

EcoHue Capture Trend



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Class 4 ENG, Business Management



a Fashion Trend Forecasting project



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Eco-Social Revolution

The macro trend

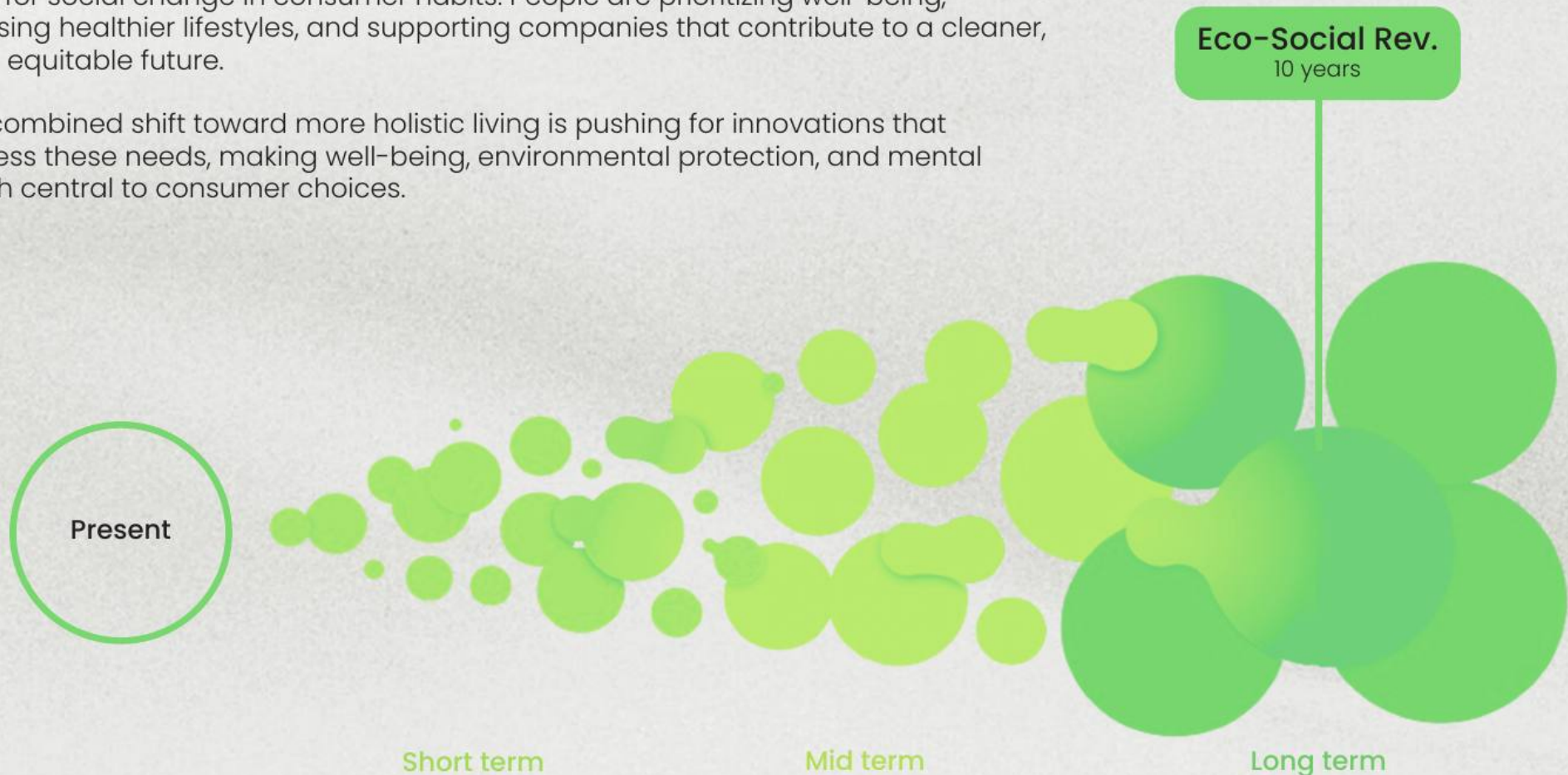


What is the Eco-Social Revolution?

The “Eco-Social Revolution” is driven by increasing awareness of environmental degradation, health concerns, and social responsibility.

Key factors include the rising demand for sustainable and eco-friendly solutions, growing public concern over pollution, innovation in green technologies, and the need for social change in consumer habits. People are prioritizing well-being, choosing healthier lifestyles, and supporting companies that contribute to a cleaner, more equitable future.

This combined shift toward more holistic living is pushing for innovations that address these needs, making well-being, environmental protection, and mental health central to consumer choices.



Signals

Drivers



www.businessoffashion.com

California Set to Mandate Clothing Recycling as Wardrobe Waste Grows

A new California bill proposes that brands take charge of recycling efforts, allowing consumers to drop off unwanted clothing at designated sites.

signal n.1



wellbeingnews.co.uk

Supporting Healthier Choices: The Appeal of Vaping Flavours Over Traditional Smoking -

The debate between vaping and smoking has drawn considerable attention, particularly as more people look for alternatives to traditional tobacco use. One of the most compelling reasons people are switching to vaping is the variety [...]

signal n.2



www.bbc.com

How beer is used to make alternative leather

The grain left from beer production is being used to make alternative leather. So, how does the technology work?

signal n.3

Well-being

Well-being refers to a state of overall health, happiness, and life satisfaction.

It encompasses physical, mental, and emotional health, as well as social and financial stability. Achieving well-being involves maintaining a balanced lifestyle, fostering positive relationships, managing stress effectively, and engaging in activities that promote personal growth and fulfillment.

It is a holistic concept that varies for each individual but generally reflects a sense of purpose, resilience, and contentment in life.

Anti pollution

Anti-pollution efforts focus on reducing contaminants in air, water, and soil to protect human health and the environment.

These measures include using clean energy, reducing waste, promoting sustainable practices, and enforcing environmental regulations.

Technologies like air purifiers, water filtration, and eco-friendly transportation help minimize pollution. Public awareness and global cooperation are crucial in combating pollution, ensuring cleaner ecosystems and a healthier future for all.

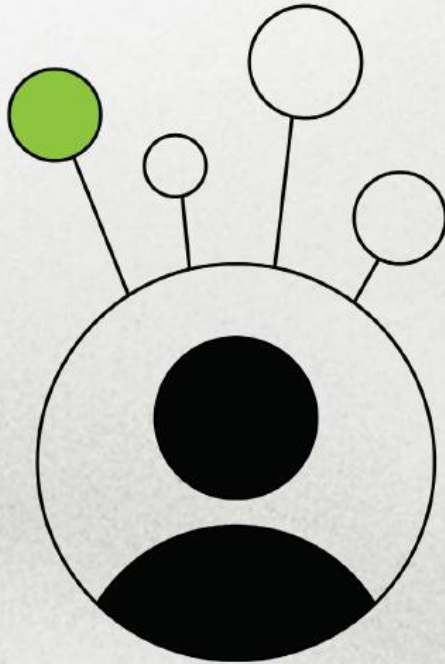
Innovation

Innovation in sustainable materials and fabrics aims to reduce environmental impact by developing eco-friendly alternatives.

These include biodegradable textiles, recycled fibers, and plant-based materials like organic cotton, bamboo, and hemp. Innovations such as lab-grown leather, mushroom-based fabrics, and bioengineered textiles offer sustainable solutions for fashion and industry.

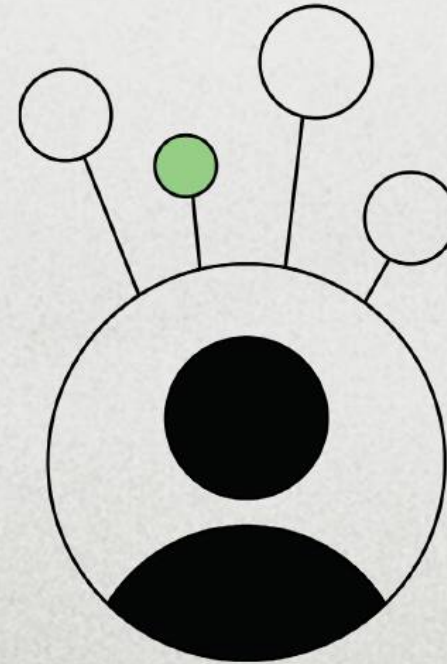
By minimizing resource use, reducing waste, and lowering carbon emissions, these materials help create a greener, more responsible future.

