

NEWSLETTER



On 19 November 2025, we officially launched our MSCA Staff Exchanges project, GuardAgents. This milestone marked the beginning of an exciting research journey aimed at developing innovative and sustainable solutions to combat plant diseases-reducing reliance on chemical treatments that pose significant challenges to the environment.

Our team consists of early-stage and experienced researchers from both academia and industry, all driven by a shared passion for advancing the research. Through secondments over the four years of the programme, we aim to promote the exchange of knowledge, training, expertise, and ideas, while extending the project's impact well beyond its initial scope.

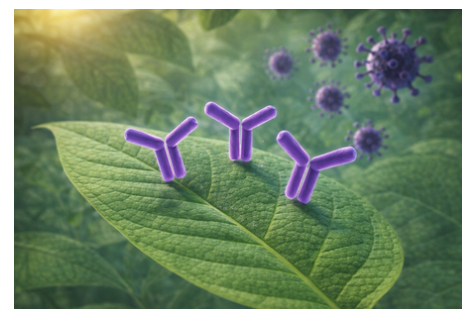
REDUCING CHEMICAL PESTICIDES: THE GROWING ROLE OF BIOPESTICIDES

The growing reliance on chemical pesticides raises serious concerns for human health, environmental sustainability, and global food safety. Pesticide use contaminates soil and water, harms non-target organisms,

and threatens biodiversity. With plant viruses responsible for nearly half of all plant diseases worldwide and causing extensive annual economic losses, the demand for effective yet sustainable crop protection is urgent. Europe sets ambitious targets to cut chemical pesticide use by 50% by 2030, accelerating the transition toward **biopesticides** as safer, environmentally friendly alternatives. The GuardAgents project will carry out innovative research to generate novel, sustainable biopesticides.



HOW PLANTS WILL DEFEND THEMSELVES: A NEW WAY TO FIGHT CROP VIRUSES



The GuardAgents project aims to develop a new way to protect crops from Cucumber Mosaic Virus (CMV), a common virus that affects important plants, such as cucumbers and tomatoes. Instead of spraying chemical pesticides, the project will study an innovative approach in which plants will protect themselves. This will be done by enabling plants to produce nanobodies, which are very small antibodies that will recognize and block the virus. Using a method known as molecular farming, plants will become their own defense system, offering a safe and sustainable alternative to chemical treatments.

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GuardAgents brings together researchers from Universities and SMEs across 2 European countries: **Greece** and **Czechia** along with 2 Horizon Europe associated countries: **Serbia** and **Türkiye**.



The project brings together a dynamic consortium of 6 partners from both academia and industry, building on existing collaborations while also creating new ones.

United by a common goal, the consortium is working to develop next-generation biopesticides to combat Cucumber Mosaic Virus (CMV), a serious threat to crops worldwide. By strengthening plants' natural resistance to this virus, the project aims to support more sustainable agriculture and help safeguard global food production.

1. REZOS BRANDS



Project's Coordinator and Dissemination Leader

REZOS BRANDS S.A will be responsible for the development of an exploitation strategy to explore and propagate the project's results and the development of a business plan to highlight the strategies for a business to bring the project's results into the market.

REZOS BRANDS S.A is an agri-food SME, with expertise in superfoods and functional foods, established in Patras, Greece. The company has adopted the vertical business model: "from Farm to Fork" and has invested in the organic cultivation of superfoods at a farm located at the centre of the protected area of Natura 2000 network (Central Greece). The company's philosophy is the continuous improvement in the fields of R&D, training, networking on farming and food, sales, marketing, and distribution.

2. UPAT



Beneficiary participating in the consortium with two Departments:

1. Department of Pharmacy and 2. Department of Sustainable Agriculture.

The Department of Pharmacy will be responsible for the design, production and purification of the nanobodies. They will also lead the nanobodies' production in medium and large lab scale.

The Department of Sustainable Agriculture will be responsible for the generation of genetically transformed plants, cultivation, harvesting and processing processes for the nanobodies' production in plants.

The University of Patras was founded in the city of Patras in 1964 and is currently the third largest University in Greece regarding the size of student potential, Faculty Members, Administrative Personnel, number of Departments, and accredited student titles. The lab facilities of UPAT's Department of Pharmacy (PI: Dr. Georgios A. Spyroulias) host currently 4 Post-Docs, 6 PhD students and 6 Master's students. The group has expertise on Biochemistry and Protein Chemistry, Conformational and Functional Dynamics. The Department of Agricultural Sciences at UPAT is a key hub for agricultural research and education, placing strong emphasis on plant-microbe interactions and plant disease management. The Laboratory of Systems Microbiology and Applied Genomics under the leadership of Prof. George Tsiamis, plays a pivotal role in exploring microbial communities, focusing on plant symbiosis and their impact on plant health.

3. METU



Beneficiary

METU will be responsible for activities involving harvesting and extraction of *in vivo* produced nanobodies, bioaccessibility/bioavailability studies and microscopy image analysis.

