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INNOVATIVE SOLUTIONS

that contribute to the evolution towards a

CIRCULAR ECONOMY

in the agri-food sector

INNOVATIVE TECHNOLOGIES
CONSUMABLES
SERVICES

DATE: DECEMBER 2019

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SUMMARY

Innovative solutions that contribute towards a Circular Economy in the agri-food sector: INNOVATIVE TECHNOLOGIES + CONSUMABLES + SERVICES

This document is a Deliverable of the ORHI Project (Interreg-POCTEFA), outcome of collaborative work carried out by the different partners of the project:

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AZARO FUNDAZIOA **www.azarofundazioa.com**
ACLIMA, Basque Environment Cluster **www.aclima.eus**
ADER, The Economic Development Agency for La Rioja **www.ader.es**
AIN, Industry Association of Navarre **www.ain.es**
APESA, Environment and Risk Management Technological Centre **www.apesa.fr**
ESTIA, School of Advanced Industrial Technologies **www.estia.fr**
Bayonne Chamber of Commerce and Industry Basque Country **www.bayonne.cci.fr**
COOP of France Occitanie **www.coopdefrance-lr.com**

Publication date: December 2019

ORHI is a European project promoted by a consortium of entities in the cross-border territory of France and Spain.

The ORHI project aims to contribute to the evolution of the agri-food sector towards a Circular Economy, focusing on the "organic matter" and "plastic" resources of the agri-food value chain.

ORHI project as a whole integrates different lines of work or actions. These include the following:
- Action 3 involves regional and cross-border workshops aimed at promoting synergies and value based connections between companies (as well as the development of the methodology used to do so).
- Action 4 involves the identification of companies offering innovative solutions that contribute to a more effective and efficient use of "organic matter" and "plastics" resources in the agri-food value chain.
    - Identification of innovative solutions in all the territories involved in ORHI: Basque Country, La Rioja, Navarre, Pyrénées-Atlantiques, Hautes-Pyrénées, Haute-Garonne, Ariège and Pyrénées-Orientales.
    - Identification of innovative solutions at national and international level beyond the territories involved in ORHI.

In this Action, work has been done in two areas. On the one hand, for the identification of "Innovative Technologies" and, on the other hand, for the identification of "New Business Models".
- Action 5 involves the development of projects designed to contribute to the implementation of innovative solutions in the companies of the ORHI territory.
- Action 2 involves the development of Communication activities that contribute both to the involvement of players in the project processes as well as for the dissemination of value generated by the project in the business and social fabric.

This document is part of one of the Deliverables of Action 4: the Solutions catalogue in the "Innovative Technologies" category.
It is also a key component of value for the dissemination of these Solutions among the business and social fabric both in the ORHI territories as well as beyond at both national and international levels (Action 2).

The project is co-financed 65% by the European Regional Development Fund (ERDF) through the Interreg programme v-a Spain-France-Andorra (POCTEFA 2014-2020). The aim of POCTEFA is to strengthen the economic and social integration of the Spain-France-Andorra border area. It focuses on the development of cross-border economic, social and environmental activities through joint strategies for sustainable territorial development.

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CHAPTER 1
INTRODUCTION

This chapter provides an introduction to the document as a whole. It explains the "search focus" set for the identification of Innovative Solutions carried out both in the ORHI regions and beyond at the national and international level.
It explains the contents that can be found in the other chapters, and what types of entities can find value in them.
Likewise, it also outlines the different entities that the ORHI team has relied upon to complement its work in the search carried out.

CHAPTER 2
INNOVATIVE TECHNOLOGIES

The second chapter features 19 Technologies, fully commercial, that we at ORHI have identified and assessed as being of special interest, in the area of equipment solutions, which contribute to the more effective and efficient use of resources by companies in the agri-food sector that use them.

For the identification of these innovative technologies, besides the involvement of all ORHI partners, we received collaboration from the following entities:

- Basque Agency for Internationalisation (Basque Trade&Investment)
- La Manga Corporation
- Transfer Consultancy

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READING GUIDE

CHAPTER 3

CONSUMABLES

The third chapter features 16 consumable items, fully commercial, for different applications in the agri-food sector that can contribute to advance towards a Circular Economy. There are items that can **replace currently used consumables based on plastic material**. There are also items that can lead to a **greater efficiency** in the use of resources in the process and/or a **longer life in the conservation of products.**

This chapter was not foreseen at the start of the project but it was important to create it to differentiate it from the chapter on Innovative Technologies, so as not to mix Equipment (Investment) based solutions with another type of solutions in the same chapter such as:
(*) CONSUMABLES, recurrent consumer products for the company's activity, listed in Chapter 3
(*) SERVICES, listed in Chapter 4

To identify the Consumable items that we outline in this Chapter 3, besides the involvement of all ORHI partners, we received collaboration from the following entities:

- Transfer Consultancy
- Material Connexion Bilbao

CHAPTER 4

SERVICES

The fourth chapter features 2 items on Services available to companies in the agri-food sector based on Business Models aligned with the Circular Economy.

This chapter was not foreseen at the start of the project.

There is another publication of the ORHI project aimed at showcasing references of **Business Models** aligned with the Circular Economy. The search done for Business Models for this publication led to the identification of companies in the ORHI territory that are offering services to the agri-food sector. We find it of interest to highlight these experiences in this publication.
The identification of Services references that we outline in Chapter 4 has been carried out entirely by ORHI partners.

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1. INTRODUCTION

What value can this document offer and to whom

This document outlines different Innovative Solutions that can be of value to companies in the agri-food sector that want to advance towards a Circular Economy, regarding the use of "organic matter" and "plastic" resources. We must emphasize that all of them are currently fully commercial and available for companies that wish to integrate them into their processes.

Specifically, 3 types of solutions are featured:
- **Innovative Technologies:** references of equipment that companies in the agri-food sector can integrate in their production process and consequently improve the circularity of their "organic matter" or "plastic" resources (equipment, as a concept of "investment").
- **Consumables:** references of consumables that companies in the agri-food sector can acquire and thus improve the circularity of their resources (consumables, as a concept of "recurrent expense").
- **Services:** references of services available to companies in the agri-food sector which are based on Business Models aligned with the Circular Economy.

At first, only the Innovative Technologies type was foreseen but as we were identifying ***equipments** (investment for the user company) and ***consumables** (recurrent expense for the user company) as references of Innovative Technologies, we saw the need to create two different categories for these two types of solutions.

Later, we also saw the need to add a third ***services** category to list those services offered by companies identified in the territory of the ORHI partners that are based on Business Models aligned with the Circular Economy which are available to companies in the agri-food sector in the territory.

A Summary Sheet of the Solution is offered for each solution presented in this Catalogue. Each Summary Sheet identifies to which Target Group of the ORHI project the Solution at stake can offer value, as well as the type of value it can offer.

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As a guideline, we list below for each Target Group of ORHI the types of value that will normally be found:

TARGET GROUPS	TYPE OF VALUE YOU WILL FIND
Agri-food sector companies.	• Solutions that offer alternatives for the recovery of by-products. • Solutions that allow the replacement of current consumables with others that contribute to a greater circularity of resources. • Solutions that allow to amend the production process and thus to extend the life of food and/or to reduce food waste.
Companies that process organic matter and plastic outside the agri-food sector.	• Solutions that offer alternatives for the recovery of by-products.
Companies that offer technological solutions and services to the agri-food sector.	• References of foreign companies that are open to collaboration with local companies to distribute and/or manufacture their solutions in Spain and/or France.
Companies that want to invest (or diversify) in other activities.	• Solutions for new business activities that can be set up in partnership with companies in the agri-food sector.
Local authorities, R&D centres, entities that promote circular economy in general.	• References of Best Practices to facilitate the evolution of the agri-food sector towards a Circular Economy which can be disseminated in their areas of influence.

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1.INTRODUCTION

Circular Economy, beyond the recovery of by-products

We believe it is worth mentioning that since the start of the project, the ORHI team of partners wanted to pay special attention not to "limit" the search to solutions from the "by-product recovery perspective (organic or plastic)", but also to integrate the "design perspective for circularity".

When thinking/speaking about Circular Economy, the vast majority of people look at the so-called "waste" (by-products for which the company has not yet identified their potential value) and at proposals for action that will allow these "resources" to be exploited (finding the potential value they can offer and how to realise it). We call this a "by-product recovery perspective".

Looking at how to foster production activity to be "regenerative by design", and at proposals that allow new product designs (product to be offered) and/or process designs (raw materials, equipment, organisational systems, etc.) in such a way as to reduce and/or avoid the generation of so-called "waste" is less common, but we consider it to be of utmost importance in the attempt to evolve towards a Circular Economy. This is the perspective that we refer to when at ORHI we say "design for circularity perspective".

Entities that have collaborated in the search and identification of Solutions

We would like to mention that in addition to ORHI partners, who have actively participated in the identification of solutions in their respective regions, the below entities have also collaborated in the search and identification of Solutions:

- Basque Agency for Internationalisation (Basque Trade&Investment)
- La Manga Corporation
- Transfer Consultancy
- Material Connexion Bilbao

We thank all these organisations for their collaboration in making this material available to the agri-food sector.

2. INNOVATIVE TECHNOLOGIES

We now present the 19 references of Innovative Technologies identified by ORHI in SUMMARY SHEET format.

In the below TABLE we specify for each one of the identified Innovative Technologies, their location, the entity that has been the source of their identification and a brief description.

In the subsequent slides we provide a summary sheet for each one of them, where besides reflecting the "value" that the solution offers to the different ORHI Stakeholders, we also provide a contact person of the company to get in touch if you wish to obtain further details and/or request additional information.

	INNOVATIVE TECHNOLOGIES			SHORT DESCRIPTION	
	IT	LOCATION	SOURCE OF IDENTIFICATION		PÁG.
ORHI	1 COMPO G.S.	Basque Country	Saiolan	Innovative industrial composting system for the recovery of organic waste	10
	2 CWT	Basque Country	Saiolan	Advanced DAF equipment that optimises subsequent wastewater treatment	11
	3 EKONEK	Basque Country	Saiolan	Technology that recovers organic matter by-products through intensive drying	12
	4 OKLIN	Basque Country	Saiolan	Small-scale equipment for "on-site" composting of organic by-products (e.g. restaurants, catering...)	13
	5 BREEN (B.A.S.)	Basque Country	CCIB	Engineering solution for the integral production of fish and vegetables in autonomous and closed circuit	14
	6 SENSARA	La Rioja	Ader	Oxygen detection technology to optimise the wastewater treatment process technically and energetically	15
	7 GREEN RESEARCH	Occitania	CDF	Technology that creates charcoal (biochar) from wood waste	16
	8 MCUBE	Occitania	CDF	Small-scale biomethanisation equipment	17
	9 NEREUS	Occitania	CDF	Wastewater ultrafiltration solution that recovers N, P and Carbon	18
	10 SAPOVAL	Occitania	CDF	Saponification technology that recovers fatty waste in "soaps" for energy recovery	19
BEYOND ORHI	11 NAODEN	France	Estia	Technology for energy recovery from biomass via gasification	20
	12 BIOBEEBOX	France	CDF	Small-scale biomethanisation equipment	21
	13 JIMCO	Denmark	Saiolan	Disinfection equipment that extends the shelf life of food	22
	14 TECHNICAN	Japan	La manga corporation	Intensive deep-freezing of fresh food by immersion in a ethanol+water liquid mixture	23
	15 HYOKAN	Japan	La manga corporation	Refrigeration equipment that extends the freshness of food (preservation) and improves its taste (ripening)	24
	16 DNP	Japan	La manga corporation	Reusable containers (made with VIP) for reefer transport (no negative environmental impact and minimum energy consumption)	25
	17 KENDENSHA	Japan	Saiolan	Equipment for solid/liquid separation of liquid waste with energy and operational advantages over the screw press	26
	18 ECOVATIVE	USA	Transfer	Bio-manufacturing for obtaining compostable materials (e.g. protective packaging)	27
	19 SWISS BIOCHAR	Switzerland	Transfer	Technology that creates charcoal (biochar) from wood waste	28

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T.I./1

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BASQUE COUNTRY (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Poultry farms (>100,000 head), beef cattle (>500 head), Food processing industry.	Transforms slurry and other organic by-products into a valuable product (fertiliser) rich in N, P and K valued by the market.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Organic waste managers in urban settings with > 50,000 inhab.	Halves the managing cost of this waste (from about 200 €/t to about 90 €/t).
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Public bodies of municipalities with > 50,000 inhab. - Entities fostering Circular Economy in general	- Facilitates intensive waste management - Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Minimum environmental impact (no unpleasant odours or leachate)
- Since waste is processed in-situ, the environmental impact of transporting it to a management plant is greatly reduced

CONTRIBUTION TO ECONOMIC IMPACT

- Makes the investment profitable by selling the fertiliser obtained (target price >100 €/t in powder)
- Allows the waste generator to be fully self-sufficient in its management, without depending on other parties
- As the input/output ratio is 3/1 by weight, the cost of transporting the product to the customer is reduced.

