

TECH OFFER

Vegan Leather: Sustainable, High-Performance Material from Agricultural Waste



KEY INFORMATION

TECHNOLOGY CATEGORY:

Sustainability - Low Carbon Economy

Sustainability - Sustainable Living

Waste Management & Recycling - Food & Agriculture

Waste Management

TECHNOLOGY READINESS LEVEL (TRL): TRL9

COUNTRY: INDONESIA

ID NUMBER: TO175323

OVERVIEW

The leather industry faces increasing challenges due to its high environmental impact and ethical concerns. Traditional leather production drives deforestation, greenhouse gas emissions, and water pollution, while the tanning process involves toxic chemicals. Synthetic alternatives, often made from PU or PVC, contribute to microplastic pollution and long-term waste. As industries seek sustainable and ethical alternatives, the demand for eco-friendly materials is rising.

This innovation introduces mycelium-based leather, a biodegradable, non-toxic, and low-carbon alternative. Cultivated using agricultural waste as a substrate, it eliminates the need for livestock farming, excessive water use, and harmful chemicals. The result is a high-performance material that mimics the look, feel, and durability of traditional leather while being sustainable and scalable.

Ideal for fashion, footwear, automotive, and upholstery industries, this technology meets the growing demand for eco-friendly and ethical materials. With customizable properties and scalable production, it offers a viable alternative for brands looking to reduce their environmental footprint without compromising on quality or aesthetics.

The technology owner is looking for R&D collaborations and test-bedding partners.

TECHNOLOGY FEATURES & SPECIFICATIONS

This mycelium-based leather is engineered for strength, flexibility, and durability, making it a high-performance alternative to traditional leather. It resists tearing, stretching, and abrasion, ensuring longevity even under frequent use. The material remains crack-free and flexible over time, making it suitable for applications requiring both durability and comfort.

Its colorfastness properties ensure that the material retains its color and texture, even after washing, exposure to sweat, and prolonged wear. It is resistant to staining and fading, maintaining a premium appearance over time.

From a sustainability and safety perspective, this leather is free from harmful chemicals and has natural insulating properties, making it suitable for various applications. It is also fully biodegradable, decomposing naturally within a short period, unlike synthetic leather, which contributes to long-term plastic waste.

With a significantly lower carbon footprint compared to traditional leather, this innovation provides an eco-friendly and scalable solution for industries seeking high-quality, sustainable materials without compromising on performance or aesthetics.

POTENTIAL APPLICATIONS

This mycelium-based leather technology can be deployed across multiple industries that require durable, flexible, and sustainable materials.

Fashion & Accessories

- Footwear, handbags, wallets, small leather goods, apparels

Automotive & Transportation

- Car seat upholstery, steering wheel, dashboard covering, seat interiors

Consumer Electronics

- Smartphone cases, smartwatch straps, laptop sleeves and accessories

Furniture & Interior Design

- Upholstery for chairs and sofas

Luxury Goods & Packaging

- Branded accessories for premium products

MARKET TRENDS & OPPORTUNITIES

The global leather goods market is projected to reach **USD 470 billion by 2025, with a 7% CAGR**, while the leather alternatives market is valued at **USD 150 billion**. The mycelium leather market is expected to grow from **USD 106 million to USD 5.6 billion by 2028-2030**, signaling strong industry adoption.

- **Sustainable & Circular** – Biodegradable, plastic-free, and low-carbon, offering a cleaner alternative to animal and synthetic leather.
- **Regulatory & Consumer Shift** – EU and US restrictions on animal and PU/PVC-based leather are driving demand for ethical, low-carbon materials.
- **High Performance & Cost-Effective** – Matches traditional leather in durability and aesthetics, with a lower environmental impact and scalable production.
- **Expanding Adoption** – Growing investment in bio-materials across fashion, luxury, automotive, and furniture industries, creating B2B collaboration opportunities.

UNIQUE VALUE PROPOSITION

Key Advantages Over Animal Leather

- **Sustainable Production** – No livestock farming, reducing land use by 100x, water consumption by 90%, and carbon emissions by 42%.

- **Chemical-Free Tanning** – No toxic chromium or heavy metals, preventing water pollution.
- **Ethical & Cruelty-Free** – No animal slaughter, aligning with the demand for ethical and sustainable fashion.

Key Advantages Over Synthetic Leather (PU/PVC)

- **Plastic-Free & Biodegradable** – Fully biodegrades within 90 days (ISO 14855-1), unlike PU/PVC, which contributes to microplastic pollution.
- **Lower Carbon Footprint** – Made from upcycled agricultural waste instead of fossil fuel-based materials.
- **Non-Toxic & Safe** – Free from harmful solvents and chemicals, ensuring safer consumer use.

Why Mycelium Leather?

- **Scalable & Customizable** – Easily grown and processed, with adjustable thickness, texture, and color.
- **Durable & High-Performance** – Matches animal leather in strength, flexibility, and longevity, without cracking or peeling.