2025 AND BEYOND

SUSTAINABILITY RADAR

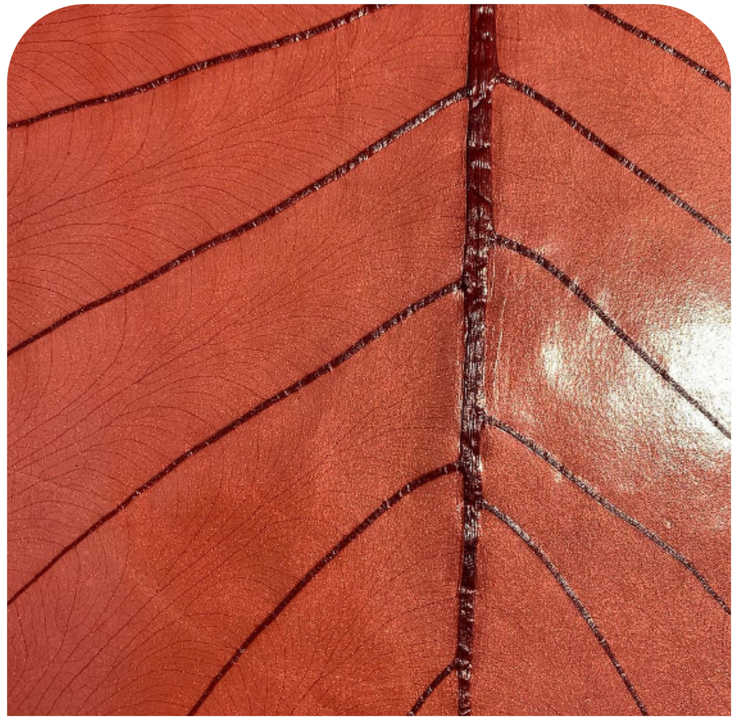
LIVETREND

SUSTAINABILITY RADAR
INTRODUCTION

- NEXT-GEN FIBRES
- NEW SYNTHETICS
- NATURAL FAKE FURS
- LEATHER ALTERNATIVES
- NOVEL DYES
- LATEST INNOVATIONS

LIVETREND

SUSTAINABILITY RADAR **WHY?**



Stay Ahead Of Innovation

Explore the latest breakthroughs in sustainable materials, from next-gen natural and synthetic fibers to novel dyes, and integrate them into your collections.

Choose Responsibly

Understand the origins and impacts to prioritize eco-conscious low carbon alternatives without compromising on quality and aligning with sustainability goals.

Embrace Transparency

Adapt to regulatory frameworks that are pushing brands toward accountability and transparency in production volumes and waste management.

Lead The Change

Keep up with the latest innovations shaping the future of fashion and contribute to a more responsible industry by adopting best practices.

DIVERSIFICATION IS KEY

The next generation of materials and fibres is shaping the future of fashion, propelled by existing and upcoming regulations and global environmental imperatives. Legislative frameworks, such as the EU's Due Diligence, the ESPR, and various national laws on extended producer responsibility (EPR), are driving the adoption of sustainable materials. Microbial-engineered fibres, biofabricated leather, and textile-to-textile recycling solutions are emerging as important, key and viable responses to these regulatory pressures, alongside efforts to repurpose

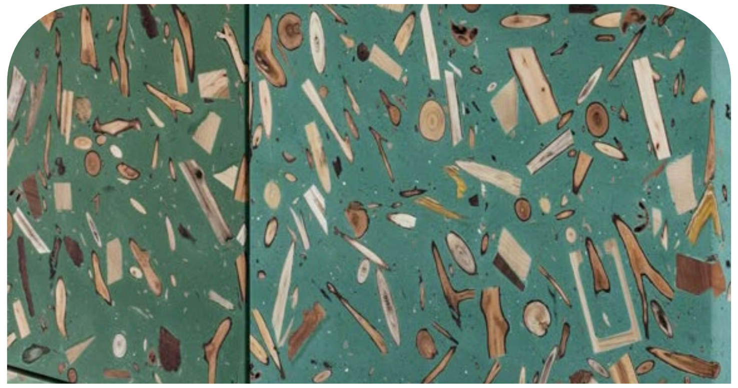
However, given the complexity of the fashion supply chain, there is no singular perfect solution. The industry's growing interest in the origin of materials, whether organic, recycled, or waste-derived, points to a broader shift towards regenerative practices and resource conservation. Certified natural fibres, innovations in fibre recycling (both mechanical and chemical), and the use of alternative feedstocks help reduce the reliance on virgin resources and promote responsible consumption.

As regulations tighten and consumer demand evolves, sustainable sourcing and mindful use of resources will define the material revolution, offering both environmental and economic resilience.

SUSTAINABILITY RADAR **BEST PRACTICES**

Adopting Smart & Circular Design

Designing garments for durability, repairability, and recyclability, helps close the loop. This reduces textile waste and dependency on virgin materials, aligning with environmental regulations and consumer expectations. Regulations (such as the EU's Extended Producer Responsibility laws) are tightening. Adopting circular principles now helps brands avoid penalties, and secure supply chains.



Sourcing Sustainable & Regenerative Materials

Using surstainable materials as certified organic cotton, hemp, bio-based synthetics, recycled fibers, and regenerative agriculture practices significantly lowers water use, chemical input, and carbon footprint. This enhances brand credibility and resilience against supply chain disruptions. Supporting innovation, brands show leadership in a crowded market, attracting conscious and purpose-driven consumers.

Ensuring Transparency & Traceability

Consumers and regulators increasingly demand accountability and proof of sustainability claims. Implementing digital tracking systems (blockchain, product passports) to disclose material origins, environmental impact and labor conditions builds trust. EU's Corporate Sustainability Due Diligence Directive (CSDDD) will soon require to track and disclose supply chain data from raw materials to finished goods.

Reducing Over-production

Overproduction leads to millions of unsold garments that are landfilled, incinerated, or dumped in the Global South. By aligning supply with demand, brands reduce waste, carbon emissions, and water usage, reducing their environmental footprint and, at same time, optimize inventory, and protect margins. Shifting to demand-driven, made-to-order models or capsule collections, helps minimize waste and unsold inventory.

SUSTAINABILITY RADAR

NEXT-GEN FIBERS

Next-gen materials, defined by the MII (Material Innovation Institute) as animal-free and more sustainable than incumbent (animal-based) and current-gen (petrochemical-based) materials. They use a variety of biomimicry approaches to replicate the aesthetics and performance of their conventional animal- and petrochemical-based counterparts.“ In this first chapter, we‘ll focus on next-gen fibres replacing conventional man-made artificial fibres, and on next one, we‘ll see those replacing fossil-fuel based. Discover these new generation of fibres that are not reliant on virgin ressources, using food, agri or textile waste as feedstock, and the biotech innovations with microbial developments.

MAN-MADE CELLULOSICS

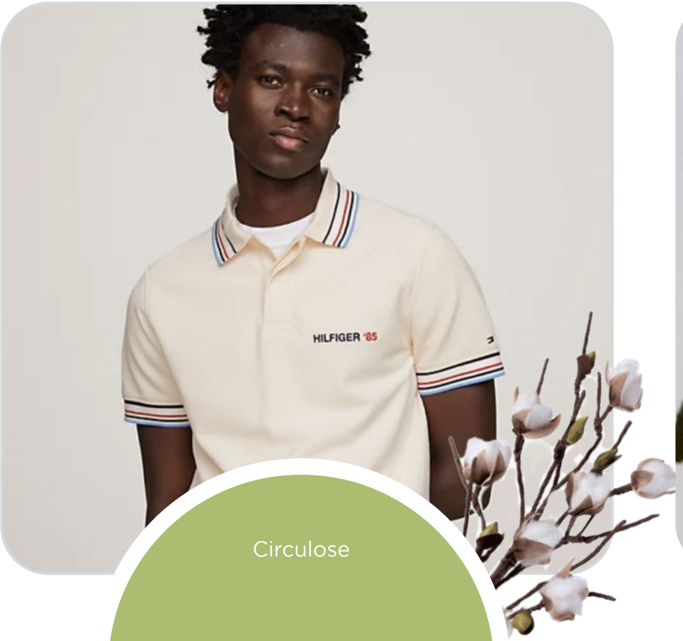
UPCYCLED NATURAL CELLULOSE

BIOENGINEERED / MICROBIAL

NEXT-GEN SILKS

NEXT-GEN FIBERS **MAN-MADE CELLULOSICS FROM RECYCLED TEXTILES**

Tommy Hilfiger



Circulose

CIRCULOSE®

FROM 100% TEXTILE WASTE

Circulose®, is developed by Swedish innovator Renewcell and serves as a sustainable alternative to virgin cotton and wood-based materials in the production of regenerated fibers like viscose, lyocell, and modal. The process involves breaking down cellulose-rich textile waste into a biodegradable pulp, which can then be used to create new high-quality textile products. This approach not only diverts textile waste from landfills and incineration but also reduces the need for virgin resources, contributing to a more circular and sustainable fashion industry.

