VOLUME 30
ISSUE TWO 2024

WSA SPORTS MATERIALS



Bio-based nylon in demand

Textile additives from food
Alternative natural fibres
Inactivity is 'human' climate change

THE INTERNATIONAL MAGAZINE FOR PERFORMANCE & SPORTS MATERIALS

Contents



Front cover:
The cover image comes from cycling apparel brand Le Col, which has incorporated a bio-based version of Polartec's Power Shield fabric into four of the garments in its latest collection for road cycling.

IMAGE: LE COL

Editor
Stephen Tierney

Deputy editor
Clare Grainger

Consultant technical editor
Sophie Bramel

Content developer
Charlotte Robson

Consultant editor
David Buirski

Features writer
Shari Shallard

Publisher
Simon Yarwood

Design
Tim Button

Commercial manager
Rupert Patterson-Ward

Subscriptions manager
John Collins

Administration
Lisa Fabian-Smith

Editorial enquiries
stephen@worldtrades.co.uk

02 Global news
04 Industry & Innovation
06 People
08 Backtrack

10 **Enzymes with a mission**
Artificial intelligence and machine-learning are helping start-ups identify enzymes with a big appetite for breaking down polyester and polyamide.

14 **Creative chemistry**
Food waste, including used cooking oil and stones from fruit, is at the core of a series of innovative textile auxiliaries.





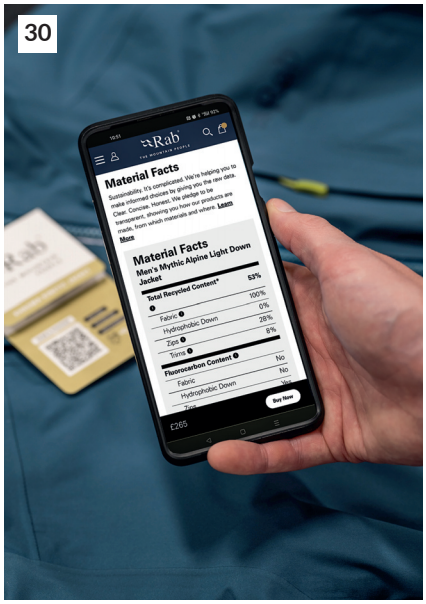
18 **Alternative natural fibres**
A desire among many consumers to have synthetic-free products is driving the discovery and rediscovery of some less conventional natural fibres.

22 **Rise to the Challenge: Celanese and Under Armour**
A major sports brand and a materials innovation company have combined to create Neolast fibre, which they claim represents a stretch-fibre breakthrough.

24 **Newcomers: Beyond the bottle**
A drive to offer fabrics with bio-content has helped Polartec bring a new version of Power Shield into the cycling apparel market.







26 Footwear Technology: Performance buzz

Footwear brands' desire to boost athlete performance through advances in material use and design need not be at odds with their sustainability strategies.

30 Sustainability: Down recycling expansion

Outdoor brand Rab is expanding a programme for recovering and reusing down from used jackets, gilets and other garments.

32 Dialogue: Emma Zwiebler, WFSGI

The acting chief executive of the World Federation of the Sporting Goods Industry has referred to inactivity as 'human' climate change because of the seriousness of the long-term consequences

36 Essential Reading



Advertisers Index

CHT	21
Performance Days	BC
Polartec	13
Unitex	17
Sportstexiles	09/ IBC

Sales offices

Head office - World Trades Publishing

The Old Stone House, Teeton,
Northampton NN6 8LH
Tel: +44 151 928 9288
Email: wsa@worldtrades.co.uk

Commercial manager

Rupert Patterson-Ward
Tel: +44 151 319 4972
Mobile: +44 7940 502046
Email: rupert@worldtrades.co.uk

Pakistan sales

Abdul Rab Siddiqi
Email: arsidiqi@yahoo.com

@WTPwsa

linkedin.com/showcase/wtpwsa

World Trades Publishing 2024

Contributions: The editor welcomes news items, articles and photographs for consideration and possible publication but no responsibility can be accepted for the loss or non-publication of such material. Opinions expressed by individual contributors do not necessarily reflect the view of the editor or publisher.

Whilst every effort is made to ensure accuracy in reproduction, no responsibility can be accepted for the technical content or for claims made by manufacturers for product performance that are published. Publication in WSA cannot be construed as an endorsement for a claim or product by the publisher.

UK Price £90 / ROW £150. Credit cards will be charged in GB Pounds converted at the daily bank rate. Your credit card company may charge you for this service.

Graphic origination by WTP
Printed by Bishops Printers, Walton Road, Portsmouth, Hampshire PO6 1TR

All rights reserved. ISSN 1356-644X

World Trades Publishing 2024. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means mechanical, electronic, recording, photocopying or otherwise, without the written permission of the publisher.

WSA (ISSN 1356-644X) is published four times a year by World Trades Publishing, The Old Stone House, Teeton, Northampton NN6 8LH, UK.

Global news

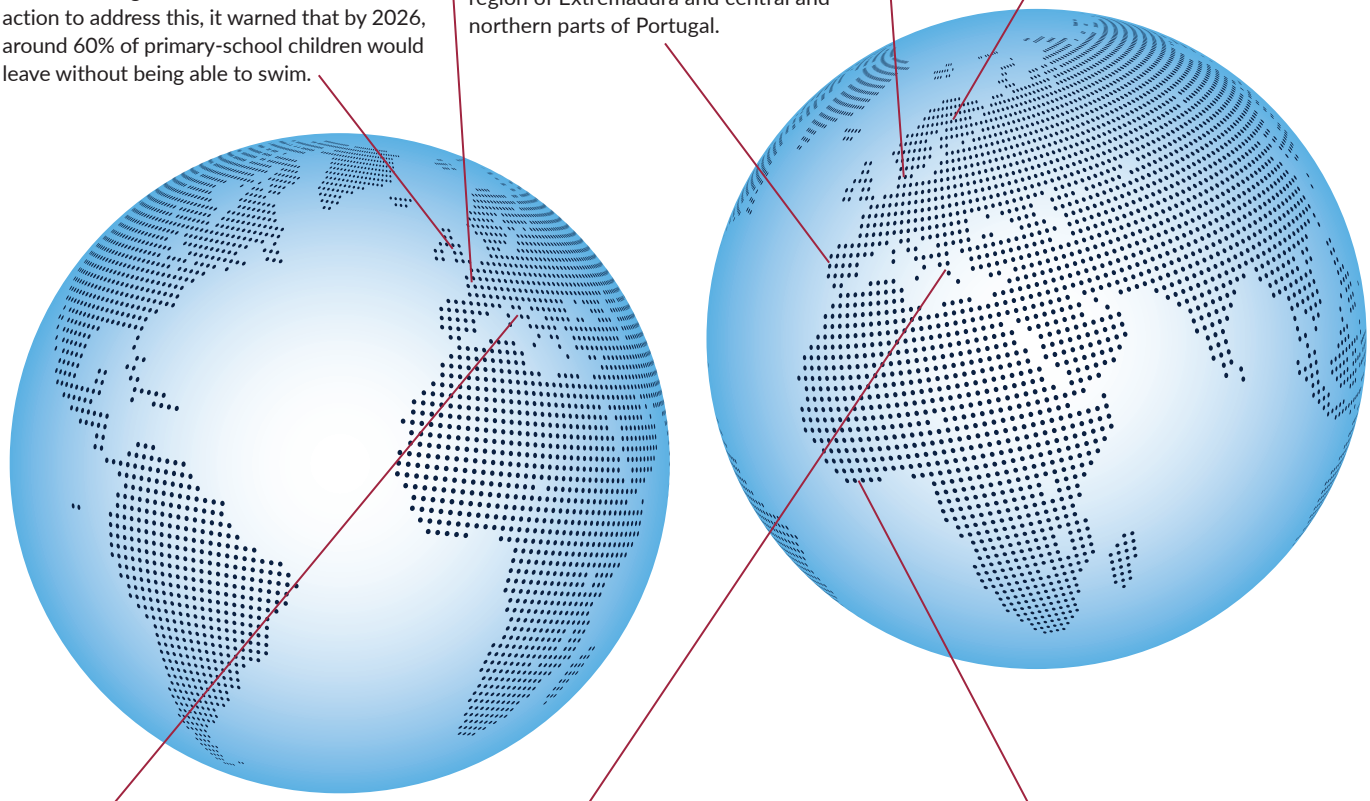
France Biorecycler Carbios has partnered with De Smet Engineers & Contractors, based in Belgium, in the construction of "the world's first" polyester (PET) depolymerisation plant. The industrial-scale enzymatic recycling facility is due to become operational in Longlaville, France, next year. De Smet pledged the support of 70-plus staff to the project. Carbios chief executive, Emmanuel Ladent, praised the contractor's "excellent track-record in the engineering and management of complex industrial projects and has extensive experience in water-based technologies." Carbios completed its acquisition of the land from Indorama Ventures on February 14.

UK Swimming brand Speedo has compiled a report on the importance of helping more children learn to swim and has submitted the document to the UK parliament. Findings of the report, Taking Pools To Playgrounds, include a figure of 33% for the number of children in the UK who leave primary school without having learned to swim. Without action to address this, it warned that by 2026, around 60% of primary-school children would leave without being able to swim.

Portugal Textile and garment industry organisations, including Portugal's ATP and Spain's Fedecon, took part in the inaugural meeting of a new cross-border project this winter. With European Union funding of more than €2.6 million, the new project, Resotex, has the aim of revitalising the textile industry in the area around the Spanish region of Extremadura and central and northern parts of Portugal.

Denmark Danish retail group Friluftsland is the latest to make Organo Tex sustainable water-repellency technology from OrganoClick available to its customers. OrganoTex products will be available in all 12 of the stores that the group runs across Denmark. Founded in Copenhagen in 1980, Friluftsland has been part of Sweden-based group Fenix Outdoor since 2017. Other retail companies that form part of Fenix Outdoor, including Naturkompaniet in Sweden and Norway, and Partioaitta in Finland, already offer OrganoTex products.

Finland Fibre producer Spinnova has teamed up with consultancy Rejlers Finland to produce a plan for scaling up production, including designing and sizing new factories. The package is not site-specific and can be used in planning the scale-up, regardless of the raw material base of the Spinnova fibre. The patented technology developed by Spinnova can be used to produce textile fibres from wood and waste streams such as leather, textile or agricultural waste without the use of harmful chemicals in the fibre spinning process.



Italy Textiles maker Eurojersey has published a welfare plan for its employees, encompassing a broad range of initiatives and targets that it wants to meet by 2026. Safety at work, continuous training, healthy nutrition and psycho-physical wellbeing, social sustainability and a better work-life balance are the cornerstones of the plan.

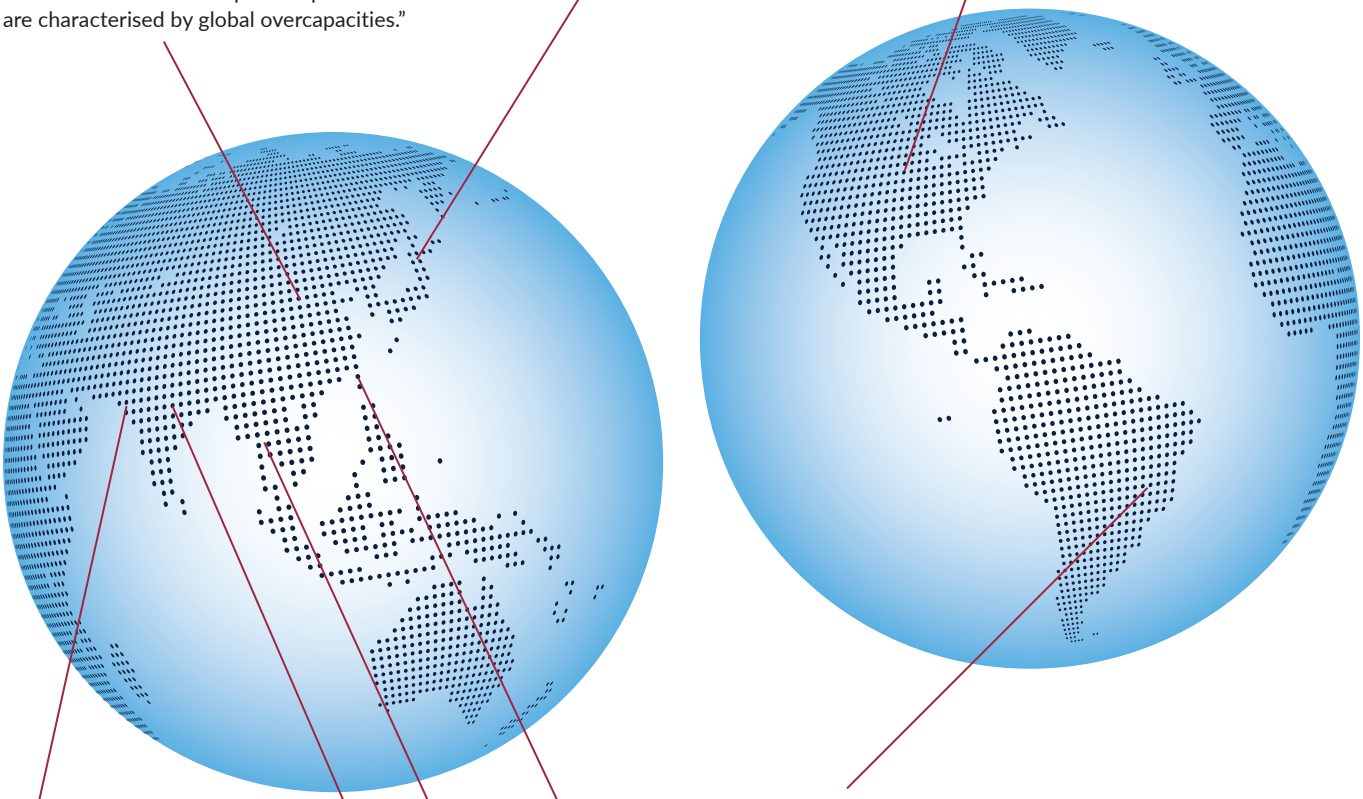
Greece Wool and wool-blend yarn developer Südwolle has announced a new joint project with Greek clothing brand Pepper Vally. The focus of the project is denim; the two partners have said they want to use wool to make denim fabrics with high levels of sustainability. In what Pepper Vally has called "an effort to create a denim line that transcends fleeting fashion trends", it worked with Südwolle on "pioneering fabric manufacturing methods". Turning away from traditional weaving methods, the partners decided to knit the denim.

