The CESAM Catalogue

Circular Economy Solutions in the Agri-food Sector in the Mediterranean

ACCIÓ Catalonia Trade & Investment

Generalitat de Catalunya
Government of Catalonia

AD'OCC Région Occitanie
Agence de Développement Économique

EUROREGIO Pirineus Mediterrània
Pyrénées Méditerranée
Pirineos Mediterráneo

AGRI SUD-OUEST INNOVATION

FundacióBit
Fundació balear d'innovació i tecnologia

Co-funded by the European Union

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Content

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

About CESAM and the Catalogue

The CESAM

CESAM (**Circular Economy and Sustainable Solutions in the Agri-food Sector in the Mediterranean**) is a European project which focuses on the regions of Occitania, Catalonia and the Balearic Islands

MAIN OBJECTIVES OF CESAM:

- Investments in **SMEs** to further a **circular economy model**
- Supporting investments in **interregional innovation**
- Furthering **sustainable solutions** in the value chains of the agri-food sector

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

About CESAM and the Catalogue

The Catalogue

The **CESAM Catalogue** consists of an identification of **Circular Economy solutions in the Agri-food** sector in the Mediterranean. Namely, within the regions of **Occitania**, **Catalonia and the Balearic Islands**

PURPOSE OF THE CATALOGUE:

- Inform on the **circular economy and sustainable solutions** in the agri-food and related sectors **developed through the CESAM cascade funding mechanism**
- Provide visibility to the **SMEs awarded through the CESAM cascade funding mechanism** which develop these solutions

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

About CESAM and the Catalogue

The Catalogue

Criteria

All solutions included in the **CESAM Catalogue** fulfil the following **criteria**:

- **Location:** The solutions have been developed by SMEs located or founded in the Mediterranean areas of **Occitania**, **the Balearic Islands and Catalonia**
- **Sectors:** The solutions can apply to the **food industries**, **agriculture and agrifood industries**, **packaging**, **industrial systems**, **packaging**, **health industries and cross-cutting sectors**
- **Circular Economy:** The solutions respond to needs related to **sustainability and circular economy in the agri-food sector**
- **CESAM Areas:** The solutions apply to at least one of the following: **water recycling**, **packaging**, **byproduct valorisation**, **and waste reduction**

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

About CESAM and the Catalogue

The Catalogue

Solutions' classification

This initiative aims to support SMEs engagement in sustainability. It serves as a tool of dissemination for the CESAM cascade funding awarded solutions, which respond to the climate emergency through sustainability and resource circularity. It also supports Mediterranean SMEs in their alignment with the **United Nations Sustainable Development Goals** (SDGs). Finally, it promotes the achievement of the **EU Horizon 2050 climate-neutral goal** (according to the EU Green Deal and the Paris Agreement).

As a result, this Catalogue addresses the following **challenges**:

- **Access to water, sanitation, water treatment and efficient use of water resources**
- **Clean energy transition**
- **Climate-neutral and circular cities**
- **Industrial transition to the circular economy**
- **Regeneration of natural capital in terrestrial ecosystems**
- **Sustainability of food production systems**
- **Climate change mitigation and adaptation** (which acts as an umbrella for the remaining SDGs)

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

About CESAM and the Catalogue

The Catalogue

Solutions' classification

All solutions are also classified according to their **sectors of applicability**, which include:

- **Food industries:** Food and beverages
- **Agriculture and agrifood industries**
- **Industrial systems:** machinery and equipment, paper and packaging, ICT and Digitalisation
- **Health industries:** Biotechnology, animal health, chemistry, energy and resources, water, raw materials
- **Packaging**
- **Cross-cutting sectors**

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

About CESAM and the Catalogue

The Catalogue

Solutions' classification

The identified solutions in this Catalogue are classified according to **their location**. They are also classified in the following **areas** addressed by the **CESAM** project:

- **Water Recycling:** water treatment, recycling or concentrated use of water
- **Packaging:** eco-conception, free from plastic, new materials or circular solutions
- **Byproduct valorisation**
- **Waste reduction:** process and circular process optimization

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Reusage of WWT Sludge in Agriculture by using Solvent-Free Flocculants

Physical-Chemical Treatment
Meat Processing

derypol

Catalonia

Sectors of applicability

Food industries; Industrial systems; Cross-cutting sectors

CESAM Areas

Water Recycling; Waste Reduction; By-Product Valorisation

SDGs impact

Objective / Challenge

Develop a Flocculant technology to perform the solid-water separation, either by physical-chemical process or sludge dewatering, that enables to obtain a final sludge that can be re-used in agriculture as fertilizer.

Environmental impacts and benefits addressed

- ✓ Farm-to-Fork: Re-usage of the agroindustry sludge, produced in the wastewater treatment process, as a fertilizer, recovering nutrients and promoting circular economy.
- ✓ Solvent-Free Flocculant Technology, changing the current paradigm in sludge dewatering processes.

Solution's description

- ✓ The HIMOLOCs are liquid brine dispersion flocculants:
  - ✓ Without solvents, surfactants and mineral oils.
  - ✓ Dissolution process can be performed with recycled water
  - ✓ The residual acrylamide can be reduced to less than 10 ppm
  - ✓ Have obtained different certificates such as GRAS (FDA) or Drinking Water Treatment (EU Directive and NSF).

+ GO TO COMPANY WEBSITE

KPIs

- Sludge Dryness %.
- Amount of Solvent in Sludge.
- Amount of Residual Acrylamide in Sludge.

Participant companies:

derypol

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: Testing in Sales Point

Catalonia

Sectors of applicability

Food industries; Packaging

CESAM Areas

Waste Reduction; Packaging

Scaling and financial needs

Expanding the system infrastructure and ensuring operational efficiency across a larger user base and geographic area.

