us in the morning. We're always keeping our eyes out for a new look or feel."

One of the most compelling arguments for using alternative fibers is that manufacturers can use them in a closed loop cycle. Fabrics like Ingeo can be recycled at the end of their life. Other fabrics can

alternative fibers guide

...THE GOOD WITH THE BAD

» Bamboo

A grass fiber, bamboo is wild harvested, mostly in China. Because of limited demand for bamboo, wild harvesting has thus far been a sustainable method of producing bamboo fiber. However, as bamboo becomes more popular, farming bamboo needs to be considered to preserve wild habitat. There are two ways to process bamboo. One method yields results similar to hemp. The other is chemical processing whereby bamboo fiber is polymerized into a regenerated cellulose fiber. Details of bamboo processing are not widely available. Air and water quality issues associated with chemical processing of bamboo need to be further investigated.



» Hemp

Due to its strength and insulative properties, hemp has been used for thousands of years. It is the strongest natural fiber known, wicks moisture and helps block UV and UVB rays. As a crop, it naturally resists pests; as a fabric, it resists bacteria and mold. Hemp uses a fraction of the water required to grow cotton. (Linen, another stalk fiber, has similar properties.) TerraPax is a good example of a company utilizing hemp.



» Organic Cotton

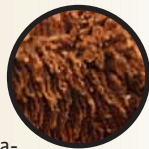
Conventional cotton uses 25 percent of the world's insecticides and 10 percent of the world's pesticides (more than \$2.6 billion worth). Organic cotton eliminates the use of chemical pesticides, fertilizer, defoliants and other toxins. Currently, organic cotton makes up only 0.06 percent of the world's cotton supply, but supply and demand are growing rapidly, spurred by the European market and U.S.-based companies like Nike, which has committed to using 5 percent organic cotton by 2013. The Organic Exchange's goal is to have 10 percent of the world's cotton supply be organic by 2013. Regardless of its organic status, growing cotton is extremely water intensive. Many companies now use organic cotton. In the outdoor industry, Sportif, Nike, Prana and Patagonia are the leaders.



» Organic Wool

Conventional wool is sometimes called an environmental fiber because it is annually renewable. But conventional wool production doesn't take into consideration overgrazing of sheep, farming practices that may damage the land, and toxic pesticide dips or sprays frequently used on fiber sheep. Many conventionally farmed Australian merino and some New Zealand merino undergo mulesing, which means having a saucer-sized hunk of skin and flesh hacked out from the hindquarters to prevent the growth of wool there and possible subsequent infection by blowfly eggs. Blowfly egg infestation (flystrike) will kill the merino. People for the Ethical Treatment of Animals (PETA) has launched a boycott campaign, and the Australian government has stepped up its efforts to develop a non-surgical alternative. The most promising is an injection which Australian officials expect to be available in 2007.

Certified organic wool assures sheep are treated in an ethical manner and helps promote organic agriculture (sheep are fed organic feed, and land is farmed according to organic farming standards). Organic wool eliminates synthetic pesticides both on the land and on the animal. Patagonia is using organic wool, and Smart Wool is considering organic. Icebreaker and iZWool both state their wool is "sustainably" harvested.





be recycled into virgin fibers. Solvents used to make Tencel are reused.

“When the market has achieved critical mass, when companies have committed their marketing dollars to educating the public about alternative fibers, price barriers to organic alternative fibers will be gone and consumers will pick what’s better for the planet almost every time,” Ziff said. “It’s amazing how quickly people change. Ten years ago, there wasn’t organic food in any mainstream market. Now, Wal-Mart is carrying organic milk in some stores.”

In 1998, Nike launched a corporate environmental policy that it has been working to integrate since Eraina Duffy was hired as its sustainable innovation director of apparel. Duffy spends her time on R&D for sustainable fabrics, and cataloging that information in Nike’s three fabrics libraries in the United States, Holland and Hong Kong. The libraries have been in development since 1987 and contain about 50 percent Nike-approved fabrics and 50 percent “inspirational” fabrics. Nike’s research and use focuses on three categories of fabrics: regenerated content, renewable content and other. To be approved, a fabric has to have a story that extends into the supply chain. And suppliers have to be able to “dot the i’s and cross the t’s,” Duffy said.

“We try to take a holistic approach,” she said. “We look at how using a material effects water quality and we look at its restricted substance reference. We don’t want to add a new restricted substance to the list. We assess whether a potential supplier has a position on environmental issues and if they’ve collected environmental impact information on their products. Then, we assess whether that supplier can manage those environmental impacts effectively.”