Zara

Circ

CIRC® LYOCELL

POLYCOTTON SEPARATION

Circ, a U.S.-based innovator in textile recycling, has created a proprietary hydro-thermal process to separate polyester-cotton blended textiles and recover both the polyester and cotton. Cellulose will be transformed into cellulosic fibers for textile use and the polyester will be regenerated into Circ Polyester that performs as well as virgin polyester. Both fibers work in existing manufacturing infrastructures, allowing for a 'drop-in' replacement to their virgin counterparts.

1890

Infinited Fiber Company

INFINNA™

REGENERATED CELLULOSE

Infinited Fiber Company, founded in Finland in 2016, has developed a patented technology that transforms cotton-rich textile waste into Infinna™, a regenerated fiber with the natural look and feel of cotton. This innovation reduce reliance on virgin materials and minimize textile waste. Infinna™ is biodegradable, free from microplastics, and can be recycled at the end of its lifecycle. Major fashion brands, including H&M Group, Adidas, and Ganni, have partnered with Infinna™ to incorporatethe fiber into their products.

Worn Again Technologies

Worn Qgain technologies

WORN AGAIN

CHEMICALS FOR CIRCULARITY

Worn Again uses a solvent-based technology that can recover PET and cellulose from pure and blended poly-cotton fibres. This process efficiently separates and purifies polyester (PET) and cellulose (from cotton) from non-reusable textiles, as well as from PET bottles and packaging.. The resulting material free from dyes and other contaminants and restored to virgin equivalent quality/specification.

According to Textile Exchange's 2024 Materials Market Report, recycled MMCFs accounted for approximately

0.7%

of global MMCF production

LIVETREND

NEXT-GEN FIBERS **MAN-MADE CELLULOSICS FROM FOOD OR AGRI-WASTE**

Peet Dullaert

ORANGE FIBER®

MADE FROM ORANGE JUICE WASTE

Orange Fiber, an Italian company founded in 2014, has developed a patented process to transform orange juice industry by-products into sustainable, biodegradable textiles. By extracting high-quality cellulose from the 700,000 tonnes of citrus waste, the company creates a silk-like fabric known as "vegetable silk." This innovative material has been utilized by Salvatore Ferragamo and H&M's Conscious Exclusive collection. The production process aligns with circular economy principles, offering a scalable solution to reduce agricultural waste and promote sustainable fashion

Hugo Boss

HEIQ AEOINQ

HEIQ AEONIQ

ADVANCED CELLULOSE

HeiQ AeoniQ™ is a cellulosic filament yarn, manufactured with an innovative proprietary process with a low environmental footprint. Made of sustainable raw materials such as circulose®, non-valorised agricultural waste and bacterial cellulose, each ton of HeiQ AeoniQ™ can potentially enable 5 tons of CO_2 emission reduction. HeiQ AeoniQ™ has been developing a wide array of versatile feedstocks, including pre and post-consumer textile waste, bacterial cellulose, and cellulosic non-valorised agricultural waste.

Qwstion

HEIQ AEOINQ

BANANATEX

NATURAL CELLULOSE

BANANATEX is a durable, biodegradable, and plastic-free fabric made entirely from Abacá banana plants. It was developed by the Swiss bag brand QWSTION in collaboration with yarn specialists and weaving partners in Taiwan. The Abacá plants are cultivated in the Philippine highlands using regenerative farming practices that require no pesticides, fertilizers, or additional water. Bananatex® has been utilized in various products, mainly bags and accessories, including QWSTION's own range of bags and collaborations with other brands .

Cotoni di Albini

ASAHI KASEI CORPORATION

CUPRO BEMBERG™

MADE FROM COTTON LINTER

Existing since 1931, Cupro or Bemberg® is the first zero waste cellulosic fibre existing, made from the leftovers of the cotton industry: cotton linters: a pre-consumer by-product of cottonseed oil production. This fiber is biodegradable, compostable and manufactured through a closed-loop process that recycles solvents and minimizes environmental impact. Renowned for its silk-like texture, breathability, Bemberg™ is widely used in linings, outerwear, and garments. Certified by OEKO-TEX® and GRS, the only producer is Asahi Kasei Corporation, a Japanese chemical company.

MMCF market is projected to grow from USD 3.5 billion in 2023 to USD 5.9 billion by 2033, with a compound annual growth rate (CAGR) of **5.2%.**

NEXT-GEN FIBERS **UPCYCLED NATURAL CELLULOSE**

DIvyam Mehta

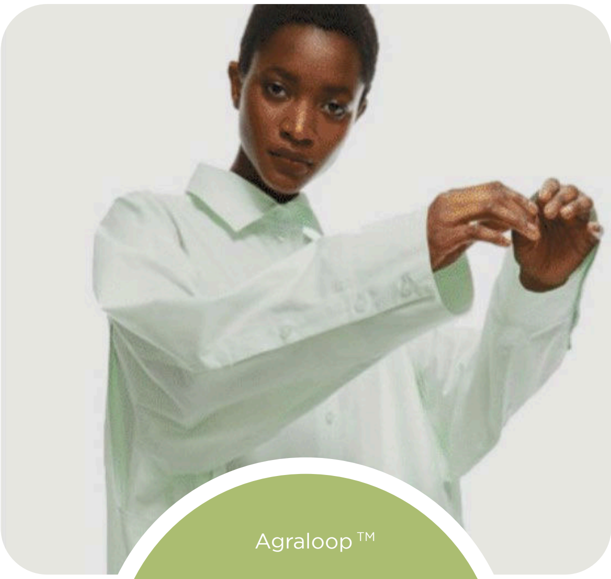
ALT MAT®

ALT TAG

LUXÙRIOUS NATURAL FIBRE FROM AGRICULTURE WASTE

ALT MAT fibres are made from waste of food crops like hemp oil seed, banana fruit, pineapple fruit or renewable feedstocks etc. and can be used as natural fibres or blended with any materials like cotton, modal, lyocell, recycled polyester etc. AltMat is produced in closed-loop which minimize water usage and eliminate hazardous chemicals. Their fibers are biodegradable and recyclable, contributing to a circular economy and reducing environmental impact.

Texloop



Agraloop ™

AGRALOOP BIOFIBRE

CARBON SEQUESTRATION AND SOIL REGENERATION

Founded in 2017 in the US, Agraloop produces fibres from residues like banana stems, hemp stalks, pineapple leaves, sugarcane bagasse, which can then be processed using conventional cotton machinery. Converting crop waste into scalable, cost-effective fibers using closed-loop, low-impact processing. Their fibres are FibreTrace® traced and embraced by brands like Levi's and H&M.

Luhta Sportswear

Agraloop ™

SPINNOVA

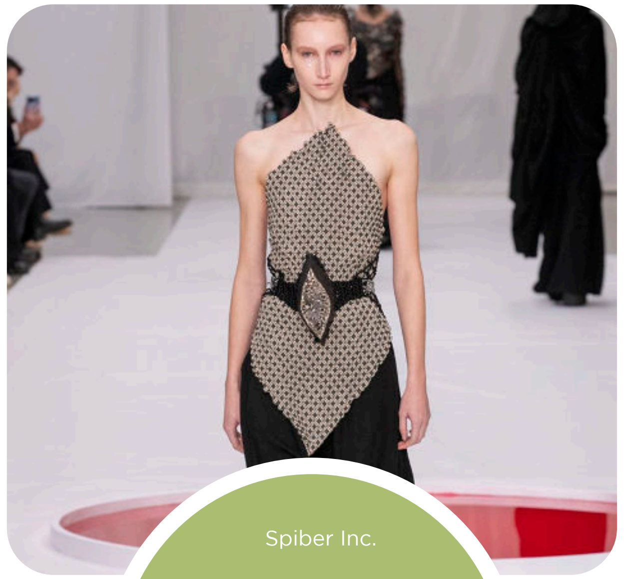
CHEMICAL FREE

Made from agricultural waste like wheat straw, barley, and other lignocellulosic biomass. The process is mechanical, chemical-free and turning cellulose into textile fiber without dissolving or harmful solvents.Extremely low environmental footprint and minimal water use; this fiber seduced Suzano and The North Face.

These are **natural cellulose** fibres, and not man-made cellulose. This means instead of melting and remaking the fibres in a man-made way, the natural structure of agriculture residue is preserved, upcycled and enhanced, reducing water, chemical, and energy use.

NEXT-GEN FIBERS **BIO-ENGINEERED/MICROBIAL**

Yuimana Kazato Couture S/S 24



Spiber Inc.

