



# NEWSLETTER

October 2024

FRIETS is an Innovative Action funded by EU's RISE framework programme (H2020-MSCA-RISE-2020).

The project's main objective is to develop novel processed berries with superior quality and nutritional characteristics, as well as extended shelf-life.

Pre-harvest management practises are optimized for cultivating high-quality berries. Low impact post-harvest technologies are developed and optimised.

The project consortium is consisting of 13 partners from 5 countries.

The project officialy began in September 2021 and its duration is 48 months.

## 8 Work Packages

From Pre-harvest management and precision farming-integration to prototyping and Public engagement strategies. All designed for efficient workflow and collaboration between our partners.

## A few words from our horticultural products expert

Dear Readers,

It is a pleasure to introduce you to the Cyprus University of Technology (CUT), a dynamic institution dedicated to advancing knowledge and innovation. With six Schools/Faculties and 13 Academic Departments, CUT offers top-tier education and research in key areas of science and applied technology.

The Fruit Sciences/Postharvest Group at the Department of Agricultural Sciences, Biotechnology and Food Science

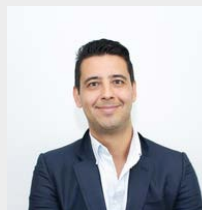
[[www.fruitsciences.eu](http://www.fruitsciences.eu)] exemplifies our focus on research excellence. Our group specializes in fruit crops, studying plant adaptation to stress conditions and postharvest technologies.

Within the FRIETS project, we have addressed key challenges in berry cultivation, particularly through Work Package 1 (WP1). By applying precision agriculture and advanced drying techniques, we have optimized cultivation, reducing water usage while maintaining berry quality.

These innovations in remote sensing, irrigation, and dehydration have improved both the sustainability and resilience of berry production. Our research continues to enhance the pre-harvest and post-harvest processes to ensure high-quality berries reach consumers.

We are proud to be part of the FRIETS project and look forward to sharing more insights with you.

Warm regards,



Prof. George Manganaris  
Department of Agricultural Sciences,  
Biotechnology & Food Science, Cyprus  
University of Technology



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101007783

# Partners

## 1. REZOS BRANDS

Coordinator of the project and a company staffed with experienced personnel in organic cultivation of superfruits and post-harvest technologies. Ready to offer their premises for optimization of drying processes at pilot scale.  
<https://rezosbrands.com/>

## 2. DIGNITY

Dissemination manager of the project with expert knowledge in the design of state-of-the-art industrial processes, product development and Life Cycle Assessment of products and services, located in Greece.  
<https://dignity.com.gr/>

## 3. NFA

Expert in herbs and aromatic plants extraction process, located in Greece.  
<https://www.natural-foodadditives.com/>

## 4. MOUNTAIN BERRIES PITSILIA (MBP)

Specialist in berries cultivation and sustainable agriculture, located in Cyprus.  
<https://www.mountainberriespitsilia.com/>

## 5. KPAD LTD

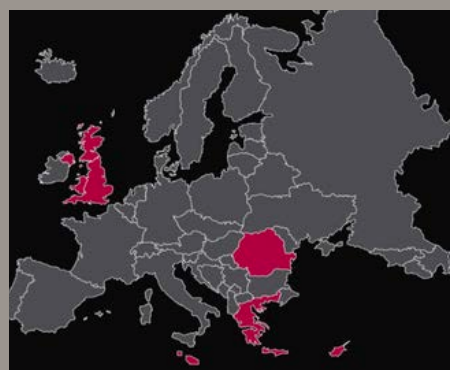
Responsible to support all the activities related to process design and Life Cycle Assessment, with experience in food processes and product development, located in the UK.  
<https://kpadltd.co.uk/>

## 6. Mgarr Farming LTD (MF)

Expert in berries cultivation and post-harvest interventions, located in Malta.  
<https://www.myhealthycorner.com/>

## 7. CENCIRA

Professionals in research and innovation development in the agro-food sector, located in Romania  
<https://www.cencira.ro/>





### **8. National Technical University of Athens (NTUA)**

The oldest and most prestigious technical university in Greece. The Laboratory of Process Analysis and Design specializes in product development and process integration.

<https://www.ntua.gr>

### **9. Agricultural University of Athens (AUA)**

It is the third oldest university in Greece and offers high-level undergraduate and post graduate Education and Research in Agricultural Science.