Contributors



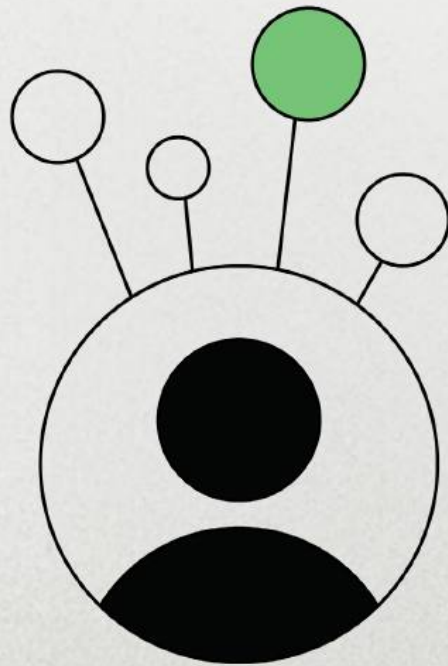
Camilla

- Research of needs and signals
- Clusters
- Presentation



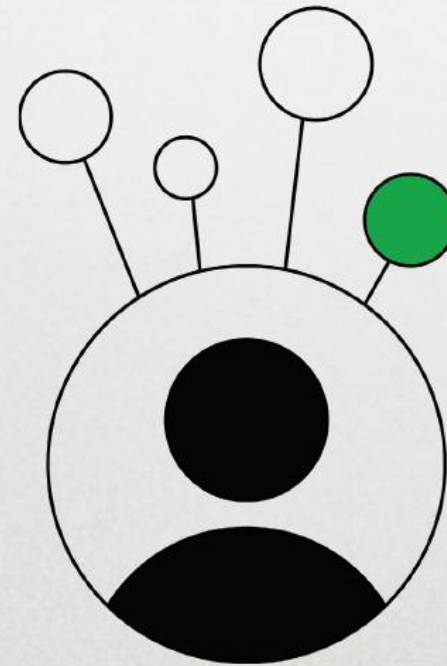
Cristina

- Research of needs and signals
- Clusters



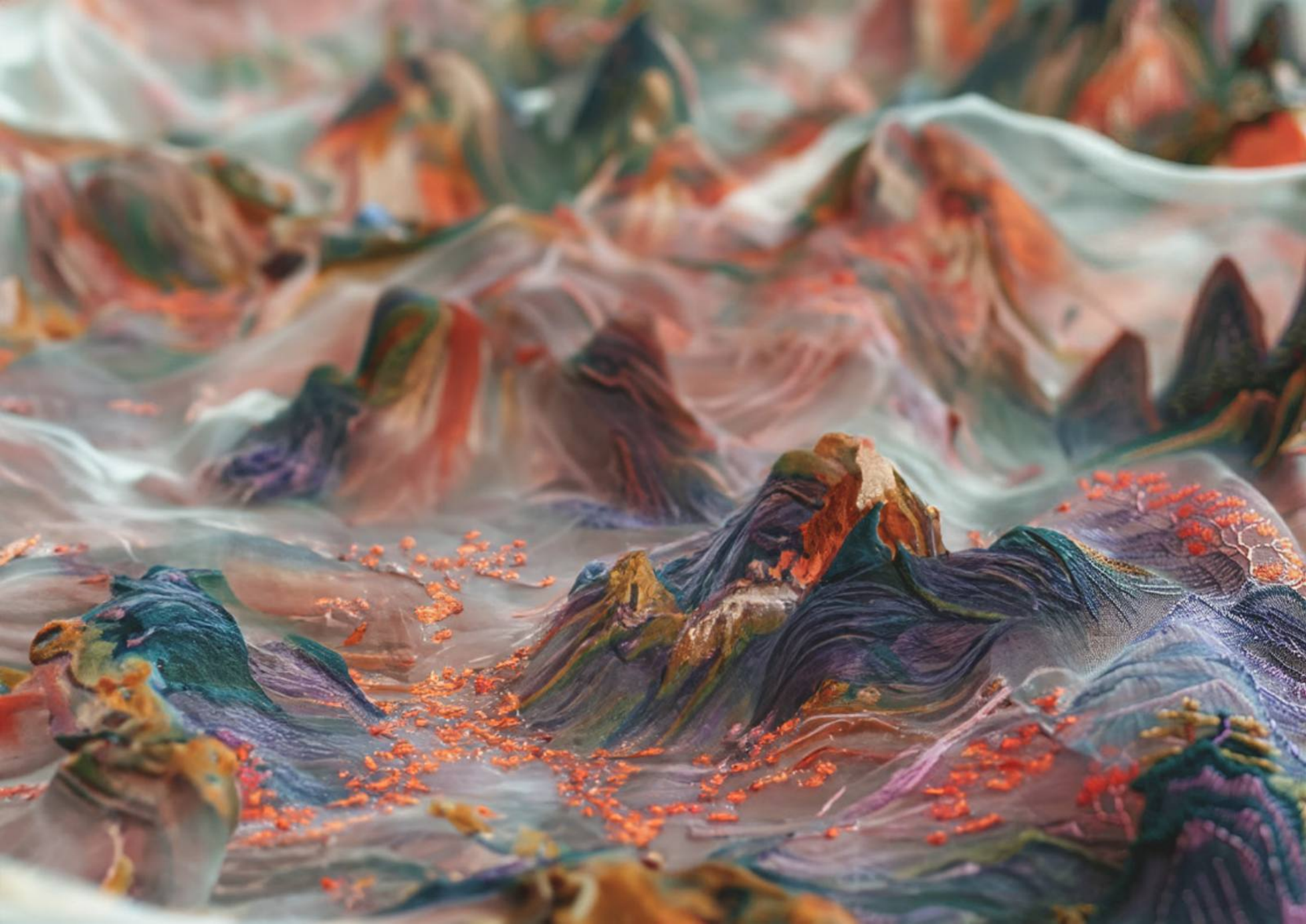
Liu

- Research of needs and signals
- Clusters
- Defining macro-trend



Simona

- Research of needs and signals
- Clusters
- Defining macro-trend





EcoHue Capture

The micro trend

A new point of view

The concept of carbon-negative fashion goes beyond traditional sustainability. Instead of merely reducing emissions, this approach actively removes more CO₂ from the atmosphere than it emits during production. By integrating innovative materials, regenerative processes, and carbon capture technologies, the fashion industry is evolving toward a more sustainable and restorative future.

One of the most polluting and resource-intensive stages of garment production is dyeing. Traditional dyeing methods consume trillions of liters of water annually and release toxic wastewater, contaminating rivers and ecosystems. Carbon-capture dyeing offers a revolutionary alternative by eliminating water use, significantly reducing emissions, and even sequestering CO₂ in the process. These advancements are paving the way for a cleaner and more responsible fashion industry.

Here is where the trend EcoHue Capture begins.

The name it's the merge of the words "Ecosostenibility" and "Hue" meant as the color of the fabrics of the clothes.

A breakthrough in sustainable dyeing is the use of bacteria-based natural dyes. Instead of relying on fossil fuel-derived synthetic dyes, brands harness genetically engineered bacteria, fungi, and algae to produce vibrant, biodegradable pigments. These microorganisms are fed simple sugars, and through fermentation, they naturally generate non-toxic dyes in a range of colors. This innovative approach not only eliminates harmful chemicals but also lowers the carbon footprint of textile dyeing.



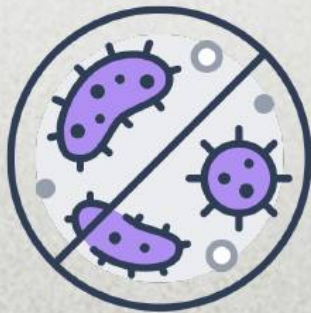
While these cutting-edge technologies hold immense potential, several challenges must be overcome for widespread adoption.

Growing bacteria for large-scale dye production is currently slower than synthetic alternatives. Existing microbial dye production facilities are limited, requiring significant investment in biotech manufacturing. Some countries impose strict regulations on genetically modified organisms (GMOs), which can hinder the expansion of bacterial dyeing techniques.

As carbon-negative fashion gains momentum, CO2 dyeing and microbial pigments have the potential to replace traditional dyeing methods within the next decade.

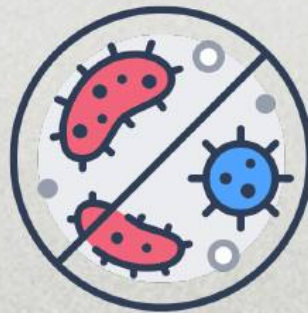
With continued investment and innovation, these advancements can drive a fundamental shift toward an environmentally restorative fashion industry.

Below there are some bacteria and fungi that could be useful in the dyeing process:



**Janthinobacterium
lividum**

Produces a deep purple pigment called violacein



**Streptomyces
coelicolor**

Generates blue and red pigments



**Monascus
purpureus**

A type of fungi that produces red, orange, and yellow pigments



**Trichoderma
harzianum**

Known for producing greenish pigments

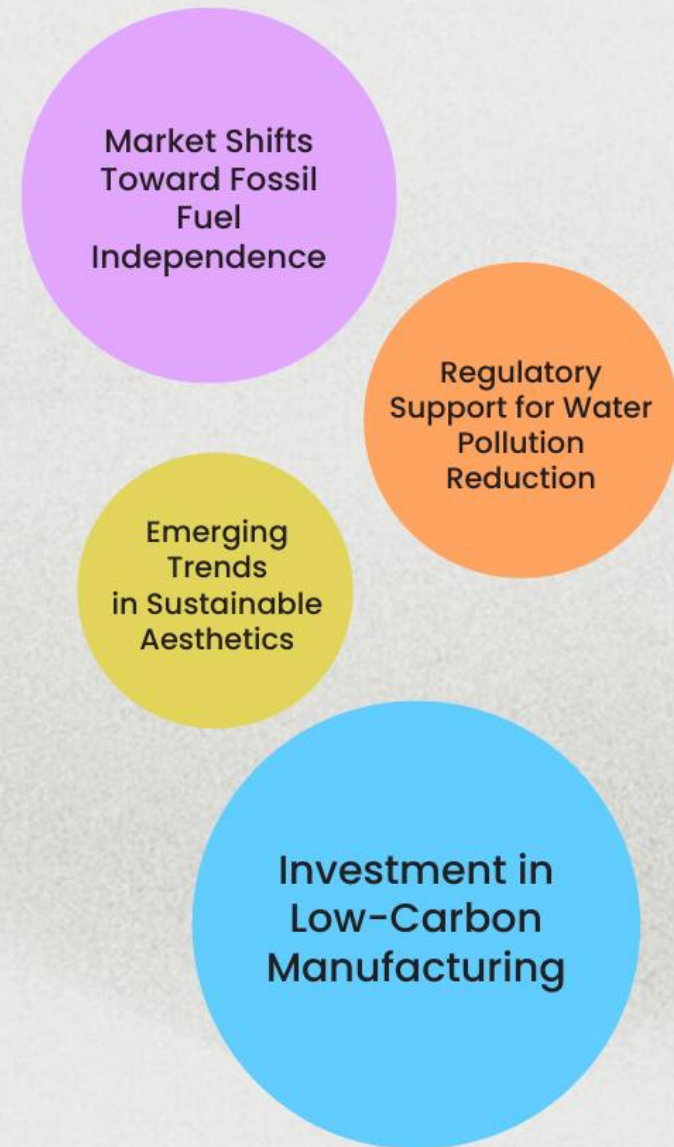
Key Findings

- **No Fossil Fuel Dependency:** Traditional dyes are derived from petrochemicals, contributing to oil consumption and CO2 emissions. Microbial dyes eliminate this issue by using natural biological processes to generate pigments without relying on fossil fuels.
- **Zero Water Pollution:** Unlike conventional dyeing, which requires toxic mordants and fixatives to bond color to fabric, microbial dyes integrate directly into fibers without producing hazardous wastewater. This makes the process entirely non-toxic and environmentally safe.
- **Lower Carbon Footprint:** The fermentation process used in microbial dyeing requires significantly less energy than conventional dyeing methods. Additionally, since no high-temperature treatments or excessive water usage are needed, CO2 emissions are minimal, further reducing the industry's overall environmental impact.
- **Unique Aesthetic Possibilities:** Some bacteria-based dyes create stunning iridescent and shimmering effects naturally, without the need for synthetic additives. This offers designers new creative possibilities while maintaining sustainability.

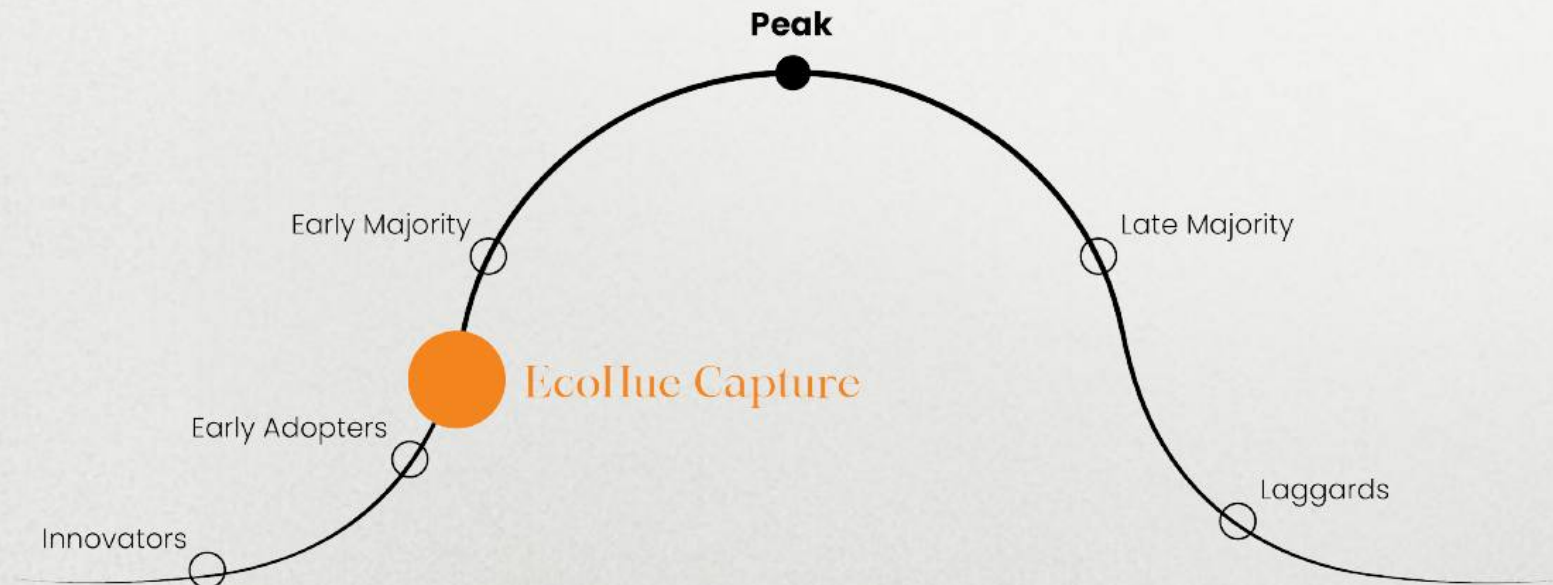
Keywords:

#Carbon-negative fashion #Sustainable dyeing #Microbial pigments
#Waterless dyeing #Biodegradable textiles #Regenerative materials
#Eco-friendly #CO2 emissions #Alternative fashion