SDGs impact

Objective / Challenge

Establish a sustainable and efficient system for the collection and recovery of reusable containers using an Internet of Things (IoT) device in a supermarket.

Environmental impacts and benefits addressed

- ✓ The main objective of the project is to implement a reusable IoT device that automates and optimizes the collection of reusable containers, thereby establishing an efficient circular economy system designed to maximize return rates, drastically reduce virgin resource consumption and waste generation, and lower logistics-related CO_2 emissions through data-driven route planning.

Solution's description

- ✓ The solution is an Internet of Things (IoT) return station designed to automate and optimize the collection of reusable containers, supporting a true circular economy.
- ✓ Smart Device: The station uses sensors (QR) to instantly verify and securely collect only authorized reusable containers.
- ✓ IoT Intelligence: It uses sensors to monitor real-time fill levels and sends this data to a cloud platform.
- ✓ Logistics Optimization: This data enables dynamic, on-demand scheduling for collection, significantly reducing unnecessary truck trips, cutting CO_2 emissions, and lowering operational costs.

+ GO TO COMPANY WEBSITE

KPIs

- 1.000 users accessing the system.
- 4.000 containers dispensed and returned.
- 300 user feedback collected.

Participant companies:

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: Testing in Horeca Business

Catalonia

Sectors of applicability

Food industries; Packaging

CESAM Areas

Waste Reduction; Packaging

Scaling and financial needs

Expanding the system infrastructure and ensuring operational efficiency across a larger user base and geographic area.

SDGs impact

Objective / Challenge

Establish a sustainable and efficient system for the collection and recovery of reusable containers using an Internet of Things (IoT) device in a restaurant.

Environmental impacts and benefits addressed

- ✓ The main objective of the project is to implement a reusable IoT device that automates and optimizes the collection of reusable containers, thereby establishing an efficient circular economy system designed to maximize return rates, drastically reduce virgin resource consumption and waste generation, and lower logistics-related CO_2 emissions through data-driven route planning.

Solution's description

- ✓ The solution is an Internet of Things (IoT) return station designed to automate and optimize the collection of reusable containers, supporting a true circular economy.
- ✓ Smart Device: The station uses sensors (QR) to instantly verify and securely collect only authorized reusable containers.
- ✓ IoT Intelligence: It uses sensors to monitor real-time fill levels and sends this data to a cloud platform.
- ✓ Logistics Optimization: This data enables dynamic, on-demand scheduling for collection, significantly reducing unnecessary truck trips, cutting CO_2 emissions, and lowering operational costs.

+ GO TO COMPANY WEBSITE

KPIs

- 1.000 users accessing the system.
- 4.000 containers dispensed and returned.
- 300 user feedback collected

Participant companies:

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

DRIVE: Disruptive Research and Innovation for Viticulture Efficiency

TALPTECH

Catalonia and the Balearic Islands

Sectors of applicability

Agriculture; Agri-food industries; Food industries

CESAM Areas

Waste reduction

Scaling and financial needs

Industrialization and Manufacturing International deployment and market expansion; R&D for AI and data integration.

SDGs impact

Objective / Challenge

By using a new technology based on AI and real-time vine vigor identification, sprayer dosage can be adjusted allowing up to 40% reduction in pesticide and fertilizer use in vineyards, without requiring technical skills from growers.

Environmental impacts and benefits addressed

- ✓ Pesticide and fertilizer use reduction minimizing over-application, runoff, and environmental contamination.
- ✓ Decreased water consumption required for mixing and spraying.
- ✓ Reduced soil and water contamination by minimizing drift which can harm ecosystems and biodiversity.
- ✓ Carbon Footprint Reduction by reducing pesticide and fertilizer use.

Solution's description

- ✓ TALPTECH integrates low-cost stereoscopic cameras and real-time edge computing directly onto conventional vineyard sprayers.
- ✓ The system autonomously measures plant vigor and crop load, adjusting pesticide and fertilizer dosage in real time, without requiring connectivity, post-processing, or skilled operation.
- ✓ This plug-and-play solution eliminates technical barriers and cost constraints, enabling immediate, on-the-go decisions during field operations.

+ GO TO COMPANY WEBSITE

KPIs

- Pesticide and Fertilizer Reduction.
- Operational vineyard data metrics and vigor and spraying maps.
- Sustainability Impact and CO_2 reduction.

Participant companies:

RIBAS

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Ferti-By PRO BIO

GROUPE ETHICAE

Occitania and Catalonia

Sectors of applicability

Agriculture; Agri-food Industries; Food industries

CESAM Areas

Water recycling; Waste reduction; Byproduct valorisation

Scaling and financial needs

Commercial deployment of the innovative fertilizer within all the Mediterranean Region.

SDGs impact

Objective / Challenge

New organic fertilizer production using water-rich by-products from plant actives extraction in a circular economy approach.

Environmental impacts and benefits addressed

- ✓ The project will provide a new and competitive solid organic fertilizer produced locally in Occitanie (Tarn, Rouairoux) involving the re-use of an internal plant water rich by-product from the Groupe Ethicae.
- ✓ It is a demonstration of a new fertilizer production using exclusively local natural raw materials and eco-friendly extraction by-products.

Solution's description

- ✓ Natural water-rich extract by-products from factories could not be used in the usual process of solid fertilizer production without energy-consuming drying step due to a too high moisture content that deprived the feasability of the pelleting step.
- ✓ The objective of this project is:
  - i. to select and mix with local dry organic raw materials with water-rich plant by-product.
  - ii. to analyse the nutrient equilibrium of the tested formulae to obtain the needed quality for granulating process of the future commercial fertilizers.
  - iii. to demonstrate its equivalent fertilizing ability in real field conditions to the final users.

