

OLIVE2NEW - Repurposing Olive Oil By-products into Sustainable Health and Nutrition Products

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Abstract:

Each year, olive oil production in the Mediterranean and other regions generates millions of tons of solid and liquid residues, creating environmental, economic, and public health challenges within a One Health perspective. For every 100 kg of extra virgin olive oil, around 500 kg of residues are produced, retaining up to 53% of total polyphenols, particularly hydroxytyrosol, while the final oil contains only about 2%. Notably, olive-derived polyphenols are the only ones recognized by EFSA as protecting blood lipids from

oxidative stress, supporting EU-authorized health claims, and strong commercial relevance.

Olive2New is a circular-bioeconomy project developed by EntoGreen, Tecnocosmética, Euromed, and CBIOS (Universidade Lusófona), aimed at transforming olive oil by-products into renewable bioactive ingredients for human and animal health. The project uses Black Soldier Fly (BSF) larvae fed on diets containing ~85% olive pomace. This biotransformation converts waste into nutrient- and bioactive-rich insect biomass, providing sustainable protein and lipid sources while enabling recovery of olive polyphenols from BSF larval oil, establishing a closed-loop bioeconomic model.

Green extraction technologies (microwave- and ultrasound-assisted extraction) combined with chromatographic analysis (HPLC-MS) are used to optimize extraction and preliminary isolation of polyphenols from olive pomace and BSF larval oil. Extraction prioritizes green solvents (ethanol and hydroalcoholic mixtures). Extracts are biologically evaluated for cytotoxicity, eco-toxicity, antioxidant activity, and enzyme inhibition related to anti-aging and skin health.

Tecnocosmética and Euromed will incorporate selected extracts into health product formulations, validating stability, performance, and regulatory compliance. The project integrates *in silico* approaches for computer-aided extraction design, enhancing mechanistic understanding. Olive2New involves early-career researchers and MSc and PhD students, promoting capacity building and knowledge transfer.

By valorizing olive by-products through insect bioconversion and green extraction, Olive2New supports the EU Circular Economy Action Plan, the EU Bioeconomy Strategy, the European Green Deal, and contributes to SDGs 3, 12, and 13, fostering sustainable innovation and eco-efficient growth in health-related products.

validated extracts and formulations to reach commercialization and drive eco-innovative growth in the health products sector.

Olive2New supports the EU Circular Economy Action Plan, the EU Bioeconomy Strategy, and the European Green Deal within the One Health framework, fostering resource efficiency, innovation, and environmental protection. The project contributes directly to the UN Sustainable Development Goals (SDGs):

- SDG 13 – Climate Action: by reducing waste and emissions;
- SDG 12 – Responsible Consumption and Production: through circular resource use;

- SDG 3 – Good Health and Well-being: by developing natural, health-promoting products.

By integrating academic research, industrial expertise, and One Health principles, Olive2New demonstrates how environmental sustainability, insect-based bioconversion, and human health can advance together. It reduces environmental impact, lessens dependence on fossil resources, and promotes green growth and innovation.

Partners:



Image of the project:

