

TECH OFFER

Eco-Friendly Vegan Leather: A Sustainable, Antibacterial Solution for the Fashion Industry



KEY INFORMATION

TECHNOLOGY CATEGORY:

Sustainability - Circular Economy

Sustainability - Sustainable Living

TECHNOLOGY READINESS LEVEL (TRL): **TRL7**

COUNTRY: **THAILAND**

ID NUMBER: **TO175281**

OVERVIEW

The leather industry, long dependent on livestock farming, is facing growing criticism for its significant environmental impact. Leather production contributes to deforestation, high water consumption, and the release of methane—a potent greenhouse gas—from livestock farming. Additionally, the tanning and dyeing processes generate hazardous waste and chemicals, leading to air and water pollution. While synthetic leather offers an animal-free alternative, it relies heavily on petroleum-based plastics like polyurethane (PU) and polyvinyl chloride (PVC), which contribute to microplastic pollution and rely on finite fossil fuel resources. Meanwhile, large quantities of agricultural waste, such as cocoa shells, mangosteen peels, and durian fibers, often end up in landfills, where they release methane as they decompose, further exacerbating environmental concerns.

This technology transforms agricultural waste into a sustainable, plant-based leather alternative that addresses both environmental sustainability and the rising demand for animal-free products. By utilizing discarded cocoa shells, along with mangosteen peels and durian fibers, it offers several benefits. The natural fibers from durian provide antibacterial properties, making it ideal for products like shoes, bags, and jackets prone to bacterial buildup. Additionally, the production process emits

fewer greenhouse gases, consumes less water, and repurposes agricultural waste, aligning with circular economy principles. This eco-friendly material is biodegradable and designed for recycling, offering a more sustainable alternative to traditional and synthetic leathers.

The technology owner is looking for collaborations with textile/furniture companies that focuses on sustainability.

TECHNOLOGY FEATURES & SPECIFICATIONS

Plant-Based Vegan Leather Synthesis Innovation

- **Raw Materials:** Cocoa shells, mangosteen peels, durian fibers, and other fruit peels are used as primary materials. Agricultural waste is ground into fine particles for the production process.
- **Formulation:** Materials are mixed with research-specific binding agents to create a plant-based leather precursor. Formulations and ratios are designed to ensure proper texture, elasticity, and durability.
- **Production Process:** The mixture is spun and poured into custom-designed moulds. A specialized resin coating is applied to achieve the desired thickness (approximately 0.8 mm). The material is then placed in a drying oven to remove moisture.
- **Post-Processing:** The vegan leather is cleaned and inspected for quality, including surface texture, flexibility, and durability.
- **Testing:** The material undergoes rigorous testing for surface testing, flexibility, durability and functionality.

POTENTIAL APPLICATIONS

The production process for plant-based leather emits fewer greenhouse gases and consumes less water and natural resources. Here are the potential applications, but not limited to:

- **Fashion:** Handbags, belts, outerwear and clothing
- **Upholstery and Interior Design:** Furniture coverings and automotive interiors
- **Footwear:** Sustainable anti-bacterial footwear
- **Sports equipment:** Vegan leather alternatives for sports gear – gloves or protective wear

UNIQUE VALUE PROPOSITION

- **Eco-friendly and Sustainable:** Made from agricultural by-products (e.g., cocoa husks, mangosteen peels), reducing waste and lowering the carbon footprint compared to animal leather and plastic alternatives.
- **Cruelty-free and Ethical:** Derived from plants, offering a humane alternative to animal leather, appealing to the growing demand for cruelty-free products.
- **Reduced Resource Usage:** Requires less water, energy, and chemicals than traditional leather production, minimizing harmful pollutants like heavy metals.
- **Biodegradable:** More likely to break down naturally over time, reducing long-term waste compared to synthetic leather made from PVC or other plastics.
- **Versatile and High-Quality:** Can mimic the look and feel of traditional leather, customizable in texture, colour, and finish, suitable for fashion, accessories, and automotive interiors.
- **Market Differentiation:** Meets the growing demand for sustainable, vegan products, helping brands differentiate with

eco-conscious, ethical offerings.