One of the biggest challenges that Nike faces is fitting alternative fibers into product lines and existing relationships while also shouldering the responsibility of developing and managing the supply chain.

“We’ve researched both recycled cotton and Ingeo,” Duffy said, “but we don’t know where to place them. The Ingeo could replace performance synthetics, but it’s gotten hung up at the dyers. The recycled cotton, which doesn’t need to be re-dyed, is harder. There has to be supply chain connectivity. Every time we decide to use a new material, we have to work with our knitters and weavers to bring that fiber in. People are pretty open, but everyone has to be on board.”

Wickers, which uses a variety of alternative fabrics including a proprietary wool-viscose (from wood pulp) blend and Ingeo’s corn-based PLA, puts a spin on the quality-first, environment-second story parroted by so many manufacturers.

“First consideration for us is presenting products that we believe in their own right have a reason for being,” said CEO Tony Mazzenga. “Second consideration for us is the sustainability story. We believe using alternative and sustainable fabrics is the right direction for our company and the industry, but consumers will have the final say.”

FOR MORE INFORMATION

For organic fiber sourcing information, contact the Organic Trade Association’s Organic Fiber Council at www.ota.com. For information on organic cotton and other alternative fibers, contact the Organic Exchange (www.organicexchange.org). In 2005, Of the Earth will have information on the technical properties of numerous alternative fibers (www.oftheearth.com). 

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alternative fibers guide

...THE GOOD WITH THE BAD

» PLA

A corn or corn-petroleum-based fiber, PLA is a renewable or partially renewable source of polyester. PLA fiber, like Cargill Dow’s Ingeo, is made from synthesized, polymerized plant sugar. After processing, PLA is similar to polyester. Placed in an industrial compost pile, it will turn to dirt in 60 to 90 days. It translates well into a base layer: it doesn’t absorb water, but attracts and wicks moisture naturally. Traditional polyester needs to be chemically treated to get it to wick. PLA is also used for bedding, carpet, furnishings and personal care items, as well as in industrial applications. Ingeo uses genetically modified (GMO) corn from cattle feedstock. If a company wishes not to support non-GMO or organic agriculture, Cargill Dow has an offset program. For more information on PLA and Ingeo, visit www.ingeofabrics.com. Cargill Dow is debuting an online Ingeo fabric library accessible from the Ingeo website.



» Silk

The strongest protein fiber for its weight, silk is stretchy, resilient, breathable and warm. Spun by the domestic silkworm, silk has been used in fiber for over 5,000 years. Machine-washable silks are relatively new to the marketplace, and could increase the usability of this fragile fabric. It is often used in a blend.



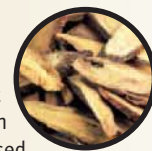
» Soy

Soy is chemically processed like bamboo. The oil is pressed out of the soybean, and the resulting bean cake is combined with a polyvinyl alcohol solvent. After wetspin processing, the resulting material is blown into a fiber. Details of soy processing are not widely available, and air and water quality issues associated with soy processing need to be further investigated. Processed soy has a synthetic feel similar to rayon. There are many proteins that can be made into the same or similar fibers with the same process, including animal waste (hair, skin, bones) from beef cattle and other food.



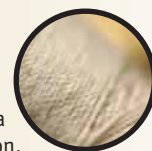
» Tencel

A man-made fiber derived from wood pulp harvested from managed forests, Tencel was designed with the environment in mind. Tencel fiber is spun into yarns, which are woven or knitted into fabrics and garments. It is increasingly used in non-woven products. Tencel production is through a closed loop solvent spinning process, which minimally impacts the environment and economically uses energy and water. Tencel processing uses a non-toxic solvent which is continually recycled. Tencel fabric is breathable, absorbent and fully biodegradable. There are two types of Tencel: standard and Tencel A100. Standard fibrillated Tencel has a soft, supple hand and varies from suede-like to silky. Tencel A100 produces less effluent, uses less dye and is more cost effective. Outdoor companies using Tencel include Royal Robbins, Travelsmith and L.L. Bean. For detailed information, visit www.tencel.com.