CONTRIBUTION TO SOCIAL IMPACT

- It allows an activity such as composting, which is very annoying, to be located very close to the population (there are multiple references like this in Japan).

VALUE PROPOSITION FOR "END USER"

-**Japanese** equipment (CHUBU ECOTEC company) with vast experience (> 3,000 units installed)
-Intensive composting of organic waste
-High performance (**between 8 and 12 days** retention time)
-**Continuous** operation
-**Vertical format**
-**Product range** (16 to 90 m^3 capacity tanks)
-Able to produce high quality **organic fertiliser** (4:5:3)
-Ensures **hygienisation** of the generated product
-Very **small space**
-**Simple operation**
-**No** need to add **structuring** products
-World's **largest capacity** equipment
-Minimum manpower

IMPLICATIONS FOR "END USER"

- **Financial investment: € 400,000**
- **Installed electrical power: 40 kW**
- **Power consumption: 15,000 kwh/month**
- **Space needed: 7 x 7 m^2**
- **Capacity: up to 12 t/day**
- **Personnel needed: 1 person ½ h/day**

PHOTOS / IMAGES

S-90 Model

REFERENCES ALREADY INTRODUCED IN THE MARKET

Larrabe Farm - Vizcaya (Laying hens)

Coop. CAC - Portugal (Laying hens)

Legaria Farm - Navarre (Laying hens)

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T.I./2

CWT CLEAN WATER TECHNOLOGY SLU

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BASQUE COUNTRY (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Companies in various industries (dairy, cheese factories, cutting plants and slaughterhouses, freezers, packaging plants, etc.) with wastewater flows between 1 and several hundred m^3/h.	Optimises the solid/liquid separation phase: - Attaining an effective separation and reduction of contaminants such as greases and oils, suspended solids with the consequent reduction of COD parameter. - Reduces the management costs of subsequent treatments, both in sludge and water management. - In an intensive process (it has a high treatment capacity in a smaller space).
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	**French and German companies** having access to the agri-food waste water treatment market and process knowledge	Access to technology with huge potential due to its ability to process waste water from multiple food industry processes. CWT is open for collaboration agreements with companies in the sector in France and Germany to enter these markets.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Public managers of urban waste water between 2,000 and 100,000 equivalent inhabitants.	- Optimisation and a high degree of efficiency of the initial treatment, especially in the case of industrial inputs, reducing secondary treatments.

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- The environmental and visual impact is far less as they are more compact equipment
- The amount of sludge is less (and it is drier) thus it has a reduced impact.
- As it is such an efficient process for collecting solids, it simplifies the subsequent treatment stages.

CONTRIBUTION TO ECONOMIC IMPACT

- Reduced use of chemicals (20-80% less)
- The cost of sludge management is reduced by 30 to 40 % on average due to its superior dryness.
- If the effluent is discharged into the sewer, the discharge rate is reduced by 60-70 % on average due to its lower load.

CONTRIBUTION TO SOCIAL IMPACT

- Minimises the environmental impact of the sludge as it is generated in less quantity, with a lower moisture content. This is well received by the local communities where they are used due to their lower level of emissions, odours, etc.

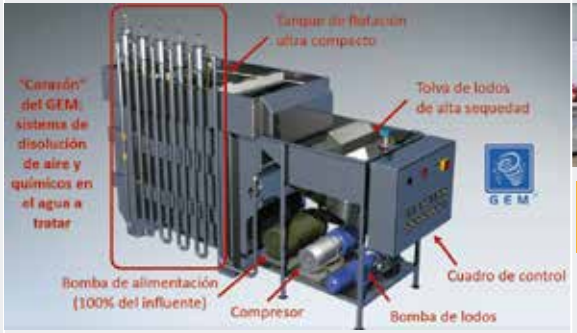
VALUE PROPOSITION FOR "END USER"

- **US** equipment (CWT company) with vast experience (> 700 units installed worldwide). Hardly known in Europe.
- **Advanced DAF equipment** (Dissolved Air Flotation) for phase separation (suspended solids or oils/fats in liquids).
- The **key element** is the **head** bench with its electromechanical equipment where the efficient water-air-chemical mixture takes place.
- Highly improved performance compared to conventional DAFs
  - * Less space needed due to shorter retention time.
  - * Sludge generated with superior dryness.
  - * High solids retention rates and very stable process.
  - * Wide range of products (from 1 to several hundred m^3/h)
  - * Highly versatile due to its ability to process waste water from different origin and composition.
  - * Great flexibility and sustainability: large mass load range in which the same equipment operates effectively.
  - * It allows retrofiting of other old equipment.
- **Several patents** in force with respect to the technology, the use of chemical additives and the aeration system.

IMPLICATIONS FOR "END USER"

- **Financial investment: € 85,000 onwards** (cost of peripherals not included)
- **Power consumption: <5 kWh/m^3**
- **Consumption of chemicals based on pollutant load.**
- **Space needed:** from 2 m^3 (7 m^3/h model) up to 12 m^3 (360 m^3/h model) of water treated per m^2 space.
- **It does not require any dedicated manpower to operate**, the equipment is fitted with enough sensors to warn of potential incidents. A daily 'visit' of the equipment is advised for a sound and visual check.

PHOTOS / IMAGES



REFERENCES ALREADY INTRODUCED IN THE MARKET

BIONOR - Alava (biodiesel production)

Grupo APEX - Navarre (Snacks production)

PROCAVI - Seville (turkey slaughterhouse)

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T.I./3
EKONEK

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BASQUE COUNTRY (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Mid-sized or large agri-food companies that handle by-products (canneries, slaughterhouses, cutting plants, dairy products, etc.) with capacities ranging from a few kg/d of high-value products (e.g. shrimp shells) to tens of t/d of lower-value products (e.g. brewer's yeast).	Convert low-value liquid or pasty food by-products into dry concentrates with physical transformation into granules or powders suitable for human consumption, animal feed, fertilisers, among others. It allows companies to access a new value chain, increasing the sustainability of the food chain in general.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	**French companies** having access to the agri-food market: **- Consultancy firms** in the industry **- Engineering and installation companies** in the industry	Access to technology with enormous potential given its ability to add value to multiple food by-products. EKONEK is open for collaboration agreements with companies in the sector to enter the French market.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Entities fostering Circular Economy in general.	- Benchmark of Good Practice to spread in its region.

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Prevents organic waste from entering natural rotting processes
- In many cases it is a relevant problem because they are very bulky.
- Since waste is processed in-situ, the environmental impact of transporting it to a management plant is greatly reduced

CONTRIBUTION TO ECONOMIC IMPACT

- Installed projects have obtained pay-backs between 1 and 4 years

- Convert a cost-generating by-product (logistics, discharge, etc.) into a source of revenue

CONTRIBUTION TO SOCIAL IMPACT

Minimises the social impact associated with organic waste by working with intensive, closed industrial processes, where the gases emitted can be easily captured for proper treatment so these projects have no problems of acceptance, even those closer to populated areas.

VALUE PROPOSITION FOR "END USER"

- **Innovative, proprietary solution** to enhance food by-products
- **5 installations** operating with various types of waste
- Validated ability to **process multiple wastes**
- It is necessary to make a **proper characterisation** and conservation of the material to be processed.
- Able to process **high moisture waste** (80-90 %) that rotary dryers cannot process
- Convert a **low-value by-product** (a few €/t) **into a high-value product** (several €/kg)
- **Compact and efficient** drying **equipment** (low energy consumption, 1 kwh/kg evaporated water)
- **Flexible** operation: easy adaptation to input changes
- **Continuous** operation with short stops for cleaning

IMPLICATIONS FOR "END USER"

- Average financial investment of the installation between € 0.4 and 2 M

- Installation delivery time: 6 months

- Gas consumption: 20 €/t of input at 30 % dry matter to obtain 94 % output

- Manpower: 1 person

PHOTOS / IMAGES

Drying equipment

REFERENCES ALREADY INTRODUCED IN THE MARKET

ABN - Madrid (brewer's yeast production plant)

NEIKER - Alava (experimental plant for obtaining fertilisers)

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T.I./4

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BASQUE COUNTRY (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	*Hotels, *Restaurants, *Airports, *Education Centres, *Hospitals, *Cafeterias, *Food processors, *Supermarkets, *Collective catering, *Local entities managing organic waste.	Equipment that converts organic by-products into compost in a short period of time. It reduces the volume of waste by 90% in 24 hours.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector		
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities fostering Circular Economy in general.	Benchmark of Good Practice to spread in its region.

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Minimum environmental impact (no unpleasant odours or leachate)
- Since waste is processed in-situ, the environmental impact of transporting it to a management plant is greatly reduced

CONTRIBUTION TO ECONOMIC IMPACT

- Allows the waste generator to be fully self-sufficient in its management, without depending on other parties
- The user entities eliminate the cost of organic waste management after the installation of this equipment.
- When user entities have suppliers who work cultivating the land, they can enter into collaboration agreements where they exchange "fertiliser generated by OKLIN equipment" for "fruit/vegetables" from the crops.

CONTRIBUTION TO SOCIAL IMPACT

- The solution prevents catering establishments, food processing companies and supermarkets from depositing organic waste in spaces close to the public, thus avoiding the potential discomfort that this could cause to the nearby community.

VALUE PROPOSITION FOR "END USER"

-**Small and medium scale organic matter composting** equipment, developed to be used "in situ" at the place where organic matter waste is generated.
-It requires a number of "specific microorganisms" for its operation which must only be added at the beginning of the operation; these are supplied along with the equipment by the company.
-Continuous cycles. By-products to be processed are added as required. Emptying of the compost generated when the volume in the tank is indicated.
-Product range (Mid-sized equipment processes between 75 and 90kg/day)
-It does not generate liquid waste.
-It operates inside at 55°C and when needed, the temperature can be raised to 70°C (to ensure sanitation).
-Very **small space**
-**Simple operation**
-Minimum manpower

IMPLICATIONS FOR "END USER"

- **Financial investment:**
  - Small-Scale Model (4 kg/day): € 1,400
  - GG-30S Model (75 kg/day): € 24,000
  - GG-30S Model (800 kg/day): € 119,000
- **Installed electrical power:**
  - Small-Scale Model (4 kg/day): 0.240 Kw.
  - GG-30S Model (75 kg/day): 4 Kw.
  - GG-30S Model (800 kg/day): 25 Kw.
- **Power consumption:**
  - Small-Scale Model (4 kg/day): 60-90 kwh/month
  - GG-30S Model (75 kg/day): 694 – 1,787 Kwh/month
  - GG-30S Model (800 kg/day): 3,953 – 10,885 Kwh/month
- **Space needed:**
  - Small-Scale Model (4 kg/day): 0.5 x 0.5 m.
  - GG-30S Model (75 kg/day): 2 m x 1.5 m
- **Capacity:** they offer a wide range from 4 kg/day (Small-Scale) to 1,350 kg/day (in commercial equipment). They also have a Large-Scale model that processes 30 Tn/day.
- **Personnel needed:** 1 person who knows how the equipment works. Easy to use.

