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Enhancement of Agro Food Chain Byproducts through Innovative and Sustainable Methods
Project Acronym: eAfoBy

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REPORT – THIRD TRAINING FOR EXPERTS

Universidade do Porto, PARTNER (P2)

01.09.2025-05.09.2025

The third specialists' training was conducted over a five-day period, from **1 to 5 September 2025**, in **Porto, Portugal**, and in selected agro-food industrial locations in the Trás-Os-Montes region and Rio Tinto. The program was organized by the **Faculty of Pharmacy, University of Porto**, within the framework of the ERASMUS KA project *"Enhancement of Agro Food Chain Byproducts through Innovative and Sustainable Methods"*, and focused on the development of new products from agri-food by-products, their nutritional characterization, and food safety and quality assessment. The training was entitled *New products elaboration with agro-food chain by-products, nutritional aspects, food safety and food nutritional quality*.
The experts attendance list was as follows:

- Coordinator (CO): Maria Simona Chis, Adriana Paucean, Anca Corina Farcas, Anamaria Pop
- P1 (UPV) – Purificacion Garcia Segovia, Javier Martínez-Monzó.
- P2 (Universidade do Porto): Maria Beatriz Prior Pinto Oliveira, Anabela Costa, Helena Ferreira de Sousa, Rita Alves
- P3 (Universitatea de Stiintele Vietii „Regele Mihai I" din Timisoara): Monica Negrea, Ersilia Alexa, Cornelia Chet
- P4 (Rompan): Daniela Voica, Dana Avram

The first day was dedicated to the formal opening of the training and the establishment of its scientific and organizational framework. Following participant registration and official welcome addresses delivered by the training coordinators and the Dean of the Faculty of Pharmacy, the host institution presented its academic profile, research infrastructure, and role within the project

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consortium. Subsequently, project coordinators and partner representatives outlined the strategic objectives of the training activities and their integration into the broader project work plan.

The afternoon session initiated the technical component of the program, focusing on the **manufacture of novel food products using agro-food chain by-products**, with particular emphasis on the valorization of Romanian and Mediterranean residues. This session combined theoretical exposition with applied technological considerations, addressing formulation strategies, processing constraints, and preliminary safety and quality parameters. The day concluded with a structured discussion synthesizing methodological challenges and research perspectives.

The second day was devoted to field-based learning within the olive oil production sector. Participants visited olive groves and processing facilities in the Trás-os-Montes region (Alfândega da Fé), observing the complete technological chain from fruit reception and milling to oil extraction and storage of olive pomace. This was followed by a technical visit to an industrial unit in Frechas (Mirandela) specializing in the storage and year-round processing of olive pomace for the production of pomace oil and biomass intended for energy recovery. In the afternoon, an expert-led discussion addressed critical aspects of the olive oil value chain, with particular focus on by-product management, processing technologies, environmental impact, and regulatory and food safety challenges. The group then returned to Porto.

The third day focused on the biochemical, nutritional, and microbiological characterization of agro-food by-products and their technological applications. A series of scientific presentations examined the nutritional and bioactive properties of diverse by-products, strategies for their valorization, the application of cladodes flour in Mediterranean bakery products, and the chemical and microbiological dynamics of naturally fermented olive pomace.

Further sessions continued the theme of innovative product development, presenting case studies on the incorporation of Romanian and Mediterranean by-products into new food matrices. The day concluded with a final segment on product manufacturing methodologies and an extended discussion on functional properties, safety assessment, and quality optimization.

The fourth day combined industrial exposure with laboratory-oriented applied research. In the morning, participants visited a coffee roasting facility in Rio Tinto, where they examined processing stages from green coffee beans to packaged roasted products, with particular attention to the generation of coffee silverskin as an industrial by-product.

Subsequent lectures and practical sessions focused on the transformation of coffee by-products “from waste to taste,” including experimental evaluation of their chemical composition after simulated gastrointestinal digestion, assessment of prebiotic potential, investigation of metabolic syndrome management properties, and characterization of protein fractions in coffee silverskin. Additional laboratory activities addressed the nutritional evaluation of foods enriched

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with by-products, followed by a structured discussion of methodological limitations and industrial scalability.

The final day concentrated on advanced methodological approaches for assessing nutritional quality. A dedicated session examined in vitro digestion models for estimating the bioavailability of bioactive compounds from agro-food by-products, emphasizing their relevance for functional food development and risk–benefit evaluation.

The training concluded with a plenary discussion synthesizing scientific outcomes, technological challenges, and future research directions, followed by an informal closing session.