+ GO TO COMPANY WEBSITE

KPIs

- New competitive commercial offer with local by-products ingredients.
- Biochemical approach to ensure the quality of products in the environment.

Participant companies:

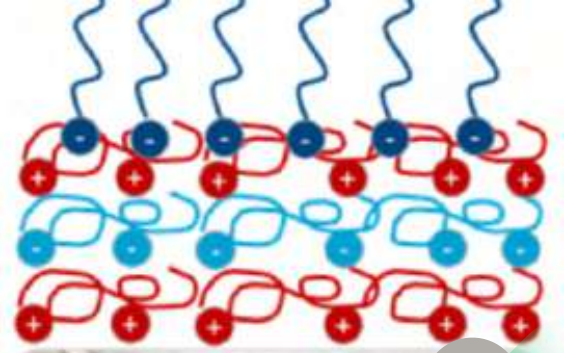
AKINAO

MAJUSTI IBERICA

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

AGORA: New biobased, biodegradable and PFAs free water and oil repellent paper packaging solution



ONYRIQ

Catalonia

Sectors of applicability

Packaging; Food Industries

CESAM Areas

Packaging

Scaling and financial needs

License for the scale-up and exploitation.

SDGs impact

Objective / Challenge

The project aims to develop and validate an omniphobic, fluorine-free coating for paper-based packaging, combining high-barrier performance with biodegradable properties.

Environmental impacts and benefits addressed

- ✓ PFAs harm the environment by polluting the water cycle and accelerating climate change, prompting strict regulations in the EU and U.S.
- ✓ ONYRIQ has developed water-based, fluorine-free coatings as a safer alternative.
- ✓ These coatings are biodegradable, over 80% bio-based, and reduce CO_2 emissions by more than 50%.

Solution's description

- ✓ ONYRIQ has developed a safe and sustainable water-based coating, combining biodegradable and renewable polysaccharide complexes with a small amount of non-persistent acrylic polymer.
- ✓ The resulting unique hierarchical micro-nanostructure delivers omniphobic performance comparable to PFA-based coatings, enabling new paper packaging solutions without the use of fluorinated compounds or non-biodegradable laminates.

+ GO TO COMPANY WEBSITE

KPIs

Performance validation:

- Water contact angle > 120°
- Oleophobicity kit tests > 10
- Surface tension < 24mN/m

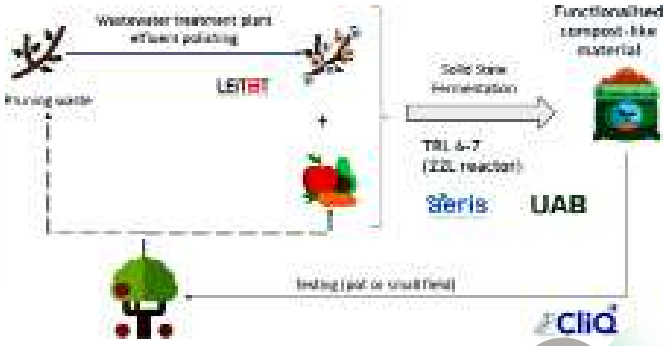
Barrier properties validation:

- Water vapor transmission rate < 50g/m²/day
- Oxygen transmission rate < 1 cm³/m²/day/atm
- End-of-life properties validation
- Biodegradability > 90%

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

SSOIL: Valorisation of agri-food residues as functionalised compost-like material



aeris
TECNOLOGÍAS AMBIENTALES

Catalonia and the Balearic Islands

Sectors of applicability

Agriculture; Agri-food Industries; Cross-cutting Sectors

CESAM Areas

Waste reduction; By-product valorisation

Scaling and financial needs

Additional test at pilot and field level are planned to validate SSF performance, nutrient tailoring and agronomic effectiveness across different climates and feedstocks.

SDGs impact

Objective / Challenge

SSOIL will increase the sustainability of agri-food sector by designing a compact and robust solid-state fermentation (SSF) equipment for on-site valorisation of agri-food wastes (including pruning residues) as compost-like material.

Environmental impacts and benefits addressed

- ✓ Valorising food waste into biostimulants is a higher-priority strategy than composting or energy recovery. SSOIL aims to improve environmental impact by valorising heterogeneous agri-food residues, which are usually composted or landfilled due to their variability.

Solution's description

- ✓ Solid-State Fermentation (SSF) has been established as an efficient and environmentally friendly tool for the valorization of various solid organic waste to produce biostimulants.
- ✓ Among them, Trichoderma harzianum has shown a robust production IAA as biostimulant on SSF using green waste because of their content in easily biodegradable organic matter and a great variety of macro and micronutrients.
- ✓ Within SSOIL, different unprocessed pruning wastes will be used as wood-based adsorbent for the uptake of nutrients from WWTP effluent and will then be used as bulking agent in SSF to produce a functionalized compost-like material containing an optimized composition of macronutrients, organic carbon, and IAA.

+ GO TO COMPANY WEBSITE

KPIs

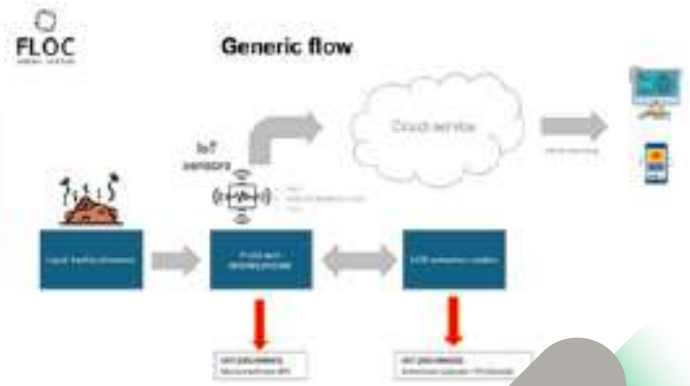
- Up to 150 kg of nutrient-rich bulking agent.
- A full operation 22 L SSF reactor for the production of functionalised compost-like material (TRL6-7).
- At least 2 trials with the functionalised compost-like material at different climate conditions.
- 2 Agricultural workshops (Catalonia and Balearic Island).