BREWED PROTEIN™

PRODUCED BY FERMENTATED MICROBES AND SUGARS

Spiber Inc. is a Japanese biotechnology company developing protein fibers. Their iconic Brewed Protein™ is a very versatile fibre that can be used pure and in blends, as alternative to animal fibers and petroleum-based fibers, for the fashion, automotive, and medical industries.

Nanollose

NANOLLOSE ™

NULLARBOR™

MICROBIAL NANO-CELLULOSE

Nanollose, australian-based ibiotechnology company produce Nullarbor™ fiber, made from microbial cellulose using an eco-friendly lyocell process. The fiber is stronger than conventional lyocell, and the starting material is made by the natural fermentation of carbohydrates from waste and by-products from the agricultural and food industries.

WEREWOOL

INSPIRED BY NATURE

Werewool develop fibers with tailored aesthetic and performance properties. Inspired by nature, they design fibers at the DNA level and their bioengineered microbes brew designed proteins that give performance and color to textile fibers without plastics and water pollution.

The global bio-based synthetic fibers market, encompassing microbial and bio-engineered fibers, was valued at approximately USD 4.5 billion in 2023. It is projected to reach around USD 9.8 billion by 2032, growing at a compound annual growth rate (CAGR) of **9.1%**

NEXT-GEN FIBERS **NEO SILKS**

AMSilk GmbH

BIOSTEEL®

VEGAN SILK POLYMERS

In 2013, AMSilk presented its innovative range of high-performance Biosteel® fibers for textiles and industrial applications worldwide. Biosteel® fiber is made of spider silk protein produced by genetically engineered microbes and spun into fiber.

Bloom Labs

BLOOM LABS

NATURAL WASTE BY-PRODUCTS TRANSFORMED INTO NEW FIBRES

Using bio-manufacturing, advanced protein engineering, and molecular biology, their proprietary technology plasticizes waste, regenerating it into uniquely practical and versatile pellets, that can be spun into high-performance fibers, designed to emulate the properties of current materials, may it be cotton, silk or polyester.

Stella McCartney

BOLD THREADS

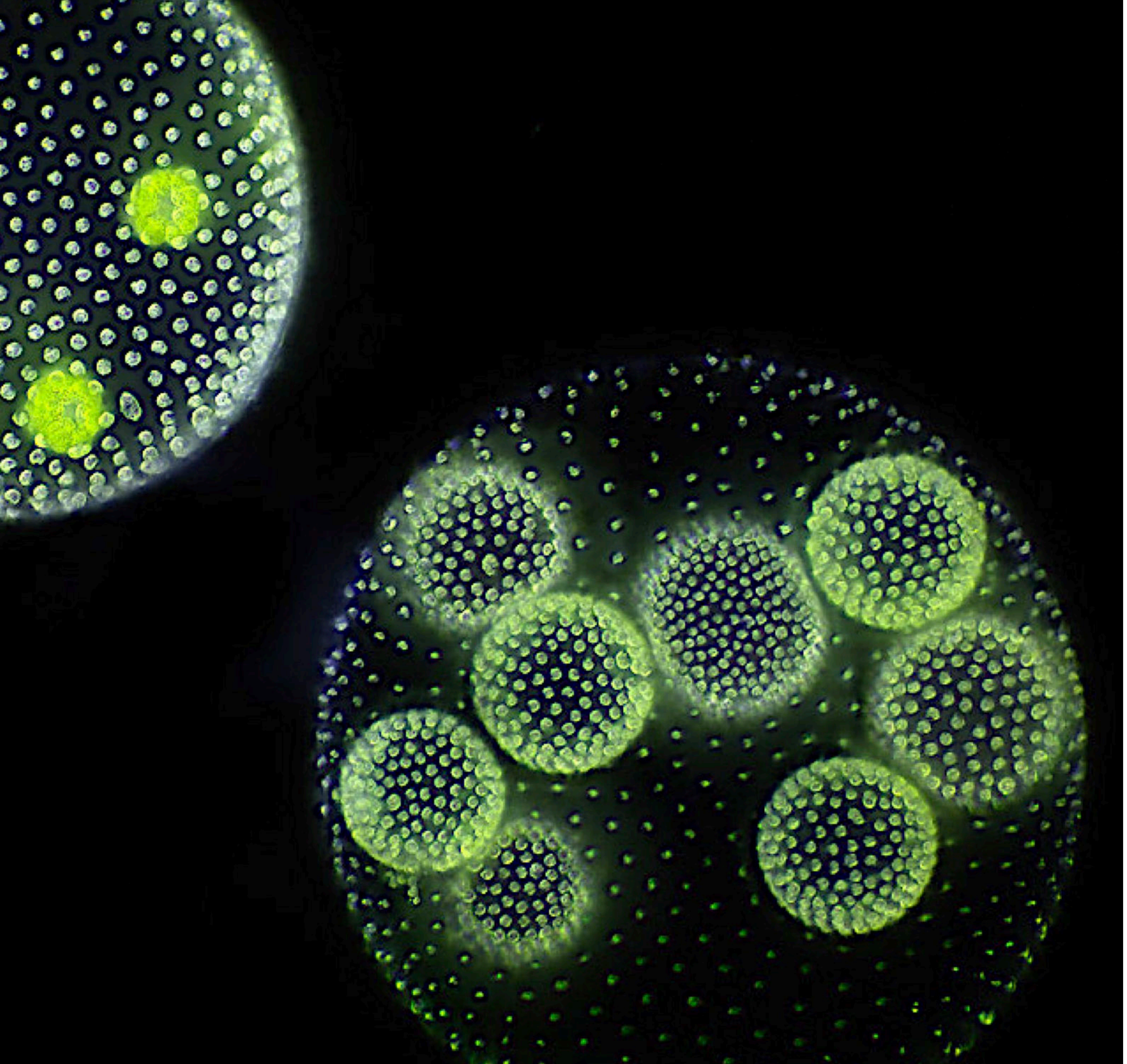
MICROSILK™

BIOENGINEERING, BIOPHYSICS, AND BIOCHEMISTRY

In 2012, Bolt Threads launched spider silk fibers to market, Microsilk is produced by fermenting a combination of water, yeast, and sugar to create silk proteins, which are then spun into fibers. The resulting material boasts properties such as high tensile strength, elasticity, durability, and softness, closely mimicking natural spider silk

Animal-free and Cruelty-free have shown notable increases in consumer searches over the past few years. However, it's important to note that consumer perceptions are nuanced. While there's enthusiasm for animal-free textiles, concerns about the quality and durability of some alternatives have led to a resurgence in interest for traditional materials like animal leather or fur. We'll see the possible alternative in the dedicated chapter.

Consumers are becoming more discerning, seeking products that balance ethical considerations with performance and longevity. Brands that can deliver on both fronts are likely to resonate well with the evolving market demands.



SUSTAINABILITY RADAR

NEW SYNTHETICS

Accounting for about 64% of the global fibre production* conventional petroleum-based synthetics account for major environmental issues, may it be the energy-intensive and highly polluting extraction and production processes, the microplastic pollution during the use and end-of-life, without speaking of its impacts on human and biodiversity health. But their strong resistance, durability and lightness properties are hard to challenge, especially due to their very low price. The innovations starting to make it to the market essentially are working on (additive-free, soil and marine) biodegradabilty of the microfibres (non persistent microplastics), on replacing petroleum by renewable ressources, (biosourced synthetics) as well as coming from textile-to-textile recycling, which remains rare.

*Textile Exchange Materials Market Report 2023

BIOBASED

ACCELERATED BIODEGRADABILITY

ELASTICITY

TEXTILE-TO-TEXTILE RECYCLED

NEW SYNTHETICS **BIOSYNTHETICS**

Neste

NESTE

NESTE RE ™

A RAW MATERIAL MADE FROM BIO BASED AND RECYCLED MATERIALS

Neste RE™ is made with renewable and recycled materials. Instead of fossil resources, they use bio-based materials, e.g. waste and residues such as used cooking oil, and plastic waste to produce Neste RE. A consortium of seven global companies(including The North Face) has jointly established what it claims is a "world-first" supply chain for more sustainable polyester.

Vaude

UPM Biochemicals

BIOPURA™

WOOD WASTE AS FEEDSTOCK

In UPM and VAUDE's process the crude oil sourced MEG ingredient, which constitutes 30% of the resin to make polyester, will be entirely replaced with a new bio-monoethylene glycol (BioMEG), UPM's BioPura™, identical to the latter. It is a drop-in solution that can be easily implemented into existing polyester manufacturing processes .

Kintra

KINTRA

POLYESTER FROM RENEWABLE FEEDSTOCKS

Kintra has developed their alternative from a novel, properietary version of poly butylene succinate (PBS) derived from renewable feedstocks. The fibres are designed to be digested to CO_2 and water within a wastewater facility, and fit recycling schemes or industrial compost at their end of use.

Bio-sourced synthetics are obtained from bio- polymers, produced by processing renewable natural resources, and thus resulting in a lower carbon footprint.

The prefix «bio» does not mean that they are made from organic raw materials, but that they are made from renewable resources, as opposed to fossil resources

The molecules are extracted from biomass to form the polymers needed to develop these synthetic materials.

The structure of a biopolymer is similar to its oil-based equivalent, it is just the raw material that is different. They can be used to replace or complement fossil fuel resources in compositions.

Polyurethanes, polyesters, polyamides and resins can be produced from corn starch, castor oil, sugar cane, apple or grape waste, to which various additives are added.

NEW SYNTHETICS **ACCELERATED BIODEGRADABILITY**

NaNea OceanSafe®

OCEAN SAFE

NANEA®

CERTIFIED cradle to cradle GOLD

TOXICANT-FREE AND INHERENTLY BIODEGRADABLE POLYESTER

With the same performance to conventional polyester, naNea emits no persistent microplastics and is biodegradable in soil and marine environments, witout any additive technology. It is also chemically recyclable through depolymerization.

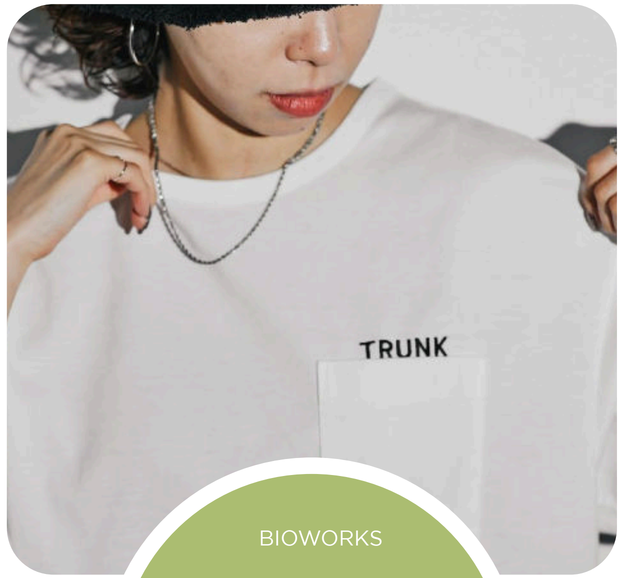
Noosa

NOOSA ™

ENDLESSLY RECYCLABLE

NOOSA™ is a naturally sourced fibre made from renewable and certified GMO-free corn, and the company's NOOCYCLE technology can transform worn and collected textiles made with at least 50% NOOSA fibre back into a 100% virgin fibre.

100% PlaX™ jersey for Trunk



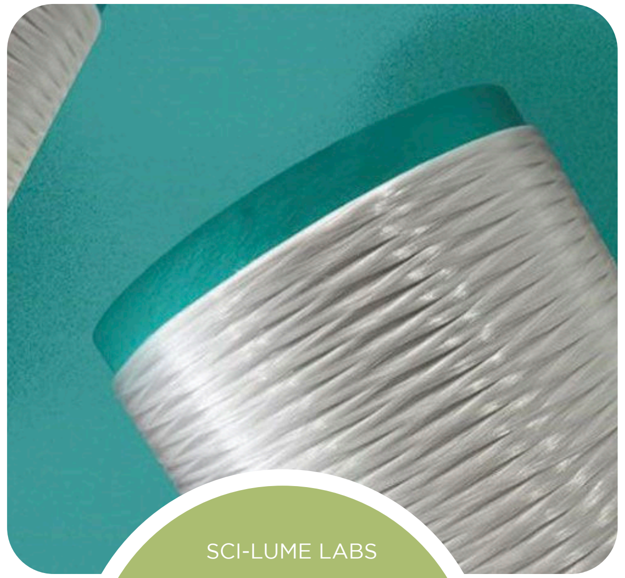
BIOWORKS

PLAX™

SUGARCANE FERMENTATION

This PLA is developed from sugarcane, and enables more saturated and resistant colours than traditional PLAs. PlaX™ can be processed into various types of fabrics by fibrillization and is chemically recyclable, in its pure firm, and tested for accelerated biodegradability, under specific conditions.

Bylon by Sci-Lume



SCI-LUME LABS

BYLON

NYLON ALTERNATIVE

Bylon uses agricultural waste as its renewable biobased feedstock, is 100% recyclable by both chemical and mechanical recycling technologies, and biodegrades in the natural environment, resulting in fewer persistent plastics in our ecosystems and food chains.

NEW SYNTHETICS **RECYCLED TEXTILE-TO-TEXTILE**

Researchers from the University of Delaware have introduced a very efficient and quick chemical processing technique capable of converting old fabrics into reusable molecules.

Saucony

Ambercycle®

CYCORA

REGENERATED POLYESTER

End-of-life polyester and polyblended textiles from dismanteled garments are shredded and through a proprietary molecular regeneration process, purified from dyes and impurities. The resulting polyester is then reconstituted into pellets, which the group's partners extrude into filament fibers for use in Cycora fabrics.

Houdini

Tejin Frontier

ECO-CIRCLE ®

CLOSED LOOP RECYCLING SYSTEM

Eco-Circle Fiber, developed by Teijin, is a sustainable polyester made from at least 30% recycled polyester textiles. This innovative material retains the same high quality, functionality, and properties as PL produced from petroleum. By recycling post-consumer polyester, Eco-Circle Fiber helps reduce waste and the need for virgin resources.

Loopamid X Zara

BASF

LOOPAMID

100% RECYCLED TEXTILE WASTE

The process developed by BASF enables PA6 (or nylon 6) polyamides to be recycled several times. The resulting material would have characteristics identical to those of a conventional virgin polyamide.

Solvay

SOLVAY

RHODIANYL

100% PRE-CONSUMER RECYCLED NYLON

Solvay launched a new, specialized grade Rhodianyl in July 2023 as a 100% pre-consumer recycled polyamide 6.6 polymer with SCS Recycled Content Certification, produced at its Santo Andre plant in Brazil.

NEW SYNTHETICS **ELASTICITY/REPLACING EA (SPANDEX)**

Pangaia

Fulgar

EVO®

MADE FROM CASTOR OIL

Its breathability and good elasticity, plus its ultralightweight, fast-drying, built-in bacteriostatic and intrinsic thermal insulation properties, make EVO® by Fulgar increasingly popular in athleisure and everyday knitwear.

Sorona

Covation bio

SORONA®

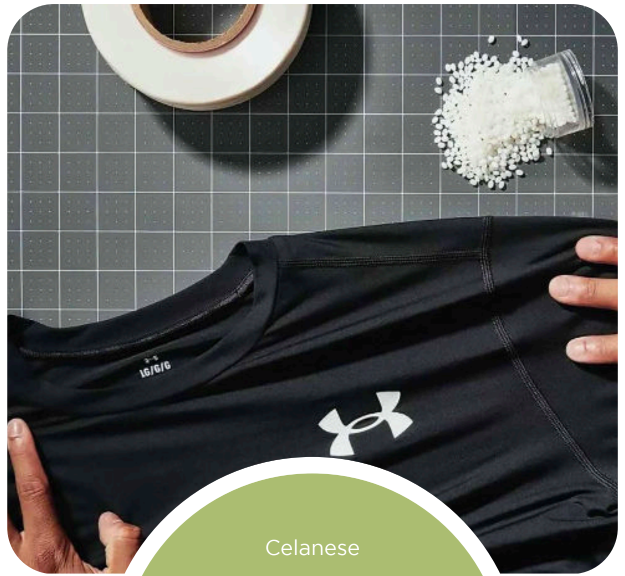
OEKO-TEX® CONFIDENCE IN TEXTILES STANDARD 100

ALTERNATIVE FOR MECHANICAL STRETCH

This Polylactic Acid, is one of the oldest PLAs, developed from 37% renewable resources such as corn and sugar cane. Its qualities make it soft, breathable, crease-free and with a good natural elasticity.

USDA CERTIFIED BIOBASED PRODUCT

Under Armour



Celanese

NEOLAST TM

RECYCLABLE ELASTANE ALTERNATIVE

Used as an alternative to elastane, NEOLAST™ fiber is spun using a solvent-free proprietary melt-extrusion processm using recyclable elastoester polymers, a critical first step for the industry to address the challenge of recycling blended fabrics containing elastane.

The proportion of renewable material can vary from one material to another, and no minimum threshold is specified in order to use the label. Certifications, such as OK Biobased or USDA Certified Biobased Products, can be used to confirm the biomass content and percentage.