<https://www2.aua.gr>

### **10. Cyprus University of Technology (CUT)**

A technical University with high ranking in the world lists, which is located in Cyprus, and specializes in optimization of production protocols and characterization of berry cultivars.

<https://www.cut.ac.cy/>

### **11. UNIVERSITATEA DE STINTE AGRICOLE SI MEDICINA VETERINARA CLUJ NAPOCA (USAMV)**

A Romanian University with great history in Agriculture Science, which has an active role in recovery and determination of bioactive compounds from plants, herbs and by-products via green extraction techniques.

<https://www.usamvcluj.ro/>

### **12. L-Univeristà ta' Malta (UM)**

It has been, over its 400-year history, the hub for international academic exchange on the island of Malta.

<https://www.um.edu.mt/>

### **13. University of HUDDERSFIELD (HUD)**

A growing centre of research and excellence in England, that focuses on environmental impact assessment of industrial processes using Life Cycle Assessment.

<https://www.hud.ac.uk/>





# Dissemination material

All the necessary promotional material needed for the dissemination activities of the FRIETS project has been designed, namely:

- a brochure
- a bookmark
- a leaflet
- a roll-up/poster

The leaflet was created in English and translated by the partners to their native languages (Greek, Maltese, Romanian).

Coordinator  
**REZOS** Defining Value  
**EUROPEAN R&D DEPARTMENT**

Partners  
 Cyprus University of Technology  
 KIS  
 GENERA  
 L'Università di Malta  
 DEFTV  
 HUGOESFELD  
 NFA

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 Twitter: @FRIETS10 | <https://friets.eu/>

**FRIETS**  
 100% NATURAL HEALTHY SNACKS

H2020-MSCA-RISE-2020, Sustainable optimization of the value chain of added value fresh and dried berries through the integration of Precision Agriculture management strategies and innovative dehydration and edible coating



**FRIETS Project Facts**

- 13 Partners
- 8 European countries
- 48 months
- 8 Work Packages
- 15 Deliverables
- 116 Secondments
- 529 Secondment months
- 2.43 M € EU Contribution


**FRIETS at a Glance**

The overall aim of FRIETS proposal is the development of novel processed berries (strawberry, raspberry and blackberry) with superior quality and nutritional characteristics, as well as extended shelf-life. Pre-harvest management practices will be optimized for cultivating high-quality berries. Low impact post-harvest technologies will be developed and optimized including (1) mild and energy efficient drying techniques (i.e. osmotic dehydration, freeze drying, microwave vacuum drying or their combination) using limited or no sugar or salt, and low temperatures, (2) composite or multi-layered edible coatings, based on micro- and macro-algae components, including encapsulated or non-encapsulated natural functional ingredients, Life Cycle Analysis and socio-techno-economic analysis will be implemented for the sustainable development of new products.


**Why FRIETS?**

- There is a need to control production of berries towards higher nutritional value fruits rather than volume of production and the use of excessive agricultural chemicals rather than increase yields.
- There is a need to reduce salt and sugar content of processed fruits in order to be used for personalized nutrition for specific groups of people (seniors, dieters, pregnant, etc.).
- More advanced edible coatings with improved properties are needed.
- The interest for increased functionalities dictates the incorporation of functional ingredients into processed foods. Novel, environmentally friendly techniques are needed for extraction, green recovery of compounds. Protection of precious agents is also needed for maximizing bioavailability and controlled release.
- There is a need to develop rigorous quantitative approaches that will allow on developing comprehensive risk assessment system for evaluating and ranking larger and smaller hazards in berries.
- Multi-based process optimization based on quality and safety properties of the berries are crucial for ensuring market or food operations.
- The need to develop sustainable and environmentally friendly food products suitable for the average consumer.

**Work Plan and Research Exchange Pathway**



**FRIETS secondments among the 13 partner institutions**



**Healthy snacks promoting well-being and environmental sustainability**

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H2020-MSCA-RISE-2020, Sustainable optimization of the value chain of added value fresh and dried berries through the integration of Precision Agriculture management strategies and innovative dehydration and edible coating

**116 Secondments**

**FRIETS Steps**

- STEP 01 Precision farming-integration of digital management and surveillance technologies
- STEP 02 Recovery of bioactive compounds
- STEP 03 Encapsulation of bioactive compounds
- STEP 04 Dehydration processes
- STEP 05 Novel prototypes of edible - coated berries using microalgae and macroalgae components - Production of functional smart snacks
- STEP 06 Shelf-life determination
- STEP 07 Business modelling & Life Cycle Assessment
- STEP 08 Risk management