Signals



Trend adoption curve phase

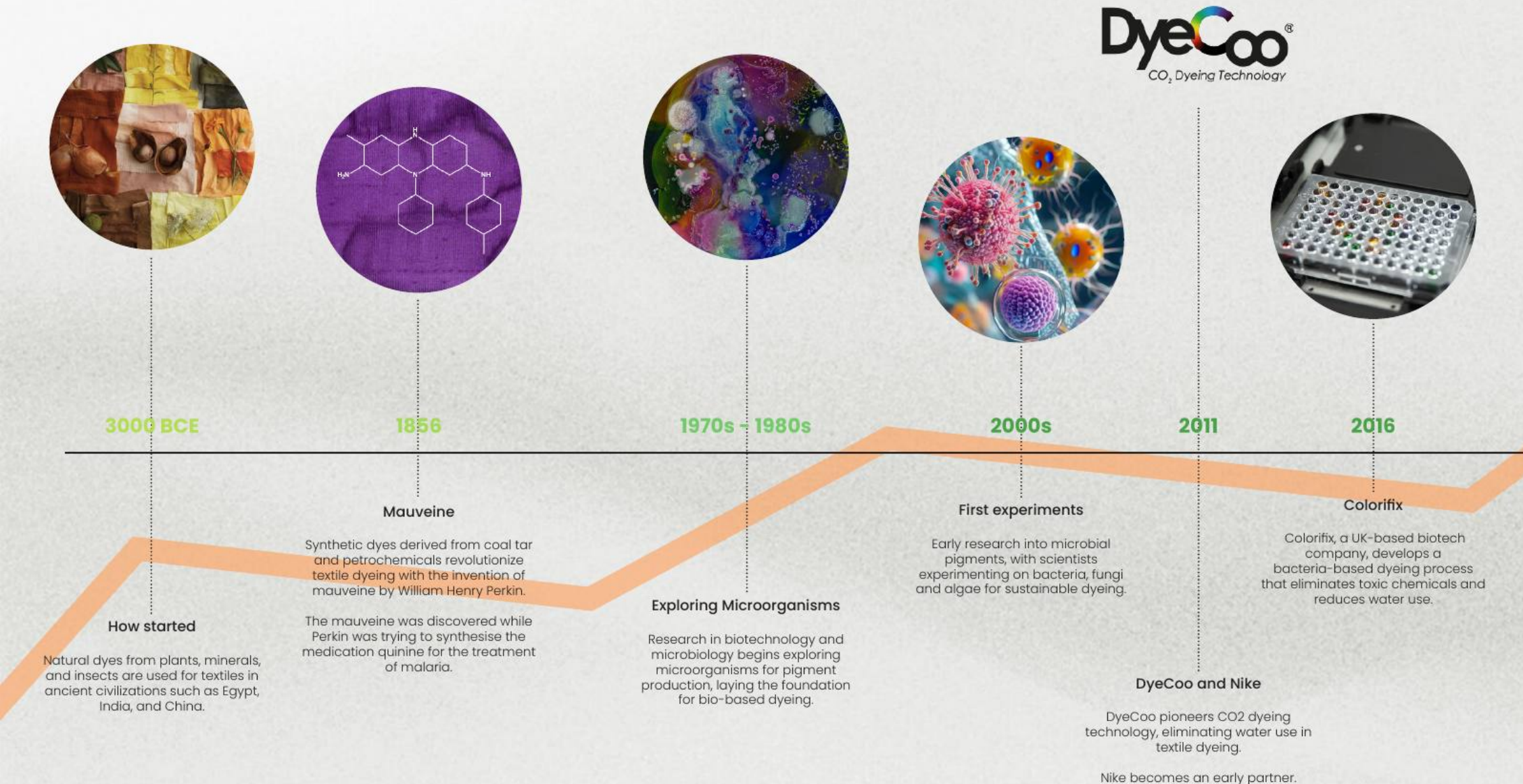


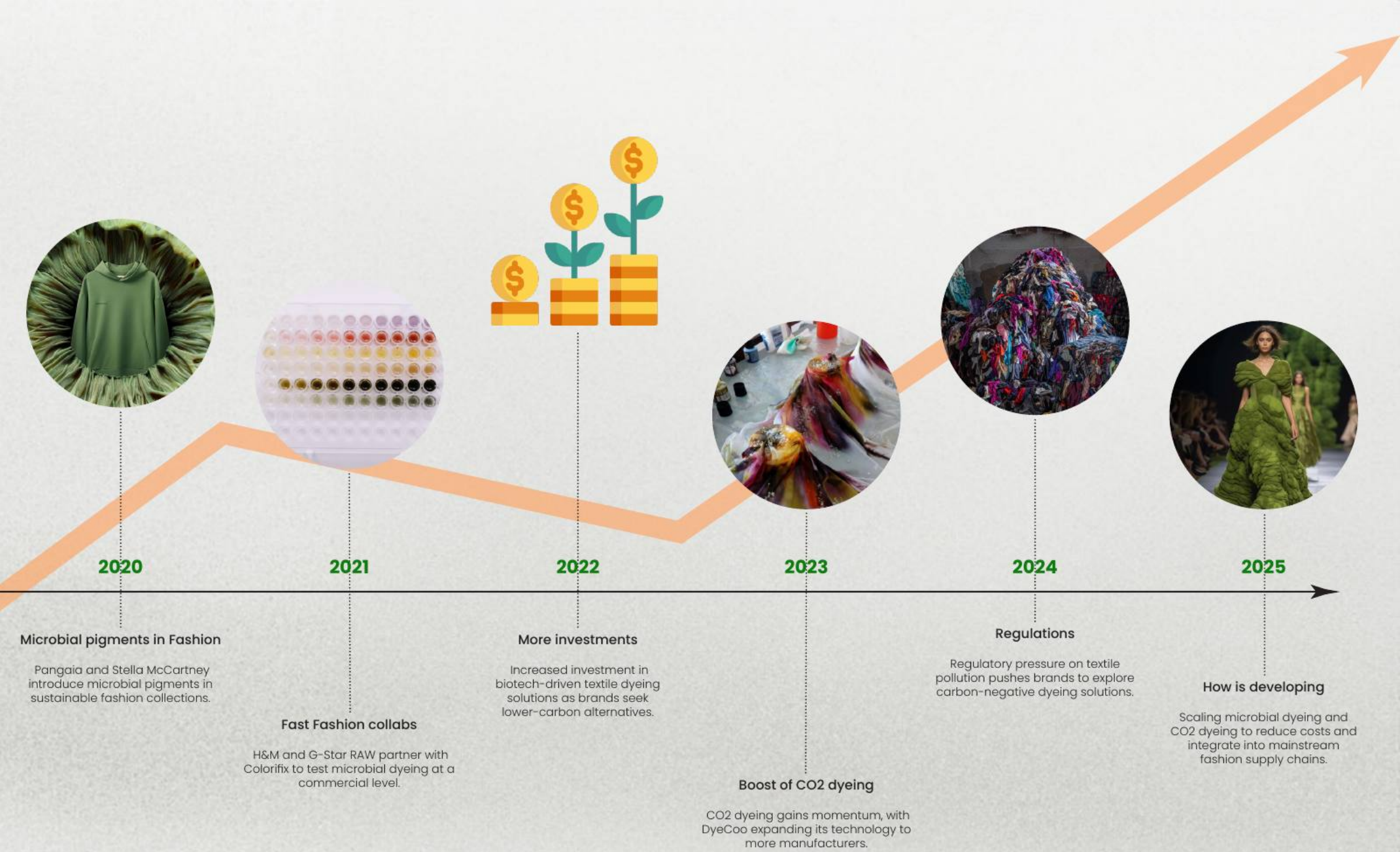
The EcoHue Capture trend is in the Early Adopter phase rising toward the Early Majority phase on the trend adoption curve. It's located in this phase because sustainable fashion brands and high-end designers are experimenting with these technologies, integrating them into small production runs and niche collections.

Below the reasons why the EcoHue Capture trend it's in the Early Adopters Phase:

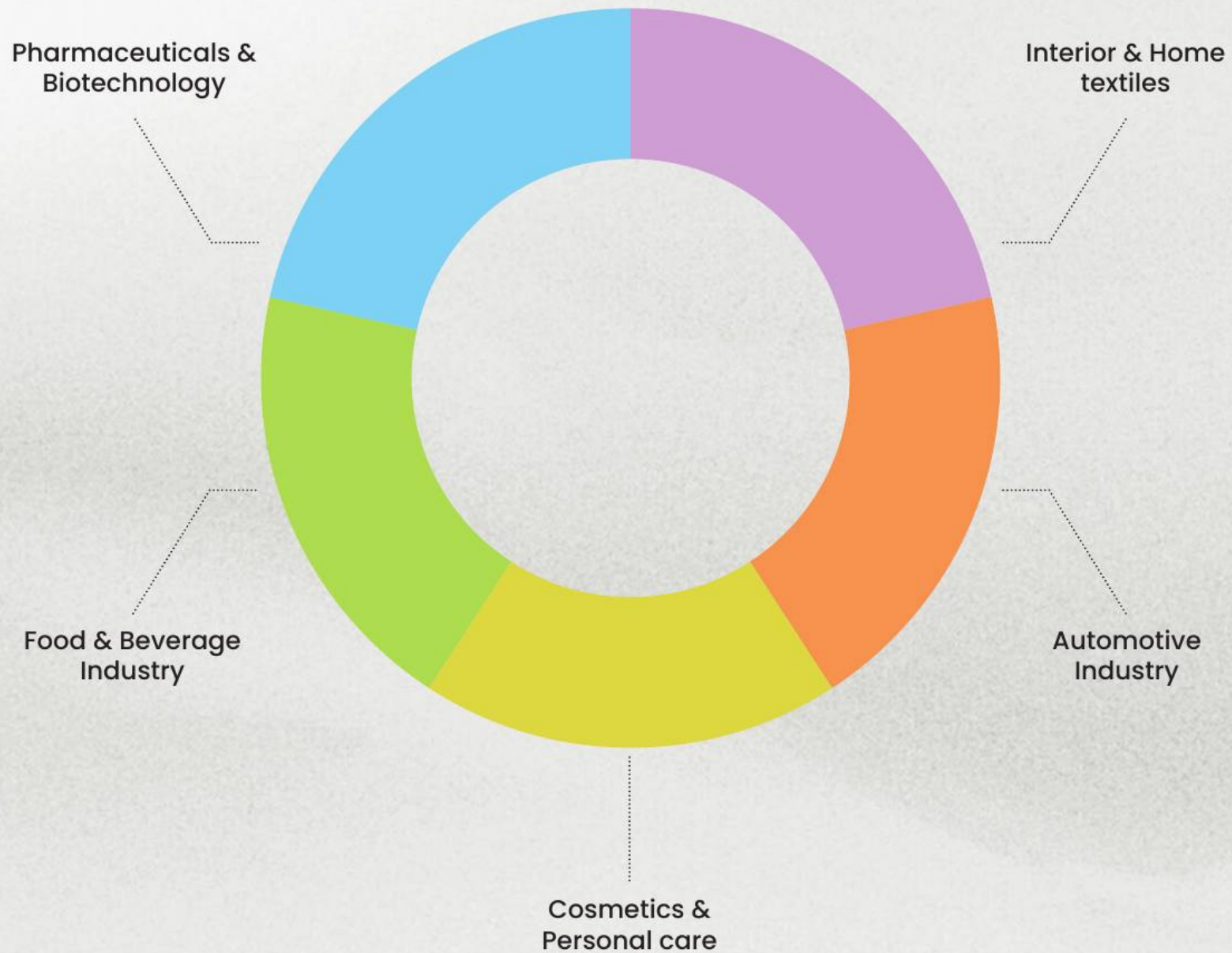
- **Proven Feasibility but Limited Scale:** Companies have successfully developed and tested their technologies, showing they work at a commercial level. However, these solutions are still not widely adopted by mass-market brands
- **Adoption by Sustainability-Driven Brands:** Early adopters in fashion have integrated these innovations into select products but major fast-fashion players haven't yet implemented them at scale due to cost and production challenges.
- **Regulatory and Consumer Pressure Driving Interest:** Governments are enforcing stricter water pollution and CO2 emissions regulations, encouraging brands to explore alternatives.
- **Cost and Scalability Constraints:** Traditional dyeing methods are deeply integrated into existing supply chains, making it difficult for large manufacturers to shift overnight.

Trend History chart





Ubiquity

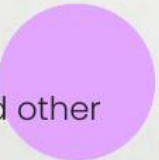




1 Interior & Home textiles:

Sustainable dyeing methods are being used for carpets, curtains, and upholstery to reduce water pollution and emissions in home decor manufacturing.

Are also exploring microbial pigments for eco-friendly, non-toxic sheets, towels, and other home fabrics.



2 Automotive Industry:

Sustainable dyeing processes are used for seats, dashboards, and upholstery in vehicles to reduce petrochemical-based dyes and water waste.

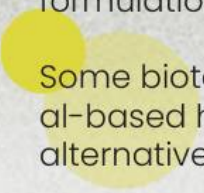
Companies like BMW and Tesla explore bio-based materials and eco-friendly dyes for a lower-carbon supply chain.



3 Cosmetics & Personal care:

Bacteria-based pigments are being explored for sustainable lipstick, eyeshadow, and skincare formulations as alternatives to synthetic dyes.

