



Bio-Dry: A Sustainable Collagen Innovation Transforming Leather Tanning

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Participants

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Introduction

The European leather sector is a global leader, generating €8 billion annually and employing over 33,000 people across 1,600 companies. Renowned for quality, innovation, and sustainability, it stands out in the global market by producing high-value leather goods that meet strict environmental and health standards-especially when compared to other major producers like Asia.

Methodology

The most disruptive feature of Bio-Dry is the application of freeze-drying process in the production of semi-processed leather. This allows for a dry product with 50% less weight than wet-blue or wet-white leather, while maintaining high quality and durability. The elimination of fungicides and reduced water and energy use result in significant environmental benefits.

Objective

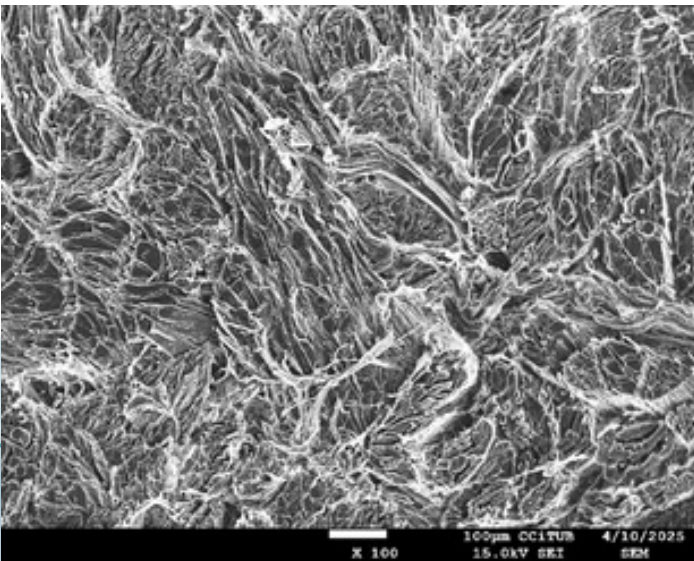
This project aims to develop and validate a new commodity of bio-leather for the tanning sector, ensuring its physicochemical characteristics to those resulting from the conventional tanning. The application of the lyophilisation technology to produce a new product (called as Bio-Dry) which is basically composed by pure collagen, will suppose a ground-breaking change with the current state of the art of leather tanning

Experimental



Results

Bio-Dry collagen prototypes are processed into leather using a fast and continuous tanning method, which reduces traditional tanning and post-tanning operations by 70–80%. This enables more agile production and faster market response while substantially lowering the environmental footprint.



	Before freeze-drying	After freeze-drying
Volatile matter	68%	14%

Contraction temperature after Chrome tanning ≥ 100



Conclusions

Bio-Dry represents a breakthrough in leather manufacturing, aligning cutting-edge technology with circularity and sustainability—redefining how leather can be produced and delivered in the 21st century.

A unlike conventional tanning methods, Bio-Dry uses a more efficient and eco-friendly process that eliminates the need for chemical preservatives and refrigeration during storage. This innovation is aligned with the Leather Working Group’s (LWG) goals of advancing sustainable practices across the leather value chain.