Ivory Coast Six teams at the Africa Cup of Nations in Ivory Coast in January and February had kit suppliers with African origins. Mali had clothing from Airness, a company founded in France by former boxer Malamine Koné, who is originally from Mali. Mauritania's national team used kit from a Moroccan company, AB Sport. Burkina Faso, Guinea-Bissau, Tanzania and Zambia have teamed up with a kit supplier from their own countries. The companies concerned were, respectively, Tovio, Guisport, Sandaland and KoPa.

China Chemicals group BASF has announced that it is taking steps to get out of butanediol (BDO) production in China. BDO and its derivatives are used for producing plastics, polyurethanes, solvents and spandex fibres. Towards the end of 2023, BASF started the process of divesting its shares in two joint-venture companies in China, BASF Markor Chemical Manufacturing and Markor Meiou Chemical. It said: "BDO value chains are under increased competitive pressure and are characterised by global overcapacities."

Japan Sports footwear and clothing brand ASICS has been announced as the winner of Japan's Open Innovation Prize for its GEL-LYTE III CM 1.95 shoe. This award is presented by Japan's national sports agency and is sponsored by six different government ministries in recognition of creative initiatives that can serve as role models and help accelerate innovation in Japan. ASICS has described the shoe as having extremely low CO_2 emissions.

US A student team has won an annual materials science competition at the Massachusetts Institute of Technology with a design for a biodegradable material than can be easily added and removed from shirts. The aim is to tackle excessive textile waste, suggesting T-shirts could be created with designs that could be easily washed off.



Brazil The cotton industry in Brazil is celebrating projections that the country's cotton crop for 2023-2024 will be 14.6 million bales, a new record and an increase of 23.7% compared to the previous year. This makes Brazil the third-largest producer of cotton at the moment, behind China and India. What made the most headlines in Brazil is that this record figure will put it ahead of the US as a cotton producer in 2023-2024.

Pakistan Cotton sector information resource Cotlook has published its industry update for January. It said in the report that mills in Pakistan had been among "the most active buyers" in the market in the first month of this year. Domestic supplies of raw cotton in Pakistan have dwindled, Cotlook said, and mills bought cotton from "a wide variety of origins" to take its place.

Taiwan Taiwanese performance foam manufacturer Dahsheng Chemical took advantage of its presence at the North East Materials Show in Boston and the North West Materials Show in Portland in January and February to launch Durapontex N33 Bio. It said this new foam uses 44% bio-based materials in its composition without any compromise on its performance and is suitable for use in performance insole products.

Bangladesh The garment manufacturing sector in Bangladesh has said it fears the effect a change in government policy might have on the industry. Bangladesh's status as a Least Developed Country is coming to an end. The United Nations recommended Bangladesh's 'graduation' from Least Developed Country status in 2021. As things stand, Bangladesh will cease to qualify as a Least Developed Country in October 2026. The government will then no longer be able to offer cash incentives to boost export performance.

Thailand Fibre manufacturing group Indorama Ventures is to provide special polo shirts made from its Deja recycled polyester yarn to Thailand's amateur weightlifting team. The weightlifters will wear the shirts at the 2024 International Weightlifting Federation World Cup, which will take place in Phuket from March 31 to April 11. Indorama's donation of the shirts is part of a wider sponsorship deal it has made with the Thai Amateur Weightlifting Association (TAWA).

Industry & Innovation


CREDIT: DECATHLON

Mattress effect

Footwear brand Kiprun, part of the Decathlon group, has launched its first new shoe of 2024, the KS900.2.

Kiprun will move away from a broad athletic footwear focus, Decathlon has said, and dedicate itself from now on to running and trail shoes. It added that the KS900.2 "embodies this new positioning perfectly".

The shoe is specifically for road running. It is an update to a 2023 shoe, the KS900 Light, with the principal difference coming in forefront cushioning.

To achieve this, the brand has increased the thickness of the sole in the forefoot. To be exact, the sole in this part of the shoe has a thickness of 33 millimetres, while the thickness at the heel is 39 millimetres.

According to Kiprun, this has reduced stiffness in the forefoot by 47%, resulting in what it calls "a greater balance in the cushioning in the shoe as a whole".

The foam that makes this possible has a deliberately padded appearance. This, the brand claims, makes it look as comfortable as a mattress. Kiprun has called this proprietary material MFoam, with the 'M' standing for 'mattress'.

'Circular polyester' company launched by H&M

Apparel group H&M has set up a new textile-to-textile recycling spin-off, calling it Syre. Starting with a factory in North Carolina that will be operational before the end of 2024, the new company will use textile waste to produce what it called 'circular polyester'. It has said the fibres it produces will be of the same quality as oil-based virgin polyester, but with "a superior sustainability performance".

It has calculated that producing polyester for garment production in this way will reduce the fibre's carbon emissions by up to 85%.

Syre has said it will establish the new factory in North Carolina as a blueprint and then move quickly to use the same technology in other parts of the world. It described the technology involved as plug-and-play and insisted it will integrate into the existing textile value chain.

Its aim is to have 12 large-scale factories in place within ten years and for those factories to have a combined production capacity of 3 million tonnes of the company's circular polyester per year. It said the technology will also work with other fibres.

Syre means 'oxygen' in Swedish. H&M and its launch partner, investment firm Vargas Holding, also chose the name because 'sy' is Swedish for sewing and 're' means 'over again' in Latin.

Skin in the game

Italian gymwear brand Deha has continued an existing partnership with yarn developer Fulgar by putting Emana Perfect Skin into a new set of leggings. Deha has emphasised the cosmetic benefit of using fabric developed from this polyamide-based yarn. It said that, as well as offering high levels of comfort and breathability, the leggings will help reduce the appearance of cellulite and will enhance the skin's elasticity and tone.

New targets

US-based yarn maker Unifi has committed to transforming the equivalent of 1.5 billion T-shirts worth of textile and yarn waste by 2030 in its new Sustainability Snapshot. In its fourth sustainability report, the company also set a goal of 30% reduction in Scopes 1 and 2 (in its own facilities and where the energy it uses is produced) greenhouse gas emissions by 2030, and pledged to achieve zero non-compliant water discharges.

Time for trays

Plastic recycling innovator Carbios will reduce its reliance on plastic bottles as a feedstock through a partnership with Germany's Landbell Group. Carbios has developed an enzymatic processs which breaks plastics down to form new polymers and is building a polyester depolymerisation plant in Longlaville, France. From 2026, Landbell will supply the French company with 15 kt/year of PET flakes from plastic food trays.

Package deal

Textile chemicals developer Archroma has put some of its solutions into a package it has called Super Systems+. It said the solutions would help mills, brands and retailers make progress in their environmental performance. Director of strategic marketing, Kerim Oner, said Super System+ was a portfolio of cutting-edge technologies and would allow Archroma's customers "to embrace eco-friendlier innovation".

Support measures

Germany-based testing service provider Hohenstein has developed a scientific assessment method for fine-tuning sports bra support levels.

$600m investment

Fashion group H&M has formally entered into a "take-or-pay offtake agreement" with its new textile-to-textile recycling company Syre. It has committed to an investment of $600 million over seven years in the new company's 'circular polyester'.

Its estimate is that this will cover more than half of the group's own polyester consumption in the course of those seven years.

According to Syre's calculations, the projected annual capacity of 3 million tonnes of circular polyester per year would be a 3% share of total global polyester consumption, at current rates. This would be enough to make 16 billion T-shirts.

It has worked out that the saving in carbon emissions from using circular polyester for these garments instead of conventional polyester will be the equivalent of taking 3 million petrol-engine cars off the road. "This is a decent share in the short term," Syre told *WSA* at the time of its launch, "but it is still just the beginning."

Boot link to ACL injuries

A parliamentary committee in the UK has criticised sports footwear manufacturers for failing to take the needs of women footballers into full consideration in their boot designs.

The Women and Equalities Committee in the House of Commons, the lower house of the UK Parliament, has carried out a far-reaching examination of health barriers that exist for girls and women in sport. It published its latest report on this subject on March 5.

In the new report, committee members said they were surprised to hear evidence that, "despite the soaring popularity of women's football and increasing rates of girls' participation", there are very few football boots designed specifically to meet the needs of girls and women.

Furthermore, the report acknowledged "the potential link" between a lack of consideration for women players in the design of football boots and "the disproportionate prevalence of anterior cruciate ligament (ACL) knee injuries in women's football". It said female footballers are between three and six times more likely to suffer an ACL knee injury than their male counterparts.

Innovation at the double

Functional materials developer Sympatex showcased two new technologies at the Lineapelle exhibition in Milan in February.

One of the innovations, Moisture-tech, offers fast sweat absorption and quick drying times in footwear materials. In addition, tests have shown it to offer wearers extra comfort through reducing heat inside the shoe by 45% compared to other technologies, Sympatex claims.

The second technology, Non-woven, eliminates the use of polyurethane foam in the production of laminates. Sympatex said this has delivered a 10% reduction in carbon emissions and a 15% reduction in water consumption. It has replaced the polyurethane layer with non-woven material developed from 100% recycled polyester.

Melt-spinning expansion project complete at DITF

Germany's Institutes of Textile and Fibre Research (DITF) have completed a project to modernise and expand a melt-spinning pilot plant at their Denkendorf headquarters.

Financial support from the state government of Baden-Württemberg helped fund the project. DITF said the new facility would help research into new spinning and fibre production processes, including work to develop fibres made from biodegradable and bio-based polymers.

Other focal points will include the development of bicomponent spinning technology, in which the fibres can be produced from two different components. The expansion project has included the installation of bicomponent spinning technology from Oerlikon Neumag.

The new test has been designed to classify varying degrees of support under three categories: high, medium and low. It analyses up-down, right-left and forwards-backwards movements, but also benchmarks its data against other bras on the market. The method still demands a fit test.

Insulation choice

Performance brand Artilect, based in Boulder, Colorado, has become the latest to incorporate Baur Vliesstoffe's Lavalan Sport natural wool insulation into its outdoor jackets. The wool is mulesing-free, traceable and sourced in Europe, according to its developer. A corn-derived polylactic acid or PLA fibre enhances its stability. Other adoptees of Lavalan Sport include brands such as On, Vaude, Ziener, Fjällräven and Black Diamond.

Online learning

The Microfibre Consortium (TMC), which works to encourage brands and retailers to take steps to control fibre fragmentation and microfibre pollution, has launched an online course on reducing the release of microfibres into wastewater during production processes. It has developed the new e-learning project in partnership with the Zero Discharge of Hazardous Chemicals (ZDHC) programme and made it available globally from February.

Claim confirmed

The European Centre for Innovative Textiles (CETI) has confirmed that the Cycora product that Ambercycle produces is of similar quality to that of virgin polyester. US-based Ambercycle uses molecular regeneration technology to develop Cycora from end-of-life textile polyester yarns for use in new garments. Tests at CETI, which hosts advanced melt spinning technology of its own at its research centre in France, have confirmed Ambercycle's claim.

Thumbs up for upcycling

Fabric developed Polartec is to work with Must Had, a software provider that seeks to enable companies to repurpose, reuse and recycle their end-of-life textile products. Polartec said the agreement would help it find a second life for its excess inventory. It added that this would benefit upcycling designers and small businesses, supporting their efforts to produce clothing with high levels of sustainability.

People

Tiger Woods creates his own brand


CREDIT: SUN DAY RED

Golfer **Tiger Woods** has launched his own clothing brand, Sun Day Red, in partnership with TaylorMade. He signed a sponsorship deal with Nike immediately on turning professional in 1996. This relationship lasted until the start of 2024, when he announced his departure from Nike after 27 years.

Nike provided Tiger Woods with one of the wealthiest endorsements any athlete has ever had. It even named one of the buildings at its Beaverton campus in Oregon after the golfer.

On announcing Sun Day Red on February 13, Tiger Woods said the time was right for him to move on. He said he had always liked wearing red to compete and had built this into the identity of the new brand.

The logo for Sun Day Red is a tiger, but the graphic is made up of 15 stripes to represent the 15 major tournaments he has won in the course of his career to date.

TaylorMade said it was honoured to work with Tiger Woods to create the brand and said he was "the greatest athlete in the history of our sport".

CEO for AeoniQ

Materials innovation specialist HeiQ has appointed **Julien Born** as chief executive of the holding company it has set up for AeoniQ, the cellulosic yarn derived from renewable raw materials that it brought to market in 2021.

HeiQ AeoniQ Holding is an independent subsidiary that the Swiss group has established to attract investors and value-chain partners as it embarks on what it has called "an ambitious multi-year scale-up of the world's first climate-positive cellulosic filament fibre".

As a former chief executive of The Lycra Company, Julien Born will bring extensive textile industry experience to the new role. In 2025, commercial production of AeoniQ will begin at a 20,000 square-metre facility in Portugal. This is part of an €80 million investment, HeiQ stated.

Endurance feat

Cold-climate footwear and apparel company Baffin has named Ironman athlete **Connor Emeny** as its newest brand ambassador.

Already, at the age of 26, the youngest person to complete an Ironman on six continents, the Canadian endurance athlete set off for Antartica earlier this year, taking Baffin footwear and clothing with him.

The challenge he will take on will involve swimming a distance of 3.86 kilometres in water at a temperature of zero degrees, cycling 180 kilometres on ice and running a marathon in freezing air temperatures.

Baffin has equipped the athlete and his team with cold-weather apparel, high-performance winter boots, insulated slippers and rubber boots for the sea voyage south from Ushuaia in Argentina.

"The cold is what we know," said Baffin senior vice-president **Mark Hubner**, "and as Connor faces the unique and formidable challenges of this expedition, we are proud to provide him with gear that will protect him from extreme conditions along the way."