Participant companies:

SaCanova
where good things grow

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

NITRO-TIC



FLOC
AMMONIA SOLUTIONS

Catalonia

Sectors of applicability

Food industries; Agriculture, Agri-food industries; Cross-cutting sectors

CESAM Areas

By-product valorisation

Scaling and financial needs

Scaleup and industrialization of the initiative, IP Protection

SDGs impact

Objective / Challenge

Developing an automated IoT-based measurement System. Achieve to a TRL 8 by validating the technology in a real-environment setting. Conducting a strategic patentability study and facilitating future commercialisation by ensuring industrial-scale feasibility.

Environmental impacts and benefits addressed

- ✓ CESAM NITRO-TIC initiative will not only advance the TRL of the nitrogen recovery system but also contribute to the broader goals of circular economy, climate change mitigation, and sustainable agricultural practices. This strategic investment will help bridge the gap between research and commercialization unlocking significant environmental and economic benefits.

Solution's description

- ✓ The CESAM NITRO-TIC project introduces automated monitoring and control systems based on IoT and ICT technologies in order to increase the TRL of an existing pilot plant project.
- ✓ This upgrade will enable real-time data acquisition, remote system management, and predictive maintenance, key features that will significantly enhance the system's readiness for large-scale deployment.
- ✓ At the same time, it will enable to reinforce IP protection by analysing the potential file of a new patent.

+ GO TO COMPANY WEBSITE

KPIs

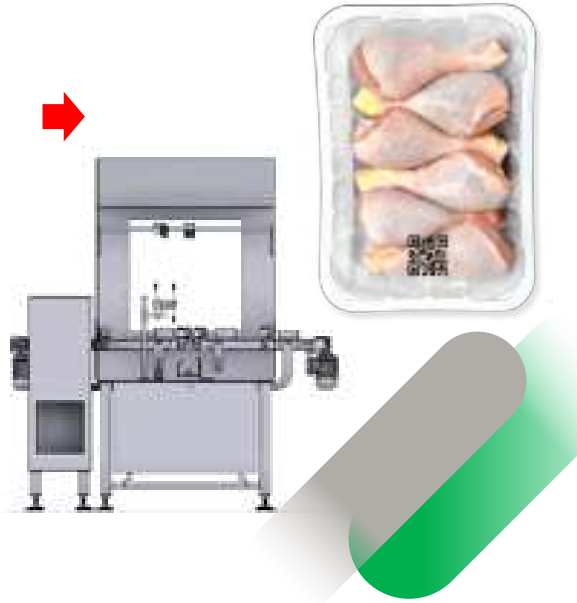
- Functional and Fully tested, IoT monitoring system integrated into the pilot plant.
- Demonstration of automated data collection correlating with manual readings.
- Building a web based interface and an APP running in mobile devices that both can allow remote access to the information in real time.
- Technology qualified for real-environment operation (TRL 8).

Participant companies:

Club GLOBALS innobound

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

FoodSensing4CE: Smart Sensing Packaging for Sustainable Food Supply Chain



ColorSensing
tracking true colors

Catalonia

Sectors of applicability

Food industries; Packaging

CESAM Areas

Packaging; Waste reduction

Scaling and financial needs

Currently raising a funding round to industrialize our sensor-label manufacturing and implementing system and launch pilot programs with key food industry partners.

SDGs impact

Objective / Challenge

To validate a smart, scalable, non-invasive food inspection solution that reduces waste and improves traceability.

Environmental impacts and benefits addressed

- ✓ Reduces food waste through real-time quality monitoring.
- ✓ Lowers CO_2 emissions by avoiding unnecessary foo d production.
- ✓ Enables 100% non-invasive inspection, replacing destructive testing.
- ✓ Supports circular economy with low-cost, eco-friendly smart labels.

Solution's description

- ✓ AI-based visual inspection system integrated into industrial packaging lines.
- ✓ Smart QR-coded labels change colour with food quality (e.g., gas levels).
- ✓ Enables real-time, non-invasive, cost-effective inspection.
- ✓ Dual verification: OCR + colorimetric sensor for full packaging integrity.
- ✓ SaaS model for data processing, traceability, and transparency.

+ GO TO COMPANY WEBSITE

KPIs

- Inspection accuracy: **>95%**
- Inspection efficiency improvement: **+15%** over traditional methods.

Participant companies:

ColorSensing tracking true colors

IFS Inox-Ferro Sanchez S.L.

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: TER-ZEOS PACKAGING

B'ZEOS GREEN TECH

Catalonia

Sectors of applicability

Food Industries; Agriculture, Agri-food industries; Packaging

CESAM Areas

Packaging

Scaling and financial needs

Partner up with industrial-size converters to produce the film rolls; Partner up with a seaweed provider at higher scale.

SDGs impact

Objective / Challenge

Development of a seaweed-based biodegradable film as a sustainable alternative to conventional plastic wrap for fruits and vegetables.

Environmental impacts and benefits addressed

- ✓ Reduction on water consumption and land use compared to other alternatives such as PLA.
- ✓ Enhance circular economy due to bio-based and biodegradable seaweed packaging.

Solution's description

- ✓ Identify and optimize seaweed-based bioplastic formulations to replace traditional plastic wrap films for fresh fruit and vegetables.
- ✓ Ensure that our material maintains the freshness and quality of fresh produce, matching or surpassing the capabilities of plastic.
- ✓ Develop and refine film prototypes that meet industry performance standards and can be smoothly implemented in automated packaging machines.
- ✓ Create cost-effective, scalable solutions that compete with existing sustainable alternatives in the market.