CERTIFIED BIOBASED

labels :

OK biobased

USDA CERTIFIED BIOBASED PRODUCT

There are different types of biopolymers, and they can be biodegradable and non-biodegradable. They represent an interesting alternative to fossil fuel resources. However, their development can compete with agricultural or biofuel produttion. Agricultural by-products should be favoured in their production.

©STUDIO SAISON/ROMAIN GUITTET FOR BIOFLUFF

SUSTAINABILITY RADAR

NATURAL FAKE FURS

As many brands are freeing themselves from traditional furs as there are raising concerns on animal welfare, options of fake furs remain problematic as they are most frequently made from synthetic materials produced from fossil fuel resources. The fur intertwined with the floor tends to escape over time, and runs the risk of releasing plastic microparticles. Developments are now focusing on fur made from plant-based materials, like cotton, linen, hemp or ramie, or biosynthetics, where the fossil fuel basis is replaced with biobased ingredients Wool and alikes, mohair, alpaca, all are good options, with brushed sheets to replicate the fur.

PLANT BASED

WOOL OPTIONS

BIOBASED SYNTHETICS

NATURAL FAKE FURS **PLANT BASED**

Ganni

BIOFLUFF

SAVIAN

RENEWABLE PLANT BASED AND AGRICULTURAL WASTE

BioFluff's provisional patented technology transform several unusual plant fibres like nettle, hemp and flax into luxurious plush textures. They are augmented in a fibre pre-treatment process to extract technical fibres that mimic animal hair in length and shape, that is knitted with a recycled polyester underlay.

CQ Studio

CQ STUDIO

MADE FROM FLAX

This cruelty-free and vegan alternative to animal fur is a completely biodegradable material sourced from a local plant. Designed for those seeking to transition away from traditional fur trims, it offers a sustainable solution without compromising on style or function. The material is available in a range of colors, allowing for versatile design

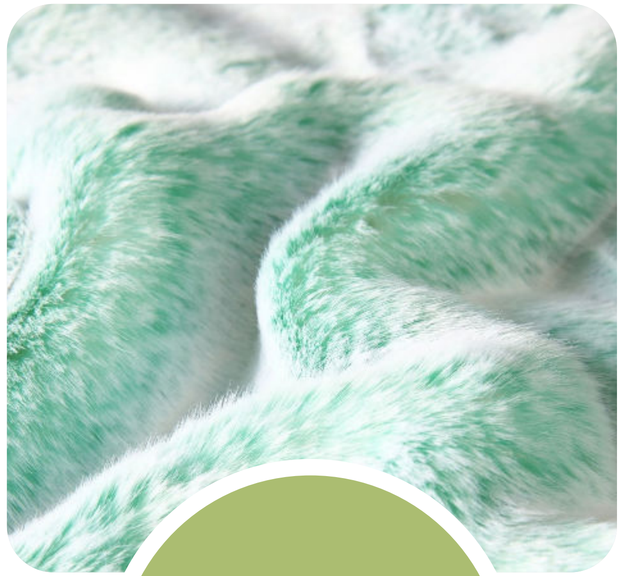
Devo Home

DEVOHOME

HEMP FUR

DevoHome, a Ukrainian textile innovator, has developed and patented in 2021 a groundbreaking plant-based alternative to fur. This hemp fur is crafted from a blend of hemp and viscose fibers on a 100% cotton knitted base, resulting in a material that is entirely natural, biodegradable, vegan, and free from harmful chemicals. Its inherent antibacterial and antifungal properties, are coupled with excellent thermal regulation.

Tissavel



TISSAVEL

BAST FIBRES AND BIOSYNTHETICS

Pioneers in faux fur, Tissavel today faces the environmental challenges today by offering 100% natural fibre furs, made with hemp or linen on cotton floors, as well as plant based synthetic fake fur from renewable resources, with accelerated biodegradability properties.

The global vegan fashion market is projected to grow by

over 14%

annually, reaching billions in value by 2030

NATURAL FAKE FURS **WOLLY ANIMAL BASED**

A'Girls 100% cashmere

A GIRLS

ULTRA SOFT CACHEMIRE KNIT

Japanese luxury jersey company A'Girls offer fur like knits made with cachemire, mohair and wool fibres, as well as cotton/silk blends, beautiful natural alternatives to synthetic petroleum-based faux furs.

Incalpaca 100% alpaga wool

INCALPACA

LUXURIOUS ALPAGA HAIR

100% natural and 100% biodegradable, without any dyes the alpaca fabrics from Incalpaca are an excellent opportunity for fur like high end creations.

Steiff Schulte

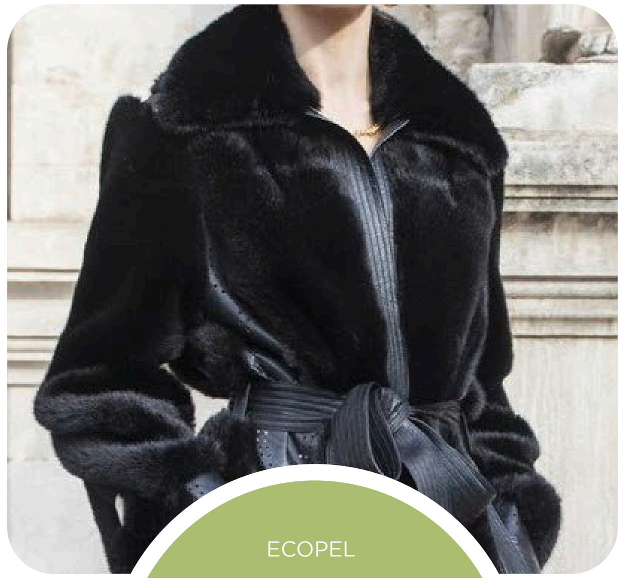
STEIFF SCHULTE

MOHAIR & COTTON BLEND

Steiff Schulte is a historical german of mohair textiles producers Their high quality fur like fabrics are of excellent handfeel, vibrant colours and strong durability.

NATURAL FAKE FURS **BIOBASED**

Ecopel



ECOPEL

KOBA®

MADE WITH COVATION BIO SORONA®

Committed to phasing out the use of non-renewable fibers, Ecopel partnered with DuPont to create KOBA® faux fur in 2019. Two years later, Ecopel partnered with the French faux fur mill Peltex to create Cannaba wool, a shearling material made of blends of hemp and recycled fiber. Same year, they developed GACHA faux fur made from 100% biodegradable fibers.

Biofur

BIOFUR®

BIOBASED AND COMPOSTABLE

BioFur's durable, soft, warm, washable and flame retardant textile is produced from the polymerization of renewable bio-based building blocks made from corn. This procedure contains no petrochemicals.

BrewedProtein™ Boa

Spiber INC.

BREWED PROTEIN TM

ENGINEERED BREWED PROTEIN™

Biotech company Spiber also develop animal and plastic-free materials made from Brewed Protein staple fibers with a realistic, long-haired fur-like texture. Brewed Protein fur alternatives have the potential to mimic natural fur without relying on animals. The ground is often made with recycled polyester.

The global artificial fur market was valued at approximately $288.34 million in 2024 and is projected to reach $1.12 billion by 2032, growing at a CAGR of

18.55%

from 2025 to 2032.

SUSTAINABILITY RADAR
LEATHER ALTERNATIVES

Due to leather's significant environmental impact and associated animal welfare concerns, the development of alternatives has become a well-established and highly competitive field. Beside synthetic (plastic) fake-leather (non sustainable) solutions, truly sustainable ones can include plant-based, biofabricated, mycelium-based, lab-grown materials, and more.
Yet, we need to keep in mind that, beside the fact that leather is in its very essence a zero-waste product, it's unique combination of durability, suppleness, flexibility and resistance remains up to now difficult to compeet with. We won't be talking on the already known Desserto, Ananas Anam's Pinatex, Vegea, Planet of the Grapes or Uppeal, but we 'll focus on the latest and as pure from any synthetics (PU and other synthetic binders) as possible, biobased and biofabricated alternatives, from biomass, cellulose-fed bacteria, to collagen and mycelium, the root-like structures of mushrooms.

BIO-BASED

BIOFABRICATED

MYCELIUM

LEATHER ALTERNATIVES **BIOBASED**

Biophilica

BIOPHILICA

TREEKIND®

LONDON PARK GREENS

Biophilica has developed a technology that transforms leaves, agricultural and other green waste (known as lignocellulose) from London parks into powder. That powder is then mixed with a natural binder and dried into sheets. The resulting material is coated with a biobased layer to be water-resistant and free of polyurethane and PVC.