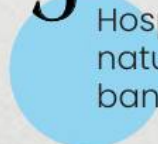
Some biotech firms are developing microbial-based hair dyes as a non-toxic, eco-friendly alternative to traditional chemical dyes.



4 Food & Beverage Industry:

Microbial pigments, particularly from bacteria and fungi, are used as natural food colorants, replacing synthetic additives like Red 40 and Yellow 5.

Companies are using bio-based dyes for sustainable food packaging to eliminate harmful inks and synthetic dyes.



5 Pharmaceuticals & Biotechnology:

Hospitals and healthcare providers are testing naturally dyed antimicrobial fabrics for uniforms, bandages, and wound dressings.

Some pharmaceutical companies are exploring microbial pigments as alternatives for synthetic color coatings in medications.

Cosmetics & Personal care

Microbial pigments used in cosmetics and personal care are naturally biodegradable, free from harmful toxins, and derived from bacteria, fungi, or algae rather than petrochemicals.

Their production relies on fermentation, requiring minimal energy and emitting fewer greenhouse gases, making them a sustainable alternative to synthetic dyes. Unlike traditional dye extraction, which demands significant water usage and chemical processing, microbial pigments can be cultivated in controlled environments with little to no water waste. Additionally, they offer a broad spectrum of vibrant, iridescent, and bio-luminescent colors that provide unique aesthetic qualities.

The importance of this innovation in the cosmetics and personal care sector lies in its ability to transform the way beauty products are formulated while reducing environmental harm.

Traditional synthetic colorants often contain petrochemical derivatives, heavy metals, and allergens that pose risks to both human health and ecosystems. Microbial pigments eliminate these concerns, ensuring safer, non-toxic alternatives for consumers with sensitive skin or ethical preferences. Moreover, the beauty industry is a major contributor to water pollution, particularly through the disposal of chemically treated products and dyes. By adopting waterless, bio-based pigment production, brands can significantly lower their ecological footprint.

With increasing consumer demand for clean beauty and regulatory shifts discouraging synthetic additives, microbial pigments present an opportunity for brands to align with sustainability goals, enhance product innovation, and appeal to a growing market of environmentally conscious buyers.



Food & Beverage Industry

Microbial pigments in the food and beverage industry are naturally derived from bacteria, fungi, and algae, offering a non-toxic and biodegradable alternative to synthetic food colorants.

Unlike artificial food dyes, which often rely on petroleum-derived chemicals and require extensive processing, microbial pigments can be produced with minimal water and energy consumption.

Additionally, as food safety regulations become stricter, microbial pigments present a compliant and health-conscious solution, reducing reliance on artificial ingredients that may pose long-term health risks.

The importance of this innovation in the food and beverage industry is rooted in both health and sustainability concerns. Many artificial food dyes, such as Red 40 and Yellow 5, have been linked to potential health risks, including allergic reactions and behavioral effects in sensitive individuals. Microbial pigments eliminate these risks by providing natural, plant-based alternatives that meet clean-label demands.

Furthermore, synthetic food dyes contribute to environmental pollution through chemical runoff and energy-intensive manufacturing processes. By transitioning to microbial pigments, food producers can lower their carbon footprint while maintaining vibrant, appealing colors in their products.

As consumers increasingly prioritize natural and organic ingredients, food brands that incorporate microbial pigments can enhance transparency, strengthen brand trust, and meet the growing demand for healthier, environmentally responsible food choices.



Pharmaceuticals & Biotechnology

Microbial pigments in the pharmaceutical and biotechnology industries are derived from bacteria, fungi, and algae, providing a natural, biodegradable, and non-toxic alternative to synthetic colorants.

Unlike conventional pharmaceutical colorants, which often contain artificial additives, heavy metals, or petroleum-derived chemicals, microbial pigments offer a cleaner and more sustainable solution.

They can be used for drug coatings, medical textiles, and diagnostic tools while maintaining stability and bio-compatibility. Additionally, as pharmaceutical regulations tighten around synthetic dyes and chemical additives, microbial pigments provide a future-proof and health-conscious alternative.

The importance of this innovation in the pharmaceutical and biotechnology sectors lies in its potential to enhance drug safety, sustainability, and patient well-being. Traditional synthetic colorants in medications have been linked to potential adverse reactions, including allergies and sensitivities, making natural alternatives more desirable for health-conscious consumers and regulatory agencies.

Microbial pigments eliminate these concerns by offering biocompatible, non-toxic solutions that meet stringent pharmaceutical standards.

By adopting microbial pigments, pharmaceutical companies can reduce their environmental impact while ensuring safer, high-quality formulations. As the demand for eco-friendly, patient-safe pharmaceuticals grows, the integration of microbial pigments can improve transparency, enhance drug development practices, and align with global sustainability goals in healthcare innovation.



Audience



Eco-Conscious Millennials & Gen Z:

Young adults passionate about sustainability, ethical consumption, and environmental activism, who actively seek out eco-friendly fashion, beauty, and lifestyle products.

Likely to engage in online discussions, follow sustainability influencers, and participate in eco-conscious movements.

High-Income Ethical Consumers:

Professionals with disposable income who invest in sustainable luxury brands.

Willing to pay a premium for innovation, ethical sourcing, and cutting-edge eco-tech solutions.

Fashion & Beauty Innovators:

Designers, fashion-forward individuals, and trendsetters who experiment with unique aesthetics, interested in bio-generated colors, iridescent effects, and innovative textiles.

Likely follows fashion tech startups and sustainable designer collaborations.

Health & Wellness Enthusiasts:

Consumers who prioritize non-toxic, biodegradable materials for skincare, cosmetics, and clothing.

Includes clean beauty advocates, vegan lifestyle followers, and organic product users.

Tech & Biotech Enthusiasts:

Individuals fascinated by biotechnology innovations in fashion and textiles.

They could be investors, startup founders and researchers in green tech themselves.

Sustainable Home Consumers:

Consumers seeking eco-friendly alternatives for home textiles, upholstery, and decor, interested in sustainable furniture, non-toxic home products, and organic fabrics.

Often aligned with minimalism, zero-waste living, and toxin-free home environments.

A person wearing a bright orange jumpsuit is lying on their back on a forest floor. The ground is covered in lush green moss and numerous mushrooms of various sizes and colors, including orange, yellow, and brown. The person's arms are spread out to the sides, and their legs are slightly bent. They are wearing white sneakers. The overall scene is vibrant and naturalistic.

Pangaia (IT):

Is a materials science-driven fashion brand committed to sustainability and innovation.

Known for its use of bioengineered fabrics, plant-based fibers, and eco-friendly dyes, the brand merges cutting-edge technology with ethical fashion.

PANGAIA has pioneered bacteria-based dyes, carbon-neutral textiles, and biodegradable materials, making it a leader in the sustainable fashion movement.

Key Influencers

Colorifix (UK):

Colorifix is a biotechnology company transforming the textile industry with its bacteria-based dyeing technology.

By harnessing genetically engineered microorganisms, Colorifix produces natural, non-toxic pigments without the need for petrochemicals, heavy metals, or excessive water usage.

This groundbreaking approach eliminates harmful waste water pollution and significantly reduces the environmental footprint of traditional dyeing.

A close-up, high-resolution image of a single, large feather. The feather is a vibrant orange color with a soft, downy texture. It is set against a dark, blurred background, which makes the feather stand out prominently. The lighting highlights the fine details of the feather's structure.

Living Colour (NL):

Living Colour is a design and research studio revolutionizing textile dyeing with bacteria-based pigments.

The brand explores biofabrication by cultivating bacteria that naturally produce vibrant, non-toxic dyes.

Through experimental collaborations with fashion brands and research institutions, Living Colour is shaping the future of bio-based textile innovation.

Vollebak (UK):