+ GO TO COMPANY WEBSITE

KPIs

- Creation of >2 prototypes design.
- Reduction on production costs by >10%.
- Final prototype validation.
- Perform an environmental impact assessment.

Participant companies:

TERRACOR

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: Food bulk distribution machine

DUO LOZERE

Occitania

Sectors of applicability

Food industries; Packaging

CESAM Areas

Packaging; Waste reduction

Scaling and financial needs

Search for shops and catering sites to set up bulk distributors. Search for reusable packaging and a packaging collection/ cleaning circuit.

SDGs impact

Objective / Challenge

Our proposal to distribute yogurt and “fromage blanc” in bulk will significantly reduce the use of disposable PP packaging and cartons.

Environmental impacts and benefits addressed

- ✓ Our current PP packaging is made from fossil-based materials; distributing in bulk using recyclable and reusable glass jars will improve our environmental footprint.

Solution’s description

- ✓ Fair relationship with our dairy producers.
- ✓ Reduction in the use of single-use packaging.
- ✓ Practical bulk distribution solution that can be adapted for direct-to-consumer sales as well as for use in collective catering (canteens, company restaurants).
- ✓ Integration of the project into the company’s value chain.
- ✓ This project fits perfectly within the company’s CSR (Corporate Social Responsibility) approach.
- ✓ Participation in the circular economy.

+ GO TO COMPANY WEBSITE

KPIs

- Reduction in packaging consumption.
- Complete emptying of pouches to avoid product waste.
- Integrated traceability and weighing system in the dispenser for ease of use.
- Hygienic and easy-to-clean dosing system.

Participant companies:

CŒUR LOZÈRE CENTRE COMMERCIAL HYPER U

Newtimer ingénierie

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: Bulk Juice Sales. A sustainable and inclusive model

Fundació DRISSA

Catalonia and Occitania

Sectors of applicability

Food Industries; Packaging

CESAM Areas

Packaging; Waste reduction

Scaling and financial needs

Expansion to more sales points and logistical optimization; financial support needed to scale the model and improve digital traceability.

SDGs impact

Objective / Challenge

Reduce single-use packaging by implementing bulk juice dispensing in our own sales points, promoting sustainability and inclusion.

Environmental impacts and benefits addressed

- ✓ Reduction of packaging.
- ✓ Lower carbon footprint.
- ✓ Use of surplus produce.
- ✓ Promotion of circular economy.

Solution's description

- ✓ Implementation of a bulk juice dispensing system at in-house retail points.
- ✓ Local production with a dedicated workshop, staff training, awareness campaign, sales monitoring, and environmental impact analysis.

+ GO TO COMPANY WEBSITE

KPIs

- Bulk juice sales volume.
- Number of returning customers.
- Packaging saved.
- Emissions avoided.
- Economic return.

Participant companies:

Fundació DRISSA

Newtimes ingénierie

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: Bulk Product Metering Machines

sibio!
PRODUCTEURS ARTISANS

Catalonia

Sectors of applicability

Agriculture; Agri-food industries; Packaging

CESAM Areas

Waste Reduction

SDGs impact

Objective / Challenge

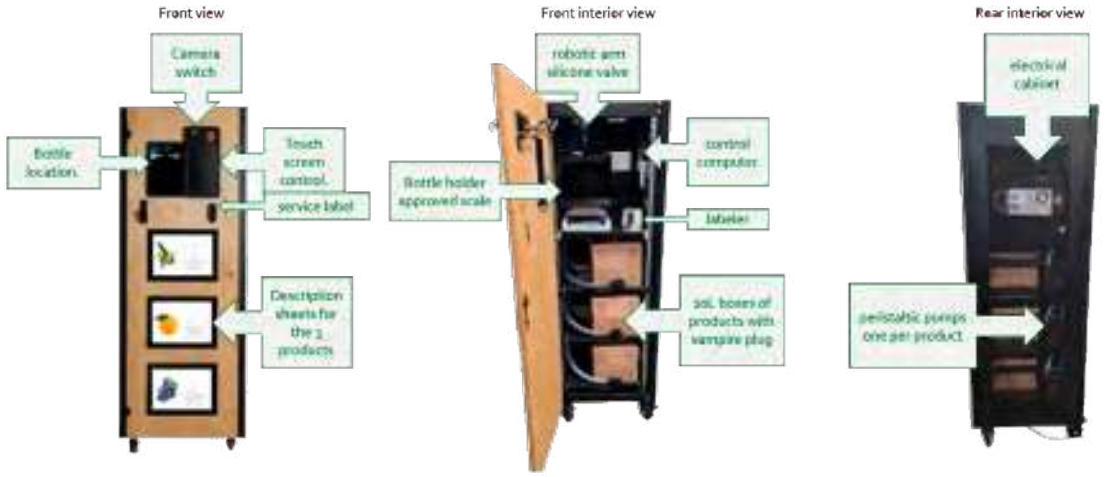
Experimentation project of a Bulk Product 'Metering and Sales' Machines with a liquid food producer.

Offering bulk liquid products for sale in order to reduce and reuse packaging.

Environmental impacts and benefits addressed

- ✓ Reduction of packaging (reuse of final packaging)
- ✓ Optimization of circular processes.

Solution's description



+ GO TO COMPANY WEBSITE

KPIs

- Reduction of primary packaging waste
- Compatibility of supplied products
- Viable economic model.

