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Advancing the *Pinus pinea* value chain through integrated bioresource valorization

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Abstract

The Pilot Project for the Valorization of *Pinus pinea* in the Central Region of Portugal aimed to strengthen regional development by promoting sustainable forest management and expanding the Pinus pinea value chain. Through collaboration among public institutions, research entities, and local stakeholders, the project explored innovative economic opportunities arising from the valorization of *Pinus pinea* products and by-products. Building on this initiative, the project Pineaceutic 2.0 and PhD project "*Pinus pinea* pine nut shells as eco-friendly solutions for soilless cultures" was developed as a continuation of this regional effort. The research focused on characterizing the chemical composition of pine nut shells, a major industrial by-product, and evaluating their potential as sustainable substrates for soilless horticulture. The project also aims to find sustainable disease management solutions for bacterial diseases in agricultural ecosystems and sustainable alternatives to synthetic agrochemicals as plant growth

promoters. By aligning scientific innovation with territorial development strategies, the project promotes the circular economy, supports the substitution of synthetic agrochemicals, and adds value to local forest resources. The results highlight the potential of *P. pinea* nut shells to contribute to more sustainable agricultural systems while reinforcing the economic and environmental resilience of the Central Region of Portugal.

Short Bio

Dulcineia Ferreira Wessel is Professor Coordinator at Polytechnic Institute of Viseu, Portugal. She has implemented within twelve years 11 RD&I projects at IPV, in cooperation with the industry, leading multidisciplinary teams at national and international level, generating new ideas, tools, methodologies and knowledge that were transferred to the SMEs for their economic, social, and environmental benefit. Some main new ideas were on valuing traditional agri-food products, biowaste and by-products, promoting the deployment of innovative technology and creation of value-added products, where she set out to bridge the gap between academia, industry, and agribusiness. She was scientific coordinator of the Pilot Project for the Valorization of *Pinus pinea* in the Central region of Portugal, where a co-creative and multi-actor approach was implemented. Presently coordinator of the EU PRIMA project InovFarmer.MED: Improving Mediterranean supply chain through innovative agri-food business models to strengthen small-scale farmers competitiveness, using prickly pear and fig as case studies to promote sustainable and competitive Mediterranean agri-food systems (https://inovfarmer-med.org/pt-pt/).