PHOTOS / IMAGES

Small-Scale Model **GG-30S Model**

REFERENCES ALREADY INTRODUCED IN THE MARKET

Restaurante Nolla (Finland)

Hotel Sheraton Schiphol (Netherlands)

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UNION EUROPÉENNE

T.I./5

GREENRESEARCH

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BASQUE COUNTRY (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	- Fish farms - Vegetable producers	Engineering solution for the integral production of fish and vegetables in autonomous and closed circuit, continuously reusing the resources generated to reintroduce them into the system and generate zero waste and zero pollution.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector		
Companies that want to invest (or diversify) in other activities	Supermarkets, Hotels, Restaurants, Restoration, Collectives	Concept that allows the production of fish and vegetables in the same process.
Local authorities, R&D centres, entities that promote circular economy in general	- Schools - Entities promoting Circular Economy in general	- Opportunity to create a demonstrator of the feasability of the acuaponic system that serves as an educational reference - Good Practice Reference for Spreading in Your Territory

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

The main value of the system is the reduction of water consumption and energy producing fish and vegetables. Production is local, in short circuits.
So, Breen Aquaponic Systems has developed an engineering solution that can solve the overexploitation of the seas and the scarcity of farmland, as well as sustainably managing water.

CONTRIBUTION TO ECONOMIC IMPACT

- Perform economies of water, supplies and raw materials. Also carry out transport savings.

- The engineering solution offers the opportunity to diversify its activity with the production of a quality product in the market, with food safety.

CONTRIBUTION TO SOCIAL IMPACT

Fish farms and horticulture entities can diversify their activity with this solution. This could involve the integration of new people (employment) with new skills
Public awareness of local and responsible consumption.
It is a promising field with a lot of knowledge to develop, learn and expand.

VALUE PROPOSITION FOR "END USER"

The company offers a proven engineering solution in the market that allows to produce fish and vegetables in an autonomous closed circuit, where waste water from the fish farm is used for irrigation of vegetable cultivation.

The proposal is to be sustainable in water, energy and food in aquaculture crops, continuously reusing the resources generated to reintroduce them into the system and generate zero waste and zero pollution.

Aquaponics is the ideal method of cultivation in urban and peri-urban areas because it can be practiced indoors (wine cellar, veranda, garage), on terraces and roofs of buildings, on wasteland, and especially in areas where access to land is limited and expensive. As a result, the model is particularly suitable for the development of short circuits. The aquaponics thus promotes the development of a local economy and direct sales, thus limiting the costs and CO_2 emissions linked to transport.

IMPLICATIONS FOR "END USER"

Depending on the location, the climate, the quantity and quality of the water, the market and the volume of production, the investment will be different. In each of the custom projects the concept will be the same but the execution different in designs and costs.

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

Breen Aquaponic Systems carried out the first industrialization (located in Hondarribia - Gipuzkoa) on a production area of 6,000 m^2 and another of research and development of 800 m^2. The company on which this first installation was made is a producer of "tilapia" fish and vegetables.

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T.I./6

SENSARA S.L.

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LA RIOJA (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Medium or large agri-food companies or those that treat their wastewater using aerobic systems, mainly activated sludge.	Oxygen detection technology that allows the process to be optimised both technically (toxicity detection, process conditions) and energetically, which leads to significant cost savings.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Both **Spanish** and **French** companies interested in saving and improving the activated sludge process.	Gain access to technology with huge potential. Sensara is open to establish collaboration agreements with companies in the sector to enter the French market.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Public entities managing Wastewater Treatment Plants (WWTP). - Entities that promote Circular Economy.	- Oxygen detection technology that allows the process to be optimised both technically (toxicity detection, process conditions) and energetically, which leads to significant cost savings. - Benchmark of Best Practice that can be disseminated in its territory.

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

It detects the harmful effects of wastewater on microorganisms just when it starts to affect them, so that measures can be taken to mitigate the effects and avoid the stability of the activated sludge process.

CONTRIBUTION TO ECONOMIC IMPACT

The optimisation of energy costs in wastewater treatment plants accounts for more than 60% of their operating costs. Through this technology it is possible to obtain 15-40% average savings in energy and reagents depending on the current condition of the plant. Pay-backs obtained are reduced, ranging from < 1 to 2 years.

CONTRIBUTION TO SOCIAL IMPACT

As it is a tool that provides information on the condition or activity of the biomass, it enables us to assess, control and protect the activated sludge process. This makes it possible to foresee most of the issues that may affect the process, ensuring that the correct measures are being taken, minimising the problems.

VALUE PROPOSITION FOR "END USER"

Detects the supply of oxygen based on the degradation of the bacteria in the biomass.
- Configurable with a basic respirometer.
- Control of more than one reactor with the same equipment
- Not affected by the pond level.
- Low maintenance sensors.
- Reproduction of the process in real conditions.
- Can be installed in different points of the process.
- Configured with MODBUS TCP communication, 4-20 or 0-10V outputs, for integration with the plant control system. Remote control, data base and alerts via email.
- Primary assessment of the sludge.
- Discharge detection.
-Automatic aeration control, based on respirometry: Energy optimisation: both in nitrification and in industrial plants with and without nitrification.
- SBRs optimisation.
- Automatic control of nutrient dosage.

IMPLICATIONS FOR "END USER"

- **Financial investment: € 30,000**
- **400 x 500 mm portable cabinet.**
- **Low power consumption**
- **Continuous measurement**
- **Full remote control**

PHOTOS / IMAGES

Respirometer SN8

Electronic panel

Communications

REFERENCES ALREADY INTRODUCED IN THE MARKET

Marqués de Murrieta Cellar Wastewater Treatment Plant
Torres Cellar Wastewater Treatment Plant
Murcia Este WWTP Wastewater Treatment Plant
Front de la Pedra WWTP Wastewater Treatment Plant
Industrial wastewater treatment plants managed by EXMAN company

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T.I./7

GREENRESEARCH

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Transforming your green waste into green energy

OCCITANIE (FRANCE)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	- All agri-food or agricultural companies with woody biomass to be exploited (oil cakes, stalks, coffee grounds, shells, seeds, etc.) - Viticulture (vine shoot, stumps, stems, cuttings, prunings, etc.)	- Equipment to convert the unrecovered wood waste into an ecological, economic, sustainable energy or enrichment: standardised agrofuel (pellets), electricity (injected into the national grid), Syngaz, Biochar. 4 kg wood material = 2 kg fuel = 1L fuel oil - Filing of 3 patents
Companies that process organic matter and plastic outside the agri-food sector	- Sawmills. .	- Equipment that allows the reuse of wood waste in packaging (dry, untreated, unpainted wood, pallets, crates, boxes ...).
Companies that offer technological solutions and services to the agri-food sector	- Companies distributing energy recovery solutions.	Greenresearch is interested in distribution and prospecting exploration through a company based in Spain. Open to signing a NDA.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Local authorities, green waste from cities, municipal communities, composting platforms. Geographical study phase to assess the potential and then implementation of the project with public or private investors - Entities promoting the Circular Economy in general	- Greenresearch is also a consultant and research and development laboratory that supports local authorities and metropolitan areas in the search for unexploited deposits in their territory. - Benchmark of Best Practice for its dissemination in the territory.

FIT IN CIRCULAR ECONOMY

Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
✓ Revaluation
Recycling
✓ Energy recovery
Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Reuse of woody biomass in situ with mobile granulation: the environmental impact of transport is reduced.
- Local and national agronomic perspective.

CONTRIBUTION TO ECONOMIC IMPACT

- Innovative solutions (tools, projects) for access to energy in the regions
- Circularisation of the economy in the same territory: biomass, collection, storage, treatment, transformation and valorisation (potential mobile granulation tool), resources, activities of the territory: Collect all the materials in the territory for redistribution in the same territory
- Average return on investment time: 7 years. Green research turns a cost-generating by-product (logistics, treatment, etc.) into a source of income.

CONTRIBUTION TO SOCIAL IMPACT

- Creation of unskilled, sustainable, direct and indirect jobs
- Dynamic job creation on the sale of pellet boilers (installation and maintenance).

VALUE PROPOSITION FOR "END USER"

-Equipment that enables the recovery of woody biomass: from the city (pruning, green waste ...), from recycling (wood A), from the countryside (vine shoots, stumps, stems, cuttings, pruning, vines ...), from the forest (wood energy, sawmill related ...), from the agri-food industry (oil cake, seeds, cores, shells, grounds ...) in local and storable energy in different forms: energy granules (pellets), soil improvers, electrical and thermal energy (cogeneration), from gas and hydrogen, in production, injection or self-consumption.
***Customised**
***Saving strategies for community budgets**
***A valuation system designed to be either fixed or mobile**
***The Lego factory: assembly of modules under supervision**
***Granulation: 1 to 4 T/h**

IMPLICATIONS FOR "END USER"

- Treatment capacity: from 1 to 4T/h
- Projects from 600 K€ to 5,000 K€:
A single granulation unit of 1T/h : about 600 K€
- Space needed: 600 m² for a 1T/h unit but usually double the amount with storage
- Return on investment: 6 to 9 years net, but lower if the initial treatment costs of green waste are included (in France: from €35 to €65 per ton)
- Personnel needed: 2 people for 1T/h solution

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

Horticultural company in Cher (Dépt 18- France) – in progress: conversion of its biomass into pellets. Some of these agrofuels are used to produce electricity. With this electricity, the company will be able to heat its greenhouses in winter and cool them in summer. By doubling its production and turnover, the company expects to create 20 jobs.

SMIRTOM DU SAINT AMANDOIS (Local authority – Waste - Dept 18 – France) Bucket and granulation line – 10 000 T of green waste per year

Composting platform in Nogent-sur-Vernisson in Loiret region (Dept 45- France)- in progress: installation of an electricity production unit based on a gasification system. The heat will be reused for pellet production and the ash generated by this system will be recovered to improve the compost quality.

T.I./8 OVALIE INNOVATION

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"Renewable energy at the farm through micro-methanisation"

OCCITANIE (FRANCE)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	- Agricultural farms: dairy cow, pig, fattening duck breeding... Micro methanisation in situ.	- Harness the farm's energy resources (livestock manure, slurry, dung, vegetable matter from crop waste, etc.) to produce a digestate (stable, less odorous product) and a biogas that can be transformed into electricity through co-generation (heat production or injection into the grid).
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies offering energy recovery solutions.	- The search for distributors is planned from end 2020. At that time, it will be determined in what form.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities promoting the Circular Economy in general.	Benchmark of Best Practice for its dissemination in the territory.

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- ✓ Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Does not affect the site and surroundings
- Use of slurry pits in situ: health benefits, no transport and risk of disease spread
- Digestate of the slurry pits: stable product, hygienisation and deodorisation, on-site spreading
- Fosters farming based on agro-ecological practices (intermediate energy crops, return of digestates to the soil, etc.)
- Less greenhouse effect gases
- Animal welfare (hot & cold, more regular cleaning)

CONTRIBUTION TO ECONOMIC IMPACT

- Generates stable income for farmers (sale of electricity)
- Ease of electricity injection into the networks
- This value creation occurs at all stakeholder levels: manufacture of biogas unit modules in standardised industrial conditions, installation of pre-manufactured units by assembling the modules on agricultural sites, maintenance of equipment (biogas and co-generation), farmer's income from biogas

CONTRIBUTION TO SOCIAL IMPACT

- Creation and distribution of value throughout the territory: Creation of jobs and skills in cooperatives for the installation of the methaniser, maintenance of farms thanks to additional income.

VALUE PROPOSITION FOR "END USER"

- Innovative on-farm biogas solution, turnkey and customisable for isolated bio-waste producers, i.e. outside the scope of major biogas plants

- Patented, movable and modular machine that adapts to any type and quantity of waste: micro methanisation

- Automated machine, remote supervision, 24/7 assistance.