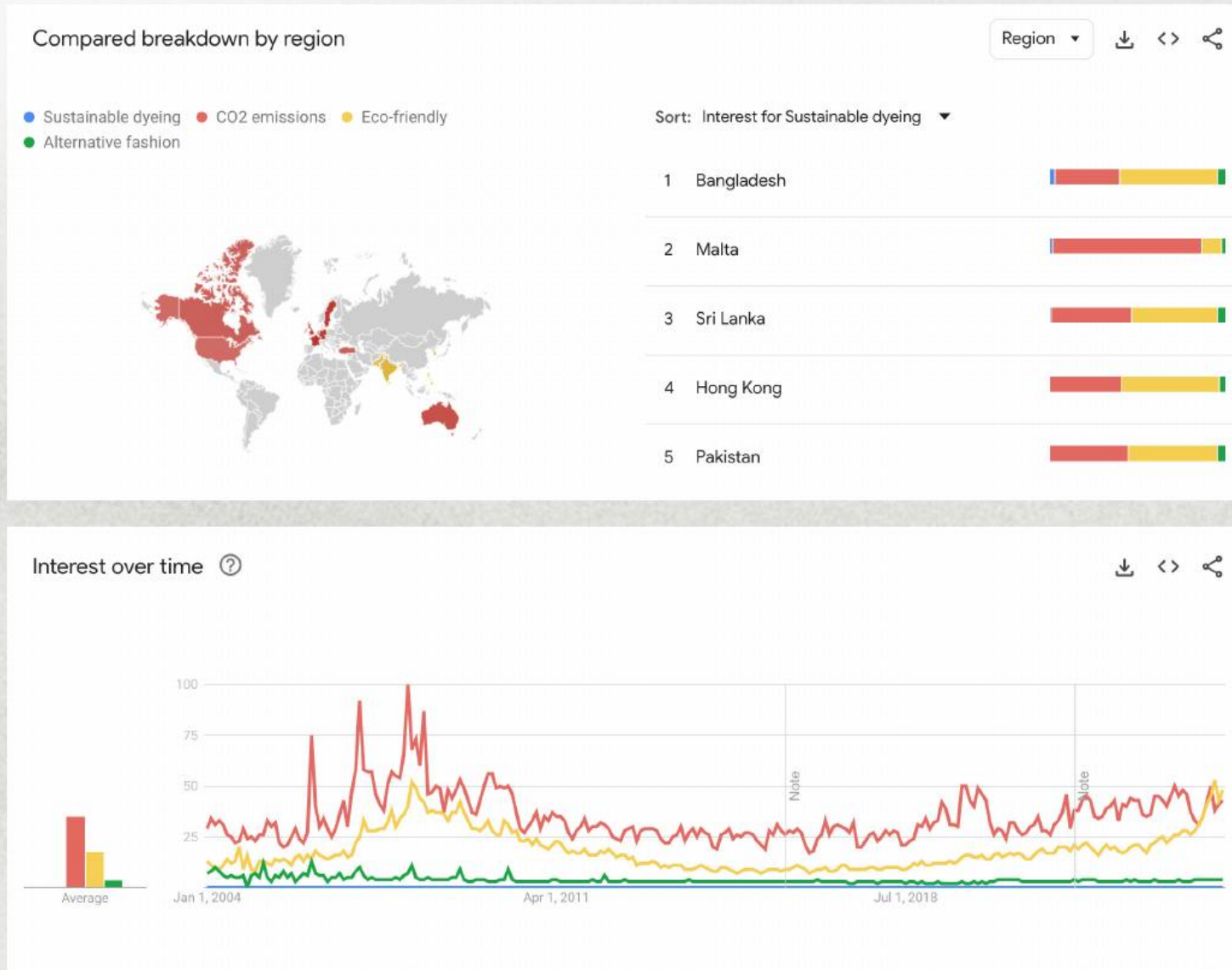
Vollebak is a cutting-edge fashion brand pushing the boundaries of science, sustainability, and innovation.

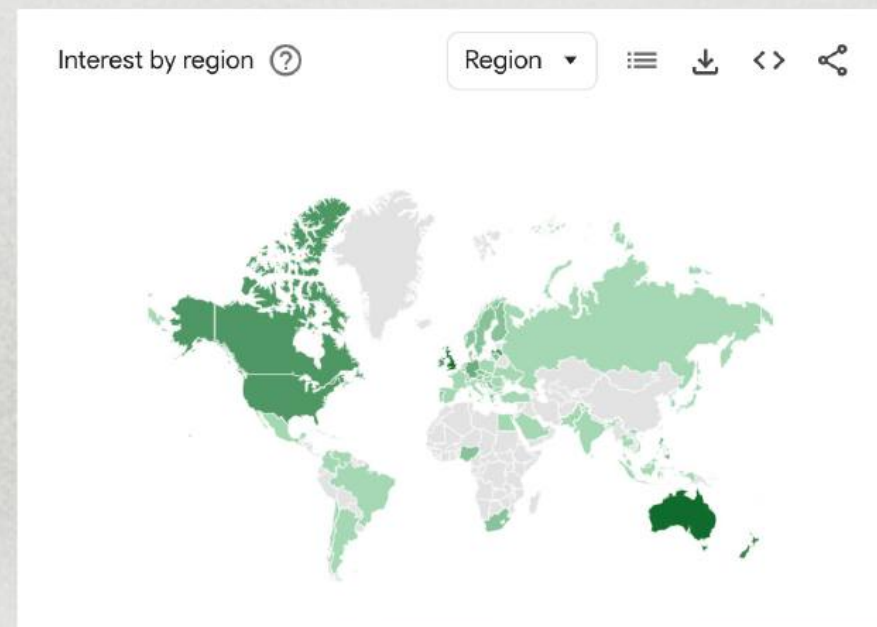
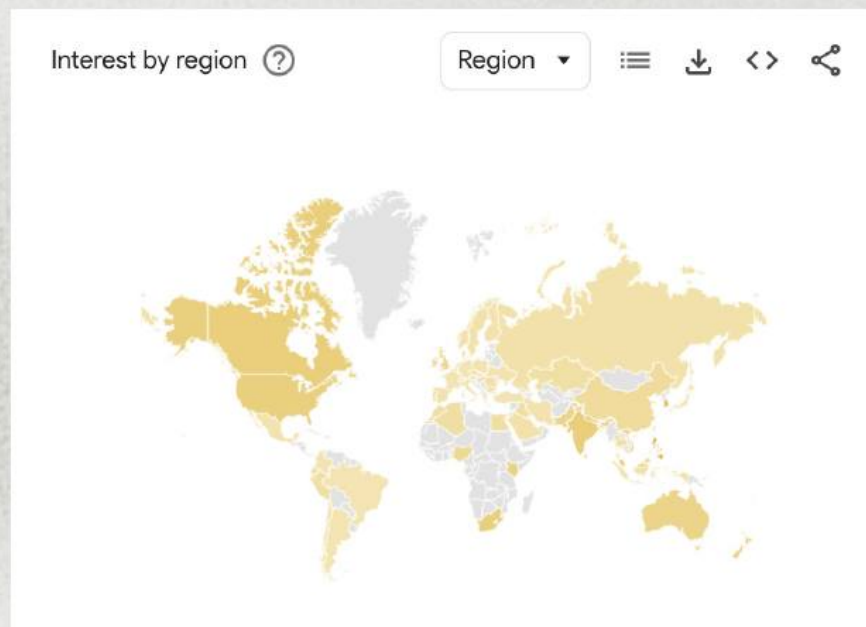
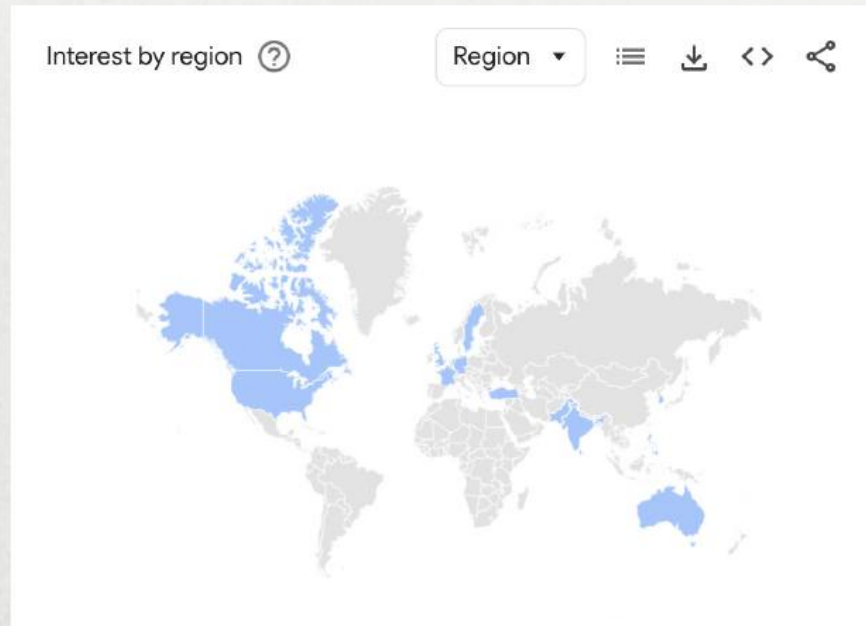
Known for its futuristic, technology-driven materials, the brand creates garments using biodegradable, bacteria-dyed, and carbon-neutral fabrics. The brand has pioneered a bacteria-dyed T-shirt, where pigments are naturally produced by microbes, eliminating the need for synthetic dyes and toxic chemicals.

In addition to the bacteria-dyed pigments, the brand is working also with the DNA to create innovative colors.

The island in the picture it's Vollebak Island, part of another project of the brand.

Google Trends







Trend Inspiration Moodboard 1

Trend Inspiration Moodboard 2



Design & Lifestyle



Well-Being & Holistic Health:

Integrate mental, physical, and environmental wellness into daily life, choosing products free from toxins, synthetic chemicals, and environmental harm.

Engage in meditation, plant-based nutrition, and minimalism.



Minimalist & Futuristic Approach:

Avoid overconsumption, focusing on high-quality, long-lasting garments that align with a circular economy mindset.



Aesthetic Experimentation:

Style is avant-garde yet natural, embracing biogenic hues, iridescent pigments, and organic textures.

Seek fashion that is both visually unique and sustainable.



Sustainable Choices:

Live in home that features natural, toxin-free fabrics and use microbial pigment-based cosmetics for skincare and makeup.

Runway & Silhouettes

All the looks are provided by tag-walk.com



Balenciaga SS24



Balenciaga SS25



Yohji Yamamoto SS25

Excessive Layering:

An excessive number of layers to convey movement and add texture to clothes.

Unstructured & Soft shapes:

Soft lines created with fabrics dropped on the body remembering the simplicity of nature.



Altuzara FW25



Christian Siriano SS25



Rick Owens FW23



Valentino SS24



Schiapparelli SS25



Schiapparelli SS25



Ganit Goldstein

Textures & Applications:

Applications with bright colors that recall the elements and microorganisms present in nature.

Draperies & Curved Shapes:

Draperies and curved lines that recall the harmony of nature.