Ocean-bound

Technical editor of *WSA* magazine, **Sophie Bramel**, will explore "what ocean-bound plastic is exactly and what can be done with plastics already at sea" during a panel discussion to be held on the second day of Munich fabric show Performance Days on March 21. Panellists include managing director at polyester fibre manufacturer Advansa, **David Bayliss**; global marketing and sustainability director at fibre producer Hyosung, **Simon Whitmarsh-Knight**; and Seaqual managing director, **François Devy.**

Healthy growth

Outdoor group Columbia Sportswear has reported full-year revenues for 2023 of just under $3.5 billion, an increase of 1% year on year. Chief executive, **Tim Boyle**, said a programme to reduce inventory across the group had proved successful. Other plus-points he mentioned were that the Columbia brand had generated "healthy growth outside of the US", led by China and Europe.

On board

Recycled cotton producer Recover has added **Hans Ploos van Amstel** to its board. Mr van Amstel previously worked as chief financial officer at Levi's, and held roles at Partners Group and Adecco. He was also previously co-chief executive officer of C&A. This appointment follows the company's recent appointments of **Anders Sjoblom** as chief executive officer and **Matthew Neville** as chief commercial officer.

Shake-up

Under Armour has announced two appointments: **Yassine Saidi** as chief product officer and **Kara Trent** as president for the Americas. Mr Saidi brings nearly 20 years of industry brand experience. Ms Trent was managing director for the brand in Europe.

New heights

Swiss traceability technology provider Haelixa has named **Patrick Strumpf** as chief executive, and welcomed the addition of **Stefan Karlen** to its board of directors. Chief technology officer, **Dr Gediminas Mikutis** said that he expected the appointees' extensive knowledge to help propel Haelixa to new heights.

Record-holder dies in accident

The authorities in Kenya have confirmed that men's marathon world record holder, **Kelvin Kiptum**, died in a road traffic accident on February 11. He was travelling in a car with his coach, **Gervais Hakizimana**, in western Kenya when the accident occurred. in which he was also killed.

Kenya's sports minister, **Ababu Namwamba**, confirmed the news after visiting the site of the accident. He said Kenya and the entire world had lost an athlete who was a role model to many. Kelvin Kiptum set a new record of 2:00:35 at the 2023 Chicago Marathon in October. He wore a prototype pair of Nike Alphafly 3 running shoes for the race.

Changes at H&M

Swedish clothing and footwear group H&M has named **Daniel Ervér** president and chief executive in place of **Helena Helmersson**, who has left the company after 26 years of service, the latter four spent as chief executive. Mr Ervér most recently led group flagship brand H&M, for which he retains responsibility.

Ms Helmersson's decision was a personal one, she said, but not easy. The departing chief executive cited the strength of the group's brands, its culture and "high ambitions in sustainability" as among the most important reasons for her continued faith in its onward trajectory.

Global brand strategy director for Puma

Sports group Puma has appointed **Julie Legrand** as its new senior director of global brand strategy. Ms Legrand was previously global brand director at H&M and, before that, she held senior roles at consumer products brand Procter & Gamble.

Puma described her as a senior leader and said she would define and execute a strategy to drive higher brand visibility and strengthen the perception of the Puma brand around the world. She will be based at corporate headquarters in Herzogenaurach in Germany.

Gobal brand management and marketing operations for Puma were previously based in Boston but the company announced last year that it would move this function to Herzogenaurach.

Bremen beckons

Bremen will host the thirty-seventh International Cotton Conference from March 22-24, bringing experts from cotton production, brands and the wider textile supply chain to the German city.

There will be presentations and discussions on a wide range of topics, covering cotton farming, ginning, spinning and textile processing, and recycling are all on the agenda.

Speakers will include analyst, author and specialist in fashion sustainability issues **Veronica Bates Kassatly**, senior vice-president for global supply chain marketing at Cotton Incorporated, **Mark Messura**, executive director of the International Cotton Advisory Committee, **Eric Trachtenberg**, director of Brazilian cotton farmers' association **Abrapa Marcelo Duarte Monteiro**, and the chief executive of Better Cotton, **Alan McClay**.

Hopeful vision

US-based Advancing Eco Agriculture (AEA) has launched a cotton standard called Integrity Grown that aims to increase yields, lower chemical inputs and water usage and improve soil health. The programme's purpose is to attract more cotton growers to transition to regenerative practices.

AEA founder **John Kempf** said: "Many growers today are caught up in contemporary agriculture's cycle and myth that using more chemicals and water is required to increase yields.

"This is particularly true with cotton, a crop heavily sprayed with chemicals, depleting all soil nutrition and life. There is another tested, proven way to effectively grow cotton using regenerative agriculture. This way of farming offers a hopeful vision and an exciting path forward for farmers."

Linen and flax focus

Milan-based sustainable textiles hub CLASS, with its founder, **Giusy Bettoni**, has become the Alliance for European Flax-Linen & Hemp's official representative in Italy. Work has begun to draw up an action plan for European flax-linen in Italy. A long-time partner of the alliance's in Italy, **Ornella Bignami**, will provide expert training and advice on flax and linen to textile, fashion and design learning centres in Italy.

Pastures new

Austrian Fibers Institute president and former Lenzing chief sustainability officer, **Robert van de Kerkhof**, has joined Swiss textile innovator HeiQ's board of directors. Mr van de Kerkhof, himself Switzerland-based, left Lenzing in January to focus on delivering sustainability, circularity and decarbonisation advisory services with Pepper-i2, a company he founded last August.

Beyond business

Patagonia CEO, **Ryan Gellert** has joined The B Team, a group co-founded by **Richard Branson** and **Jochen Zeitz** that states business has the capacity and the responsibility to become a driving force for social, environmental and economic benefit. Mr Gellert said he looked forward to joining leaders he respects in a collective effort.

Recycling specialist

The general manager of greentech company RE&UP, **Andreas Dorner**, has been named as the new managing director of the Dornbirn Global Fibre Congress. RE&UP's technology enables textile waste recycling into new raw materials. Mr Dorner was a senior executive at Lenzing until the end of 2023. Organisers of the event, which takes place from September 11-13, said having Mr Dorner in the role would mean sustainability and recycling were sure to feature prominently at this year's conference and at future editions.

In the wake

Rab and Lowe Alpine owner Equip Outdoor Technologies has named **Richard Leedham** chief executive in the wake of **Matt Gowar's** decision to step down after 30 years late last year. Mr Leedham most recently led the team at UK-based women's outdoor brand Acai between 2019 and 2023, after spending 2013 to 2018 as president of Berghaus' outdoor division.

Backtrack

Limitations on space make it impossible for us to run more than a carefully selected sample of industry news in *WSA*. However, we publish hundreds more stories on www.sportstextiles.com, one of the most comprehensive archives of news anywhere on the web for textiles, apparel, footwear and equipment for sports and outdoor. Below are just some of the headlines that have appeared on the site in recent weeks.

06 March 2024

Higher cotton prices driven by speculation not fundamentals

05 March 2024

VF-backed scheme upskills workers in the face of automation

04 March 2024

Award nomination for Icebug forestry initiative

Brazil date for Shima Seiki

Growth for European Outdoor Group

01 March 2024

CNTAC hosts eighteenth China textile roundtable

Olympic optimism from Intersport

Alpha SV headlines Arc'teryx Museum in Shanghai

29 February 2024

Record results for Moncler

Former EOG president urges better backing for industry events

Demand for 'slow fashion' growing, says Ventile

28 February 2024

Adidas keeps sale of 2022-era Yeezy stock in-house

RWS certification for Nuyarn

Patagonia waste becomes Naia Renew

27 February 2024

Footwear leads growth for Puma

Hyosung FDC issues its latest trends forecast

Sustainable Apparel Coalition rebrands as Cascale

26 February 2024

H&M, Arvind and Deven team up for supercritical CO_2 testing

23 February 2024

Fashion group eyes acquisition of Boardriders' business in Europe

Reintroduction of the Puma Suede

BlockTexx completes $7m funding round

Circulose Supplier Network adds 35 more members

22 February 2024

Lunar New Year brings China breakthrough for Canopy

Interloop saw 40% rise in revenues over H1

21 February 2024

Wolverine Worldwide is now "a different company", CEO says

First in-house footwear from Arc'teryx due in March

20 February 2024

Recycled materials feature prominently at Indorama event

New Moncler store in China

Spiber issues its first sustainability progress report

19 February 2024

Fila unites teams at new 13-storey HQ in South Korea

Stricter rules proposed for European textiles waste

16 February 2024

Winter sports brands draw up pact for addressing climate change

Only Natural invites synthetic-free submissions

15 February 2024

Athleta debuts new PowerMove material

Allied signs first brand to circular down programme

14 February 2024

Latest drop from Inov8 tackles hard ground

Full-year sales up 18% at ASICS

13 February 2024

Sky's the limit as Columbia tech heads to the Moon

12 February 2024

Month-long regenerative fashion hub for London

09 February 2024

Prada kits out China women's football team

Nike to give $3m to NFL-led indigenous sports training

08 February 2024

Falls in North America for Under Armour but growth elsewhere

Major win for Rieter in patent dispute in China

Walmart grant will help Accelerating Circularity expand

Ecco pairs up with Minotaur for Japan-only golf shoe

07 February 2024

Earth-focused plan from Radici Group

Sympatex boosts sales team

Fully recycled N850 FishTale swim fabric lands at Vitamin A

06 February 2024

Trade body to support GTT's bid for business in Japan

Nike selects Air Max Dn for Dynamic Air take-off

Unifi ready for increased demand in 2024

05 February 2024

Two additions to Première Vision's 'Better Way' programme

Skechers celebrates record-high annual sales

Made in Europe isn't always better – Ortovox

SPORTSTEXTILES.COM

Stay ahead of the game – subscribe to *www.sportstextiles.com* with news of the latest innovations in performance textiles delivered straight to your desktop.

know
THE SCORE



www.sportstextiles.com

Enzymes, microbes and such can develop the ability to break down any substance they find in their close environment, including plastics. They are now being screened and tailored to depolymerise PET plastics, polyester textiles and fabrics made from polyamide.

Plastic-eating enzymes

It is called destructive metabolism. From the Greek metabole, meaning change, it is a form of metabolism that produces energy and waste matter. This is, roughly, the biological process at work when enzymes metabolise or break down synthetics into their original building blocks. And change is also an apt term for this biorecycling category, whose technology is arguably one of the most 'advanced' of the many so-called 'advanced recycling' technologies in development and implementation.

The technology is still in its infancy, but it is taking its first steps. Since 2021, French company Carbios has been operating a pilot biorecycling plant in Clermont-Ferrand and the construction of an industrial scale facility is under way in Longlaville, with Indorama Ventures. Its projected capacity will be 50,000 tonnes of PET waste per year, when finished. A good step forward. But, when the company first began research in enzymatic recycling in 2011, the mandate set by company founder, Philippe Pouletty, was to develop the technology for ten different polymers. Two of the ten have been achieved. In addition to PET, the company's Carbiolice division has developed an enzyme-based additive that makes PLA compostable, not quite recyclable, but still an end-of-life solution. Each polymer, of course, has a different chemical structure, and will require a different type of organism to break it down. As Carbios' chief scientific officer, Dr Alain Marty, told *WSA* at the inauguration of the pilot plant in 2021, the ester bonds of polyesters are relatively easy to cleave, as could be the amide bonds of polyamides. But the carbon-to-carbon bonds of polyethylene (PE) and polypropylene (PP) are very difficult to separate.



An early investor in Protein Evolution through her SOS Fund, Stella McCartney presented a parka made from the company's biologically recycled polyester at the COP28 in Dubai last year.

CREDIT: PROTEIN EVOLUTION / STELLA MCCARTNEY





Enzymes at work

In the development of enzymatic recycling processes, the first and critical step is to identify the organisms that have an affinity with a polymer. This can be done by placing various plastics or synthetics in various natural environments, including soil, fresh or salt water, and letting nature do her thing. When a biofilm forms on the material, the agent responsible for this sign of biodegradation can then be singled out as a possible candidate. Although artificial intelligence and machine learning have sped up the process of screening enzymes, this is not the end of the recruiting process. The enzymes need to withstand various conditions, remain highly efficient and ideally fast. This research stage can be a long process of tweaking and tailoring to achieve the desired skills. The stability of the enzymes, the rate at which they break down the plastic and temperature at which they do so in the vats are some of many parameters that need to be resolved. It took Carbios several years to engineer a specific 'PETase' strain capable of operating in temperatures around 100°C.

Enzymes may be powerful biological catalysts, but thermoplastics are sturdily built materials that do not naturally or easily break down. The second stage of research into these new biotech recycling methods is thus to make the plastic polymer more readily digestible. This can involve various chemical and mechanical preparatory phases to alter the structure of the polymer into a more amorphous form and increasing its surface area to make it more accessible to the action of the enzymes.

Once these two sides of the equation are solved, proponents of these technologies believe that the highly targeted action of enzymes gives them an advantage over other forms of recycling. An extensive scientific article written by the Carbios team, and published in *Chemical Reviews* this year, 'Enzymes' power for plastics degradation', presents a critical overview of all research published to date on the enzymatic degradation of all types of plastics. It includes a summary of the promise of enzymes as "highly efficient biocatalysts" for their ability to operate in milder reaction conditions (temperature, pH and pressure), their high selectivity, and low environmental impact (less energy consumption and waste generation).

> **"Carbon-to-carbon bonds are particularly difficult to separate."** DR ALAIN MARTY, CARBIOS

(Left:) The process of identifying enzymes capable of breaking down common plastics is part of Carbios' ongoing research. (Right:) The Carbios demonstration plant in Clermont-Ferrand has been running since 2021.

CREDIT: CARBIOS-SKOTCHPRODAGENCY

Catalysts for change

Carbios is not the only company betting on biorecycling. Protein Evolution, based in New Haven, Connecticut, is developing a biorecycling process for polyester and Samsara Eco, a start-up based in Canberra, has successfully identified polyamide-metabolising enzymes. The first presented a parka made from recycled polyester designed by British designer Stella McCartney, an early investor and partner, for the COP28 climate conference in Dubai. The latter recently announced that its partner, Lululemon, had made the first samples of garments from its biorecycled nylon.

Founded in 2021 by Connor Lynn and Dr Jonathan Rothberg, Protein Evolution has developed a biorecycling process that breaks down polyester textiles into terephthalic acid (PTA) and mono-ethylene glycol (MEG), as does the Carbios process. These can then be converted into 100% recycled polyester that is "indistinguishable from oil-derived polyester, but with a far lower carbon footprint," says Connor Lynn, chief business officer. He adds: "Our Biopure

process can handle a variety of traditionally tough-to-recycle materials that involve dyes, mixed materials and dense weaves." The proprietary technology has been validated in an initial prototype system and is currently transitioning to an industrial demonstration facility, he says.

The start-up uses artificial intelligence to identify enzymes that have the desired plastic-degrading properties across vast biotech databases. This accelerates the discovery process and reduces the time from initial concept to potential enzyme. "Additionally, through our machine-learning models, we can predict the activity of enzymes under different conditions or modifications. This predictive capability is crucial for understanding how changes in enzyme structure might impact function, allowing our engineers to design enzymes with specific characteristics without extensive trial and error," says Mr Lynn. AI, he adds, helps predict which mutations are likely to result in beneficial properties (streamlining the enzyme evolution process), as well as to create entirely new 'enzymes' that do not yet exist in nature. The company is not stopping at polyester and is also pursuing research into enzymes capable of breaking down polyamide and polyurethane. It has recently teamed up with Basecamp Research, a UK firm specialising in mapping biodiversity data for AI biodesign, to do so. "We expect to have promising enzyme candidates for new applications in the second half of 2024," says Mr Lynn.

In February 2024, Canadian athleisure brand Lululemon presented the first samples of clothing made from enzymatically recycled nylon 6.6, a long-sleeve top for its Swiftly Tech range. The commercial version of this item is made in a blend of 50% nylon, 44% recycled polyester, 3% elastane and 3% X-static nylon. According to the press release, 90% of the nylon content is biorecycled using Samsara Eco's patent-pending technology.

Also founded in 2021, the start-up is backed by the Australian National University (ANU), retail group Woolworths and Main Sequence, the deep-tech venture arm of national research centre CSIRO. It says it draws its technology from an extensive library of plastic-eating enzymes. Until now, the textile-to-textile recycling of nylon 6.6 has been near impossible, as company founder and CEO, Paul Riley, points out. "We've started with nylon 6.6, but this sets the trajectory of what's possible for recycling across a range of industries as we continue expanding our library of plastic-eating enzymes."

Mechanics of metabolism

Carbios, as mentioned, has turned its attention to identifying enzymes capable of depolymerising polyamides and polyolefins, both polyethylene (the world's most produced plastic) and polypropylene. These three thermoplastics currently have few recycling pathways, the company noted in a strategic update. The French firm says it has vastly accelerated its enzyme optimisation techniques through the use of microfluidics, which enable it to screen millions of enzymes a day, compared with a few thousand a week using conventional technologies.

It can therefore be expected that progress in enzyme screening and optimisation will, at some point, make it possible to biologically break down all types of synthetics and plastics. Like any new technology, it won't happen overnight. Change, like metabolism, can take time.



The very first item of activewear made from biorecycled nylon, a technology developed by Canberra-based Samsara Eco in a partnership with Canadian athleisure label Lululemon.
CREDIT: SAMSARA ECO / LULULEMON



Protein Evolution has developed a biorecycling process for polyester textiles and is now working with Basecamp Research to engineer enzymes that can break down polyurethane and polyamide waste..
CREDIT: PROTEIN EVOLUTION


POLARTEC®
Made To Go Beyond
The Best,
Just Got Better.
Polartec® Power Shield™
Made With Biolon™*.
Nylon. Made Better.
Waterproof re-imagined. Windproof re-defined. Breathability re-designed. The Biolon™* plant-based content** within Power Shield™ reduces reliance on fossil fuels and lowers carbon footprint by up to 50%.▲
Discover more
*Biolon™ is a trademark of Milliken & Company
**Biolon™ nylon content varies by product.
▲Compared with virgin Nylon-6,6.

Cooking oils and fruit stones are among the new raw materials being harnessed to make textile auxiliaries. In addition to recycling food industry waste, makers of functional finishes are also switching to plant or biobased formulations, signalling a move away from petrochemicals in the business of textile additives.

Creative chemistry

New recipes are being cooked up, literally, in the world of chemicals for textiles. Italian company Erca makes its auxiliaries to treat fibres and fabrics from used vegetable oils, the first, it says, to carry GRS (Global Recycled Standard) certification. Citric acid, an ingredient commonly found in food, is the active ingredient that powers Noble Biomaterials' Ionic+ Botanical, launched in 2022. "Sometimes innovative solutions are staring you right in the face," says Joel Furey, company founder and chief commercial officer, of the plant-derived antibacterial finish. Polygiene's new antibacterial finish is fully plant-based and its active ingredient, lactic acid, is also widely used in the food, pharmaceutical and cosmetics industries. StayFresh Bio, as it is called, was developed in partnership with Proneem, a French biotech company that specialises in natural actives, all of which are produced in France. "For quite some time, we have been looking for a biobased technology that meets all our tough quality requirements, which has not been easy," said Polygiene CEO, Ulrika Björk, ahead of the product launch at Ispo in 2023.

The switch to recycled or renewable ingredients extends to a wide array of solutions and companies. They are driving innovation at German chemicals supplier Rudolf, whose latest moisture-wicking solution, Hydrocool, is biobased, following up on Ruco-Dry Bio, a durable water repellent (DWR) finish made from plant-derived processing waste. "New biobased materials are being released on the market on an ongoing basis," says Stephan Müller, the company's business development manager. The goal, he says, is to increase biobased content without sacrificing performance and to continue to identify compounds from renewable sources that can perform in a similar way to petroleum-based ones.

Waste not

First introduced five years ago, Erca's Revecol, for Recycled Vegetable Cooking Oil, has slowly expanded to include auxiliaries that cover the preparation, dyeing and finishing of synthetic fibres, recycled or not. This product category is now managed by a stand-alone company, Erca Textile Chemical Solutions, or Erca TCS, spun off from the Grassobbio-based chemicals company earlier this year.



Italian chemicals company Erca Textile Chemical Solutions has developed a range of auxiliaries for the textile industry that are made from used cooking oils.

CREDIT: ERCA

As Fabio Locatelli, Erca TCS CEO, tells *WSA*, the collection of used vegetable oils is regulated and monitored in Italy by various organisations. One of these, CONOE, estimates that 260,000 tonnes of used vegetable oil are generated annually in the country from both professional and domestic activities. Only 80,000 tonnes are collected and sent to regeneration processes. "We have achieved an important goal by completely replacing castor oil and palm oil with recovered vegetable oil in a good part of Revecol products. Until a few years ago this seemed impossible," he says. Last year, Japanese trimmings manufacturer YKK converted the dyeing processes of a factory in Vietnam to Revecol LV-TS, which is said to have a 72% lower carbon footprint than conventional chemical auxiliaries produced by Erca.

Fruit stones are the novel active ingredient in Rudolf's Rucolase DWS. Their abrasive fraction is used as an alternative sanding agent for denim laundries. The company cannot say exactly which type of fruit the product is derived from. "But we can say that this particular renewable raw material was chosen for its hardness and density, its roughness and surface irregularities, and its composition which contributes to its resistance and durability," says Alberto De Conti, who heads Rudolf Hub1922. The fruit stone content of the solution has many advantages, he adds: "The very fine, natural granulate penetrates deep into the cotton fibres and causes a very effective micro-abrasion. Its high hemicellulose and pectin content forms a gel when in contact with wet garments, preventing the product from being lost in an open drum." In addition, a small amount of vegetable oils, extracted during tumbling, generates a very appealing sheen and smooths the cotton fluff. Finally, Rucolase DWS avoids all the obvious health and safety problems associated with handling sand and drastically reduces any problems associated with machine damage and excess sludge in the treatment plant, which he says can account for 20-25% of a laundry's operating costs.

> **"It is an ongoing process to identify compounds from renewable sources that perform like petroleum-based ones."**
>
> STEPHAN MÜLLER, RUDOLF



Salomon's new trail running range features Noble Biomaterials' Ionic + Botanical Technology whose anti-odour properties are derived from citric acid, a common food industry ingredient.

CREDIT: SALOMON SPORTS

The switch to renewable

Silver is one of the main antibacterial agents used today to limit the growth of bacteria on activewear, and although it is natural, concerns regarding its use have inspired a search for alternative solutions. Last year, fabric developer Polartec introduced a new product called Fresh Face, which it describes as a natural and renewable odour reducer based on mint oil. Noble Biomaterials' new Ionic+ Botanical derives its antimicrobial properties from citric acid. "Citric acid is a plant-based industrial solution that meets the criteria of the Environmental Protection Agency (EPA) in the United States, which is the largest market for antimicrobial solutions," says Allon Cohne, marketing director for Noble Biomaterials, adding that EPA approval can take a long time to secure, and the decision to choose an active that was already registered sped up the development process. "What we needed to do was to develop a textile application," he tells *WSA*. The company has been conducting tests with mills throughout 2023 and two brands have adopted the novel solution. Salomon is introducing Ionic+ Botanical in a revamped running range and Trident, a maker of home textiles, has also adopted the new finish.

Ionic+ Botanical is a topical solution that is applied after a fabric has been manufactured, as opposed to Noble Biomaterials' legacy technology, X-Static, in which silver is embedded into a fibre during extrusion. "We are proponents of permanent efficiency, which we offer by embedding silver in a yarn that will never wash out. Durability is key to our company's mission," insists Mr Cohne. For brands that need some flexibility in their fabric selection process, a topical finish may be preferred.

Fully plant-based solutions

Some suppliers of additives or auxiliaries have made plant or biobased ingredients their core focus. This is the case for Proneem, a biotech company based in Marseille and founded in 2003. Over the years, it has identified a range of natural actives that repel bugs and offer a fresh or a warming effect for activewear. Its new, patented lactic acid solution inhibits the growth of odour-causing bacteria by up to 99.99%, and is the result of three years of research, says founder and CEO, Nathalie Hagège. It is now being offered by Polygiene through an exclusive agreement.

RDD Textiles, the innovation lab of Portuguese textile manufacturing group Valerius, is another company seeking to extract useful chemicals from food industry and agricultural waste. Dyeing is a major focus of its research, says Ana Tavares, RDD Textiles CEO. The company works with a number of textile start-ups to assist them in industrialising their processes. It operates a biotech fermenter that produces pigments developed by UK start-up Colorifix. It can also dye fabrics using Officina39's Recycrom dyes (extracted from used textiles), Living Ink's algae-based black pigment and the food waste dyes developed by Japanese company Toyoshima.



Leftovers from ready-to-eat salads, coffee houses, and processing waste from suppliers of herbs, essential and vegetable oils are some of the ingredients that Toyoshima turns into 'Food Textile' dyes.

CREDIT: FOOD TEXTILE

The European Commission has plans for higher targets for reducing food and textile industry waste. It estimates that 60 million tonnes of food and 12.6 million tonnes of textiles are discarded every year in the European Union. Chemicals companies have already begun to play their part in this cause, as seen. "Our R&D department is often solicited to study new opportunities that go precisely in the direction of circularity and sustainability," says Mr Locatelli of Erca TCS. Renewable and recycled content is also, as mentioned, part of Rudolf's move away from petrochemicals. These are promising signs of change. But there are probably several tens of thousands of different chemicals used in the textile industry. Creative green chemistry needs to be more than just a trend.



Made from fruit stones, Rudolf's Rucolase possesses not only the required abrasive properties for denim laundering but also produces a premium shine, the company says.

CREDIT: WTP

Unitex

Green your life

Award-winning circular and warp knit fabrics for sports, outdoors and intimate apparel.

National Level Green Factory - eco plant incorporating solar and wind power renewable energy, eco efficient textile processes and intelligent augmentation.

Brand ingredients with a wide range of performance including bio—based polyamide, recycled synthetics, bio-based spandex, mono fabrics, cellulosics.

Sustainability • Creativity • Performance

View our latest functional fabric developments featuring premium ingredients at:

Performance Days - Munich

Functional Fabric Fair - Portland

Global Recycled Standard · Higg Index · ISO 9001 · ISO 14001 · ISO 50001 · OEKO TEX® · SAI SA 8000 · ROADMAPTO ZERO

www.sinounitex.com



Derived from abacá banana plants, Bananatex was developed by Swiss bag brand and material innovators Qwstion, in collaboration with a yarn specialist and a weaving partner in Taiwan.
CREDIT: LAUSCHSICHT

The rise of alternative natural fibres

In the wide world of agricultural waste lie many long and strong fibres that can be spun into textile yarns for apparel and accessories. Driven by demand for fabrics that have a cotton-like hand feel and by the plastic-free movement, pineapple, banana and even straw-derived materials are weaving their way into today's textiles.

They come in many forms. Banana stem fibres can measure up to four metres, those of kapok seeds are considered too short to spin into yarn, the cellulose in wheat or rice straw is only a few millimetres long, but could, with adequate processing, become a viable raw material for a new class of biofibres. Some of these, abacá and jute, not to mention palm and hemp, have been used to make ropes, matting and roofing for centuries. The inherent strength of these fibres has made them a valuable resource for many indigenous communities. Their transformation into materials suitable for modern-day apparel and accessories could be a challenge but may also have the potential to offer a larger array of natural fibres for the fashion, denim and sportswear industries.

In 2018, Swiss eco-brand Qwstion introduced Bananatex, a material derived from banana stems, into its collection of bags and accessories. The result of diligent research by company founders Hannes Schönegger and Christian Kägi, it is made from a wild banana plant that grows in the Philippines, Musa textilis, and the fruit of which is inedible. It is also known as abacá. "This genus produces a very strong fibre that can measure up to four metres in length, but it is fairly coarse and thick," says CEO, Hannes Schönegger. To make a fabric from these rustic fibres, the company applies a paper-making technique, known in Japan as washi. The sheets of paper are cut into fine filaments that are twisted into a yarn and can then be woven or knitted into a textile. The individual

fibrils are 2mm long, he adds, and this is what gives the fibre its resilience, high tear-strength and abrasion resistance, perfect for backpacks. It does, however, tend to wrinkle, he notes.