IMPLICATIONS FOR "END USER"

- Minimum size of the farm: 3000 m³/year of pig manure (160 nascent fattening sows with young born and fattened in situ) or cow manure (about 150 cows). 1000 m³ for fattened duck
- Investment: between € 400 and 600 K
- Return on investment: 7 years
- Power consumption: 0.05 MWh consumed/MWh of injected electricity
- Treatment capacity: from 1,500 to 10,000 tons of incoming materials
- Personnel needed: farmer supervision
- Delivery time of the installation: between 6 months to 1 year (the limiting point is the administrative formalities)

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

- Dairy cow farm at the Purpan School of Agriculture, Toulouse (Dept 31 - France)

- Duck feeding farm in Barcelonne du Gers (Dept 32 – France)

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T.I./9 NEREUS

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Nereus, low energy recycling of your effluents

OCCITANIE (FRANCE)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	- Food processing, beverage and dairy companies, which must reduce their water intake, which want to recover ingredients from wash water to reduce the pollutant load of waste water and produce biogas or polymers - Agricultural livestock breeders (for slurry), Mass and commercial catering	Néréus provides innovative and sustainable solutions for the recycling of effluents such as slurry, digestate and wastewater in industries and communities. Thanks to a ceramic disc membrane, Néréus machines consume 5 times less energy to produce drinking quality water from waste water or slurry or liquid by-products. Recovery of precious compounds (N, P, C) and basic components
Companies that process organic matter and plastic outside the agri-food sector	- Producers of bioplastics or biopolymers - Industrial laundries, swimming pools and ponds, hotels and camping on sites/areas lacking water	Intensive processes for the production of PHAs from residual carbon sources
Companies that offer technological solutions and services to the agri-food sector	Suppliers of upstream and downstream processing technology, operational partner. Composting and methanisation platforms	- Energy efficiency & lower CAPEX for given performance - Very robust selective separations
Companies that want to invest (or diversify) in other activities	- Companies developing circular economy solutions - Developers and operators of eco-responsible habitat	- Liquid / fluid sorting technology to start a new activity
Local authorities, R&D centres, entities that promote circular economy in general	- Water authorities and local authorities. Biogas producers, methanisers - Entities promoting the Circular Economy in general	- Short-term reduction in water use from natural resources, water cheaper than from the network, disinfected water without tertiary treatment - Benchmark of Best Practice for its dissemination in the territory.

FIT IN CIRCULAR ECONOMY

Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
✓ Revaluation
✓ Recycling
Energy recovery
Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Use of 5 to 10 times less energy per m^3 of recycled water from waste water
- Sustainable management of micropollutants
- Zero discharge of liquid waste
- Recovery of ingredients and energy from waste water
- In-situ processing
- Sustainable biogas production
- Aim to achieve water autonomy

CONTRIBUTION TO ECONOMIC IMPACT

- Sustainable water and waste water management: 85% extraction of drinking water from effluent recovery
- Simultaneous in situ reduction of water and energy consumption for sustainable buildings: preservation of natural water resources, low energy consumption (less than 10kWh/T for the 3 extraction stages)
- For biogas producers and farmers: reduction or elimination of digestate/slurry volumes to be spread and stored, increase in profitability of their production unit or farm, practical for farms whose spreading sites are too far away or which do not have enough spreading area.

CONTRIBUTION TO SOCIAL IMPACT

- Designed and built in Occitania: local jobs
- Training and skills upgrading for workers and technicians

VALUE PROPOSITION FOR "END USER"

- **Effluent recycling**
- **Less natural water consumption**
- **Less dependence on water needs**
- **Efficient recovery of valuable compounds**
- **Less waste and energy production**
- **Easy to convert to a circular economy**

IMPLICATIONS FOR "END USER"

- **Easy to use, 100% connected for remote monitoring and control**
- **Lower treatment limit: 200 litres/hour (industry) or 40 IE (building)**
- **Very compact and easily positioned on site, which minimises civil engineering work and further reduces environmental impacts**
- **Very easy to increase capacity (+ 100% after 2 days of work)**
- **Return on investment within 5 years**

Synthèse gamme Valordig pour le fractionnement des lisiers, digestats, fluides agroalimentaires

Machine	Capacité moyenne sur digestat ou sur lisier - T/an	Prix public - Amortir sur 16 ans	Consommation électrique - kWh/tonne entrée	Main d'œuvre - Heures/an	Cout remplacement de membranes - € par an
VALORDIG 2(+2)	20 000	485 000 €	11 +/-3	200+/-40	12 125 €
VALORDIG 3(+1)	30 000	555 000 €	11+/-3	200+/-40	18 188 €
VALORDIG 4	40 000	628 000 €	10+/3	200+/-40	24 250 €
VALORDIG 6(+2)	60 000	889 000 €	10+/-3	250+/-50	32 738 €
VALORDIG 8	80 000	1 015 000 €	9+/-3	250+/-50	43 650 €
VALORDIG 10+2	100 000	1 200 000 €	9+/-3	300+/-60	48 500€
VALORDIG 16	160 000	1 580 000 €	9+/-3	300+/-60	77 600 €

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

Valordig range (concentration of digestates and slurry):
EV6 ENERGY (effluent digestate) (2.2T/h treatment capacity) – Pleuvezain (Dpt 88- France)
Gaec des Moulins de Kerollet (effluent digestate) (2.2T/h treatment capacity) – Arzal (Dpt 56- France)

Gamme range (waste water recycling):
Maison de Steven restaurant (grey water) – Anvers (Belgium)

Néostep range (waste water treatment and/or recycling):
Aria Foods (dairy water) (19 m^3/h treatment capacity)-Rødkærsbro (Denmark)
Hennig Olsen Ice (ice cream factory water) (10 m^3/h treatment capacity) – Kristiansand (Norway)

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T.I./10

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" Management of fatty waste from waste water"

OCCITANIE (FRANCE)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Any food industry with fatty waste (canneries, processed dishes, cured meats and slaughterings exceeding 50-60 T/year of fat production), mass catering, etc.	Equipment to improve fat waste management: **pre-treatment through fat saponification**. Treatment cost halved. Reliable technique, easy to use and very low time consuming. Finally, maintenance and monitoring by the maintenance staff of the food company.
Companies that process organic matter and plastic outside the agri-food sector	All companies in the sector that have oily effluents for treatment.	Saving in material treatment or optimised energy recovery with fat (as appropriate) through saponification of the materials.
Companies that offer technological solutions and services to the agri-food sector	Companies offering services in the agri-food sector and local authorities.	- Sapoval is looking for prescribers (design office ...) and not investors. - Sapoval offers the possibility to distribute its technical solutions in France and Spain
Companies that want to invest (or diversify) in other activities	By geographical area, SAPOVAL offers the possibility to develop, through investors, its mobile solution for saponification and fat treatment of agri-food sector companies.	Offer a mobile solution to several companies to optimise fat treatment (economic optimisation of the complementary process of the saponification process for small volumes of fat).
Local authorities, R&D centres, entities that promote circular economy in general	.Urban communities that avoid fat flow management through saponification since everything is eliminated at the plant (plant larger than 20 000 IE.) .Urban and agro-industrial waste water treatment plants .Entities promoting the Circular Economy in general	- Converts solid and sticky flotation fat waste into a liquid, odourless and easily biodegradable effluent which is then acceptable to any type of plant. - Benchmark of Best Practice for its dissemination in the territory.

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- ✓ Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- ✓ Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Improving the carbon footprint and participating in the circular economy
- It enables an optimised treatment of fats in pre-treatment or waste water treatment plants (product obtained through highly biodegradable saponification): odourless
- Energy optimisation (enables a strong growth of biogas production)
- Environmental gain: 100-300%

CONTRIBUTION TO ECONOMIC IMPACT

- Reduction of fat treatment costs (-10 to 70% depending on the case)
- Low investments and operating costs of the saponification process
- Saponification process originally developed for companies

CONTRIBUTION TO SOCIAL IMPACT

- No impact.

VALUE PROPOSITION FOR "END USER"

- Customised unit for conditioning your fatty waste integrated into your methaniser.
- Improvement of costs related to fat and water treatment (direct and indirect)
- Optimisation of biomass energy production
- Standardisation of saponification that fits on a mobile unit and is automated
- Uses of saponified flow: for energy production (methanisation), integrated into the biological level of a waste water treatment plant, enables a balance to be maintained between the carbonaceous and nitrogenous parts.

IMPLICATIONS FOR "END USER"

- Be equipped with a flotation or fat recovery system in the water
- Pricing for an installation:

Minimum investment: Approx. 25-60 k€ (simple project that can process up to 1 to 2-3 T/day of fat approx. 10% DM); 85 – 150 k€ (complex project that can process approx. 1500 T/year of fat approx. 10% DM); 180 – 220 K€ (complex project that can process up to 4000 to 7000 T/year of fat approx. 10% DM)

The full operating cost of the SAPO'FIX unit developed and optimised by SAPOVAL, ranges from € 7 to 15 HT/T treated. It includes electricity, reagent costs, time spent managing the unit (10 to 15 min/day), changing parts over time due to wear and tear, annual calibration of probes by an external agency, etc.

Space needed for the installation: From 15 to 50 m² approx for a fixed installation on a site (water pretreatment, purification plant, methaniser), possibility of setting up a mobile installation in a 30 m³ box (usual waste bin), particularly for local authorities or companies with several sites under management.

Treatment capacity: For companies in France, economic min 50 – 60T/year of fat to be treated (depends on the local context)... no upper limit (custom installation). For local authorities, no technical limits can be stated because the system is not technically binding and does not add any real value to the waste water treatment plant or to methanisation (fat preparation)

Internal rate of return from 1 to 3 years depending on the context

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

- In the agri-food sector (with a fixed saponification process):

Groupe MENGUY'S- Barnier Olives (Dept 34- France) – 150 T fat/year

- In the agri-food sector (with a mobile saponification process):

Several meat product processing companies (AFG, Intermarché, etc.)

- In waste water treatment plants:

Graulhet (Dept.81 – France) 1500 T fat/year

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FRANCE

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Agro-industry.	Naoden recycles biowaste to produce electricity and heat through its own bioenergy plants.
Companies that process organic matter and plastic outside the agri-food sector	Various sectors with biomass waste	Biomass gasification is a process that uses plant material such as wood to extract a synthesis gas after a thermochemical reaction. The transformation process takes place in a reactor in four successive stages which are drying, pyrolysis, oxidation and reduction.
Companies that offer technological solutions and services to the agri-food sector		Develop internationally (Spain to be explored)
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Local authorities that generate wood waste - Entities promoting the Circular Economy in general	- Recycling of biosourced waste to generate electricity - Energy recovery. - Benchmark of best practices for propagation in its territory

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- ✓ Recycling
- ✓ Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

Multistage positive Naoden micro-cogeneration solution:
- Promotes energy transition.
- Reduction and control of the energy bill.
- Neutral carbon balance on the equipment side.
- Reduction of CO_2 emissions in project management (promotes local product).

CONTRIBUTION TO ECONOMIC IMPACT

Transforming locally available waste into energy, all of which can be fully recovered on site, with a reduction in the energy bill, a reduction in the carbon footprint and a revitalisation of the local economy.

CONTRIBUTION TO SOCIAL IMPACT

Solution that creates local employment.

VALUE PROPOSITION FOR "END USER"

- Electricity and heat production based on the principle of cogeneration with the IMPERIUM power plant (160 kWth / 90 kWel).

- Production of heat only based on the burner principle with the NOBILIS power plant (330 kWth).

- Positioned on the micro-cogeneration market, i.e. below 100 kWe, Naoden has chosen co-current fixed bed technology (Downdraft) for its gasification unit.

- Services to finance the project to set up a bioenergy plant, to provide maintenance and after-sales service or to train the "end user" teams on site in the routine maintenance of the various control parameters.

- Parallel operation of the units is able to obtain 900 kW electrical power.

IMPLICATIONS FOR "END USER"

- Micro-cogeneration < 100 kWe,

Fuel type: Forest chips, wood waste class A, pallets/palox, pruning wood, fruit stones, fruit shells, olive pomace. Under research: CSR, step sludge, class B wood waste, marine plastic.

Fuel size: < 80 mm
Maximum moisture: 20 %
Fine rate: < 30 %
Wood consumption: 0.78 kg/kWhel
Nominal gas flow rate: 186 m³/h
Net heating value of gas: 1.42 kWh/m³

- Unit Dimensions (Width/Length/Hight)
UGZ : 1.2 x 3.6 x 3 m
UFL : 1.2 x 4.2 x 3 m
UPE : 1.2 x 4.2 x 3 m
UTO : 0.6 x 1.0 x 5.0 m

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

NAODEN has installed an IMPERIUM power plant in Vertou (44) at the Côteaux Nantais site.

Community of municipalities Pays du Haut Val d'Alzette (57).

Kerval Centre Armor, a waste recovery association at the Côtes d'Armor centre (22).

Eolyo, commissioning of a Biomass cogeneration plant at the Safran site in Tarnos (64).

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T.I./12

BIOBEEBOX

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"Unleash the energy of your biowaste"

NOUVELLE AQUITAINE (FRANCE)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	- All companies in the agri-food industry generating organic waste including meat products - Collective catering (school restaurants, central cooking facilities...) - Wholesale food market (Market of National Interest) - Food superstores - Farms: treatment of manure and slurry from livestock production	Micro methanisation: On-site integrated treatment solution in containers: hygienisation, production of electricity and heat, standardised compost product, industrial water
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	The company is not looking for an investor but is interested in finding distribution outlets in Spain.	Interest for distributors is to be able to promote and sell a turnkey micro-methanisation solution to provide a treatment solution as close as possible to the places where bio-waste is produced.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Local authorities having either the competence for waste treatment or in charge of the management of schools and their waste – Regulatory obligation from 10 Tons per year - Entities promoting the Circular Economy in general	- A local treatment solution with reduced collection at the city outskirts, thus ensuring a reduced collection cost and promoting social and community acceptance that takes into account the ecological and energy transition. - Benchmark of Best Practice for its dissemination in the territory.

FIT IN CIRCULAR ECONOMY

Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
Revaluation
Recycling
✓ Energy recovery
Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Producer of renewable energy to renew the image of the waste producer.

- Reduction of the carbon footprint of waste collection: allows the treatment of bio-waste within a radius of less than 5 km from its production site.

- CO_2 producer from biomass.

CONTRIBUTION TO ECONOMIC IMPACT

-Substitution of a collection/treatment cost by an on-site treatment cost

- Guaranteed electricity income in France under the renewable energy purchase obligations over 20 years at €175/MWh

CONTRIBUTION TO SOCIAL IMPACT

- Local waste management
- Compliance with the law by creating local business and outlets for the produced compost
- Establishment of an integrated solution in the territory providing bio-waste management and energy production with small units that are easily installed and socially accepted.

VALUE PROPOSITION FOR "END USER"

Micro-methanisation solution to provide a treatment solution as close as possible to the places where bio-waste is produced
- Compactness, safety, pollution control, ease of use
- State-guaranteed energy income in place of collection and treatment costs
- Positioning the user as a player in the environmental and energy transition
- Use of compost in the green areas of the municipality
- Reduced CO_2 impact on end users.
- Miniaturised networked methanisation plant (remote process control, sends daily operating report, signals alarms and alerts on mobiles)
- Over 20 years lifetime

IMPLICATIONS FOR "END USER"

- Implementation of a separate flow of organic waste often in operation in the agri-food industry
- Adoption of the sorting step for communities by separating the flow of organics separated from OMs
- High price:
€200 K to €700 K (treatment solution for deposits ranging from 80 to 1000 tons/year)
- Amortisation in less than 6 years
- Size: 2 x 20-foot sea containers

DONNEES D'ENTREES	
Biodéchets	BioBeeBox®
Restes alimentaires (restauration hors foyers –RHF)	Modules de 80 – 1000 T/an
Déchets de GMS,	
Déchets des IAA	Du XS au XXL

DONNEES DE SORTIES	
Electricité =	2 – 30 kW
Thermie =	4 – 60 kW
Compost =	2 – 35 T/an
Eau industrielle =	60 – 800 m3/an
TCO2 économisée =	60 – 700 T/an

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

- A BioBeeBox® with a 100 Tons capacity per year of biowaste installed at MIN (wholesale market) of Bordeaux (33) since July 2017.

- A BioBeeBox® with a 300 Tons capacity per year in the town of Vitry-sur-Seine (94) for managing food waste for 40 school groups in the town.

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T.I./13

JIMCO A/S

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Company based in Denmark. In-house technology, in collaboration with DTU (Danish Technological University).

DENMARK

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	*Poultry farms, cattle farms, * Food processing companies, * large fruit/vegetable stores, * fish processors, *bread and pastry shops, *logistics companies, *supermarkets.	*Farm disinfection kits without removing the animals (because it does not require the use of chemicals) *Equipment for disinfecting atmospheres and surfaces using ozone, which extends the life of food and reduces "food waste".
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies marketing storage and transport equipment in the agri-food sector.	Opportunity to establish collaboration agreement for distribution in Spain and France (They already have distributors in Madrid and Barcelona, but are open to new collaborations)
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities fostering Circular Economy in general.	Benchmark of Good Practice to spread in its region.

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Helps to increase the shelf life of food and reduce food waste.

- Compared to other sanitation solutions, it avoids the "use of water", "use of chemicals" and "heating of water to 50°C".

CONTRIBUTION TO ECONOMIC IMPACT

- JIMCO states that in Denmark the recovery of investment (Payback) is less than one year.

- The user companies save costs derived from the "use of water", "use of chemicals" and "heating of water to 50°C"

CONTRIBUTION TO SOCIAL IMPACT

- Besides disinfecting, it also avoids bad smells.

- The presence of listeria and salmonella bacteria can be eliminated almost completely by using this equipment 1 hour/day.

VALUE PROPOSITION FOR "END USER"

- **Equipment for disinfecting atmospheres and surfaces** using ozone, generated by the action of UV rays acting on the oxygen in the air.
- **Accessories (patented) that offer data recording of the atmosphere, as well as safety and guarantee of the disinfection process carried out.**
- **2 types of equipment:**
  - **FLO-D:** aimed at warehouses, processing plants, farms. It can disinfect a volume of 1,500 m³
  - **FLO-D MINI:** aimed at food transport trucks and containers.
- **Advantages it offers:**
  - Extends the shelf life of food and reduces "food waste".
  - Allows mixing (transport and storage) of different products (e.g. pears and apples, which are normally not mixed because when one begins to oxidise it emits ethylene gas, which negatively affects the other product).
  - Avoids listeria and salmonella in fish processing plants
- **Payback under 1 year (Assured in Denmark)**

IMPLICATIONS FOR "END USER"

FLO –D
- Investment: **€ 55,000**
- Power supply:

3x400 v + PE50/60 Hz + 16 A
- Installed power: **9 Kw**
- Size: **2.1x1.2x1.2m (175 kg)**
- Disinfection capacity area: **1,500 m³**

FLO-D MINI
- Investment: **€ 11,000**
- Power supply:

1x230 v + PE50/60 Hz + 10 A
- Installed power: **0.64 Kw**
- Size: **1.15x0.56x0.89m (59 kg)**
- Disinfection capacity area: **314 m³**

PHOTOS / IMAGES

FLO-D Model

FLO-D MINI Model

REFERENCES ALREADY INTRODUCED IN THE MARKET

- **Vega Salmon A/S (Esbjerg, Denmark)**
- **Levenstond Seafood (Belgium)**
- **Dalco (Belgium)**
- **Volys Star (Belgium)**

- **Danfrugt Skælskør A/S (Denmark)**

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T.I./14

TECHNICAN

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JAPAN

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	- Meat and fish processing and packaging companies - Restaurants - Fruit and vegetable producers -	Extend the freshness of highly perishable foods without losing their properties (taste, texture, moisture, etc.) even outside of their natural life, thus providing connotations of novelty or timelessness.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	**Spanish and French companies** having access to the agri-food market: **- Suppliers of industrial kitchen equipment** **- Engineering and installation companies** in the industry	Open to sign a **Manufacturing License Agreement** for the operation of business in Europe with a range of high value equipment for the user.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Entities fostering Circular Economy in general	- Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- **Avoids the waste** of fresh food (very perishable). Enables to achieve **zero waste**

- Avoids the management of food waste (bulky, bad smells, etc.)

- Allows logistics to be optimised, with intermediate warehouses

CONTRIBUTION TO ECONOMIC IMPACT

- Fresh food is, by default, expensive (fish, mushrooms, etc.) If managed properly, waste is avoided (as re-freezing is allowed)

CONTRIBUTION TO SOCIAL IMPACT

- Minimise the social impact associated with organic waste

VALUE PROPOSITION FOR "END USER"

- **Ultra-fast freezing equipment** (20 times faster than conventional air freezing)
- **By immersion** in a **liquid medium** (ethanol/water 60/40) at **-27°C**
- **No loss of** food **freshness**
- **2,000 installations** in 35 countries
- **Freezes foods** that are **normally deficient** in **freezing** (fruits, fish, mushrooms, etc.)
- Aimed at professionals (**fresh food distributors, restaurants, food processors**)
- **Minimises dripping** in thawing (4% by weight in conventional meat freezing)
- Does not change the flavours and textures of food through the generation of **ice microcrystals** (5 µm)
- **Avoids the reddish colouration** typical of freezing **meat and fish**
- **Does not replace the freezer chamber** for long-term preservation

IMPLICATIONS FOR "END USER"

- **Improves the working environment** (avoids operators to stay in frozen environments)

- **Reduces** food **waste**

- **Allows savings** by better managing purchases (buy more when there is higher supply)

- **140 kg/h Model** (operating 8 h/d)

  - Investment: € 140,000

  - Amortised in 10 years: € 0.035/Kg.

  - Operation: electric. € 0.011/Kg.
    Ethanol € 0.002/Kg.

PHOTOS / IMAGES

With TOMIN **With air**

Mid-size model (140 kg/h)

REFERENCES ALREADY INTRODUCED IN THE MARKET

Linear models
(up to 3 t/h)
~ 20 implantations approx.-

Compact models
(from 20 to 700 kg/h)
~2,000 units sold approx.

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UNION EUROPÉENNE

T.I./15

HYOKAN

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JAPAN

TO WHOM IT OFFERS VALUE AND WHAT VALUE

	TO WHOM	WHAT VALUE
Agri-food sector companies	- Fish distribution companies - Restaurants - Fruit and vegetable producers - Florists -	Extend the freshness of highly perishable foods without losing their properties (taste, texture, moisture, etc.) even outside of their natural life
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	**Spanish and French companies** having access to the agri-food market: - **Suppliers of industrial kitchen** equipment - **Engineering and installation companies** in the industry	Manufacture of the equipment through a **Manufacturing License Agreement** that allows expanding the product range with high value equipment for the user. Also willing to set up a **Joint Venture**
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Entities fostering Circular Economy in general.	- Benchmark of Good Practice to spread in its region.

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- **Avoids the waste** of fresh food (very perishable). Enables to achieve zero waste
- Avoids the management of food waste (bulky, bad smells, etc.)
- Allows logistics to be optimised, with intermediate warehouses

CONTRIBUTION TO ECONOMIC IMPACT

- Allows the producer and distributor to go to market at peak prices
- Allows consumers to make larger purchases when there is a greater supply
- Fresh food is, by default, expensive (fish, mushrooms, etc.) If managed properly, waste is avoided
- Allows to develop businesses now unthinkable (e.g. "fresh" off-season fruit)

CONTRIBUTION TO SOCIAL IMPACT

- Minimise the social impact associated with organic waste.

VALUE PROPOSITION FOR "END USER"

- **ADAPTED industrial refrigerators and cold rooms**
- Capable of **preserving the freshness of food and flowers** (avoids dehydration)
- **Extends the life** of scarce, limited-duration or expensive foods over a long period of time
- **Applying** a high voltage, low intensity **electric field** to the shelves to **prevent water** molecules from **freezing**.
- Does not freeze food **at – 3°C**
- Have characterised **more than 1,000 foods**
- **Over 1,000 installations**
- **Adds ripeness** to the food (enhancement of flavours and content of Amino acids)
- **Allows savings** in the purchase of food, flowers, as they can be bought in periods of greater supply
- Allows to **preserve organic products** (without preservatives) longer

IMPLICATIONS FOR "END USER"

- **Reduces** food **waste**
- **Allows savings** by better managing purchases (buy more when there is higher supply)
- HYOKAN's current restaurant customers have an **average saving** of **€ 80/month** on food purchases.

Mid-sized fridge:

Cost (in Japan): € 12,000

Power consumption: € 3/month (extra cost)

PHOTOS / IMAGES

Chrysanthemums after 2 weeks


Strawberries after 3 weeks


Meat, after 1 month, retains its natural colour


REFERENCES ALREADY INTRODUCED IN THE MARKET

Industrial refrigerator

Cold Room

Refrigerated warehouse

Florist's showcase

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T.I./16
DAI NIPPON PRINTING (DNP)

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JAPAN

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies		
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	- Companies in the **logistics sector** of thermosensitive products - Manufacturers of **vending machines**	- Avoid the need for isothermal transport - Interested to carry out: * **Demonstrative projects** of the benefits of its solution * Conclude **Distribution Agreements** of its containers in Europe
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Entities fostering Circular Economy in general	- Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- **Transporting products** in the same vehicle **at different temperatures** allows you to fill them more (make fewer trips)

- The use of **returnable containers** avoids waste

- **Air transport** avoids the use of polyurethane (which is discarded) with dry ice (solid CO_2), which is discharged into the atmosphere.

