DOTTORATO DI RICERCA IN BIOLOGIA CELLULARE E DELLO SVILUPPO

41 CYCLE
Project proposal for a Sapienza PhD scholarship

Research line covered by Horizon Europe Project OLinWASTE -Prof. Lionetti

Title: Smart and Sustainable Biorefining of Olive Mill and Biorefinery Exhaust Flows into Biocompounds for Soil and Plant Health and in Bioenergy

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https://research.uniroma1.it/researcher/f0c0beb7b319419965ee72623ca59591d5988869e3c7e72a2f565d4f

Summary (max 500 words)

The PhD project is an integral part of the HORIZON EUROPE initiative, specifically the OLinWASTE project, which aims to establish a zero-emission system for the management of olive mill waste. The project boasts a robust consortium of leading universities, research institutes, and industry partners, all dedicated to setting new benchmarks in sustainable waste management and renewable energy production. By fostering collaboration among these diverse stakeholders, we will leverage their expertise and resources to create a comprehensive framework for addressing the challenges of olive mill waste. Furthermore, the project will emphasize collaboration with biorefineries, utilize AI-driven analyses, and incorporate nanomaterial integration.
In alignment with the principles of circular economy and green chemistry, the PhD project focuses on the upcycling of agro-industrial by-products, specifically Olive Pomace and Digestate, into bioactive plant bioimmunostimulants, biopesticides, biofertilizers, and bioenergy. By adopting this innovative approach, we aim to significantly minimize greenhouse gas emissions, reduce soil pollution, optimize resource efficiency, and facilitate the development of eco-innovative alternatives to chemical pesticides.

Pertinent Publications of the proponent

- Greco, M, Kouzounis D, Fuertes-Rabanal M, Gentile M, Agresti S, Schols HA, Mélida H , Lionetti V (2024). Upcycling Olive Pomace Into Pectic Elicitors for Plant Immunity and Disease Protection. Plant Physiology and Biochemistry 217: 109213.
- Greco M, Fuertes-Rabanal M, Frey C, Grosso CD, Coculo D, Moretti P, Lionetti V. (2024) Phenolic compounds-enriched extract recovered from two-phase olive pomace serves as plant immunostimulants and broad-spectrum antimicrobials against phytopathogens including *Xylella fastidiosa*. Plant Stress. 14: 100655
- Del Corpo, D, Coculo, D, Greco, M, De Lorenzo, G, Lionetti, V. (2024). Pull the fuzes: Processing protein precursors to generate apoplastic danger signals for triggering plant immunity. Plant Communications (Cell Press) 5, 100931
- Vicré M, Lionetti V (2023). Plant cell wall in pathogenesis, parasitism and symbiosis,

Volume II. Front Plant Sci. 14:1230438.
- Swaminathan S, Lionetti V, Zabotina OA (2022). Plant Cell Wall Integrity Perturbations and Priming for Defense. Plants. Dec 15;11(24):3539.
- Sciubba F, Chronopoulou L, Pizzichini D, Lionetti V, et al (2020). Olive mill wastes: a source of bioactive molecules for plant growth and protection against pathogens. Biology. 9: 450