AltLeather

ALT LEATHER

10% BIOMASS FEEDSTOCK AND NATURAL FIBRES 90% REGENERATIVE PLANT-BASED RESIN

Alt. Leather is a high-performance 100% bio-based leather alternative, turning agricultural biomass, natural fibres and regenerative plant-based ingredients into a material for multiple applications across fashion, footwear, furniture, automotive and more.

The Falabella Bag Stella McCartney in Mirum

NATURAL FIBRE WELDING

MIRUM®

PLANT-BASED, PLASTIC FREE, NOT LEATHER

Through the sustainable use of plants and natural fibers, Natural FIbre Welding create plastic-free, durable goods and textiles, like Mirum®, which is colored uniquely with plant and mineral pigments and can incorporate varied natural filler ingredients for a huge range of tone, shine, texture, grain, thickness and fragrance, in a clean, closed-loop process.

PACT

PACT

OVAL

NATURAL COLLAGEN FROM WASTE FISH SKINS AND SCALES

Oval is a supple material made from natural collagen, tanning reagents, oils and colourants, on customisable textile backing. Its environmental footprint is minimised across the entire production process, and the collagen is ethically gathered as a by-product from sustainable freshwater fish farms.

LEATHER ALTERNATIVES **BIOFABRICATED**

Peter Do S/S 23

Ganni

TÔMTEX

MADE FROM CHITOSAN AND MUSHROOM

TômTex create a unique leather alternative with a biopolymer called chitosan, which comes from shrimp shells and mushroom waste, 100% biodegradable. TômTex emphasizes a circular business model, responsibly sourcing all of their ingredients and utilizing water-based green chemistry.

Polybion

CELIUM ™

DESIGNED WITH NATURE AND MANUFACTURED WITH BIOLOGY

Polybion's first product, Celium™, is a premium alternative to animal-based leather and petroleum-derived synthetics. It is grown by feeding bacteria with agroindustrial fruit waste; the bacteria, in turn, creates cellulose, a natural polymer.

The global bio-based leather market was valued at approximately $10.71 billion in 2024 and is projected to reach $31.57 billion by 2034, exhibiting a compound annual growth rate (CAGR) of

11.4%

during the forecast period.

Biobased materials are 'wholly or partly derived from biomass, such as plants, trees or animals (the biomass can have undergone physical, chemical or biological treatment)'*. (excluding those derived from fossil sources)

Biofabricated materials are produced by living cells (e.g. mammalian) and microorganisms such as bacteria, yeast and mycelium. Examples of biofabricated materials would include fermented biosynthetic & biofabricated ingredients and bioassembled materials."

Understanding`Bio`materials Innovations Report, Biofabricate and Fashion For Good

LEATHER ALTERNATIVES **BIOFABRICATED**

Ganni

MODERN SYNTHESIS

LARGE SPECTRUM OF TEXTILES FROM PLASTIC FILMS TO LEATHER

Modern Synthesis works with bacteria to produce an entirely new class of nanocellulose-based textiles which offer performance without plastics, and aesthetics wilhout animal inputs

Balenciaga SS24

Gozen

LUNAFORM

ULTRALIGHT YET STRONG BIOBASED MATERIAL

Gozen's first biomaterial, Lunaform, is a versatile material derived from nanocellulose, it is produced by microorganisms during fermentation.

Modern Meadow

Modern Meadow

BIO-ALLOY™ BIO-TEX ™

NATURE-INSPIRED PROTEIN SOLUTIONS

Modern Meadow Biofabricated Materials began with an initiative to develop a sustainable alternative to leather. Their products include Bio-VeraTMand Bio-TexTM. In 2021, they announced the joint venture BioFabbrica with the Italian luxury supplier Limonta.

The global mycelium leather market was valued at approximately $15.9 million in 2024 and is projected to reach $211 million by 2031, growing at a compound annual growth rate (CAGR) of

45.3%

during the forecast period from 2025 to 2031.

LEATHER ALTERNATIVES **MYCELLIUM**

Mycoworks

Mycoworks

REISHI ™

ENGINEERED MYCELIUM CELLS

According to a peer-reviewed life cycle assessment that was published late last year, Reishi has less than 1% polymer (plastic) content, the lowest of the plant-PU hybrids. The fabric's highest profile adopter is Hermès.

Ecovative

Ecovative

FORAGER ™

MYCELIUM AND AGRIWASTE

With their AirMycelium® technology, Ecovative develop high performance, biodegradable materials and products with applications in food, fashion, beauty and other industries. The Ecovative Mycelium Foundry is build on an extensive library of fungal strains to test and perfect new mycological materials.

Stella McCartney

Bolt Threads

MYLO ™

VERTICALLY GROWN MYCELIUM

By 2018, Bolt Threads launched its innovative Mylo material, in a mycelium farming facility powered by 100% renewable energy. In 2020, Bolt Threads created a consortium with adidas, Kering, lululemon, and Stella McCartney for exclusive access to Mylo.

Balenciaga

Sqim

EPHEA ™

MYCELIUM LEATHER WITH UNIQUE TEXTURES

Ephea is a bio-material made from mycelium, providing a soft, durable alternative to leather. While it consists mainly of mushroom roots, a thin layer of synthetics is added for durability and water resistance, making it suitable for the features needed ccessories and luxury fashion.

SUSTAINABILITY RADAR
NOVEL DYES

Colour is certainly one of the most decisive factors in purchasing appeal; in fact, it's cited as the number-one buying influence, yet it is also one of the most harmful : dyeing is said to be responsible for 20% of water pollution worldwide.*
Yet game-changing innovations in the chemistry field, as well as machinery are entering the market. More and more alternatives and improvements are not only emerging but proving an industrial success: natural dyes, more water and energy-efficient processes, plant-based pigments, revision of specifications to replace certain constraints...

The focus here will be on the particularities of algae, of the use of waste as a resource and finally, the infinite world of bacteria and its potential.

* https://multimedia.ademe.fr/infographies/infographie-mode-qqf/

ALGAE-BASED

RECYCLED

MICROBIAL

NOVEL DYES **ALGAE-BASED**

Vollebak

Living Ink Technologies

LIVING INK

ALGAE-POWERED INK

Living Ink is made from renewable algae waste and other agricultural waste sources. Leftover algae and other biomass from farms are repurposed into a powder or suspended liquid form, primarily used in packaging and print design, totally free from plastisol and mineral oils.

Zeefier

Zeefier

ZEEFIER

INDUSTRIAL NATURAL DYES

Zeefier produces dyes from seaweed, offering a natural, non-toxic alternative to synthetic textile dyes. These dyes require minimal freshwater and no harmful chemicals. While the colour palette is predominantly earthy tones, Zeefier ensures consistent quality and stability.

Algaeing

Algaeing

ALGAEING

ALGAE FIBERS AND DYES

Algae dyes are requiring up to 80% less water during production. These dyes are derived from algae, offering enhanced antimicrobial and antioxidant properties. These qualities make algae-dyed fibers particularly useful in sportswear, as they help reduce odors, fight bacteria, and provide long-lasting freshness, while minimizing environmental impact.

Soarce

Soarce

SOARCE

SEAWEED-BASED COLOURANTS WITH UV STABILITY

Soarce's pigments, made from seaweed, offer vibrant, long-lasting colours with exceptional resistance to UV fading. They also develop nanoceramic-infused textiles and additives, combining natural and technical performance, including fire resistance and durable coatings for various industries.

NOVEL DYES **REDUCED WATER USAGE**

Vollebak

KILIMDENIM

CACTUS DYEING

KILIMDENIM'S SUSTAINABLE GREEN LINE

In conventional denim production, one pair of jeans uses 70 liters of water and 780 grams of chemicals. With KilimDenim's Sustainable Green Line, water usage has been reduced to 16 liters (77.1% savings) and chemicals to 26 grams (96.6% savings). Thanks to the Cactus Dyeing process, water consumption during dyeing has decreased by 91% and chemical use by 87%.

Zeefier

Calik Denim

DYEPROxAWARE

WATERLESS ECO-FRIENDLY DYEING PROCESS.

Calik Denim has created an eco-friendly dyeing process that requires no water and produces no chemical waste, while matching the appearance of traditional indigo dyeing. By combining its Dyepro technology with Aware, Calik Denim offers fully traceable, low-impact dyed denim. Aware's technology verifies sustainable materials, creating a digital twin on the blockchain.

Soarce

IndiDye®

INDIDYE® ⌀ ZDHC

SEAWEED-BASED COLOURANTS WITH UV STABILITY

IndiDye® natural plant dyes promote sustainable practices by reducing reliance on petrochemicals. Made primarily from waste and by-products, these dyes are free from hazardous chemicals and petrochemicals. They are produced using water-based extraction or natural fermentation, making them biodegradable and safe for the planet. IndiDye® is GOTS approved and meets ZDHC level 3 standards for Zero Discharge of Harmful Chemicals.