CONTRIBUTION TO ECONOMIC IMPACT

- **Avoiding** the use of **isothermal transport** means major savings in many cases

- The ability to adapt to the use of **small** isothermal **containers** is also a saving when **small quantities** are sent (for example, delivery of drugs near Pharmacies).

- The use of **returnable containers** is another saving

CONTRIBUTION TO SOCIAL IMPACT

- The **waste of polyurethane panels** is frowned upon due to their poor recyclability.

VALUE PROPOSITION FOR "END USER"

- **Folding containers for isothermal transport**
- **Proprietary insulation solution** applied to the walls consisting of polyurethane and a barrier film (produced by DNP) on which a few Pascals vacuum is generated.
- **Allows the insulating walls** to be reduced to 5 % of the glass wool thickness (for the same insulating capacity).
- Suitable for **thermosensitive substances** (food, flowers, pharmaceuticals, chemicals, etc.)
- Sold **200 units in 2 years**
- Returnable container
- **Avoids** the need for **isothermal transport**
- **Allows products to be carried at different temperatures** in the same vehicle
- **No** need for **electrical connection**
- **Alternative to** using **polyurethane with dry ice**
- They have a **software that simulates** the transport conditions to define the necessary means.
- Given an initial T of 8°C, it allows to keep 100 l water at less than 10°C for 8 h.

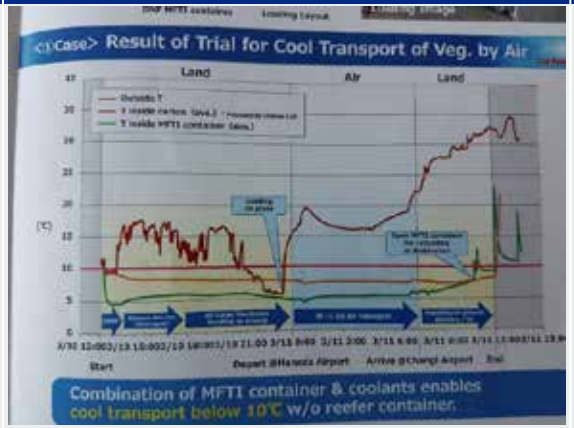
IMPLICATIONS FOR "END USER"

- **Unlimited life** equipment, unless the vacuum of the panels is broken

- **40 l Model:** € 600/unit (purchasing 50 units)

- 1,000 l Model: € 2,000/unit (purchasing 50 units)

PHOTOS / IMAGES



They have carried out several demos handling thermosensitive products by air and land transport obtaining very good results.

REFERENCES ALREADY INTRODUCED IN THE MARKET

Various models and formats between 40 and 1,000 l capacity

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T.I./17
KENDENSHA

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JAPAN

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Companies that generate waste flows with low suspended solids content: - Cattle and pig farms - Food processing companies (slaughterhouses, freezers, canneries, etc.)	- An equipment for separating the solid fraction from the liquid fraction, with the capacity to efficiently and cheaply separate the suspended solids present in the waste - It is necessary to do a prior characterisation with a portable equipment
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies supplying waste management equipment for the agri-food sector Engineering/consultancy firms advising or designing waste management facilities in the agri-food sector.	- Opportunity to incorporate KDS equipment into the catalogue (KDS is interested in opening market in Europe, and open to Distribution Agreements). - Logical process: 1st Collaboration agreement with engineering or equipment supplier (they would make the sale, installation, maintenance), 2nd Manufacturing License Agreement or Joint Venture with local manufacturing partner here.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities fostering Circular Economy in general	Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- **Minimises the impact of high moisture waste** as it facilitates individualised handling of each stream after separation (liquid and solid)

- It allows to provide a **solution in situ** to the generation of waste without having to resort to specialised companies

CONTRIBUTION TO ECONOMIC IMPACT

- Allows the **economic recovery of the solid fraction** of the waste

- **Avoids** the need to **transport waste far away** for treatment (dumping in the field, processing, etc)

CONTRIBUTION TO SOCIAL IMPACT

- **Minimises the impact** of waste as it is processed as soon as it is generated, reducing the level of emissions into the atmosphere.

VALUE PROPOSITION FOR "END USER"

- Proprietary **equipment for solid/liquid separation** of waste streams
- **Technical** separation **principle different** from conventional (rotary multidisc system)
- **Vast experience** in processing waste from the agri-food industry and farms
- **No** need **for coagulants** (for primary separations) **or with coagulants** (for refining separations)
- **Allows to recover the sludge** generated by composting
- **900 units** installed **in Japan** (about 30 each year)
- It has **CE marking**
- **Adjustable disc spacing**, allowing better solids retention (or processing more flow for the same solids retention rate)
- **Product range** for processing between 5 and 60 m^3/d (depending on the concentration of suspended solids and the desired retention level)

IMPLICATIONS FOR "END USER"

- Allows to obtain **sludge** with **25-30 % solid matter** (suitable for intensive composting)

- **Farm case 8,000 fattening pigs**:
  Generate 34 m^3/d slurry
  KDS Equipment: € 26,000
  Electricity cost: € 15/ month

PHOTOS / IMAGES

They have a small portable testing equipment that allows to evaluate the adequacy of each waste to this solution

REFERENCES ALREADY INTRODUCED IN THE MARKET

100 references in livestock, 90 in public managers, 90 in agri-food companies, 40 in waste managers, etc.

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T.I./18
ECOVATIVE DESIGN

ECOVATIVE DESIGN

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USA

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Food companies (especially mushroom producers) interested in diversifying activities.	- Opportunity to enhance organic matter by-products in new products (packaging, furniture, etc.). It is recommended that they go with a partner with knowledge about industrial transformation processes of materials. ECOVATIVE is interested in having a production centre in Spain or France.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Suppliers of protective packaging, willing to move from synthetic to biodegradable material.	- Opportunity to diversify and create a new product line. ECOVATIVE is interested in having a production centre in Spain or France.
Companies that want to invest (or diversify) in other activities	Companies interested in creating new activities aligned with the Circular Economy, through the technology transfer of another company in another country.	- Opportunity to diversify and create a new business activity. ECOVATIVE is interested in having a production centre in Spain or France.
Local authorities, R&D centres, entities that promote circular economy in general	- Entities fostering Circular Economy in general.	- Benchmark of Good Practice to spread in its region.

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- **Contributes to sustainable development**, substituting synthetic materials for biodegradable ones.

- **Encourages the cultivation of plants beneficial for the soil** (such as hemp), whose wastes are more reusable

- Buried waste takes **30 days to decompose**

CONTRIBUTION TO ECONOMIC IMPACT

- **Spain and France are two countries particularly feasible** for this type of solution due to the abundance of raw materials: mushrooms, forest resources (pine, eucalyptus) and agricultural resources (straw, hemp, etc.).

CONTRIBUTION TO SOCIAL IMPACT

- **Selected by Fast Company** as one of the 10 most innovative companies in the world for the social welfare.

VALUE PROPOSITION FOR "END USER"

- **Bio-manufacturing to obtain compostable materials** (protective packaging, structural elements of furniture, acoustics, buildings, etc.)
- **It uses myceliums from various types of fungi and agricultural waste** (straw, wood shavings, leaves, etc.) previously pasteurised
- By mixing these raw materials, the mycelium generates a very resistant organic fabric which, after cooking and drying, generates the end product
- **Growing conditions** must be **strict**: temperature between 18°C and 28°C under plastic protection, light intensity 100 luxes (gloom) and moisture between 60 and 90 %.
- They **produce protective packaging** for **DELL computers** and **IKEA furniture**
- Various items for the **furniture sector** (chair parts, doors, etc.)
- **2 allied companies in Europe: CNC Exotic Mushrooms** (distributes the raw materials) and **Krown Design** (manufacture their products with mycelium)
- **Company interested in having a production centre in Spain or France**

IMPLICATIONS FOR "END USER"

- **Minimum production** to make the investment profitable: **5,000 panels/year** of 1 m^2 x 1 cm (thickness)

- **Investment** in machinery: **€ 400,000**

-**Need to improve the industrialisation** of the production process (too handcrafted).

PHOTOS / IMAGES

Semi-finished product in the production process.

REFERENCES ALREADY INTRODUCED IN THE MARKET

DELL protective packaging

Inner door core

Chair backrest

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T.I./19 SWISS BIOCHAR

Swiss Biochar

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SWITZERLAND

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Agricultural companies that generate wastes (wineries, alcohol factories, processors, canneries, etc.).	- Processing of organic matter by-products into a valuable product, allowing them to enter a new market.
Companies that process organic matter and plastic outside the agri-food sector	Wood processing companies (forest cleaning, sawmills, etc.).	- Converting wood waste into a valuable product, allowing them to enter a new market.
Companies that offer technological solutions and services to the agri-food sector	Engineering companies that offer solutions in energy generation and waste management.	- Distribution opportunity in Spain and France. SWISS BIOCHAR is interested in having a distributor for the Spanish and French markets.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Entities fostering Circular Economy in general.	- Benchmark of Good Practice to spread in its region.

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- **Conversion of agricultural and forestry waste** into high quality soil substrates
- **For every 1,000 kg grape marc processed, 330 kg biochar is generated and 500 kg CO_2 is captured**
- **Self-sufficient** process **from the energy point of view**
- Way to **avoid climate change**
- Particularly suitable for **intense agricultural regions**

CONTRIBUTION TO ECONOMIC IMPACT

- Allows the **economic recovery of low-value waste.**

CONTRIBUTION TO SOCIAL IMPACT

- Allows **employment** to be **generated** in the **rural** area, which is very necessary, **complying** with the strictest **emission** regulations.

VALUE PROPOSITION FOR "END USER"

- **Industrial plant that transforms agricultural waste** (grape marc, chips, miscanthus, etc.) **into biochar** (charcoal).

- Meets **European Biochar Certificate**

- **Pyrolysis at 650°C**

- To be applied to **crops**

- Effective way to **retain nutrients and water in crops**

- Process **without energy consumption** (self-sufficient)

- A way of **generating value activity in the agricultural setting**

- **Pyrolysis** generates gases (**syngas**) whose **subsequent combustion** raises the temperature to **1,200°C**, which is what is used **to heat the biomass in the kiln**

- Several facilities in Europe and Asia

IMPLICATIONS FOR "END USER"

- **For its activation in the field** it is advisable **to mix it with mature compost** (50/50).

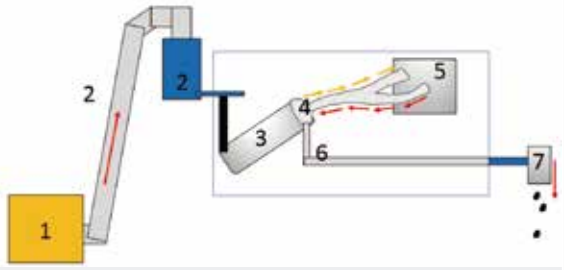
- **Not** suitable **for** use in **alkaline soils**

- **Biochar sale price:**
  - Small scale (9 kg sacks): € 3/Kg.
  - Large scale (big-bag 360 kg): € 1/Kg.

- **Complete plant** with all its peripherals **to produce 230 t/year**
  Investment: € 642,000
  Operation cost: € 150,000/year

PHOTOS / IMAGES

Biochar sample.



REFERENCES ALREADY INTRODUCED IN THE MARKET

NovoCarbo (Germany) 2014
Remains of pruning and shavings

Verora (Switzerland) 2012
Green cuts

Greenpoch (Belgium) 2016
Green cuts

Sonnenerde (Austria) 2012
Paper mill sludge, cereal husk

3.CONSUMABLES

We now present the 16 references of Consumables identified by ORHI in SUMMARY SHEET format.

In the below TABLE we specify for each one of the identified Consumables, their location, the entity that has been the source of their identification and a brief description.

In the subsequent slides we provide a summary sheet for each one of them, where besides reflecting the "value" that the solution offers to the different ORHI Stakeholders, we also provide a contact person of the company to get in touch if you wish to obtain further details and/or request additional information.