REZOS BRANDS  
 EUROPEAN R&D DEPARTMENT

Partners: Cyprus University of Technology, KIS, GENERA, L'Università di Malta, DEFTV, HUGOESFELD, NFA

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 ✓ 8 Work Packages ✓ 15 Deliverables ✓ 116 Secondments  
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**FRIETS Innovations**

- Develop a new production system based on precision agricultural practices, using digital monitoring technologies and finding the best practices to achieve high quality berries, while achieving a sustainable production
- Develop innovative, green extraction techniques for sustainable recovery bioactives compounds from plants and herbs
- Develop innovative technologies for protecting bioactive substances
- Develop modified osmotic dehydration techniques, using alternative agents to increase the shelf-life of several berries, replacing conventional salts and sugars, leading to healthier foods
- Develop edible coatings with advanced and improved carrier properties, taking advantage of the significant properties of micro- and macro-algae
- LCA and LCC analysis will be applied throughout the whole value chain for determining the environmental impacts and identifying the hotspots, providing sustainable solutions at reasonable cost

**FRIETS Impact**

- Young researchers will receive high-quality cross-sectional training environment
- The secondaries will enhance their geographical mobility in EU, develop new set of research and transferable skills, be exposed to new research environments and have their career perspectives widened
- Researchers will comprehend in depth the requirements of the industry transforming knowledge to next generation products and services
- SMEs personnel will take advantage of research results to strengthen and add value to their products and processes and possibly expand their intellectual property and/or product portfolio

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www.facebook.com/Frietsproject  
 www.linkedin.com/in/friets-rise-03368721/  
 @FRIETS10  
 https://friets.eu/

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# 3rd WORKSHOP

May 2024

We are thrilled to share the success of the 3rd FRIETS Workshop, which took place on 21st & 22nd May 2024 in Limassol, Cyprus! Hosted by the Cyprus University of Technology, the workshop brought together experts, researchers, and stakeholders from the fields of precision agriculture and novel food technologies, both in-person and online, in a hybrid format.

## Workshop Highlights:

Day 1 featured key discussions revolved around the role of novel technologies in the food industry and how these innovations contribute to the project's goals.

Day 2 included a site visit to a local soft fruits farm, offering participants a hands-on look at precision farming techniques in action. This was followed by a visit to the scenic village of Omodos, where participants enjoyed traditional Cypriot hospitality.

We extend our heartfelt thanks to all the speakers, participants, and partners who contributed to making this workshop a huge success! Stay tuned for more updates as we continue to work towards sustainable food innovation.





## Dissemination activities

### FRIETS Showcased at SuperFoods Festival 2024

The FRIETS Project was excited to participate in the Athens Superfoods Festival from 24th to 28th April 2024 at the iconic Zappeion.

Our team was on-site, showcasing our latest innovations in superfoods, focusing on the sustainable and innovative technologies we are developing through the project.

Visitors had the chance to learn more about our work with berries, precision agriculture and novel food processing methods that enhance the nutritional value and sustainability of superfoods.

The festival, which attracted thousands of visitors, provided the perfect platform for us to connect with the public, share insights about the project's progress and highlight the importance of sustainable food innovations.



### FRIETS Showcased at European Researchers' Night 2024



The FRIETS Project made a significant impact at this year's European Researchers' Night, held in both Athens, Greece and Cluj-Napoca, Romania.

The event offered a platform for researchers to engage with a wide audience, sharing insights through interactive demonstrations and discussions. Attendees showed keen interest in the future of food sustainability and agricultural innovation, sparking a dynamic exchange of ideas.

The FRIETS team expressed excitement about the promising developments in agriculture and the growing interest in their research.





# Secondments ✈✈✈✈✈

110 Secondments in 5 countries

By August 31st 2024, 80 secondments have been completed and 7 are ongoing (~80%).