Wrangler

WRANGLER

INDIGOOD

FOAM DYEING

INDIGOOD is made from a collaboration among the iconic Americana brand, Texas Tech University, Gaston Systems, and the Spain-based fabric manufacturer Tejidos Royo. This method uses foam instead of water to apply dye, resulting in zero water waste, a 90% reduction in chemicals, and 60% less energy consumption compared to traditional indigo dyeing processes.

NOVEL DYES **LOWER CHEMICAL USE**

Algaeing

Archroma

EARTHCOLORS®

A NEW METHOD OF CREATING WARM SHADES

EarthColors® is Archroma's patented method for creating warm shades from non-edible agricultural waste, like leaves and nutshells. This innovative technology transforms natural waste into high-performance dyes, keeping edible parts available for consumption.

EVERDYE

EVER DYE

EVERDYE

ELECTROSTATIC DYES

EverDye's electrostatic dyeing technology offers a groundbreaking approach to textile coloration, using electricity to bond dyes to fibers without the need for water. This method drastically reduces water usage, energy consumption, and chemical waste compared to traditional dyeing processes. The electrostatic approach ensures high-quality, vibrant colors while maintaining the sustainability of the dyeing process.

The dyeing processes are among the most polluting stages in textile production The goal of novel sustainable dyes is to:

1. Drastically cut water consumption
Traditional dyeing can use up to 200 tons of water per ton of fabric; novel dyes like waterless or low-water solutions help conserve this vital resource.

2. Lower chemical use and pollution
By minimizing or eliminating toxic dye chemicals, these methods reduce wastewater contamination and the ecological damage caused by dye effluents.

3. Improve energy efficiency
Many sustainable dyes operate at lower temperatures or require shorter dyeing times, reducing energy use and carbon emissions.

4. Enhance performance and functionality
Some dyes, like algae- or bio-based dyes, offer added benefits such as antimicrobial or antioxidant properties, especially valuable in sportswear or medical textiles.

NOVEL DYES **RECYCLED**

DyeRecycle

DYERECYCLE

EXTRACTING AND RECYCLING DYES AND REVERTING WHITE FABRIC.

A solution without toxic solvents, which extracts the colour from synthetics, and can then be reused as a dye bath for other garments. An ingenious way of creating a dye on the one hand, and reverting to white textiles on the other white textiles on the other, to generate a pool of uniform mate-

Global Recycled Standard

© Officina+39

Officina 39+

RECYCROM ™

ZDHC

PIGMENTS FROM SHREDDED TEXTILE FIBERS

Officina +39 has developed a system to reprocess the scraps and transform textile fiber into colored powder. In contrast to other dyes, Recycrom is applied as a suspension and not as part of a chemical solution – cutting environmental impact.

Future Fabrics Expo 2024

DE MONTFORT AND LOUGHBOUROUGH UNIVERSITY

ENZYMATIC SEPARATION OF WOOL BLENDS, AND RECOVERY OF DYES

The project explores recycling wool fibres, reclaiming dyes from waste wool to reuse in new fabrics, promoting circularity in textile production, as well as enzyme-based and laser dyeing technologies that require less water, energy, and chemicals compared to conventional methods.

Artistic Milliners

NATURE COATINGS

BIO BLACK®

BLACK PIGMENT FROM WOOD WASTE

BioBlack is a black pigment made from upcycled wood byproducts. It mimics carbon black but with no petroleum derivatives, making it a cleaner option for printing inks and paints. While it avoids fossil fuels, it's typically mixed with traditional binders for better adhesion.

NOVEL DYES **MICROBIAL**

Colorifix

COLORIFIX

PIGMENT CREATED VIA DNA ANALYSIS AND MICROBIOLOGY

These microorganisms grow on renewable feedstocks such as sugar, yeast, and plant-byproducts. They divide every 20 minutes, so a large quantity of colourful dye liquor is created within just one or two days. Compatible with standard dye machines, without additional specialist equipment or toxic chemicals.

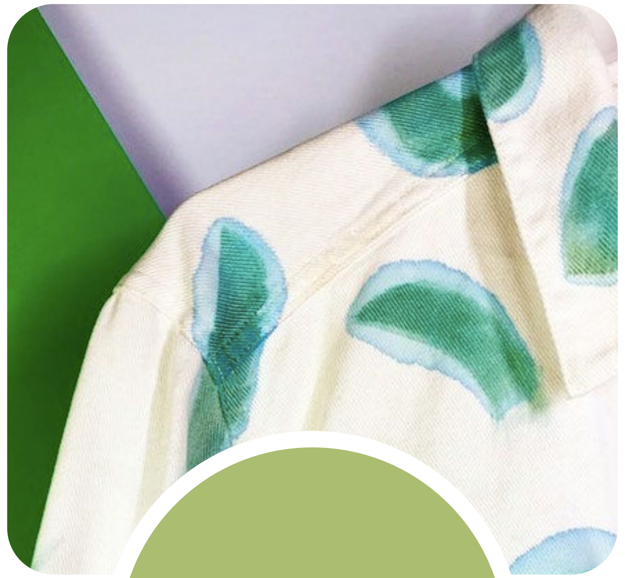
© Officina+39

OCTARINE BIO

GENETICALLY MODIFIED YEAST FOR COLOUR PRODUCTION

Octarine Bio uses CRISPR-modified yeast to produce natural colours that are entirely customizable, replacing synthetic dyes and allowing for more controlled, specific colour outcomes in textiles and cosmetics. The process also cuts down water and chemical consumption in the dyeing industry.

Post Carbon Lab



TRUE TONE INK BY POST CARBON LAB

HUES WITH BIO-MORDANTS AT SCALE

Leveraging the power of photosynthetic microorganisms like cyanobacteria and algae, Post Carbon Lab has developed high-performance, SGS-certified microbial colours. In collaboration with True Tone Ink, they have successfully integrated the best industrial practice of natural dyeing techniques with these resulting in an expanded portfolio of industrially compatible. standardised, microbial-herbal colours with green chemistry formulations.

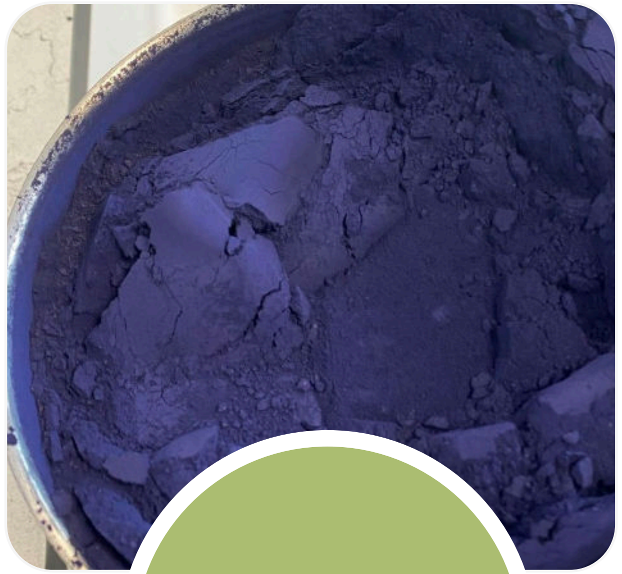
Huue Bio

HUUE BIO

PLANT-POWERED COLOURS

Huue Bio dyes utilise pigments from indigo, beetroot, and turmeric. Extracted from natural sources like the indigo plant, beets, and turmeric roots, these dyes deliver rich hues of blue, red, and yellow, respectively. Ideal for textiles, they offer sustainability with vibrant, long-lasting colours. Their first product is a indigo replacement.

Synovance



SYNOVANCE

MICROBIAL PIGMENTS FOR CLEANER DYEING

Synovance engineers microbes to produce natural, biodegradable pigments for textile dyeing. These pigments are free from the heavy metals and harmful chemicals found in traditional dyes, promoting eco-friendly fashion with vibrant, lasting colors.

SUSTAINABILITY RADAR
LATEST INNOVATIONS

The industry is exploring alternative materials and production methods to reduce its environmental footprint. Polymers derived from renewable resources such as corn, castor oil and sugar cane are replacing hydrocarbons in synthetic and protective textiles. A new generation of «bio-sourced» polymers, produced in laboratories or by CO_2 capture, aim to preserve natural resources and reduce pressure on arable land. Artificial intelligence is used to very quickly and efficently design novel enzymes capable of unlocking superior processes to separate blended fabrics, create new biosynthetics with the best characteristics and performances, thanks to computational protein design.

LAB-GROWN

CO_2 CAPTURE

AI-POWERED

LATEST INNOVATIONS **LAB-GROWN**

Galy Co

GALY CO

LAB-GROWN COTTON FOR RESOURCE EFFICIENCY

Galy produces cotton through cellular agriculture, cultivating cotton cells in bioreactors. This method uses 99% less water and 97% less land than traditional cotton farming, and emits 77% less CO2. The company with investments from Inditex and H&M Group, aiming to scale its production.

Vitro Labs

VITRO LABS

ANIMAL-FREE LEATHER GROWN FROM CELLS

Vitro Labs grows animal leather in a lab using cultured animal cells. This process mimics traditional leather's texture and durability without harming animals, reducing water usage and carbon emissions, making it ideal for fashion and upholstery.

Modern Synthesis

MODERN SYNTHESIS

BACTERIAL NANOCELLULOSE COMPOSITES

This London-based startup combines bacterial nanocellulose with natural fibers like hemp and linen to create leather-like and film-like textiles. Their materials are petrochemical-free and compatible with existing textile machinery. They are collaborating with brands like GANNI.

LATEST INNOVATIONS **CARBON CAPTURE**

Rubi Laboratories

RUBI LABORATORIES

CARBON-NEGATIVE FIBERS

Founded in 2020, US company Rubi turns industrial CO2 emissions into drop-in cellulose pulp for MMC alternatives utilising a cell free, enzyme based direct biochemical process. Through mimicking the process of trees, Rubi's technology can achieve cradle-to-gate carbon-negativity and produce output for use in existing textile mills.

LanzaTech x Zara

LANZA TECH

MICROBIAL CONVERSION OF WASTE GASES INTO FABRICS

LanzaTech's microbes convert industrial waste gases, like carbon monoxide, into ethanol, which can be further processed into fibers for textiles or plastics. The process offers a scalable way to reduce carbon emissions while creating useful products from what would otherwise be pollution.

Fairbrics

FAIRBRICS

CO_2-BASED POLYESTER FIBERS

Fairbrics transforms CO_2 into polyester fibers through a process that blends captured emissions with existing petro-chemical inputs, reducing the need of virgin fossil fuel based fibers and encouraging a more circular fashion.

Newlight Technologies

NEWLIGHT TECHNOLOGIES

AIRCARBON: BIOSYNTHETIC FROM GREENHOUSE GASES

AirCarbon is a biodegradable material made from methane and CO_2. This carbon-negative bioplastic is used in packaging, fashion, and various consumer products, offering an alternative to traditional plastics.

LATEST INNOVATIONS **CARBON CAPTURE**

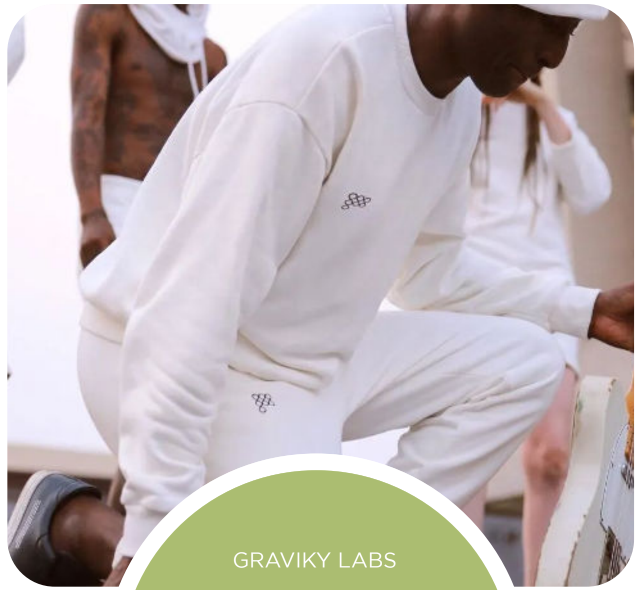
Mango Materials

MANGO MATERIALS

METHANE-CONVERTED BIOPOLYMER FOR TEXTILES

Mango Materials produces biodegradable PHA plastic by feeding bacteria with methane. This innovative approach turns a potent greenhouse gas into sustainable plastic, ideal for use in textiles, packaging, and consumer goods, contributing to waste reduction.

Air Ink X Pangaia



GRAVIKY LABS

AIR INK™

INK FROM CAPTURED AIR POLLUTION

Graviky Labs transform carbon soot from vehicle emissions into high-quality ink. The product repurposes air pollution into a safe, usable material for art and printing applications, turning waste into value while addressing urban air quality issues.

Carbon capture projects in the textile industry focus on using innovative technologies to capture carbon dioxide (CO_2) emissions and either store or repurpose them in the production of textiles and related materials. These projects aim to reduce the carbon footprint of the textile industry, which is one of the largest contributors to global CO_2 emissions.

Here's a breakdown of how carbon capture works in textiles:

1. Capturing CO_2:
Carbon capture involves removing CO_2 emissions from industrial processes, including manufacturing, power plants, and even directly from the air (direct air capture). This can be done using various methods like chemical absorption, physical capture, or biological processes.

2. Repurposing CO_2 in Textile Manufacturing:
Once CO_2 is captured, it is repurposed in innovative ways. For example, some companies convert the captured CO_2 into cellulose fibers like lyocell and viscose, which are used in clothing. By using CO_2 to create fibers, the textile industry can significantly reduce its reliance on traditional raw materials, such as wood or cotton, which have environmental impacts.

LATEST INNOVATIONS **AI POWERED**

Epoch Biodesign @Mills Fabrica 2024

EPOCH BIODESIGN

INFINITE RECYCLING FOR BLENDED NYLON MATERIALS

Epoch combines generative AI and synthetic biology with process design to transform complex pre-and post-consumer Nylon waste, from elastane blended sportswea to high performance multi-layer laminate waterproofs, providing both an end of life soltuion and producing the chemical building blocks to manufacture new recycled Nylon materials.

Solena @The Mills Fabrica 2024

SOLENA MATERIALS

AI DESIGNED FIBRE PROTEINS

Solena materials is a biotechnology company leveraging AI to design high performance sustainable fibres made by microbes for market-leading apparel. They use computational design to develop a new class of synthetic proteins from scratch. They design fibre proteins to have a spring-shape, providing toughness, that self-assembles into a liquid crystal (a stable state of matter between solid and liquid).

Nanoloom @Future Fabrics Expo 2024

NANOLOOM

GRAPHENE NANOMATERIALS

Nanoloom has developed biodegradable, recyclable and non-toxic fibres, yarns and fabrics from graphene nanomaterials, which are a high-performing, cost-competitive replacement for traditional synthetics in apparel. Their first focus is in providing stretch yarns. They also use AI algorithms to intelligently select which fibres to combine, understand the perfect ratios for each blend, and predict the exact characteristics of the resulting fabric or knit.

Why AI is Crucial for the Textile Industry:
The textile industry faces pressure to reduce its environmental impact, manage waste, and improve labor conditions. AI provides advanced data-driven solutions that enable manufacturers to achieve these goals in a cost-effective and scalable manner.

1. Sustainability in Materials and Recycling
AI is crucial for material innovation, helping create more sustainable fibers and fabrics by predicting the performance of bio-based, recycled, or upcycled textiles.
AI models assist in optimizing textile recycling processes, improving the sorting and breakdown of materials, thus enhancing the efficiency of recycling systems (e.g., AI-assisted textile recycling projects by companies like Rubi Labs).

2. Reducing Water, Chemicals, and Energy Use
AI is aiding in the optimization of chemical treatments in textile production, reducing the need for harmful chemicals and excess water during dyeing and finishing processes.
AI-driven systems can also optimize energy usage during production, helping to cut down on the carbon footprint of textile manufacturing.

3. Quality Control and Predictive Maintenance
AI is being used for real-time quality control. Machine learning algorithms can detect defects in fabrics as they are produced, helping to prevent waste and ensure high-quality products.
Predictive maintenance powered by AI analyzes machinery performance data to detect potential failures before they occur, reducing downtime and ensuring that production is uninterrupted.

THE FUTURE OF FASHION

The Livetrend Sustainability Radar highlights how the fashion industry is undergoing a transformative shift—where smart design, material innovation, and circular strategies are no longer optional, but essential. The most forward-thinking brands are adopting best practices such as designing for durability, disassembly, and recyclability, integrating low-impact and regenerative materials, and leveraging AI and traceability tools to optimize production and transparency. Innovations in bio-based, upcycled, and lab-grown textiles, as well as waterless dyeing and carbon capture, are redefining what's possible in sustainable fashion.

The key takeaway: sustainability is not a constraint, but a creative and strategic lever. By embedding smart design and sustainable innovation into every stage of the value chain, brands unlock new business models, enhance customer loyalty, and build greater resilience against future regulatory, environmental, and economic disruptions. In a landscape shaped by climate urgency and shifting consumer values, those who lead with sustainability will not only meet rising expectations: they will define the future of fashion.

LIVETREND

THANK YOU!

If you have further needs, please contact us via chat.