	CONSUMABLES			SHORT DESCRIPTION	
	IT	LOCATION	SOURCE OF IDENTIFICATION		PÁG.
ORHI	1 SMURFIT KAPPA (mulching)	Navarre	Ain	Paper-based agricultural mulch solution	30
	2 ISANATUR	Navarre	Ain	Nutritional ingredients from the recovery of by-products from a zero-waste oil mill	31
	3 OLEOFAT	Navarre	Ain	Oil products from the processing of vegetable oils	32
	4 PENTABIOL	Navarre	Ain	Animal feed that improves their health and avoids the preventive use of antibiotics	33
BEYOND ORHI	5 APEEL SCIENCES	USA	Transfer	Plant-based coatings that extend the shelf life of fruits and vegetables	34
	6 mOASIS	USA	Transfer	Hydrogel injected into the soil that increases moisture retention and improves plant performance	35
	7 PLASTIROLL (mulching)	Finland	MCX Bi	Bioplastic-based agricultural mulch solution	36
	8 BIOBAG (mulching)	Norway	MCX Bi	Bioplastic-based agricultural mulch solution	37
	9 SILVEX (mulching)	Portugal	MCX Bi	Bioplastic-based agricultural mulch solution	38
	10 MATER BI (mulching)	Italy	MCX Bi	Bioplastic-based agricultural mulch solution	39
	11 LANKHORST (rope)	Netherlands	MCX Bi	Bioplastic-based rope solution for greenhouses	40
	12 PACK BENEFIT (packaging)	Spain	Saiolan	Bioplastic-based food packaging solution	41
	13 PLASTIROLL (packaging)	Finland	MCX Bi	Bioplastic-based food packaging solution	42
	14 FRESCO (packaging)	Spain	MCX Bi	Bioplastic-based food packaging solution	43
	15 TIPA (packaging)	Israel	MCX Bi	Bioplastic-based food packaging solution	44
	16 SIRANE (packaging)	UK	MCX Bi	Bioplastic-based food packaging solution	45

C/1

SMURFIT KAPPA S.A (paper industry)

Smurfit Kappa
AgroPaper

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NAVARRE (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Primary sector companies that use mulching technique in their horticultural crops (outdoor and greenhouse).	Agricultural paper mulching solution that replaces the plastic mulching application which is applicable with current machinery. It has less environmental impact, less CO_2 footprint, effectively controls weeds (it is the only mulching solution that controls sedge), it does not overheat the crop and once used is reincorporated as organic matter into the soil.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies that offer products linked to agricultural mulching.	Distributors of agricultural supplies have the opportunity to offer the innovative AgroPaper® from Smurfit Kappa in their product catalogue.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Regional public authorities - Agricultural Research Centres R&D working on new solutions for the agri-food sector - Organisations, collectives and promoters related to the subject of interest of the project: circular economy, plastics... Organic farming associations.	- R&D is the core of this product, which continues to evolve. It is tested for different types of crops. Further research is needed on its application in all existing types of plastic mulching, as well as in potential new uses. - This product has been developed through collaboration between Smurfit Kappa and INTIA S.A., and is a benchmark of Good Practice in the creation of new products between an instrumental public entity and a leading private company in its sector.

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- AgroPaper® is especially relevant from the point of view of waste prevention in the agricultural sector, mainly polyethylene (PE), whose management and treatment as waste is very complex and with low recycling rates. This is due to the fact that once the agricultural plastic has been used, it has a high percentage of impurities (mainly soil and vegetables). Cleaning this waste is very complicated and in some cases, as in tomato cultivation, it is impossible. The traces of plastic that remain in the farm make it difficult to manage it, limiting its use. Certain agri-industries (peas, spinach, etc.) require for quality criteria the use of soil in which there are no traces of plastics, or that are biodegradable. The real costs of managing this waste are very onerous.
- Another important fact with regards to the environmental impact is the high consumption of fossil resources associated with plastics. In general, it can be said that 1 kg plastic -3.5 kg CO_2.
- The raw material used for the production of this paper at the Sangüesa plant comes from sustainably managed forests, certified with FSC and PEFC.
- Other environmental assets of the plant are: its own pulp mill, chemical product recovery system, auxiliary boiler for the combustion of vegetable matter for the production of green energy, causticizing plant and waste water treatment system. The plant is ISO:14.001 certified.

CONTRIBUTION TO ECONOMIC IMPACT

- The environmental problem of plastics management in the agricultural sector also generates an enormous economic impact. The substitution of plastics in the mulching of crops with paper entails an enormous economic saving in the management and valorisation of plastic waste (PE).
- Economic benefits for Smurfit Kappa associated with the sale of the new product (paper for vegetable mulching).

CONTRIBUTION TO SOCIAL IMPACT

- Local development of the area, generation of local employment.
- Fire prevention (FSC and PEFC labels certify sustainable forest management).
- Application of AgroPaper® sets up the rural population by replacing the material but not the application process

VALUE PROPOSITION FOR "END USER"

- The farming sector is a growing industry that is fundamentally faced with the population growth challenge that must be supplied food. One of the solutions is the intensive production of the horticultural sector in greenhouses, mulch and tunnels, systems for which an enormous quantity of plastic is required along with a management that involves a high environmental and economic impact. The value proposition of Smurfit Kappa's project is to replace agricultural plastic with paper with AgroPaper® in the cultivation of horticultural species, so as to provide a solution to this issue.

- The paper used in Smurfit Kappa's solution is paper with special properties, where the production process had to be modified for this purpose. AgroPaper®, which can be used on existing mulchers, provides excellent sedge control, long-lasting storage and is totally biodegradable and porous, so it does not overheat the crop.

IMPLICATIONS FOR "END USER"

Solution to the following problems associated with plastic:
- Waste management:
  - Complex removal not separated from organic matter
  - Non-recyclable waste to landfill
  - Necessary resources for proper management
  - Soil contamination with microplastics
- No control of all weeds
- Consumption of fossil resources:1 kg plastic -3.5 kg CO_2

Advantages over biodegradable-compostable plastic:
- Lower cost (compared to conventional plastics, its price is higher)
- Effectively controls sedge
- It does not have problems in stock management. While the storage of biodegradable plastics is complicated due to its early degradation, AgroPaper® can be stored much longer without altering its properties.

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

- Tested on pepper, tomato, lettuce, broccoli, aubergine, borage, and melon.

- Implanted in organic aromatic plant crops.

- Very interesting for organic producers as they could produce food free of plastic from minute 0.

- AgroPaper® is a product made from pine fibre from sustainably managed forests.

- In order to be applied mechanically, it has been given a 10% elasticity.

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C/2

ISANATUR S.L

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NAVARRE (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Bakeries, Companies that produce and sell drinks, meat and fish that use high value nutritional ingredients in their production process	As Isanatur's raw materials are the waste products of an oil mill, when acquiring Isanatur's products they acquire products aligned with the Circular Economy. Thus, the products recovered by Isanatur are integrated into the food matrix of bakery, beverage, meat and fish. They provide quality products with high added value to be used as ingredients from zero waste processes and organic origin in the production of products such as vegan burgers.
Companies that process organic matter and plastic outside the agri-food sector	Companies in the health sector, in the use of products for cosmetics and massages.	As Isanatur's raw materials are the waste products of an oil mill, when acquiring Isanatur's products they acquire products aligned with the Circular Economy. ISANATUR is working to expand its product range
Companies that offer technological solutions and services to the agri-food sector	- Distribution companies (department stores and traditional distribution) - Distribution companies for the food industry - Distribution companies for the health sector (massages...)	Throughout the production process, its laboratory carries out continuous analysis and checks, controlling the levels of fatty acids and polyphenols at all stages of the process, ensuring a constant high level of production. Isanatur's products are focused on the international market (UK, Japanese and North American). Isanatur is open to business partnerships with companies that facilitate the entry of their products into these markets.
Companies that want to invest (or diversify) in other activities	Investment companies looking for opportunities to diversify and create new business activities that are committed to innovative processes in traditional industries and the HEALTH sector.	Isanatur is open to new investors or industrial partners who provide market access/capacity or equity for its business. It is a quite recently created company with an enormous scope, very attractive due to its uniqueness and extraction patent. One of the goals of Isanatur's project is to promote its integral implementation (technology and products) in the main olive oil producing countries in Europe (Spain, Italy, Portugal and Greece).
Local authorities, R&D centres, entities that promote circular economy in general	- R&D Centres working on new solutions for the agri-food sector - Organisations, collectives and promoters related to the subject of interest of the project: Circular Economy, waste recovery...	- Isanatur seeks to develop new processes and technologies for the extraction of high value products - Reference of Best Practice. Isanatur's business model is an inspiring model that is best described in the below pattern: Full conservation of the value of a raw material, recovering by-products with high added value whose process is zero waste, seeking financing and partners for the development of the project, patent registration, industrial development of the process and products and highly qualified personnel

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Environmentally sustainable and raw material friendly production process
- No chemical additives, no destructive processes and no waste
- Oil extraction is carried out using CO_2 supercritical extraction technology, which is an innovative, clean and environmentally friendly technology (does not generate waste or gaseous pollutants)

CONTRIBUTION TO ECONOMIC IMPACT

- Isanatur's business model not only preserves the full value of the material and avoids the cost of managing it as waste, but also generates high value-added products.
- The economic potential of the EcoPROLIVE brand products is very high. Spanish oil production accounts for 44% of world production and 62% of European production. The food market is becoming increasingly complex and customers demand certain properties in the products among which the health benefit stands out. Olives are nutritious fruits with a wide range of health benefits.

CONTRIBUTION TO SOCIAL IMPACT

- Isanatur is committed to the economic development of the area, generating wealth and quality employment
- Improving people's health by bringing to market products with properties tested by independent studies, they are ideal for celiac and gluten-free diets, for people with diabetes, for people with skin care problems such as eczema, or with gastrointestinal and/or heart health problems.

VALUE PROPOSITION FOR "END USER"

ISANATUR is a specialist in the production, marketing and distribution of high-value nutritional ingredients for use in dietary supplements and functional foods.
Its products are marketed under the EcoPROLIVE brand.

ISANATUR uses technologies such as Supercritical CO_2 extraction with raw materials rich in antioxidants (Olive, Grape, others).

IMPLICATIONS FOR "END USER"

In general, EcoPROLIVE products are recommended for the regeneration and care of skin (irritations, eczema, nail care, massages...) and cardiovascular and gastrointestinal health.

Some of EcoPROLIVE's products :

- Prebiotic fibre rich in polyphenols; 100% dehydrated olive pulp

- Extra virgin olive oil (different varieties: cornicabra, arroniz and picual)

- Olive extract. Essential olive oil (olea europea).

- Seasoning. Olive spices (based on dehydrated olive pulp)

PHOTOS / IMAGES

Pitting machine (the biggest difference with other oil mills)

Laboratory (acidity titration)

REFERENCES ALREADY INTRODUCED IN THE MARKET

EcoPROLIVE are fully commercial products on the market.

PREBIOFENOL product has received the award for the most innovative ingredient at GULFOOD Dubai, and has been nominated for Product of the Year 2019 at Free From Food Barcelona.

There are no other known cases that make an integral processing of the olive as Isanatur. Their process is patented and they are pioneers at an international level.