» Other Fibers

There are many other alternative fabrics available that we do not cover here, including: jute, ramie, yak, nettle, banana stem fiber, pina, animal protein fiber and recycled cotton. We have not seen most of these fabrics, and most of them have engaging cultural stories to accompany their environmental ones. In addition, DuPont makes a partially renewable polyester-like fabric called Sorona that will be available beginning in 2006.





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PET » PROJECT?

BY BERNE BROUDY



The past and future of recycled PET: Price remains the one stumbling block, but if enough companies get on board, or oil prices keep climbing, we may have a new favorite PET.

it seemed like such a good idea at the time—turning recycled plastic soda bottles into fleece. Everyone would jump at the chance to make fabrics from such a fantastic source, right? Well... not exactly.

Ecospun recycled fleece was developed in the early 1990s by Wellman (fiber), Dyersburg (fabric) and Patagonia (apparel). It took the fast track from lab to market, from concept to finished garment and hit the shelves after several years of fiber and yarn development and only nine months of fabric development. It was a supply-chain success story, and there were high hopes that it would also be a marketplace success story.

By 1993, light green fleeces made from recycled soda bottles were hitting the market with a tale to tell. That tale was about keeping waste out of landfills and reducing petroleum use by reclaiming and reusing polyester (PET) for clothing.

However, production of the fleece had its early challenges. Light green raw material limited dyeing options for one, which limited the material's applications. Wellman refined its sourcing and switched to clear bottles only, and the color problem was solved. But Ecospun fleece continued to be limited by feedstock impurities, price and marketplace maturity.

"The degree of purity of the source determines what can happen downstream," Joe Walkuski, Patagonia's former director of textile research and development, explained. Chipped bottles produce a fairly coarse and short fiber, which in turn produce a coarse yarn and limited possibilities for final fabric. The market price of Ecospun was high at a time when the price of petroleum-based polyester was falling. Recycled PET was available in a spun yarn only that was formed from short length staple fiber.

Consumers also either didn't get it or didn't want to pay for it. The fleece had a

limited market which made it expensive. The outdoor industry didn't step up to the plate to promote the concept as hoped either, so Wellman was never able to achieve economies of scale that would have made the fleece price-competitive.

"I was pretty upset with other brands' inability to incorporate it into their lines and unwillingness to start to educate consumers," Walkuski recalled.

"We wanted Wellman to expand their offerings," said Jill Vlahos, Patagonia's environmental analysis director. "They couldn't do it without significant capital investment that they needed to make back quickly, and we couldn't commit to that volume of material."

Recycled fleece still exists, but it has never hit the mainstream. Wellman licensed the Ecospun technology, and the fiber is still being made in limited quantities.

"I still believe there is a huge marketplace out there," said Jim Ciccone, who worked on the project at Wellman. "We need to talk about what else Ecospun can offer besides being recycled. A better story needs to be told."

That better story may be Teijin's ECOPEL recycled PET. It's not just recycled, but part of a process that can recycle itself or other PET at the end of its life. Instead of mechanical processing that grinds plastic bottles, ECOPEL's process chemically purifies and recycles PET. ECOPEL can also provide the raw material for a filament yarn, unlike Ecospun which can only produce a spun yarn. Further, ECOPEL is essentially virgin polyester, indistinguishable from conventional polyester.

Teijin's ECOPEL is made from recovered

polyester fiber products and fiber raw materials, as well as recovered PET bottles. Chemically processing PET turns its polymers into monomers, which are building blocks of polyester. The chemical breakdown of the material eliminates purity issues, fiber length quandaries and technical limitations of mechanically processed PET. New recycled PET can be extruded into a continuous filament. That filament can be shaped and textured into an endless variety of yarns that can be made into fabrics and other materials as tame or wild as a designer's imagination.

"Now you can make anything you want from PET," Vlahos said. "But it's still so new, there is still more product development that can be done."

The bigger problem of price remains, though.

"Right now, economies of scale for chemically recycled PET don't exist," Vlahos said. "We're moving as much into it as we can at Patagonia. And we're hoping that other companies see the significant positive environmental impact that recycled PET can have and get on board. Suppliers that are willing to make the investment in new and environmentally sound technology need to be supported by buyers."

Critical mass could lower the price of ECOPEL, but most notable in the short term is the rising price of oil. Oil prices have doubled in the past year, which is pushing conventional polyester prices higher and making ECOPEL relatively more affordable. Also, until now, fiber was being made into yarn and woven into fabric in Japan only. Soon, the yarn will be available for knitting in Taiwan and other locations, which will help control the price.

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