



Valorization of biomass into high value products: waterproofing leather from salmon skin with oil-based coatings

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Introduction

Nowadays, the fashion industry is looking for more sustainable solutions due to the increasing environmental awareness. In particular, it aims to introduce sustainable as well as cost-effective processes. The skin of salmon is a byproduct of the mariculture industry that is often unused or used as feed for aquaculture, causing environmental problems associated with this procedure. Transforming the unused fish skin into leather, could enable it to become an industry-shifting material, in particular in fashion. This process is done in small industries that are looking for technologies to improve their properties, in particular water resistance.

In this work, performed within the H2020RISE project FishSkin, we will show a sustainable and waterproof coating for leather, avoiding the usage of petroleum-based materials, and respecting the circular economy concept.

Experimental

The fish leather was obtained by a company in the project: ViaTalenta. Oil based building blocks were used to synthesize the coating: epoxidized soybean oil and the trimer acid Pripol. The synthesis was verified by NMR and demonstrated further by evaluating the gel fraction.

Waterproofing was characterized by water contact angle.



Figure 1. Fish leather obtained from valorization of salmon skins



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Results and Discussion

The salmon skin leather, obtained, was characterized showing a peculiar microstructure, water perspiration and mechanical properties.

The coating that we developed showed improved protection against water, with contact angle as high as 110 °. The coating did not modify significantly important properties of the salmon skin leather such as breathability and flexibility.

Conclusions

Circular economy aims at the possibility to reintroduce waste and byproducts into the value chain. Materials technologies are needed to develop this new paradigm. In this work we showed how the salmon skins from aquaculture, a waste for the food industry, can become a high added value material: fish leather. The properties of this leather were improved by using other byproducts of the food industry: oil-derived building blocks, creating a new high performance and high added value product.

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Biography

Giovanni Perotto is a Researcher at the Istituto Italiano di Tecnologia, in Genova.

He has a PhD in Scienza ed Ingegneria dei Materiali from the Università di Padova. During his Master and PhD he was working in collaboration with European Synchrotron Radiation Facility in Grenoble. After the PhD he spent three years at Tufts University in Boston (MA), working on the material science of silk fibroin in the group of Fiorenzo Omenetto.

He joined IIT in 2015, working on engineering proteins (silk, keratin, collagen, zein) and vegetable biomass into materials, especially for technological applications: electronics, packaging and nanomedicine. His work is focused on developing the technologies required for the transition to a circular economy of materials.