Qwstion saw great potential in this new, yet old, textile and decided to make it available to others. "We were quite naïve," says Mr Schönegger. "We received hundreds, even thousands of requests, and this took too many resources away from Qwstion." To address demand, which, he says, far exceeds capacity, Bananatex was spun off into a stand-alone company to develop new applications and markets.

Bananatex offers some 100 knitted or woven textiles for the fashion, furniture, accessories, footwear and automotive sectors. Accessories have been the most successful. British designer Stella McCartney has used the material for several bags and shoes, and H&M sold sneakers with Bananatex uppers. As the fabrics lack elasticity, Mr Schönegger does not see much potential in performance activewear. Denim could, however, be a good market for the fibre, he notes, and there are plans to present the first Bananatex denims this summer.

Production can be scaled, he says. Musa textilis plants grow in Ecuador, Costa Rica and the Philippines, where 80% of the rainforest has been destroyed. As part of biodiversity initiatives, it could provide smallholder farms with a new source of revenue. "These banana plants need the shade of trees and the presence of other plants to thrive," he says. "Thousands of hectares of land could be rewilded in the Philippines to supply fibre."

It is nonetheless a rather expensive fibre, owing to the manual labour involved in its production; it costs twice the price of organic cotton, says Mr Schönegger. "No economies of scale are possible, its transformation is either the result of human hands or diesel machines." He does point out though that "the true cost of polyester, or even recycled polyester for that matter, is not reflected in its market price. Taking a macro perspective, Bananatex would not be more expensive than synthetics, as its real cost is not kicked down the road to future generations."

Banana bonanza

Banana fibres can also be extracted from the stems of the edible variety of the popular fruit, as Pakistan-based vertical manufacturer Interloop does. The company operates a facility in the Sindh province, where the fibre is harvested from banana farming waste. "Banana fruit farms in Pakistan generate some 10 million tonnes of waste annually that are usually burnt or discarded," says Noor Jehan Sadiq, Interloop's head of marketing. The company has built a fully integrated supply chain, from fibre extraction and processing to spinning a yarn it calls Loomshake. Made from 80% cotton and 20% banana fibre, it is used to manufacture hosiery, jeans and knitwear.

"A natural cellulosic fibre, it possesses good moisture absorption properties and dyes well, in addition to conserving land and reducing water



Ani Wells of sustainable fashion consultancy Simply Suzette created a capsule collection using Interloop's Loomshake yarn, composed of 20% banana fibre. Unpeeled, the name of the range, presents a fresh take on the farm to fashion narrative.
CREDIT: INTERLOOP LIMITED

usage typically associated with cotton growing," says Ms Sadiq. She adds that it not only offers a solution for the disposal of biomass waste but also creates a new source of income for farmers. She admits though that the banana fibre is inherently coarse, which does not make it ideal for activewear. Loomshake has been successfully marketed by Guess, in denims, and Dinner Service NY, in hosiery, as part of their sustainable synthetic-free ranges, she says.

Banana is not the only alternative natural fibre in Interloop's product offering. It makes kapok-cotton yarns in various counts, with a maximum of 25% kapok fibre. Ms Sadiq says the company is also working on extracting jute fibre from post-consumer waste and exploring the potential of extracting fibres from corn and pineapple agro-industry waste.

Gencrest, a division of Indian conglomerate Samta Group, sees in banana crop waste the potential to make a man-made cellulosic fibre, which it has branded Vybrana. The company has developed a patented Fiberzyme technology to process the raw material and designed custom machinery for a manufacturing line that can produce up to 50 tonnes per month. Indian denim mills Arvind and Raymond UCO have integrated the banana-based viscose-type fibre into their collections.

Pineapples too

Pineapple leaves are another form of crop waste that is being tapped as a source of a new alternative natural textile fibre. Ananas Anam, a certified B Corp company based in London with production facilities in Spain, the Philippines, Bangladesh and the Ivory Coast, first developed

Piñatex, a non-woven material combined with polyurethane. The decision to create this type of textile was mostly due to the leather background of company founder, Dr Carmen Hijosa, says Riika Juva, head of communications and business development. Since its creation in 2013, Ananas Anam has built up a full supply chain and a method to make fibres suitable for spinning. "We always knew the fibre had the most potential and would be the best market application," she says.

Pineapple leaves produce very long and strong fibres, drawn from the 20 or so leaves that grow around the fruit, and are usually left to rot, says Ms Juva. But the sheer volume of these leaves, an estimated 27 million tonnes annually, makes it impossible to leave them to rot in the field, which means that some 80% are burnt, she adds. Ananas Anam's suppliers are both smallholder farms and global organisations, such as Dole and Compagnie Fruitière.

In the production process created by Ananas Anam, the pineapple leaves are now collected and decorticated on the field. The biomass residues from this operation can be used as fertiliser, or sold for fuel, creating a potential third revenue stream for farmers, says Ms Juva. The textile fibre itself is obtained via a proprietary and patented enzymatic process that removes impurities. All further processing is purely mechanical, the company says. The resulting fibre is then marketed as Anam PALF, for PineApple Leaf Fibre, or spun by Ananas Anam's spinning facility in Spain into Piñayarn.

The fibre possesses high tensile strength and high moisture absorption due to its cellulose content. "It dries quickly," says Ms Juva, "and is also a bit coarse." It is most often blended with cotton or one of Lenzing's manmade cellulose fibres, in proportions of 30% Piñayarn or Anam PALF. This keeps the price down and offsets the rusticity of the pineapple fibre. "As we have scaled, the price has come down, and can now be compared to linen, though this is still high for mass market applications," she notes.

Both Piñayarn and Anam PALF are, again, good candidates for applications in denims. Spanish mill Textil Santanderina offers such fabrics. A number of Portuguese companies have adopted the fibre, including spinner Tearfil, fabric maker Riopele and knitted shoe upper specialist Cosmiknit.

The last straw

Earth Protex is a company that originated in the 1990s as a supplier of hemp, introducing the original alternative natural fibre to adidas, Levi's, Nike, Patagonia and VF at the time. Before launching Earth Protex, its founders Yitzac and Samuel Goldstein, worked for Circular Systems. The father-and-son team is now expanding some of the technologies developed at the time on their own. AgRefinery, one of several research projects at Earth Protex, seeks to make the most of various types of crop waste by extracting micro and nanocellulose to produce fibres, films or coatings. The technology developed is not a viscose process, Yitzac Goldstein tells *WSA*, but is rather similar to the method developed by Finnish company Spinnova. He explains: "We fractionate straw waste through various gentle processes to keep the fibres long and fully valorise the cellulose chains." He believes it will be possible to extract a wide array of polymers, chemicals and fibres from wheat and rice straw as well as sugarcane bagasse through its non-wood pulping process. Mr Goldstein says it is a "tunable" technology for fibres, in that they can be treated to add hydrophobic, hydrophilic or antimicrobial functionality. "We have many ingredients in the kitchen," he says. The research phase is ongoing, in collaboration with CITEVE in Portugal and the Bio Products Institute of the University of British Columbia in Canada. Mr Goldstein expects staple spinning fibre, textile coatings and biopolymer additives to be commercially available by 2026. "We see great opportunity for cotton-like natural fibres," says Samuel Goldstein.

The cellulose content of these alternative fibres should make them comfortable to wear and easy to care for. They should also benefit from the growing plastic-free and synthetic-free movement. And though cotton is the leading natural fibre, with a market share of 25%, its production has been stable in recent years. This could leave a wide-open space for a new crop of natural fibres direct from the farm.

IN DEFENCE OF ALTERNATIVE NATURAL FIBRES

Launched in 2022, the Fibral Material Alliance was created to support alternative natural fibres, from abacá to kapok, and to all plant-derived materials. The organisation whose founding members include Ananas Anam and Bananatex, now counts 67 members. Along with Gencrest and Interloop, Pyratex, Green Whisper, Himalayan Wild Fibers, FyberX and 9Fiber have joined. It is a loose organisation designed to support alternative natural fibres, says Hannes Schönegger. "We see it as a platform to grow awareness and share experiences as it is a very fragmented space and we all face similar challenges."



Ananas Anam now markets a yarn, Piñayarn, and fibre, Anam PALF, derived from pineapple leaves. Spanish weaver Textil Santanderina made some of the first denims from the new fibre.

CREDIT: ANANAS ANAM/ SANTANDERINA

CHT
SMART CHEMISTRY
WITH CHARACTER.



BeSo®RESPONSIBLE

RESOURCE SAVING MANUFACTURING

by CHT

Clothing is essential for our life. However, textile production requires a tremendous amount of resources. It is time for a new approach! With the BeSo®RESPONSIBLE system, we empower you to save resources. BeSo®RESPONSIBLE is CHT's **be**st **so**lution that can be tailored to your individual requirements, ensuring optimal efficiency during the entire textile dyeing processes. It is up to you to take responsibility!

BeSo®RESPONSIBLE – just one of our smart effects with character.

Wash proof

Long lasting

Our products meet
the highest standards.
Find out more at:
www.cht.com/beso-responsible



Neolast can be used to add stretch for multiple sectors, including sportswear and swimwear. Celanese is also liaising with denim mills to begin R&D with a view to using it in jeans.

ALL CREDITS: UNDER ARMOUR

Striving for circular stretch

RISE TO THE CHALLENGE

Under Armour and Celanese have unveiled a fresh type of stretch fibre that they say could provide a more easily recyclable alternative to elastane – and they are keen for wider industry adoption.

Sportswear relies on stretch. It is one of the key attributes that makes clothing comfortable and form fitting. Spandex, or elastane, is made from polyurethane and polyethylene glycol and can stretch multiple times and return to its original shape; it is most often blended with polyester or cotton.

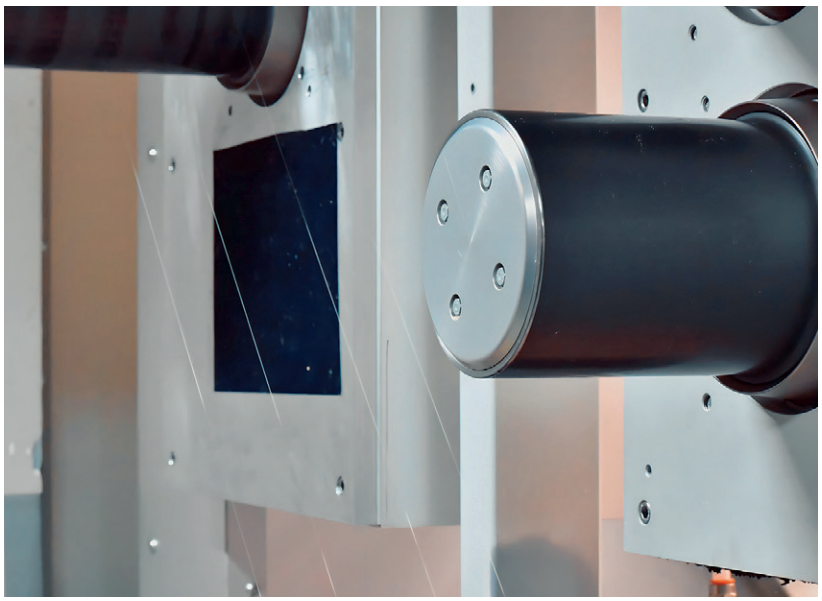
However, it does present some challenges when it comes to a garment's end of life. These fibres cannot be easily separated, so recycling becomes an issue. This is one of the "longstanding sustainability challenges" that US brand Under Armour sought to tackle several years ago when it teamed up with US-based materials developer Celanese, through a research partnership with North Carolina State University, to develop an alternative.

"Our companies share a commitment to innovating at the materials level to improve products, in this case textiles," Kyle Blakely, senior vice-president and head of innovation at Under Armour, tells *WSA*. "We saw an opportunity to team up to begin to tackle a longstanding sustainability challenge in our industry. We have a super-functional, aligned approach to complicated development and act as one team, even though we are both part of large companies."

Celanese Corporation produces specialty materials and chemicals, with production in North America, Europe and Asia. It is one of the world's largest producers of acetyl products and creates high-performance engineered polymers that are used in a variety of applications. The teams brought different expertise to the programme: Celanese provided technical know-how in polyester and elastomer chemistry and processing, and Under Armour added knowledge of fabrics, including knitting and dyeing, and the end consumer.

The resulting fibre, Neolast, is described as as offering powerful stretch properties along with durability, comfort and high levels of moisture wicking. It is produced using a solvent-free melt-extrusion process, which offers "increased production precision", allowing spinners to dial power-stretch levels up or down and engineer fibres to meet varying fabric specifications.





Left: Polymer pellets prior to extrusion and spinning.
Right: Filament passing over a godet roll.

Moisture wicking and durable

Initial tests are showing impressive results, according to the companies. Fibres can be knitted or woven into stretch fabrics at percentages from 2% and 40%, and blended with polyester, cotton, nylon, linen, rayon and silk. In a single-jersey fabric made with 84% polyester and 16% Neolast fibres (versus 16% elastane), Celanese claims there is three times more stretch power, plus improvements in overall durability. The fibres are unlikely to unravel, pill, degrade or yellow and can be dyed the full spectrum of colours. "We wanted Neolast to provide both performance and sustainability benefits," Peter Wing, global marketing director for industrial, medical and consumer products at Celanese, tells us.

One of the "key advantages" over elastane would be the potential for recycling, as the fibres are made from recyclable thermoplastic polymers rather than thermoset-based elastane. "This means it can be reprocessed much more easily," adds Mr Wing. "The potential for recycling blended fabrics made with Neolast is especially strong with polyester. As an elastoester material, Neolast polymers are part of the polyester family. It provides stretch performance in a common chemistry, which enables a mono-material garment."

The companies feel this is such a step forward, they are offering the product to the wider industry, to help develop and scale it, and to boost overall impact. Celanese is working with brands and manufacturers on testing and development programmes, "exploring the potential of the fibres to improve the compatibility of stretch fabrics with future recycling systems and infrastructure".