Participant companies:

sibio! PRODUCTEURS ARTISANS

Newtimer ingénierie

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: Monitoring grape quality following photobiological Boxistick® treatment

Occitania

Sectors of applicability

Food industries; Agriculture, Agri-food industries

CESAM Areas

Waste reduction

Scaling and financial needs

Access to water, sanitation, water treatment and efficient use of water resources; Sustainability of food production systems; Climate change mitigation and adaptation.

SDGs impact

Objective / Challenge

Evaluate the impact of Boxistick® treatments on grapes through large scale field and post-harvest trials to improve fruits preservation and quality.

Environmental impacts and benefits addressed

- ✓ Reduction of phytosanitary products.
- ✓ Waste reduction.
- ✓ Natural plant preservation.

Solution's description

- ✓ A new technology for activating nature's intelligence for resilient, nutritious and sustainable crops based on light protection for a chemical-free harvest and conservation of table grapes.
- ✓ A digitalized solution that treats a wide range of seeds, plants, fruits and vegetables in a safe and controlled way.
- ✓ It is modulable and equipped with a fully configurable treatment sequence and knowledge base.
- ✓ It is equipped with remote application and Wi-Fi monitoring, which is included to ensure safety distance from UV light.
- ✓ The system keeps transability of all treatments and is designed to be used in a laboratory.
- ✓ A sustainable and environmentally friendly technical product based on Aclepios Tech's Boxilumix photobiology treatment solution for production, conservation, improvement and food safety.

+ GO TO COMPANY WEBSITE

KPIs

- Chemical use reduction.
- Shelf-life extension.
- Qualities improvement.
- Waste reduction.

Participant companies:

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: Monitoring and Evaluation of Boxistick® Photobiological treatments on Berry Crops

Toulouse Protection Biologique Intégrée — Asclepios TECH

Occitania

Sectors of applicability

Agriculture; Agri-food Industries

CESAM Areas

Waste Reduction

SDGs impact

Objective / Challenge

Evaluate the impact of Boxistick® treatments on strawberries through large scale pre and post-harvest trials to improve fruits preservation and quality.

Environmental impacts and benefits addressed

- ✓ Reduction of phytosanitary products.
- ✓ Waste reduction.
- ✓ Natural plant preservation.

Solution's description

- ✓ A new technology for activating nature's intelligence for resilient, nutritious and sustainable crops based on light protection for a chemical-free harvest and preservation of strawberries.

+ GO TO COMPANY WEBSITE

KPIs

- Chemical use reduction.
- Shelf-life extension.
- Qualities improvement.
- Waste reduction.

Participant companies:

FIBAQ

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

EcoAljibe

Ata
Ecotecnología e Higiene del Agua

Balearic Islands

Sectors of applicability

Cross-cutting sectors; Health industries; Agriculture; Agri-food Industries

CESAM Areas

Water Recycling

Scaling and financial needs

The official approval from the Ministry of Health for the modification of the technical guidelines regarding the cleaning and disinfection of water cisterns, in accordance with Royal Decree 487/2022 – Annex IV, Section B.4.

SDGs impact

Objective / Challenge

Assess the feasibility of this new methodology in terms of sanitary effectiveness and the reduction of water and energy consumption, while ensuring compliance with current regulatory standards.

Environmental impacts and benefits addressed

- ✓ Reduction in water consumption, energy savings and contribution to the circular economy.

Solution's description

- ✓ The solution focuses on analyzing the effectiveness of a ministry protocol related to the cleaning and disinfection of water cisterns.
- ✓ Aiming to reduce water consumption during the process.

+ GO TO COMPANY WEBSITE

KPIs

- Water Consumption (water footprint).
- Energy Consumption (carbon footprint).
- Reduction in labour costs.

Participant companies:

NEXBIOLINEA
ENVIRONMENT, HEALTH & SAFETY

ReyCorks by Verréo

verréo
ensemble vers l'impact zéro

Occitania, Catalonia

Sectors of applicability

Food Industries; Packaging

CESAM Areas

Packaging; Waste Reduction

Scaling and financial needs

An investment of 300k€ to make and sell other equipment and build a database.

SDGs impact

Objective / Challenge

Development of a cork sorting industrial solution.

Environmental impacts and benefits addressed

- ✓ Reduce Waste.
- ✓ Reduce the wine packaging industry Carbon emissions.
- ✓ Increase the availability of Cork as a 2nd hand material.

Solution's description

- ✓ IA Based software that allow Characters and material recognition.
- ✓ Industrial ready equipment that sorts corks by nature and identifies all information.

+ GO TO COMPANY WEBSITE

KPIs

- Number of corks rightly sorted per hour.

Participant companies:

JACOB TKS

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

AWARE: AWAYTER Refill Ecosystem

awayter REFILL

Catalonia, Balearic Islands

Sectors of applicability

Cross-cutting sectors; Health industries; Agriculture; Agrifood Industries; Industrial Systems

CESAM Areas

Water Recycling; Packaging; Waste reduction

Scaling and financial needs

Hardware production; Software scaling; Multi-site deployment; Certification & market entry; Communication & partnerships

SDGs impact

Objective / Challenge

To pilot and validate a smart refill system that promotes reusable packaging, reduces plastic waste, and enables sustainable water consumption through digital access, tracking, and payment integration.

Environmental impacts and benefits addressed

- ✓ Reduces single-use plastic waste through reusable packaging.
- ✓ Encourages responsible water consumption.
- ✓ Lowers environmental footprint across the supply chain.
- ✓ Supports circular economy and sustainability awareness.

Solution's description

- ✓ Smart refill stations with QR-based access and digital payments.
- ✓ Use of reusable containers to eliminate single-use plastics.
- ✓ Real-time tracking of consumption and environmental impact.
- ✓ Cloud-based platform for system management and data analytics.
- ✓ Pilot implementation in a tourism setting to validate scalability.