Below are the statements from the FRIETS secondees:

"Working in the fields in Malta was an incredible experience, deepening my understanding of agricultural practices in a Mediterranean environment. I gained insights into both traditional and modern farming methods, as well as the challenges of cultivating crops in a unique climate. It was also a great opportunity to exchange knowledge with local farmers and agricultural experts, enriching my perspective on sustainable farming and crop management. Thank you, FRIETS, for making this experience possible and for the chance to collaborate with such knowledgeable individuals."  
Sokratis Koskinakis, NTUA



"The knowledge and experience I gained from the FRIETS project have opened new career opportunities and paths for advancement."  
Dimitrios Doxaras, REZOS BRANDS

"Through my position as a Research Associate on the FRIETS project, I gained hands-on experience in Life Cycle Assessment (LCA) and became familiar with consumer surveys and exploitation strategies, which are essential for implementing sustainable practices."  
Maria Parcharidou, CUT



"Participating in the FRIETS project not only strengthened my technical competencies but also helped me build a robust professional network, which will be invaluable for future career opportunities."  
Victoria Fliatoura, REZOS BRANDS

"I would like to extend my heartfelt gratitude to everyone at MOUNTAIN BERRIES PITSILIA for the incredible experience during my secondment as part of the FRIETS project. Working alongside such a dedicated team, I had the opportunity to apply my chemical engineering skills to real-world challenges by selecting products for coating experiments, preparing edible coatings, and collecting vital data on fresh berries. This experience has not only enriched my technical expertise but also broadened my professional network, opening doors to future collaborations across Europe. The exposure to a different business environment and culture has been invaluable in enhancing my adaptability and cross-cultural communication skills, all of which are crucial assets in today's global job market. Thank you for making this secondment such a rewarding experience!"  
Dimitra Fragouli, NTUA



"I was thrilled to get practical experience in food product development and process optimization during my FRIETS program secondment at the Technological University of Cyprus. My technical knowledge has grown as a result of the program, which has also given me invaluable industry connections and insights that I know will be very helpful for my next projects."  
Dimitrios Avgoulis, DIGNITY



“Thanks to FRIETS I had the opportunity to work at USAMV University. My time there was crucial in improving my skills and knowledge, allowing me to make significant progress in my doctoral studies. It also gave me the opportunity to meet remarkable people who offered fresh perspectives and warm hospitality. This experience has been key to both my academic development and personal growth.”

Aggeliki Petridi, DIGNITY



“During my secondment with the FRIETS project, I gained in-depth knowledge of cost-benefit analysis for new process implementations, focusing on the economic efficiency of pre-harvest and berry cultivation stages. I engaged in data collection from farmers, which was essential for understanding the financial feasibility of proposed processes. This experience also provided insights into field challenges and allowed me to work with advanced financial analysis tools not available at my home institution. Through this mobility, I expanded my expertise in financial assessment and deepened my understanding of the economic implications of food production processes.”

Bernadette-Emoke Teleky, USAMV



“The secondment at USAMV-Cluj was more than an academic exchange—it was the beginning of a powerful collaboration with a team of exceptional researchers. Together, we are forging new paths, combining expertise and passion to address the challenges of the agri-food sector. This partnership not only deepens our shared knowledge but also strengthens our commitment to advancing sustainable practices for the future.”

Sofia Papadaki, DIGNITY



an initiative of  European Commission

## FRIETS Boosts Impact with Horizon Results Booster!

We're thrilled to share that FRIETS has teamed up with the Horizon Results Booster for some top-tier expert advice! Here's how we're leveling up:

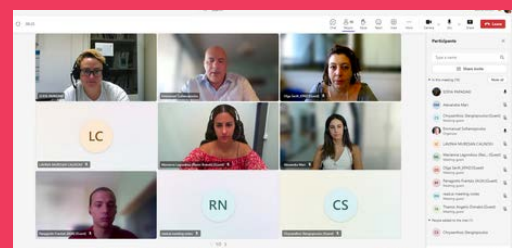
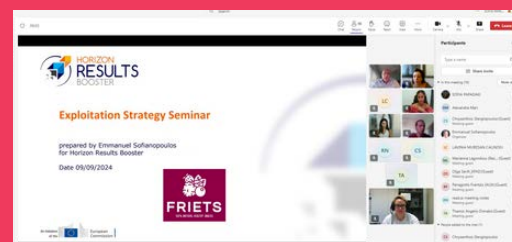
**Module A:** Identifying and Creating the Portfolio of R&I Project Results

- Pinpointed our best research outcomes.
- Built a results portfolio with real market potential!

**Module C:** Improving Our Exploitation Strategy

- Sharpened our approach to get our innovations from lab to market.
- Positioned ourselves for greater industry impact and commercialization!

