
NAME: Carmen Laezza

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POSITION TITLE: Postdoc at the Department of Agricultural Sciences, University of Naples Federico II

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date MM/YYYY	FIELD OF STUDY
University Federico II, Napoli	DVM	10/2020	Biological Sciences
University Federico II, Napoli	PHD	02/2025	Food Science

A. Personal Statement

I am a postdoc at the Department of Agricultural Sciences, University of Naples Federico II. During my PhD in Food Science I have been working on the development of plant biotechnologies – callus and suspension cell cultures – for the production of high-value natural compounds, leading to the collaboration with research groups from some of the most prestigious institutes in Europe as Max Planck Institute for Chemical Ecology and the University of Oulu, publication of impactful scientific papers and participation into national and international conferences. In particular, my work has focused on using cell cultures from different Annurca Apple tissues and mass spectrometry to investigate the production of two compound classes: dihydrochalcones and triterpenic acids. These bioactive metabolites were demonstrated to have antioxidant, antibacterial and wound-healing potential. These results also led me to become CEO of Immunoveg s.r.l, spin-off of the University of Naples Federico II, a micro-enterprise operating in the plant biotechnology sector.

Recently, I have been involved in the European project HORIZON-MSCA-2022, for the study of plant extracellular vesicles to explore their antioxidant and anti-inflammatory activity.

In summary, I have the training and motivation necessary to successfully carry out the proposed research project.

Ongoing and recently completed projects that I would like to highlight include:

SE-01 101131175

HORIZON-MSCA-2022-

G. Pocsfalvi (PI)

1 March 2024, end date 29 February 2028.

FarmEVs project. Plant Extracellular Vesicles Farming for both plant and human health.

Amount: €1,021,000.00

Projects of Significant National Interest (PRIN) 2023 – 2025

V. D'Amelia (Project Leader) Amount: €206,000.00

Duration: 2 years: 2013-2025

"TRANsIT: TRacking down the balance between polyphenols And Senescence for biotic stress tolerance In potato"

Citations (selected):

1. Laezza C., Heinicke S., Wurlitzer J., D'Amelia V., Caputi L., Rigano M. M., O'Connor E. S. Single-cell mass spectrometry reveals heterogeneous triterpenic acid accumulation in apple

callus-derived cells. Submitted to Plant Biotechnology Journal - bioRxiv –
<https://doi.org/10.1101/2024.12.08.627150>

2. Laezza C., Maisto M., Imbimbo P., Monti Maria D., Verrillo M., Di Loria A., Monti Maria S., Marzocchi A., Grieco P., Tenore G., D'Amelia V., Rigano M.M, 2024. Elicitor-mediated simultaneous accumulation of phloridzin and ursolic acid in Annurca apple peel-derived calli. Journal of the Science of Food and Agriculture, 105, 3.
<https://doi.org/10.1002/jsfa.13955>
3. Laezza C., Francesca S., Barone A., Rigano M.M, 2024. Genetic and biotechnological approaches to preserve food quality against climate change. Food and Agricultural Immunology, 35, 1. <https://doi.org/10.1080/09540105.2024.2358795>
4. De Filippis A., D'Amelia V., Folliero V., Zannella C., Franci G., Galdiero M., Di Loria A., Laezza C., Monti S. M., Piccinelli A. L., Celano R., Rigano M. M. 2024. *Cistus incanus*: a natural source of antimicrobial metabolites. Natural Research Product, 1-14.
<https://doi.org/10.1080/14786419.2024.2335353>
5. Laezza C., Imbimbo P., D'Amelia V., Marzocchi A., Monti Maria D., Di Loria A., Monti Maria S., Novellino E., Tenore G., Rigano M.M. 2024. Use of yeast extract to elicit a pulp-derived callus cultures from Annurca apple and potentiate its biological activity. Journal of Functional Foods, 112, 105988. <https://doi.org/10.1016/j.jff.2023.105988>

B. Positions, Scientific Appointments, and Honors

Positions and Scientific Appointments

April 2025	Visiting Postdoctoral Researcher, University of Oulu, Oulu-Finland
2025 - Present	Postdoctoral researcher, Department of Agricultural Sciences, Napoli-Italy
2024 - Present	CEO of Immunoveg s.r.l, Department of Agricultural Sciences, Napoli-Italy
August 2024	Visiting PhD Researcher, University of Oulu, Oulu-Finland
2023 – 2024	Visiting PhD Researcher, Max Planck Institute for Chemical Ecology, Jena-Germany
2021 – 2024	PhD in Food Science, Department of Agricultural Sciences, Napoli-Italy

C. Contributions to Science

During my PhD activity, I established and optimized callus cultures from a range of plant species, including *Malus pumila* (Annurca variety), *Cistus creticus*, and *Solanum lycopersicum* (Patanara variety). These systems were developed to explore the biosynthesis of bioactive secondary metabolites, with a particular focus on dihydrochalcones and triterpenic acids—compounds of interest for their antioxidant, antibacterial, and antidiabetic properties. Through hands-on work, I developed strong expertise in analytical platforms such as LC-MS/MS and GC-MS to investigate the metabolic pathways involved in the production of these compounds.

As part of this work, I learned to isolate and analyze single cells derived from callus cultures, applying metabolomic techniques to characterize the heterogeneity within cell populations. This approach proved critical for understanding variability in metabolite production and for informing strategies for scale-up, a key consideration in the sustainable biotechnological exploitation of plant cell cultures.

More recently, my research has expanded to include the extraction and characterization of nanovesicles from both whole plants and plant cell cultures. I have investigated their antioxidant, anti-inflammatory, and wound-healing properties with *in-vitro* studies on THP-1 and Caco-2 human cells, positioning this work at the interface of plant biotechnology and biomedicine.

These experiences have equipped me with a solid foundation in experimental design, analytical chemistry, and translational research, all grounded in a strong curiosity about the bioactive potential of plant-derived systems. Together, these multidisciplinary efforts reflect my commitment to

innovation in biotechnologies and the advancement of environmentally sustainable plant-based solutions.

Complete List of Published Work in MyBibliography:

<https://scholar.google.com/citations?user=Tuix2ZYAAAAJ&hl=it>