Redesigning machinery

How would this new fibre fit into existing manufacturing set-ups? Celanese admits some redesign modifications are required to traditional polyester spinning equipment, and is working with some spinners to implement this. There is also the option of buying new melt extrusion spinning machines that have been designed to work with the proprietary technology. "It's still early, but our current priority is to make this material widely available to the apparel industry at the right price point, and we are excited to build on the work that's already begun with a range of brand owners and value chain partners to unlock its full potential," says Mr Wing.

Addressing the end-of-life issue, Neolast will also be available with a bio-content option. This falls under Celanese's ECO-B product portfolio, which uses renewable bio-content on a mass-balanced basis. 'Mass balance' is an accounting principle that makes it possible to track the amount and sustainability characteristics of circular and/or bio-based content in the value chain. Bio-based feedstocks can come from various types of organic waste. "The ECO-B materials used are chemically identical as a drop-in solution to our standard materials," explains Mr Wing.

Target

One of the drivers for the collaboration was Under Armour's own sustainability targets. It has committed to enable recyclability for its clothing and accessories by 2030. This will be aided by eliminating 75% of spandex by the same year. "Under Armour's sustainability strategy is designed to address the impact of our business across three key pillars: Products, Home Field and Team," explains Mr Blakely. "Neolast embodies our programme's focus on performance-driven innovations that align desirability, performance and sustainability through innovation."

Both companies stress it is still an early stage, but they are excited about its performance, solvent-free production process and the potential for recyclability. Under Armour will be making more announcements about Neolast in the coming months. "We believe Neolast has the potential to solve a critical challenge for the apparel industry," concludes Mr Wing, "enabling the stretch performance consumers demand, along with an improved sustainability footprint."

NEWCOMERS

Cycling brands are among early adopters of bio-based nylon-containing Power Shield, which also incorporates a new construction to make it Polartec's most waterproof and breathable technology yet.

Polartec moves up a gear

A few seconds can make all the difference to a professional cyclist, and so it is imperative their clothing keeps them streamlined, supported and comfortable. UK-based brand Le Col counts English road and track specialists Bradley Wiggins and Victoria Pendleton among its ambassadors, as part of what it bills as one of the widest testing and development networks in cycling. These top-level athletes put all its new products and designs — manufactured in a company-owned factory in Treviso, Italy — through their paces on the toughest of circuits.

At the start of the year, Le Col released a collection made with Polartec's Power Shield, a revamped and redesigned collection that substitutes half the virgin nylon with a bio-based version without impacting performance. In fact, the US fabric developer describes it as its "most capable and versatile waterproof and breathable technology yet".

The membrane it created for Power Shield uses Biolon, a renewable, non-genetically modified plant-based nylon, at a blend of around 48% bio-nylon and 52% virgin nylon. This reduces its carbon footprint by about 50%, says Polartec, which ran trials on various bio options for several years before bringing this product to market.

Karen Beattie, director of product management at Polartec, tells *WSA* there are several reasons it went down the bio route: "First, we wanted to look beyond the bottle, to have other sources of sustainable materials besides recycled PET bottles," she says. "Second, we were

Le Col is a British cycling brand founded by ex-professional cyclist Yanto Barker in 2011. It has used Polartec's products for several years and has brought four designs to market featuring Biolon.

CREDIT: LE COL

looking for a more sustainable nylon and were not seeing anything at the time that measured up to the gold-standard performance of a nylon 6,6 for durability. Taking the bio route for nylon solved the durability problem."

Durability is one of the most important attributes in this category of fabrics, which must stand up to challenging weather conditions but remain flexible and breathable. One of the most important things Polartec can do is to make fabrics that last a long time, Ms Beattie adds. "It has been a guiding principle, even before anyone was talking about sustainability. We spent a lot of time making sure that substituting bio-based inputs would not jeopardise product performance and quality before going down this path."

Molecular diffusion

In addition to adding bio content, Polartec was determined to create offerings that performed better than before. To this end, it developed a new fabric construction that uses molecular diffusion, rather than micropores, to move out water vapour while maintaining a barrier against droplets: protecting against wet weather but transporting sweat from the skin to the surface. The construction also means it cannot lose effectiveness via clogged pores. This type of technology is not new, but rather a membrane that can layer within technical fabric and withstand stretching, washing and the abuse of outdoor sport is, it says.

The end result is Polartec's first waterproof fabric to test greater than 20,000mm in the Hydrostatic Pressure Test for Waterproofness and 20,000g/m^2/24h NVTR, Moisture Vapor Transmission Rating for breathability. The membrane can be paired with a wide range of fabrics, from stretch to wovens, to low-snag and high-stretch knits.

The combination of the membrane and the new construction also meant Polartec did not need any PFAS-based water repellents that are often used in the industry for their high performance but which are linked to environmental concerns. "That's the major sustainable advantage, in addition to the carbon footprint savings that we get from replacing fossil fuels," adds Ms Beattie.

Brand R&D

In January, Le Col released four designs containing the Biolon-containing Power Shield: Hors Categorie Jacket II, the Pro Jacket, the Pro All Weather Jersey and the Pro All Weather Gilet. The brand's product developer, Hannah Greenshield, said they "couldn't be happier" with the benefits: "Not having to sacrifice performance in the pursuit of more sustainable products is a fantastic result."

It is not the only cycling brand to have selected the membrane. Italy's Santini has also worked with Polartec for several years. It produces around 6,000 items per day from its factory in Bergamo and is the official producer of the Union Cycliste Internationale (UCI) racewear and merchandise. It has used the new Power Shield for its Adapt Shell short-sleeved shirt/ jacket and the Adapt Multi jacket.

"Many of our Power Shield fabrics have industry-leading stretch and extremely high breathability, in addition to being waterproof," says Ms Beattie of the fabric's suitability for the cycling sector. "That combination of enabling the construction of aero-dynamic garments without restricting rider movement, and enabling rider comfort through great breathability, works exceptionally well for a high aerobic sport like cycling."



Santini's Adapt Multi jacket has a tight fit that wears like a shirt, with a stripe on the shoulder and reflective logo, and an extra pocket with waterproof zip.

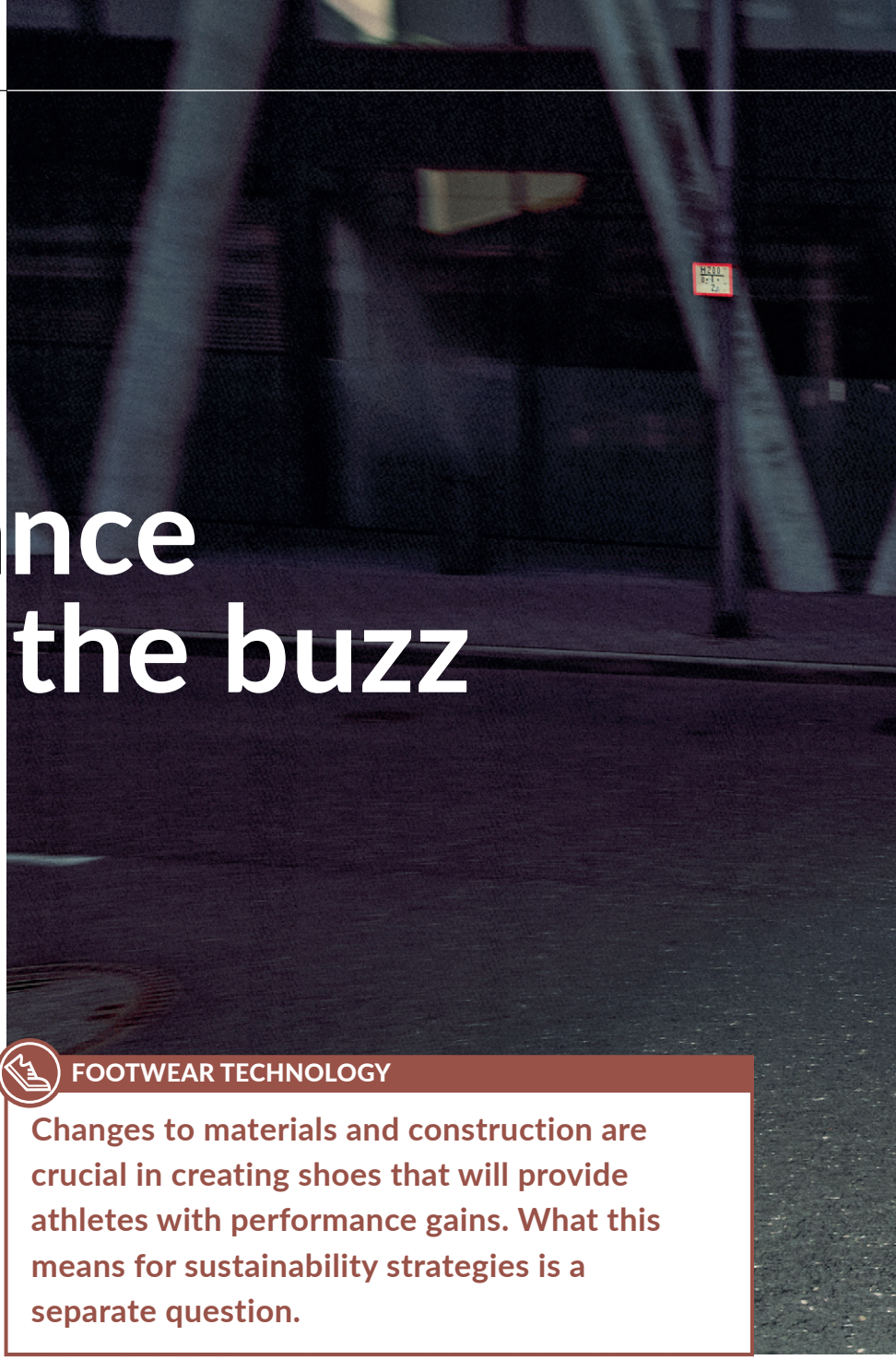
CREDIT: SANTINI

It is not just cycling brands that are adopting the development. Polartec has also updated the nylon in its Power Stretch Pro with 50% Biolon, which has attracted names including Houdini Sportswear. At ISPO Munich in November, the Swedish company announced the next evolution of the Power Houdi will feature this fabric. Several outdoor brands are also trialling Biolon-containing products, with a view of introducing them in autumn-winter 2024 and spring-summer '25 collections.

Pump up the volume

Work continues on the sustainability front. In the past 12 months, Polartec unveiled a new type of fleece that is engineered to resist breaking and rubbing off during home laundering. Polartec claims Shed Less Fleece releases up to 85% fewer fibre fragments through a combination of yarn construction, knitting, chemistry and manufacturing techniques. At the start of this year, it also announced a partnership with Must Had, a software provider that helps companies find a second life for excess inventory. One of the first examples, by upcycling designer Ilaria Ferrari, is a collection of blankets, scarves and hair bands made from discarded Polartec fabrics.

Ms Beattie says the company is not resting on any laurels, with more bio-nylon announcements due and a continuous desire to improve. "While our new technology mixes 50% of Biolon plant-based nylon with fossil fuel-sourced nylon, we are actively in research and development to pump up that volume, with an end goal of 100% replacement of extractive fossil fuel resources, and go all plant-based."



Performance provides the buzz

FOOTWEAR TECHNOLOGY

Changes to materials and construction are crucial in creating shoes that will provide athletes with performance gains. What this means for sustainability strategies is a separate question.

Sports shoe brands' seriousness about sustainability is impossible to deny. Many of them have announced ambitious targets for tackling climate change and publish annual sustainability reports to track progress.

Japanese brand ASICS has published a pledge to reduce carbon emissions from its direct operations and from its supply chain by 63% by 2030, taking the figures for 2015 as the baseline. The company also has the target of achieving net-zero carbon emissions by 2050. Puma has set itself a target of a 35% reduction in "absolute emissions" (the total amount emitted) from its own entities between 2017 and 2030, and a 60% relative emission reduction (emissions relative to specific activities) for its supply chain between 2017 and 2030.

At New Balance, the aim is to reduce scope-one and scope-two emissions by 60% by 2030, with figures for 2019 as the starting point. Scope one refers to direct emissions from the company's own facilities, while scope two means indirect emissions from the energy the company consumes. For scope three, which includes emissions from suppliers, the target is a reduction of 50% by 2030.

Nike's figures are more graphic. It has calculated that it has the same climate impact as a major city. If it includes the people who work in its supplier factories, more than a million people are involved in making Nike shoes and other products. The company said its emissions at the start of this decade were 11.7 million tonnes of carbon dioxide equivalent (CO2e) per year. According to academic modelling platform the Global Gridded Model of Carbon Footprint, these figures would rank Nike in a similar bracket to Munich, Prague or Amsterdam. Its aim is to reduce, by 2030, its scope-one and scope-two emissions by 65%, its scope-three emissions by 30%, and to reach net zero by 2050.

Compared to 2017 figures, adidas has a target of reducing the emissions for each of its products by 15% by 2025. By 2030, its aim is to have reduced absolute emissions across its entire value chain by 30%. It, too, targets becoming climate-neutral by 2050.

Where the buzz is

All of this is good work and the pride these companies have in their progress so far comes across clearly in press releases and other communications. Even so, it is hard to miss that the biggest buzz of all for brands still seems to be related to performance. If the gains that athletes make in speed, height or distance owe anything to their shoes, the footwear brands concerned are certain to celebrate loudly. This is especially true in the build-up to an Olympic Games.

The global director of athlete services at adidas, Fabian Schweizer, has said that while professional athletes are looking closely at advances in biometric monitoring and in nutrition to help them



Innovations in the Adizero Adios Pro Evo 1 include a forefoot rocker to trigger forward momentum.

CREDIT: ADIDAS

improve their performance, good footwear remains critical to their success.

Writing on social media platform LinkedIn at the start of this Olympic year, Fabian Schweizer picked out his three top innovation trends in sports performance for 2024. He said that biometric monitoring to inform personalised training programmes was certainly one of them. He explained that targeted training programmes, based on data from wearable technology and sensors, were becoming increasingly important to athletes and coaches.

In a similar way, he said personalised nutrition and the field of nutrigenomics, which studies the interaction between nutrition and a person's genetic profile, are also becoming increasingly important for professional athletes. An increase in available data is allowing sports people to address accurately their own specific nutritional needs.

If these first two trends are concepts that most athletes of previous generations barely thought about, the third trend that Fabian Schweizer has identified is as old as sporting competition itself. He said that footwear remains a critical component in professional sport. In terms of performance enhancement, he said the most important innovations are aimed at delivering customisation, energy return, and biomechanical optimisation.

Forefoot rocker

Last year's big headline-grabbers in athletics included Ethiopia's Tigist Assefa, who broke the world record for women for the marathon in Berlin in September with a time of 2:11:53. In her post-race reaction, the athlete held up one of the shoes she wore, an Adizero Adios Pro Evo 1, as though to pay tribute to its contribution.

Speaking at the launch of the shoe earlier the same month, Ms Assefa said: "These are the

lightest racing shoes I have ever worn and the feeling of running in them is an incredible experience, like nothing I've felt before. They enable me to put my full focus on the race, which is exactly what you want as an athlete. I can't wait to lace up at the start-line in these."

Each Adizero Adios Pro Evo 1 shoe weighs 138 grammes, which is 40% lighter than any previous running shoe the brand has created. It incorporates a forefoot rocker component "to trigger forward momentum". The shoe also contains a new version of a proprietary foam material called Lightstrike Pro. A non-compression moulding process makes the foam lighter, while delivering greater energy return, adidas claims. New outsole technology, a mesh upper and the removal of the sock-lining are other weight-saving measures.

From triumph to tragedy

A month after Tigist Assefa's record-breaking performance in Berlin, Kenyan runner Kelvin Kiptum set a new world record for the men's marathon, clocking a time of 2:00:35 in Chicago. He was wearing a prototype pair of Nike Alphafly 3 running shoes for the event. His success sparked widespread speculation that here was an athlete who was on course to achieve a sub-two-hour time in race conditions and would do so soon, perhaps even on the greatest stage of all, at the Paris 2024 Olympics this August. Triumph turned to tragedy for Kelvin Kiptum at the start of this Olympic year, however, when he died in a road accident. He was 24.

Features in the Alphafly 3 include a high-stack proprietary foam called ZoomX for lightweight cushioning. It has a continuous bottom, connecting the heel and the forefoot. Nike says this suits varying foot-strike patterns and provides "a smoother heel-to-toe transition", regardless of the runner's pace. The shoe also contains a wider, full-length carbon fibre plate for "a propulsive, stable ride".

The current Olympic men's marathon champion, Eliud Kipchoge, also from Kenya, has already run the race's distance, just over 42 kilometres, in less than two hours. He did so at a specially organised event in Vienna in 2019, at which he was the only competitor, with pace-setters moving in and out at certain stages to help drive him on. He, too, wore shoes from Nike at this event and achieved a time of 1:59:40. The official records only recognise times athletes achieve in official competitive events. Nike says Eliud Kipchoge has given input to the design of a number of running shoes down the years, including its Free, Pegasus, Vaporfly and now Alphafly ranges.



The global director of athlete services at adidas, Fabian Schweizer.

CREDIT: ADIDAS

Dual trend

It is no coincidence that shoes for marathon runners receive particularly intense attention from the designers of performance shoes. Changes to the design of a shoe may only shave a tiny amount of time or effort off each step an



Record-breaker. Nike's Alphafly 3. The numbers on the outsole indicate how much athlete testing these shoes have undergone.

CREDIT: NIKE

> **“There is so much we can do to reduce waste, and the time has certainly come for us to stop talking about what might be possible and to start making meaningful change at scale.”**
>
> KATY O’BRIEN, NEW BALANCE

athlete takes, but if an elite marathon runner takes 150 or 160 steps per minute, it can make a real difference over the course of a race. This is always at the forefront of the efforts of shoe designers who work at this level.

Performance gains are not their only objective, because comfort and injury prevention are also important, but a cursory glance and a brief feel of an old shoe should be enough to show how much thinner and lighter today’s footwear is. On the face of it, the enthusiasm footwear performance advances generate could be at odds with companies’ commitments to sustainability, not least because it is entirely possible that elite athletes will wear each pair only once before throwing them away. Fabian Schweizer has argued that innovative materials, including recycled and bio-based options, are gaining traction as athletes and manufacturers alike recognise the importance of reducing their environmental impact. He says the industry is now witnessing “a dual trend of sustainability and high-end performance enhancement”, as though the two can go hand in hand.

Strike a balance

A senior executive specialising in sustainability at New Balance, Katy O’Brien, says performance and sustainability can work together. She says the company she works for remains committed to creating premium, performance-driven shoes. She believes the buzz that advances in footwear performance can create is a good thing for brands and for the industry in general, but she insists that it is possible to strike a balance between performance improvements and brands’ battle to reduce waste and lower the environmental footprint of their products.

In contrast to the short lifespan of what she refers to as “the supershoes” that elite athletes race in, she says keeping and wearing footwear for a long time is an increasingly important part of this battle. In the course of her 20 years as a running enthusiast, she has absorbed the received wisdom that if you start to feel some pain in the knees, it is time to change your shoes, or that if you have already run a lifespan total of around 500 kilometres in the same footwear, it is time for a new pair. Now, however, she believes many runners are pushing beyond the pain and the previously accepted distance limits in a bid to make the useful life of a pair of shoes longer and in doing so make their carbon footprint smaller.



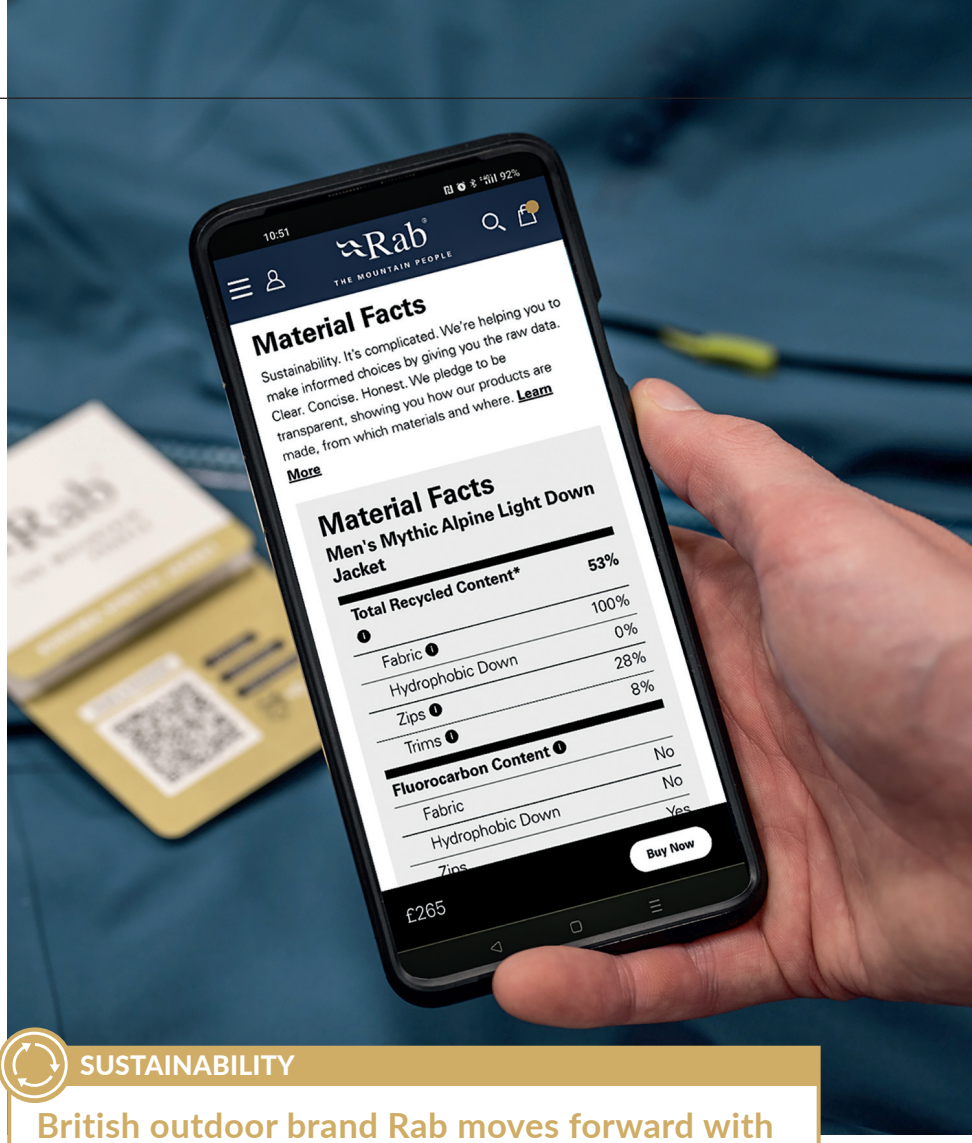
New Balance’s Katy O’Brien believes advances in performance can help footwear brands along the road to their sustainability goals.

CREDIT: MICAM

She has worn some of the supershoes and understands why athletes and designers are so captivated by the benefits they offer. Her assessment of them from a sustainability point of view is that the foams, carbon-plates and other materials in their construction make it difficult to recover much of their value at the end of their short life. “But it is a very small proportion, perhaps 1%, of all footwear,” Ms O’Brien insists.

If these elite shoes last for, at most, a marathon or two, the athletes who wear them can try to make sure their other footwear, the shoes they wear when not competing, are longer-lasting. Another benefit Katy O’Brien identifies is that the desire to emulate, if not replicate, progress in performance in more mainstream shoes is leading to changes that will provide a sustainability bonus. She mentions some of the reductions in material use that deliver the all-important weight-savings at the front end and says they can also improve the recyclability of the product.

“There is so much we can do to reduce waste,” she explains, “and the time has certainly come for us to stop talking about what might be possible and to start making meaningful change at scale.” Returning to New Balance’s target of achieving a 50% reduction in its scope-three emissions by 2030, Ms O’Brien has calculated that if the company could eliminate material waste, this would take care of 12% of the total, almost a quarter of the way to the goal.



Material Facts tables, available online, are retrievable via scanning QR codes printed on hang tags.

ALL CREDITS: RAB

Get Down with the Facts

SUSTAINABILITY

British outdoor brand Rab moves forward with its down recycling programme.

By the time 2022 had drawn to a close, Equip-owned outdoor brand Rab had recycled and repurposed 54 kilograms of end-of-life natural down material. Its domestic down recycling scheme had begun with a single bin at its Derbyshire headquarters only a year earlier. Late last autumn, Rab said it was anticipating "a substantial increase" in its collections of down and feathers by the end of 2023, with volumes expected in the 100s of kilograms. Fittingly, there was even a down drop-off point at Rab's booth at sports trade show ISPO Munich in November. Parent group Equip Outdoor Technologies acquired the brand in 2003, with Lowe Alpine joining the group in 2011.

Down to new territory

As head of corporate communications and CSR at Equip, Debbie Read, tells *WSA*, it is important to note that the brand rarely uses any of this recycled material directly in its own lines. "Only a fraction of the returned down may ever be utilised by Rab in reality," she explains. Donations typically undergo processing at partner Minardi Piume's northern Italian factory, where feathers and down from jackets, duvets, pillows, sleeping bags and more are extracted, cleaned and sorted into Global Recycled Standard (GRS)-approved material of various quality grades. Fabric fibres and trims are processed separately. "By promoting the return and recycling of end-of-life down, we effectively preserve this valuable resource from ending up in landfills or languishing unused in the back of a wardrobe," Ms Read continues. Any repurposed down that does make it into the brand's recycled lines will be highlighted in its new Material Facts tables. The nutrition-like ingredients label delineates the products' origin, recycled content and fluorocarbon (PFAS) content originating from durable water repellence (DWRs) through to hydrophobic down, zips and trims.

The company commenced the down recycling programme's roll-out to the rest of Europe in January. Rab's dedicated European Service Centre in Leusden, the Netherlands, now serves as a handling hub for post-consumer down products collected in collaboration with various local retailers on the continent. Articles not yet considered end of life can also be shipped here for cleaning or restoration from elsewhere, in a bid to extend their usefulness. As in the UK, down product donations will only be accepted if products are truly beyond repair.

Expanded vantage points

Operations do differ slightly in Europe, however. For one, there is a much stronger emphasis on retail store drop-offs when it comes to materials recycling, the senior executive tells us, as opposed to incentivising individual action. Further adjustments relate to the streamlining of logistics when shipping post-consumer down to Italy from other parts of Europe, Ms Read goes on to say. Relatively simpler customs procedures for European Union (EU) member states likewise make the transport of materials easier, speedier and more cost effective, she notes, although country-specific challenges do of course remain. At this early stage, the goal is to "identify the most



A mobile Rab-ran down collection.

practical logistics and processes with the least possible environmental impact". One route to doing so is to partner with retailers in the region, to secure improved shipping rates and other benefits while simultaneously scaling the project and, therefore, maximising its sustainability impact. She suggests that creating a network of like-minded retail partners is therefore key; the company has been encouraged by the positive response received from several Dutch and EU-based retailers thus far.

If this European pilot proves successful, there may be scope to take the scheme even further afield, perhaps as far as the US and Canada, where Rab also has offices and facilities, for instance. Any such expansion is dependent upon the availability of suitable in-country processors, capable of the level of efficiency and transparency that the brand requires, according to the communications and CSR lead. This in practice translates to extracting quality down and feathers, while minimising waste and implementing "low-impact" transport and logistics pathways.

Open field

At its core, Rab's down recycling system is intended to alleviate the need for retailers to establish their own, disparate disposal methods, as Ms Read puts it. The company's Material Facts initiative is similarly "unbranded" in this way. Its pared back, black-and-white design is deliberate, she explains, to give others the opportunity to mimic its formula and presentation in their own ranges. Made to empower today's end customer "to make educated purchase decisions based on clear and accurate data", the tables were first introduced to provide component-level clothing and sleeping bag breakdowns for Rab's autumn-winter 2023 collections.

Already, the brand has itself issued 500-plus Material Fact sheets, which the senior executive describes as an "extremely challenging and resource-demanding undertaking across the whole business and beyond", including close collaboration with supply chain partners "to ensure the validation of all data and certification of claims". This autumn-winter season will see the concept extend to Rab equipment and packs, not to mention packs by sister business Lowe Alpine, taking the percentage of finished articles allocated a Material Facts table to 87% of Equip's entire assortment. Subsequently, all packs, equipment and accessories sold by either brand will have been assigned their very own component ingredients breakdown by year's end, including a new category which will be the percentage of renewable energy for production. Rab notably committed to removing the term 'eco' from all product descriptions once current inventory sells last September.