Thanks to this support, we're more ready than ever to push the boundaries of berry innovation!



Horizon Results  
Booster





# Work progress

## Publications

The USAMV team published one scientific publication during the third year of the FRIETS project:

- Enhancing eco-friendly coatings: Aqueous olive leaves extract fortifies macroalgae-based packaging materials.

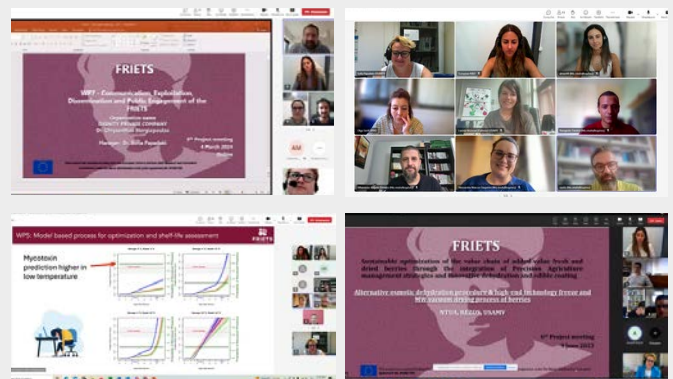
<https://doi.org/10.1016/j.lwt.2024.116805>



## Meetings

Four meetings were conducted during the third year of the FRIETS project:

- 8th Project Meeting - December 2023
- 9th Project Meeting - March 2024
- 10th Project Meeting - June 2024
- 11th Project Meeting - September 2024



## In Media

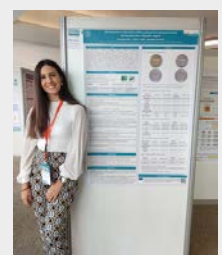
Within the third year of the FRIETS project, 2 publications have been made in press releases or social networks. These publications are listed below:

- Cibum magazine | Shelf life of berries
- Horizon magazine | Berry tasty



## Conferences

- Alessandra Gasperini presented "FRIETS: Predicting Fungal Contamination and Mycotoxin Risks in Soft Fruits" at the 12th International Mycological Congress (IMC12) 2024, in Maastricht, Netherlands.
- Alexandra Mari presented a poster entitled: "Development of alternative edible coatings from polysaccharides and proteins from Chlorella vulgaris" at 37th European Federation of Food Science and Technology (EFFoST) 2023 International Conference, in Valencia, Spain



# Achievements

## **WP1: Pre-harvest management and precision farming**

Pre-harvest optimization was achieved through the integration of satellite and aerial data to monitor crop status. This led to the development of a yield prediction model, correlating vegetation indices with soil and irrigation parameters. The key advancements include the optimization of fertilization and irrigation practices, along with sensor validation, which contributed to enhanced data-driven crop management.

## **WP2: Bioactive Compounds from Plants and Herbs**

The selection of olive tree leaves, berry leaves and rosemary leaves was made for bioactive compound extraction. Ultrasound-assisted extraction yielded the highest recovery of phenolic compounds. The use of electrospinning and spray drying for encapsulation proved highly efficient, with zein and maltodextrin serving as effective carriers, resulting in stable nanoparticles and preservation of phenolic content.

## **WP3: Dehydration and Freeze-Drying Technology**

The combination of osmotic dehydration and freeze-drying resulted in improved water loss and solid gain for berries. Pilot-scale experiments confirmed that glycerol and apple juice were the best osmotic agents for enhancing shelf stability while preserving sensory qualities.

## **WP4: Development of Edible Coatings**

Edible coatings made from microalgae and macroalgae significantly improved the shelf life of fresh and dehydrated berries. The application of coatings enriched with rosemary bioactives enhanced the antioxidant properties of the berries, with sensory evaluations confirming consumer acceptance.

## **WP5: Process Optimization and Shelf-Life Assessment**

This WP focused on optimizing processing conditions to extend the shelf life of dried and coated berries. Additionally, the identification and analysis of fungal and mycotoxin contaminants were key areas of progress.

## **WP6: LCA and LCC Analysis**

Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) analysis were conducted on commercially viable production protocols. This included evaluating pre-harvest management practices and the potential of edible coatings for dried berries. Initial results indicated that the optimized processes could reduce both environmental impact and production costs.



Find more about us on social media

Twitter: FRIETS10

Facebook: Frietsproject

Linked In: FRIETS RISE

and on our website

<https://friets.eu/>