Middle East Technical University (METU) has been a pioneer in Turkish higher education, introducing innovative methods and fostering modern education nationwide. As a EURAXESS Service Centre since 2015 and a holder of the 'HR Excellence in Research Award' since 2020, METU is committed to excellence in research and education, aligning with European standards.

4. MU



Beneficiary

MU will be responsible for the biophysical characterization of the nanobodies produced by plants and compare their characteristics with the nanobodies produced by E.coli.

Central European Institute of Technology MU – an independent university institute established at Masaryk University and a key part of a state-of-the-art research infrastructure providing top equipment and optimal conditions for basic and applied research in the field of life sciences. CEITEC MU provides access to 11 core facilities equipped with cutting-edge technologies in life, nanotechnologies and material sciences.

5. PRINSUS



Beneficiary

PRINSUS will be responsible for the Environmental and Economic Evaluation of the systems that will be developed through the project.

PRINSUS is one of the first spin-offs of National Technical University of Athens (NTUA), established on October 2022. The core activities of PRINSUS are the provision of services to the agri-food sector in order to develop innovative products, to upgrade and evolve into new technologies and business models and to increase their competitiveness in national and international markets. The company is interested in creating a global partnership in a wide range of scientific research projects (food, pharmaceuticals and cosmetics industry, bio-industry, process development, eco-innovation, life cycle assessment, feasibility studies) and undertaking competitive research projects that will lead to high scientific results and commercialized products.

6. AGROUNIK



Beneficiary

AGROUNIK will be responsible for evaluating the impact of nanobodies on soil chemical properties and microbial biodiversity, as well as monitoring of the plant's response mechanisms triggered by the application of the nanobodies

Agrounik is a biotechnology company specializing in microbiological solutions for agriculture. Its expertise lies in developing bio-based products that improve soil health, enhance crop productivity, and contribute to sustainable farming practices.

WP1

DESIGN, IN VITRO PRODUCTION AND BIOPHYSICAL CHARACTERIZATION OF NANOBODIES

Objectives:

1. Cloning, expression and purification of different nanobodies
2. Biophysical characterization of nanobodies using CD, NMR, SEC-MALS etc.

WP2

APPLICATION OF NANOBODIES AS A MEANS OF PREVENTION OR RESPONSE TO PLANT VIRAL INFECTIONS AND IN VIVO PRODUCTION

Objectives:

1. Production of plants with inherited viral immunity by inserting the nanobody into the plant
2. Production of plants with inherited viral immunity by plant transformation
3. Comparison of the biophysical profiles of the nanobodies produced in different organisms
4. Optimization of cultivation and processing.

WP3

COMPREHENSIVE ANALYSIS OF THE EFFICIENCY OF THE DEVELOPED NANOBODIES

Objectives:

1. Evaluate the effectiveness, and biological activity of the developed nanobodies
2. Validation of developed crops in terms of safety
3. Validation of the produced nanobodies in terms of safety and functionality.

WP4

SUSTAINABILITY ANALYSIS, EXPLOITATION STRATEGY AND BUSINESS PLAN

Objectives:

1. Sustainability Analysis: Evaluate environmental, economic, and social impacts of nanobody production and application through LCA, LCC,

and S-LCA; Provide recommendations to enhance sustainability and reduce reliance on chemical pesticides

2. Exploitation Strategy: Identify market opportunities and develop IP protection strategies to support commercialization; Facilitate stakeholder engagement and technology transfer to promote adoption

3. Business Plan Development: Develop a scalable business model, including financial analysis and market entry strategies; Address risks and define a roadmap for commercialization and regulatory compliance.

WP5

COMMUNICATION, DISSEMINATION AND IMPACT STRATEGY

Objectives:

1. Continuously present and promote project results ensuring large awareness of the academic community, industry and end-users
2. Organize and deliver a set of newsletters and magazines, press releases, brochures and leaflets, posters and other printed materials, Web page construction together with on-line/social media dissemination strategies
3. Organize and moderate of partner meetings and workshops
4. Prepare the ground for the introduction of the project solutions in European markets.

WP6

PROJECT COORDINATION AND MANAGEMENT

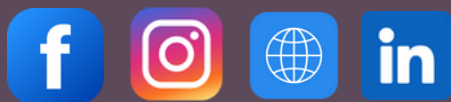
Objectives:

1. Supervise and confirm seamless collaboration between project partners
2. Guarantee overall project planning and prompt risks' alleviation
3. Ensure effective coordination and progress monitoring
4. Safeguard and work towards the fulfilment of project targets within time schedule and budget constraints
5. Arrange project meetings and conference calls for effective communication between project participants
6. Represent the project consortium towards the EC and delegates of other projects
7. Coordinate internal & external (to the EC) reporting and documentation
8. Perform appropriate management of the generated data
9. Coordinate project on technical and financial level.

SOCIAL MEDIA



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