Coming back to down, 46% of all natural down purchased by the brand in 2022 was recycled, holding GRS certification, shares Equip product director, Tim Fish. More broadly, out of all fabrics, not only insulation, bought by the business that same year, 66% were recycled. "Whenever feasible, and without compromising performance, we prioritise the use of recycled materials over virgin materials," Mr Fish states. Rab's lightweight and packable Microlight range has been filled with recycled natural down since autumn-winter 2020, for example. The company's Cirrus Ultra Hoody, meanwhile, which took home this year's Slide and Outdoor Trade Show outdoor clothing award, and which will be available to consumers in autumn 2024, features PrimaLoft's 100% synthetic Thermoplume+ insulation and features a heat-reflective thermo ionic lining technology (TILT).

In walking its talk, Rab demonstrates a breadth and depth of sustainability awareness that on the one hand pushes into uncharted territories such as shared recycling ecosystems and open-source materials labelling, yet on the other secures its footing in the land of data-led insights and transparency-motivated public accountability. As momentum builds, how quickly, and to what extent, others in the market fall in step remains to be seen.

DIALOGUE

Acting chief executive of the World Federation of the Sporting Goods Industry (WFSGI), Emma Zwiebler, says that current levels of physical inactivity represent an existential threat to the industry.

The fight against 'human' climate change





Interim chief executive of WFSGI, Emma Zwiebler.
CREDIT: WFSGI

What did you do before joining the World Federation of the Sporting Goods Industry (WFSGI) in 2018? Please sum up your background.

I played badminton at an elite level, representing my country, Scotland, 27 times, including at major events such as the Commonwealth Games in New Delhi in 2010. Unfortunately, I had to retire from the sport soon after because I suffered kidney failure and was in and out of hospital for six or eight months. Sport has been the vehicle for me. It has taken me on a journey through life that I could never have experienced otherwise. There was all the international travel, learning to appreciate different cultures, the life experience and all the life-skills that you build. I am a huge advocate for what sport can give you. When anyone asks me what my greatest achievement has been, I always say that it was coming back from those health problems. Kidney failure was the biggest failure I had ever experienced. You can't control something like that; your body fails you and that's the reality, and it meant the end of my sporting career. I think to come back from something like that, to rebuild yourself, reshape your identity and what you are going to work on and what is going to be important to you is difficult. But in many ways it was a growth moment. It proved to me how resilient I am and it gave me a great drive to succeed in my career after sport. And I am proud of what I've managed to achieve since then.

What were the business and professional opportunities that presented themselves after this?

I was fortunate because my parents are both academic doctors and are very strong on the academic front. When I took up sport seriously, they said I had to keep my studies going. I had studied chemistry at undergraduate level in Glasgow and I wanted to use that knowledge, retrain in law and become an anti-doping lawyer. That didn't quite work out because, in one of those 'sliding doors' moments, the law firm I agreed to join had a very high-profile anti-doping lawyer who left just two weeks before I joined. I enjoyed my career in sports law; I learned a lot, and met a lot of good people. I continued to be involved in badminton because I was elected as chair of the athletes' commission of the Badminton World Federation (BWF) Council. That was pivotal for me because I was representing athletes before the decision-making body at the top of the sport. I was later elected to the BWF Council's board in my own right and continued to serve on it until 2023. After six years in law, including training, I received an offer to join WFSGI in 2018 and I stepped down from everything else when I took on the role of interim chief executive in 2023 because I wanted to give everything to this. I am grateful for everything a background in elite sports has given me. I think it is possible that those lessons are particularly useful for a woman in business. I remember a really interesting EY study that found that something like 90% of women business leaders had played competitive sport at some level. In modern, international business, to have



The World Health Organization (WHO) recommends 150 minutes of moderate exercise per week for adults and 60 minutes a day for adolescents as sufficient to maintain good health.

CREDIT: ASICS

experienced different cultures, to have played against people from all parts of the world, to have trained with them, won against them and lost against them teaches you a huge amount about what is important for international business.

What would you say to people who are unfamiliar with badminton to convince them to give it a try? What do you love about your chosen sport?

People don't realise, but it is one of the biggest participation sports in the world. It depends on which statistics you look at but it is consistently between number two and number five, and is always in the top ten. A lot of people find it easy and enjoyable to play. It's a massive plus that it can be played by men and women at the same time. Tactically, it is very interesting. It is also beneficial from a physical activity and health point of view because you use almost every area of the body, whether in lunging at the front or reaching up at the back.

For the fourth annual sporting goods industry report that WFSGI recently published with McKinsey, you chose 'Time To Move' as the title. Please explain briefly why you wanted to convey urgency as a headline component of your message.

We absolutely did want to convey urgency. There are two main factors. The first is that this will be a year in which the only constant is change. That includes technological change, with artificial intelligence, for example, and change in public health, trade and politics, with all the elections that are taking place this year. We believe that companies operating in the international space will have to be ready to adapt because the circumstances in which they run their businesses could change rapidly. The second perspective is that the industry has to address the inactivity challenge. This is not a new challenge because inactivity levels have been either constant or rising for the last five or ten years, but we are reaching a critical tipping point now and if we don't act now

we will lose the opportunity to remedy this in ways that at least preserve current levels of public health.

What detail does the report give to show the extent of this inactivity challenge?

We know from 2018 and 2019 that global inactivity levels sit at 28% for adults and at 81% for young people aged between 11 and 17. The reality is that the barrier for being 'active' is pretty low. The World Health Organization (WHO) gives a figure of 150 minutes of moderate exercise per week for adults and 60 minutes a day for adolescents. That's sufficient movement to maintain good health. These are low barriers. What we are saying is that people are not moving enough to maintain good health and of course that is going to have a negative impact on what happens in the next five or ten years, particularly to the next generation. The inactivity rates are incredibly high. This isn't only about covid-19. All that covid did was to accelerate trends that were there already and to increase the disparities between those who are active and those who are not.

What led you to describe this inactivity as "human climate change"?

It's a bit of a provocative phrase, but the comparison pans out in a couple of ways. The challenge to public health is real and governments, people and communities are not worried enough about inactivity levels. This really reminds me of where the climate change debate was ten years ago, which led to Greta Thunberg becoming a catalyst for people starting to take it much more seriously. Someone who is in their thirties or forties and is inactive may not necessarily look or feel challenged now, but it will show when they reach their sixties, seventies and eighties, when they are likely to need treatment from the health service. This was the same for climate change for many years; it was hard to convince people, companies or countries to change their behaviours based on future changes to the environment. One difference is that there is no single currency for physical inactivity. Everyone can calculate their carbon footprint, whether as individuals or at government level; CO_2 emissions are a currency for that. You don't have the same thing for physical inactivity. There isn't one thing that makes it easy to understand for everyone. Tackling inactivity is to call for large-scale behavioural change and reducing carbon footprint is too. So that's another parallel.

What are the consequences likely to be?

WHO just wants people to move their bodies more. The fact that we don't, that we have become so sedentary as a global population, is something that is very challenging for public health. WHO has already calculated the impact if current inactivity levels don't change. In a 2022 study, it assessed the price-tag for inactivity, in terms of the cost of having a high number of people fall into ill health if inactivity levels remain the same, with 28% for adults and 81% for adolescents. Where they landed is pretty astronomical. If nothing changes, by 2030, we will see 500 million more people falling into ill health solely because they are not active enough and the cost to healthcare systems, just for their first year of treatment, will be $300 billion. For the sporting goods industry, if there are 500 million more people who are less likely to be active, they are less likely to consume the products that our industry provides. And there will be $300 billion less to spend on things like sports facilities, training, access to sport and any form of education on the importance of being active. From our perspective, these statistics are incredibly worrying. WFSGI has a responsibility to raise the alarm bell about this and to point out that this is serious and that more action needs to be taken.



Emma Zwiebler (left) during her badminton playing career, representing Scotland with doubles partner, Imogen Bankier.
CREDIT: EMMA ZWIEBLER

The new report does pick out some success stories. What is at the heart of the increase in popularity of sports such as pickleball, paddel and off-course golf? What can companies focusing on other sports learn from those examples?

I don't believe anyone has the full answer but we have data and we can observe the trends. The social and casual ethos of those sports is significant. They were not set up originally as competitive sports, but as social engagement and being part of a community. Competition came later. The examples you mention all have quite a low barrier to entry in terms of skill levels. You can pick them up quite easily as an adult. People's appetite for more formal, competitive structures and for watching long, drawn-out sporting events seems to have diminished. New generations don't engage with sport in the same

way now and you can see this in the rise of e-sports and in the fact that break-dancing is coming into the Paris 2024 Summer Olympics. Climbing and skateboarding were huge hits at Tokyo 2020. The popularity of these new formats show the rising interest from fans, particularly among the newer generations, in shorter, exciting formats, sports with an urban or community element, and in opportunities to engage directly with the players or the games using technology.

What could help skiing fight back, especially in Europe?

The three things that have impacted skiing in recent years are covid, the cost-of-living crisis and climate change, which is an omni-present issue for winter sports. It's a seasonal business and the resorts were shut at key times in the covid years. They are traditionally more expensive activities and family budgets have been suffering. And on climate change, I think the type of collaboration we have seen in the Climate Pact that the Federation of the European Sporting Goods Industry (FESI) announced in February with Peak 63, to accelerate climate action in the winter sports industry, the support of the winter sports industry is going to be critical in helping the wider sporting goods industry reduce the impacts of climate change and protect our winters.

Some brands have taken solace from relatively high sales of sports clothing and footwear to satisfy strong consumer appetite for comfort and casualness. What help is this, if any, to WFSGI?

Our members are businesses. To some extent, it is good for them to have this revenue stream. In our first annual sporting goods industry report in 2020, McKinsey identified athleisure, along with women's sports and China, as the key growth drivers for the coming years, so we can't ignore it. Athleisure has been hot for five, six or even seven years. But our industry leaders do want to see more people becoming physically active and this is, ultimately, where they and WFSGI would love to see more business growth. WFSGI signed a memorandum of understanding with WHO last year to improve global health through increased physical activity and sports participation. This underlines the role that the industry wants WFSGI to have, examining how we, as the private sector, can support the public sector and UN agencies, especially WHO, to get people to move more.

In general, there are contrasts in the report between a longer-term vision on the part of WFSGI and the shorter-term focus of big corporations. What is your strategy for encouraging member companies to take a more far-sighted approach?

These are not incompatible. Our members are a significant proportion of the sporting goods industry, but not all of it. Of course the leaders of these businesses are focused on growth, but they have their eyes on longer-term issues for the industry, too. Climate change goals are a clear example; many have plans in place for decarbonisation and the road to net zero. But physical inactivity, human climate change, is also something that we view as an existential threat to the long-term future of our industry. I'm confident that the leaders at our member companies have a long-term lens, too. This year, any manner of things could happen in geopolitics and have huge implications for our industry and for global stability. They have to address these questions as well. Modern leaders must maximise opportunities in the short term to deliver growth, while also keeping an eye on future trends in industry and the wider world and be able to respond quickly to ensure the long term viability of their businesses.



A mixed doubles team playing paddel.
CREDIT: SHUTTERSTOCK/ DAVID PRADO PERUCHA

MAGAZINES



WSA

The international technical trade magazine for performance and sports materials.
(4 issues per year)
UK: £90.00
Airmail: £150

FROM £10 PER MONTH



World Footwear

All you need to know to assist you in the global footwear market.
(4 issues per year)
UK: £90.00
Airmail: £150

FROM £10 PER MONTH



World Leather

The world's leading magazine for the leather industry.
(6 issues per year)
UK: £90.00
Airmail: £150

FROM £10 PER MONTH



Inside Denim

Keep up to date with denim developments from raw material to finished product with in-depth coverage of advances at fibre and fabric level.
(3 issues per year)

SPORTSTEXTILES.COM



To be kept up-to-date on what's happening in the sports and outdoor industry... sign up now.

Sportstextiles.com® is the news portal to complement WSA™, offering the latest industry news, market intelligence, product information and much more. It is a comprehensive news site for the industry. All news stories are free to read with a searchable archive of thousands, as well as emailed newsletters and an extensive technical online library of WSA™ articles.

Websites

Designed to provide up-to-the-minute news and market intelligence.

leatherbiz.com

SPORTSTEXTILES.COM

footwearbiz™.com

insideDenim.com

ORDER FORM

Please complete and scan/email back to john@worldtrades.co.uk

NAME:	**POSITION:**
COMPANY:	**NATURE OF BUSINESS:**
ADDRESS:	
TEL:	**E-MAIL:** **FAX:**
PLEASE BEGIN MY SUBSCRIPTION TO:	**PLEASE SEND ME _____ COPIES OF:**

MASTERCARD ☐ **VISA** ☐ **AMERICAN EXPRESS** ☐ **DINERS CLUB** ☐ **EXPIRY DATE:** ☐☐/☐☐ **SECURITY CODE:** ☐☐☐☐ 3 numbers on back of card — 4 on front of AMEX

CARD NO.: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ **SIGNATURE:**

Credit cards will be charged in GB Pounds. Your credit card company may charge you for this service.

WSA Issue Two 2024


Further
Faster
Higher
WSA
PERFORMANCE & SPORTS MATERIALS
Advertise in *WSA* & *sportstextiles.com* to promote your latest products and innovations to a readership of over 5,500 worldwide.
For more information: **rupert@worldtrades.co.uk**
SPORTSTEXTILES.COM



performancedays.com

THE
SUSTAINABLE FAIR FOR
FUNCTIONAL FABRICS
& ACCESSORIES

Get your free Ticket now!

PERFORMANCEDAYS
MARCH 20-21, 2024
MUNICH & ONLINE

Experience sourcing at its best.

BRAND NEW FOOTWEAR AREA

PERFORMANCEDAYS
FUNCTIONAL FABRIC FAIR

the loop

PERFORMANCEDAYS
FUNCTIONAL FOOTWEAR FAIR