Iris Van Herpen FW23



Iris Van Herpen FW23



Rick Owens SS23

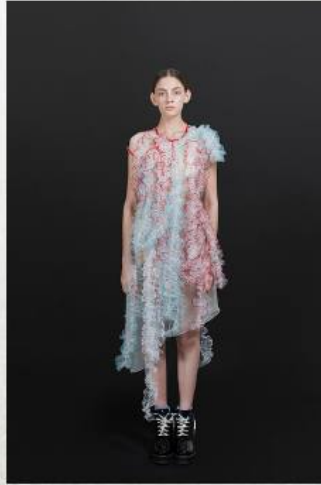


Schiapparelli SS24

Runway & Silhouettes – Special mentions



Noa Raviv



Noa Raviv



Neri Oxman Wearable 3D-printed Skins



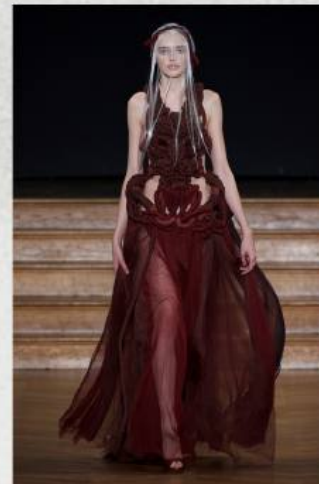
Neri Oxman Wearable 3D-printed Skins

Here are some looks, both physical and digital, which could be attributable to the characteristic shapes and colors of the EcoHue Capture trend.

Some looks are older than others, but still marked a change in the world of fashion.



Yiqing Yin FW12



Yiqing Yin SS13



Yiqing Yin SS14



Yiqing Yin SS16

Color combinations

PANTONE
374c

PANTONE
375c

PANTONE
369c

PANTONE
574c



PANTONE
805c

PANTONE
485c

PANTONE
1815c



PANTONE
2365c

PANTONE
231c



PANTONE
278c

PANTONE
2727c



Fabrics & Materials



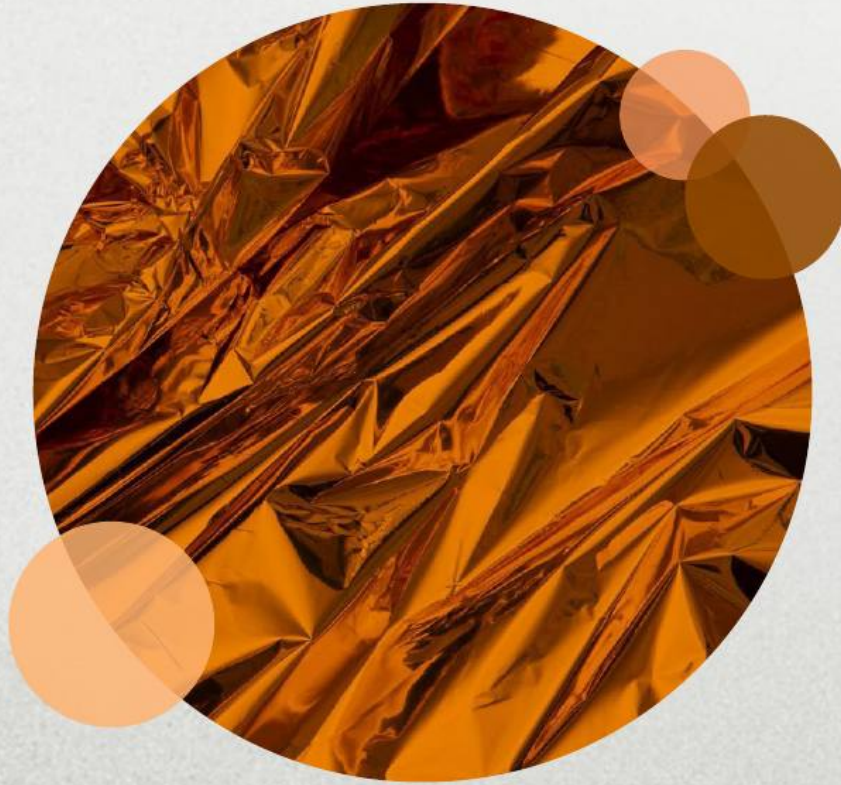
Lightweight & Sculptural Fabrics:

- Organza
- Tulle
- Chiffon



Innovative & High-Tech Materials:

- 3D-Printed Polymers
- Laser-Cut Acrylics
- Silicone & Latex
- Thermoformed Plastics



Metallic & Reflective Elements:

- Foil-Printed Fabrics
- Mirror or Reflective Materials
- Holographic Textiles



Natural & Experimental Fibers:

- Silk & Satin
- Biodegradable & Organic Textiles
- Feathers



Future design Strategies

The Future



How EcoHue Capture will evolve

Short-term: In the next 1-3 years

In the immediate future, high-end fashion brands and niche designers will continue exploring microbial dyeing and CO₂-based dyeing technologies.

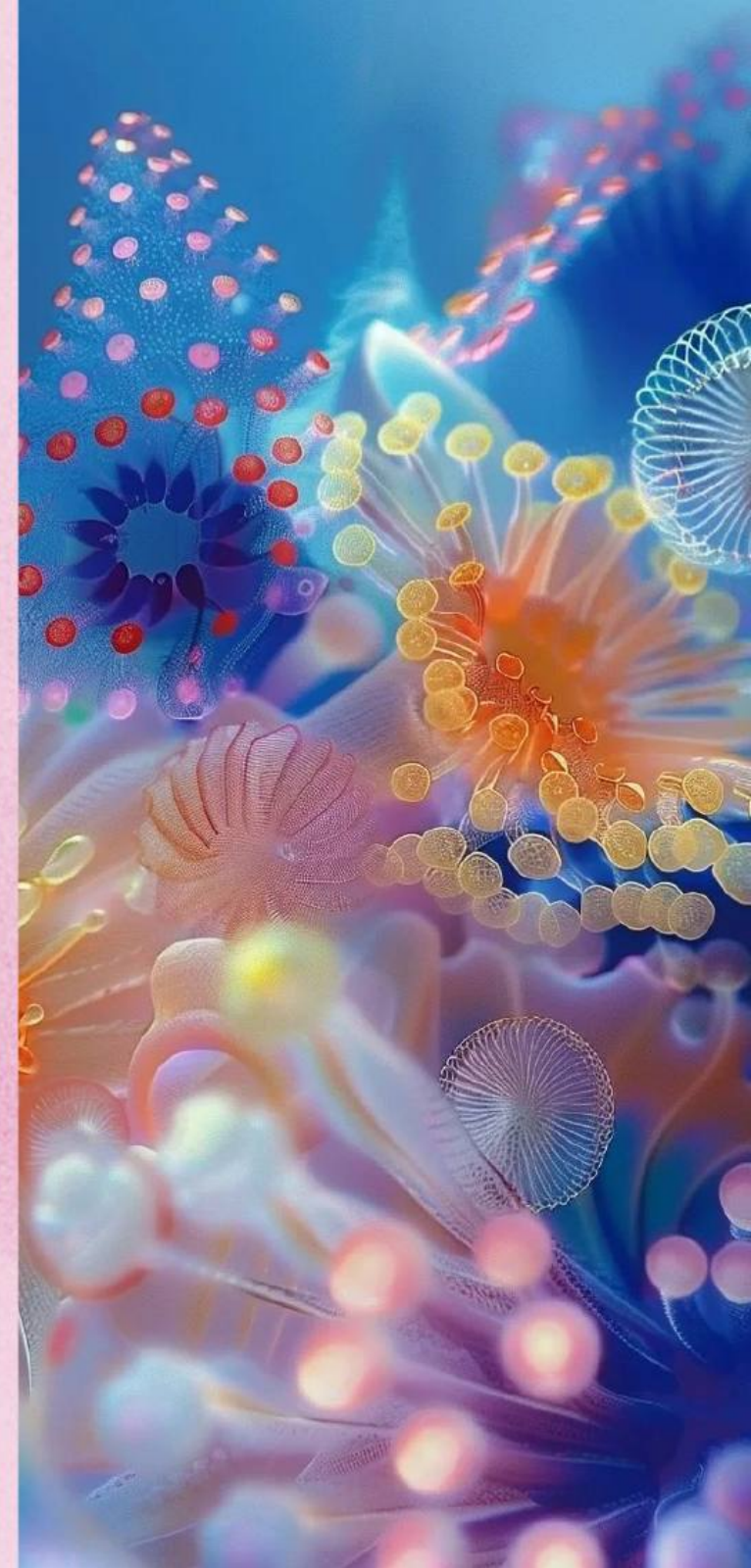
However, scalability challenges and production costs remain barriers to widespread adoption. Early adopters and eco-conscious consumers will drive demand, while governments implement stricter regulations on water pollution and synthetic dye usage.

Retailers will also test microbial dyes in home textiles, cosmetics, and sportswear, introducing small-batch collections to gauge consumer interest. Investment in biotech startups focusing on bacterial pigment production will rise, fueling further research into cost-effective and large-scale alternatives.

Mid-Term: In the next 4-7 years

The development of automated microbial dyeing facilities will allow larger volumes of textiles to be sustainably colored, reducing dependence on petrochemical-based dyes.