+ GO TO COMPANY WEBSITE

KPIs

- Plastic bottles avoided per dispenser.
- User adoption and satisfaction.
- System uptime and reliability.
- Volume of water dispensed.

Participant companies:

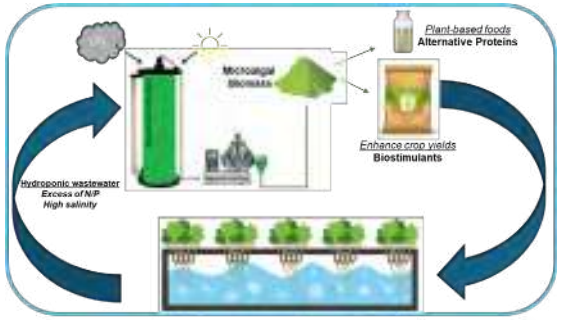
awayter REFILL

Urban Hostel Palma Santa Catalina

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

CIRCA: Advancing Circular Agriculture through Hydroponic Wastewater and Microalgae Cultivation



Algemy®

Catalonia, Occitania

Sectors of applicability

Food industries; Agriculture; Agri-food industries; Health Industries

CESAM Areas

Waste reduction; Water recycling

Scaling and financial needs

To scale up the CIRCA project, an estimated €2-3 million is needed to expand bioreactor infrastructure, optimize microalgae harvesting, and develop a commercial biorefinery pipeline.

SDGs impact

Objective / Challenge

To developed a sustainable and circular farming model by integrating hydroponic wastewater into microalgae cultivation systems, offering an eco-friendly solution for liquid waste management among regional agricultural producers.

Environmental impacts and benefits addressed

- ✓ Reduces ecological damage by reusing nutrient-laden hydroponic wastewater instead of discharging it.
- ✓ Carbon sequestration via CO_2 absorption by microalgae during photosynthesis.
- ✓ Provides sustainable protein and agricultural biostimulants, reducing reliance on conventional resources.
- ✓ Minimal land and energy use compared to traditional agriculture and protein production.
- ✓ Converts waste into valuable bio-based products, promoting a circular bioeconomy.

Solution's description

- ✓ CIRCA uses hydroponic wastewater from Groots to grow microalgae.
- ✓ Utilizes Coldep's demonstration-scale photobioreactor to scale up microalgae cultivation through an integrated VAL-based harvesting system that minimizes contamination and streamlines production.
- ✓ Biomass is harvested using a cost-effective harvesting process patented by Algemy.
- ✓ The harvested biomass is refined into proteins, lipids, and carbohydrates via a biorefinery approach for use in food and agriculture

+ GO TO COMPANY WEBSITE

KPIs

- Maintain Algemy's biomass yield using hydroponic wastewater.
- Adapt one microalgae strain to grow in 100% hydroponic wastewater.
- Develop a biostimulant that shortens basil growth by 1 day in hydroponics.

Participant companies:

Coldep

GROOTS

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Identified Challenge: Intelligent Irrigation System

SENSING & CONTROL
Simply Seamless

Catalonia, Balearic Islands

Sectors of applicability

Agriculture; Agri-food Industries; Cross-cutting Sectors

CESAM Areas

Water Recycling

Scaling and financial needs

Initial Investment: Marketing&Sales department dedicated to this product echnical deployment -SaaS IOT platform Specialization in agrifood technology.

SDGs impact

Objective / Challenge

- Improve data management efficiency by advanced sensors integrated into an IoT network
- Optimize water and fertilizer usage and improve crop production
- Develop a data-driven decision-making platform capable of controlling the irrigation system, providing recommendation and predictive maintenance.

Environmental impacts and benefits addressed

- ✓ Water conservation.
- ✓ Fertilizer Reduction.
- ✓ Soil Health.
- ✓ Sustainable production (+15% production).

Solution's description

- ✓ IoT Platform for real-time soil monitoring.
- ✓ Digital decision-support system.
- ✓ Enhance irrigation efficiency with the smart irrigation system.

+ GO TO COMPANY WEBSITE

KPIs

- >95 % irrigation efficiency.
- >90% fertirrigation efficiency.
- <2% desviation on optimal conditions.
- +15% production.

Participant companies:

TERRACOR

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

OpenCeres@TVI

Flutilliant

Balearic Islands, Occitania

Sectors of applicability

Agriculture; Agri-food Industries

CESAM Areas

Water Recycling

Scaling and financial needs

Funding for experimentation
Farms and software development.

SDGs impact

Objective / Challenge

Develop and validate a decision-support system for small farmers that supply recommendations on when and how much to irrigate. The challenge is to reduce water use without yield loss, with farmer-friendly dashboards.

Environmental impacts and benefits addressed

- ✓ Reduce water usage.
- ✓ Optimize produce growth.
- ✓ OpenSource solution to limit digital impact.

Solution's description

- ✓ Easy to use KPIs to optimize irrigation process for non-digital experts.
- ✓ Based on IOT sensors and Open Data to benefit from available data and adapt them to the reality of the farm.
- ✓ OpenSource platform to benefit from other user's experience and competence.

+ GO TO COMPANY WEBSITE

KPIs

- Reduce used volume of water while maintaining expected quality.
- Innovative and frugal open-source approach promotion.