At this stage, biotech collaborations will expand beyond fashion, with interior design, automotive, and the beauty industry embracing bacteria-based dyes. We will see sustainable upholstery, biodegradable home fabrics, and naturally pigmented personal care products becoming mainstream. Regulatory bodies will likely ban highly polluting dyeing methods, pushing companies toward waterless and carbon-sequestering alternatives.



Long-Term: In the next 8-10 yers

By 2035, the EcoHue trend could fundamentally transform the global textile industry. Dyeing processes will actively remove CO₂ from the atmosphere, making the fashion sector a carbon-negative force rather than a polluting one. Closed-loop microbial dyeing systems will be the norm, with AI-driven production ensuring efficiency and zero waste.

Consumers will demand hyper-personalized, lab-grown colors, choosing hues generated by specific bacteria strains. The rise of self-healing and bio-responsive textiles will further push the industry toward a fusion of biotechnology, sustainability, and aesthetic innovation.

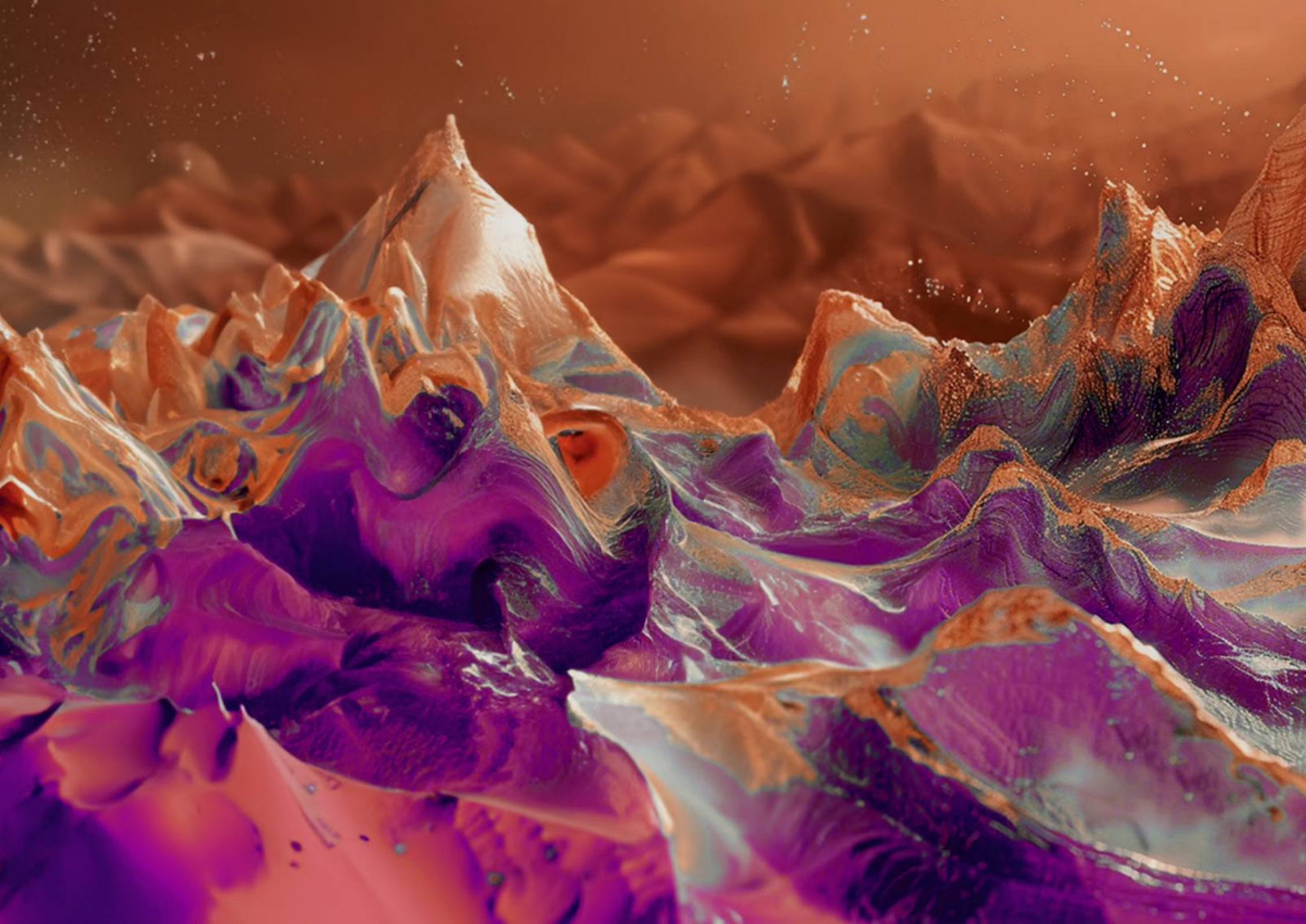
Below are written 4 important steps to reach the goals said before:

1 Expand microbial dyeing technology:
Investing in biotech research, automation, and AI-driven dyeing systems will help make microbial pigments a viable alternative to petrochemical dyes.

2 Government regulations:
Governments can introduce tax incentives, grants, and funding programs for businesses investing in waterless and bioengineered dyeing techniques.

3 Consumer awareness:
This can be achieved through storytelling, influencer collaborations, and immersive brand experiences such as interactive bio-dye workshops.

4 EcoHue Capture into fashion systems:
Instead of viewing dyeing as a linear process, where fabrics are colored and discarded, the future should involve closed-loop cycles where microbial dyes can be reactivated, reused, or even designed to evolve over time.





References

Visual references

Backgrounds

To see all the resources click directly on photos. Are all Hyperlinks.

Cover:



Index:



Cover Eco-Social Revolution:



Cover EcoHue Capture:



Cover Future design Strategies:



Cover References:



Chapters images

Some photos are linked to the same page
because they are part of a carousel.

A new point of view:



Cosmetics & Personal care:



Food & Beverage Industry:



Pharmaceuticals and Biotechnology:



Audience:



How EcoHue Capture will be:



Timeline chart images

1st image:



2nd image:



3rd image:



4th image:



5th image:



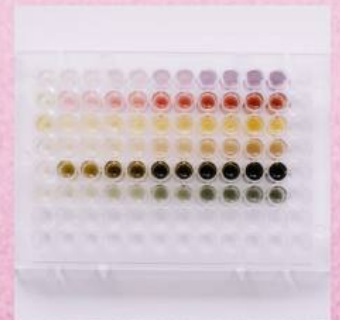
6th image:



7th image:



8th image:



9th image:



10th image:



11th image:



12th image:

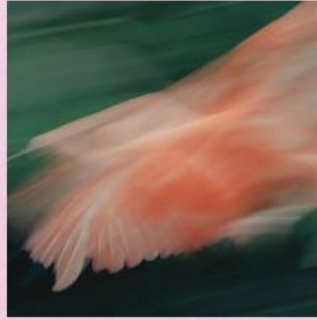


Other Photos:

PANGAIA:



Colorifix:



Living Colours:



Vollebak:



Well-Being & Holistic Health:



Minimalist & Futuristic Approach:



Aesthetic Experimentation:



Sustainable Choices:



Lightweight & Sculptural Fabrics:



Innovative & High-Tech Materials:



Metallic & Reflective Elements:



Natural & Experimental Fibers:



Moodboard 1

1st image:



2nd image:



3rd image:



4th image:



5th image:



6th image:



7th image:



Some photos have been changed to
create the moodboard.

Moodboard 2

1st image:



2nd image:



3rd image:



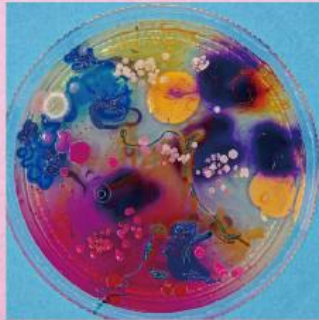
4th image:



5th image:



6th image:



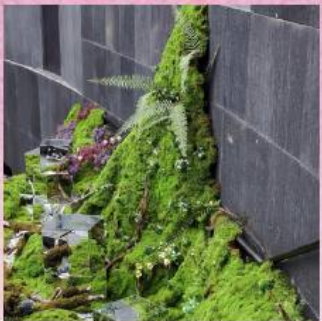
7th image:



8th image:



9th image:



Some photos have been changed to
create the moodboard.

Color combinations – mini moodboards

1st image – green:



2nd image – green:



3rd image – green:



4th image – green:



5th image – green:



1st image – b&w:



2nd image – b&w:



3rd image – b&w:



4th image – b&w:



5th image – b&w:



1st image - red:



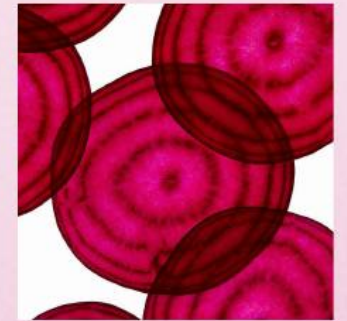
2nd image - red:



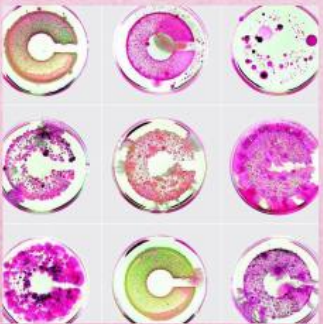
3rd image - red:



4th image - red:



1st image - pink:



2nd image - pink:



3rd image - pink:



1st image - light blue:



2nd image - light blue:



3rd image - light blue:



4th image - light blue:



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