Participant companies:

Terra Viva Ibiza

Flutilliant

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Solutions

By Sectors of Applicability

Food Industries

Solvent-Free Flocculants	IC: TER-ZEOS PACKAGING
IC: Testing in Sales Point	IC: Food bulk distribution machine
IC: Testing in Horeca Business	IC: Bulk Juice Sales
Ferti-By PRO BIO	IC: Grape Boxistick treatment
AGORA	ReyCorks by Verréo
NITRO-TIC	CIRCA
FoodSensing4CE	IC: Berry Boxistick treatment

Agriculture, Agri-food Industries

Solvent-Free Flocculants	IC: Grape Boxistick treatment
DRIVE	IC: Berry Boxistick treatment
Ferti-By PRO BIO	EcoAlijbe
SSOIL	AWARE
NITRO-TIC	CIRCA
IC: TER-ZEOS PACKAGING	IC: Intelligent Irrigation System
IC: Bulk Product Metering Machines	OpenCeres@TVI

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Solutions

By Sectors of Applicability

Industrial Systems

- Solvent-Free Flocculants
- AWARE
- IC: Bulk Product Metering Machines

Packaging

- IC: Testing in Sales Point
- IC: Food bulk distribution machine
- IC: Testing in Horeca Business
- IC: Bulk Juice Sales
- AGORA
- IC: Bulk Product Metering Machines
- FoodSensing4CE
- ReyCorks by Verréo
- IC: TER-ZEOS PACKAGING

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Solutions

By Sectors of Applicability

Health Industries

- EcoAljibe
- CIRCA
- AWARE

Cross-cutting Sectors

- Solvent-Free Flocculants
- AWARE
- SSOIL
- CIRCA
- NITRO-TIC
- IC: Intelligent Irrigation System
- EcoAljibe

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Solutions

By CESAM Areas

CESAM Areas	Sectors of applicability	Companies	Solutions
WATER RECYCLING	Agriculture, Agri-food industries Food industries Cross-cutting sectors Industrial System Health industries	derypol	Solvent-Free Flocculants
		GROUPE ETHICAE	Ferti-By PRO BIO
		Ata Ecotecnología e Higiene del Agua; NEXBIOLINEA	EcoAljibe
		awayter REFILL; Urban Hostel Palma Santa Catalina	AWARE
	Agriculture, Agri-food industries Food industries Cross-cutting sectors	Coldep; Algemy; GROOTS	CIRCA
		SENSING & CONTROL Simply Seamless; TERRACOR	IC: Intelligent Irrigation System
		Terra Vivă Ibiza; Flutilliant	OpenCeres@TVI

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Solutions

By CESAM Areas

CESAM Areas	Sectors of applicability	Companies	Solutions
PACKAGING	Packaging Food industries Agriculture, Agri-food industries	gozerowaste, food coop BCN	IC: Testing in Sales Point
		FRS, gozerowaste	IC: Testing in Horeca Business
		ONYRIO	AGORA
		ColorSensing tracking true colors, IFS Inox-Ferro Sanchez S.L.	FoodSensing4CE
		B'ZEOS GREEN TECH	IC: TER-ZEOS PACKAGING

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Solutions

By CESAM Areas

CESAM Areas	Sectors of applicability	Companies	Solutions
PACKAGING	Packaging Food industries Industrial systems Agriculture, Agri-food industries Cross-cutting sectors Health industries	Newtimer ingénierie, DUO LOZÈRE	IC: Food bulk distribution machine
		Fundació DRISSA, Newtimer ingénierie	IC: Bulk Juice Sales
		verréo, JACOB TKS	ReyCorks by Verréo
		awayter REFILL, Urban Hostel Palma Santa Catalina	AWARE
WASTE REDUCTION	Food industries Agriculture, Agrifood industries Packaging	derypol	Solvent-Free Flocculants
		food coop, gozerowaste	IC: Testing in Sales Point
		FRS, gozerowaste	IC: Testing in Horeca Business

cesam

Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Solutions

By CESAM Areas

CESAM Areas	Sectors of applicability	Companies	Solutions
WASTE REDUCTION	Food industries Agriculture, Agrifood industries Packaging	TALPTECH	DRIVE
		GROUPE ETHICAE	Ferti-By PRO BIO
		aeris, SaCanova	SSOIL
		ColorSensing tracking true colors, IFS Inox-Ferro Sanchez S.L.	FoodSensing4CE
		DUO LOZERE, Newtima ingénierie	IC: Food bulk distribution machine
		sibio!, Newtima ingénierie	IC: Bulk Juice Sales
		Fundació DRISSA, Newtima ingénierie	IC: Bulk Juice Sales
		Asclepios TECH, IFV	IC: Grape Boxistick treatment
		Asclepios TECH, Toulouse Protection Biologique Intégrée	IC: Berry Boxistick treatment

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

Solutions

By CESAM Areas

CESAM Areas	Sectors of applicability	Companies	Solutions
WASTE REDUCTION	Food industries Agriculture, Agrifood industries Industrial Systems Packaging Cross-cutting sectors Health Industries	verréo, JACOB TKS	ReyCorks by Verréo
		awayter REFILL, Urban Hostel Palma Santa Catalina	AWARE
		Coldep, GROOTS, Algemy	CIRCA
BYPRODUCT VALORISATION	Food industries Agriculture, Agrifood industries Cross-cutting Sectors	derypol	Solvent-Free Flocculants
		GROUPE ETHICAE	Ferti-By PRO BIO
		aeris, SaCanova where good things grow	SSOIL
		FLOC, Club GLOBALS, innobound	NITRO-TIC

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean

The CESAM Catalogue

Circular Economy Solutions in the Agri-food Sector in the Mediterranean

For more information: https://cesam.euroregio.eu/

ACCIÓ Catalonia Trade & Investment

Generalitat de Catalunya
Government of Catalonia

AD'OCC Région Occitanie
Agence de Développement Économique

EUROREGIO Pirineus Mediterrània
Pyrénées Méditerranée
Pirineos Mediterráneo

AGRI SUD-OUEST INNOVATION

FundacióBit
Fundació balear d'innovació i tecnologia

Co-funded by the European Union

cesam
Circular Economy and Sustainable solutions for Agrifood in the Mediterranean