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C/3

OLEOFAT TRADER S.L

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NAVARRE (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Food companies in the vegetable oil sector (sunflower, rape, olive, pomace, soya and grape seed) and other products that generate oil by-products (Spanish and European (France, Italy)	- Oleofat offers the recovery of oil by-products from the production processes of these companies in two ways: Generation of a more sustainable source of fuel and Recovery of high value added compounds (tocopherols, sterols, squalene, acylglycerols and fatty acids) to be used in the cosmetic, chemical and food and feed industry. - One can acquire secondary oil products from Oleofat that come from the recovery of by-products from the food industry.
Companies that process organic matter and plastic outside the agri-food sector	Companies in the cosmetics or pharmacy sector	The acquisition of Deoleo's advanced facilities sees the commencement of a new phase in which it is committed to diversification and the production of active ingredients for the food, cosmetics and pharmaceutical markets.
Companies that offer technological solutions and services to the agri-food sector	Sustainable biodiesel companies	At Oleofat, oil by-products are conditioned and purified to obtain oil products that are sold mainly to industries producing sustainable biodiesel.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- R&D Centres working on new solutions for the agri-food sector - Related organisations, groups and promoters: Circular Economy, biodiesel, food supplements	- Open to collaboration in R&D projects linked to new ways of using and recovering oil by-products beyond sustainable biodiesel (such as for functional foods and food supplements). - It is a best practice of Circular Economy (for the recovery of by-products)

FIT IN CIRCULAR ECONOMY

- Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- ✓ Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Carbon footprint reduction
- Less polluting emissions:
52% less particulate matter
99% less SO_2 because it does not contain sulphur
90% less aromatic hydrocarbons
63% less unburned hydrocarbons
22% less CO because biodiesel is more oxygenated
45% less CO_2
- Better combustion in the engines: As biodiesel has 11% more oxygen it therefore has a better cetane index
- Biodegradable fuel. Degrades 99% in 28 days
- Oleofat also has certified and audited the traceability of the waste and by-products it processes. This audit complies with the European sustainability regulations through ISCC certification.

CONTRIBUTION TO ECONOMIC IMPACT

Biodiesel generated from oil waste has the following advantages:
- It improves the balance of payments as it avoids the purchase of oil from foreign countries.
- Waste is made profitable by recovering it and increasing the profitability of the supply and transformation chain.
- It promotes a robust local industry compared to large multinationals.
- It generates employment and diversifies the economy.
Taxes on this waste are a new way of collecting money for the Revenue Agency.

Also, the marketing of the **new products** that Oleofat is working on will improve the company's income, as they are highly valued by the market (high value-added compounds: tocopherols, sterols, squalene, acylglycerols and fatty acids)

CONTRIBUTION TO SOCIAL IMPACT

- Local development of the area, **local employment generation**, Oleofat is committed to the economic development of the Ribera de Navarre region, generating many synergies with other businesses: transport, services, auxiliary industry, etc
- The start-up of the plant expansion will create about 10 direct jobs and as many indirect ones, and there are plans to set up another division devoted to the processing of vegetable oil derivatives where 25 more jobs are estimated.
- On the other hand, society is demanding a large quantity of cosmetics, healthy foods and supplements from natural sources that improve people's health and quality of life, which is why Oleofat's products are very well accepted by the society in general.

VALUE PROPOSITION FOR "END USER"

Oleofat is a company dedicated to the use of oil by-products from the chemical and physical refining of vegetable oils (sunflower, rape, olive, pomace, soya and grape seed) to obtain oil products for two main purposes:

- Fuels (biodiesel)

- Extraction of high value-added compounds for the cosmetic, chemical, food and feed industries.

IMPLICATIONS FOR "END USER"

Oleofat sells its products made from the recovery of oil by-products to the biodiesel industry. Drawing on the company's expertise and experience, the new business model seeks to add value to part of this waste with the aim of placing other **high value-added products** on the market from **exclusively vegetable sources** from the agri-food industry, such as
- Tocopherols: (vitamin E) Powerful antioxidant with properties in high demand in health and beauty products
- Sterols: (phytosterols) Used to control cholesterol levels.
- Squalane: cardioprotective, anti-tumor, immune system catalyst and with detoxifying power, in addition to possessing antioxidant, moisturizing and protective properties of the skin
- Acylglycerols and
- Fatty acids that will be sold primarily to cosmetics, pharmaceutical or food companies.

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

Some of the technology used by Oleofat is implemented in other companies on an international level, and some is proprietary technology developed by the company.
Oleofat has developed its own working methods and procedures for the recovery of waste in order to obtain fat.

- Productos LEA, obtains fatty acids by distillation.
- Lasenor, manufactures food emulsifiers.
- Vitae Naturals, dedicated to the extraction and marketing of vitamin E.

Internationally we can mention current customers such as Sophim (France), Silohealth (Italy), Framelgo (Netherlands) and Palsgaard (Denmark).

C/4

PENTABIOL S.L

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NAVARRE (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies		
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Animal husbandry companies, feed producers	Probisan is a supplementary feed for animal feeding obtained after a double fermentation with lactic bacteria and yeasts whose resulting product is a POSTBIOTIC that optimises the nutritional and immunological functions of the animals, allowing it to replace the preventive application of antibiotics, improving the health of the animals and, as a result, that of the human being.
Companies that want to invest (or diversify) in other activities	Investment companies looking for opportunities to diversify and create new business activities.	Pentabiol is a spin-off from the correction manufacturer Penta and is open to new investors who can provide equity for its business. The company has a great potential due to its alignment with the new EU policy that regulates a drastic reduction in the preventive application of antibiotics in animal feed due to the problems generated in human health. The feed resulting from the fermentation by lactic bacteria and yeasts allows to replace the preventive application of antibiotics and to improve the immune response of the animal by establishing a beneficial microbiota.
Local authorities, R&D centres, entities that promote circular economy in general	- R&D Centres working on new solutions for the agri-food sector - Organisations, collectives and promoters related to the subject of interest of the project: animal feed, health...Circular Economy	- The company is open to R&D collaborations for the development of new animal feed products - Reference of best practice for improving the quality, performance and sustainability of animal feed production

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

It is estimated that 30% of the antibiotics present in wastewater are not eliminated in treatment plants and this leads to a huge environmental problem due to the natural imbalance they cause in water systems but, above all, to the appearance of so-called superbugs (due to the antimicrobial resistance mechanisms developed), which are responsible for the ineffectiveness of antibiotics on a global scale, affecting both the environment and human beings.

With this product, the indiscriminate use of antibiotics in animal production is avoided, thus avoiding the spills associated with such consumption, both in the manufacture of these products and those derived from their intake by both animals and humans.

Zinc oxide, which is widely used in the pigfarming sector is only used by 10% of the animals, while the rest, 90%, is expelled, this metal is one of the most contaminating waste in our soils. Moreover, it is a substance that the EU has determined that a transition must be established to stop including this compound in diets.

CONTRIBUTION TO ECONOMIC IMPACT

The animals increase their digestibility, make better use of the nutrients, are stronger and therefore potentially increase their productivity. Once the digestibility has been improved, the feed formulation must be examined, since it is from this point that the economic R.O.I. (return on investment) of livestock farms can be improved.

Due to the own digestive regeneration of the microbiota of the animal, its immunology is stimulated better, and as the animals are healthier, the preventive application of medicines can be reduced (including the reduction of the zinc oxide in pigs).

CONTRIBUTION TO SOCIAL IMPACT

- Local development of the area, generation of local and quality employment.
- Improvement in the health of both people and animals.

VALUE PROPOSITION FOR "END USER"

Pentabiol manufactures and markets a **fermented feed with lactic acid bacteria and yeast**, under the **Probisan** brand.

The uniqueness of the product is that it is **neither a probiotic nor a prebiotic**, although it has partially similar effects as it does not interact directly with the digestive microbiota.

Starting from a culture of lactic bacteria and yeast and after a process of transformation by fermentation, by-products (metabolites) are generated that adhere to the intestinal mucosa acting as an inhibitory barrier to exogenous elements, allowing the microbiota itself to regenerate naturally, without external interactions, i.e. **stimulating the body's immune system** and as a result, the animals are healthier.

IMPLICATIONS FOR "END USER"

The use of this **postbiotic** avoids the use of antibiotics in animal production and companies that start using it will be better positioned in the market as they have anticipated new **legislation**.
The beneficial impact on animal **health** has a direct impact on **human health**.

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

Pentabiol offers a fully commercial product.

Most laboratories, accustomed to the action system of antibiotics are looking for a direct action mechanism.

However, the innovation of the Pentabiol product compared to the common use of the market is that it acts as a preventive means and indirect collaboration and thus marks a differentiation of action mechanics.

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C/5
APEEL SCIENCES

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USA

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Agricultural producers	Coating that extends the life of the product: APEELSCIENCES offers a "powder" made from lipids and glycerolipids extracted from the peels, seeds and pulps of fruits and vegetables, which, when mixed with water is applied to fruits and vegetables and offers a "natural coating" that allows freshness to be maintained for longer (2 to 3 times longer).
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Supplier of food processing consumables	Distribution opportunity in Spain and France. APEEL SCIENCES is interested in entering the Spanish / French markets through a local agent. Initially it will be a Distributor of the products. For now, in Europe they are only active in the Dutch market through Nature´s Pride
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities fostering Circular Economy in general	Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

Contributes to the reduction of food waste by slowing the deterioration of fruits and vegetables, and maintaining their shelf life as fresh product up to three times longer.

CONTRIBUTION TO ECONOMIC IMPACT

Prevents economic loss from loss of fruit and vegetable freshness to growers and distributors.

CONTRIBUTION TO SOCIAL IMPACT

The company has formulations that are listed in OMRI (Organic Materials Review Institute) so they can be used in organic products certified by the USDA and other entities worldwide. Therefore, the company guarantees that the consumption of the "natural coating" by the consumer is healthy.

VALUE PROPOSITION FOR "END USER"

- Coatings derived from plants that offer fruit and vegetable companies the possibility of extending the freshness time of food.

-The company offers the different elements of the "solution" so that producing companies can apply the "coating" to their fruits and vegetables:

(1)The powder mixture made from lipids and glycerolipids extracted from fruit and vegetable husks, seeds and pulps.
(2)Mixing equipment for the company to mix the powder with water, and have at its disposal the "mixed liquid" that provides the coating property
(3)The application equipment of the "mixed liquid" on the fruit/vegetable

- The coating that the producing company applies to fruits and vegetables creates a natural barrier that:
  - Keeps moisture inside
  - Prevents oxygen from entering from outside

- The company has several patents

IMPLICATIONS FOR "END USER"

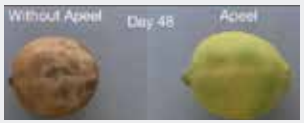
- The company that applies the coating has to acquire, in addition to the "powder mixture" (consumable offered by APEEL SCIENCES) also a "mixing device" and an "application device".

- The application of the product is done by spraying, immersion or brush. It does not require high degree of knowledge, but the company recommends taking into consideration its indications for the handling of the mixture and the application on food.

- The coating is applied by the PRODUCER

- APEEL SCIENCES does not offer prices for its products, although it claims that its product has the potential to save 70% of food waste.

PHOTOS / IMAGES



REFERENCES ALREADY INTRODUCED IN THE MARKET

The current customers of APEEL SCIENCES:

www.hortonfruit.com

ecofarms — www.ecofarmsusa.com

SiCar Farms — www.sicarfarms.com

www.delreyavocado.com

la venta — www.agricolalaventa.com

www.farmdirectsupply.com

Empresas de distribución:

www.kroger.com

Costco — www.costco.com

Martins — www.martins-supermarkets.com

HARPS — www.harpsfood.com

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

C/6

mOasis
Innovative crop science

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USA

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Agricultural producers	Hydrogel (BountyGel) is injected into the cultivated soil to improve the moisture retention capacity and fertiliser close to the plant roots, thereby improving yield and crop quality.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Suppliers of consumables for the field	Opportunity for distribution of this product. mOASIS is interested in entering the Spanish / French markets through a local agent. Initially it will be a Distributor of the products
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities fostering Circular Economy in general	Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Reduction in the water consumption needed to irrigate agricultural crops.

- Increases the efficiency of fertilisers used in crops (thanks to the ability to retain them near the root of the plant with hydrogel): less consumption of fertilisers to obtain the same amount of final product produced.

- Less infiltration of fertilisers into aquifers.

- Non-toxic and 100% biodegradable polymer under anaerobic conditions.

CONTRIBUTION TO ECONOMIC IMPACT

Economic benefits derived from the use of this "consumable".

[California reference provided by the company] (situation will vary in other contexts)
- The cost of 25 kg BountiGel required for 1 Ha of cultivation is USD 370
- On average, each Hectare has a gain of USD 2,225 as a result of *higher production and *lower water consumption
- Therefore, using BountiGel results in a gain of USD 1,855/Ha (in the case of California).

CONTRIBUTION TO SOCIAL IMPACT

Favourable social impact thanks to the benefits it brings at the environmental level:

- Lower water consumption
- Lower fertiliser consumption
- Less fertiliser infiltration in aquifers

VALUE PROPOSITION FOR "END USER"

- BountyGel is a non-toxic gel, part of a new class of patented technology called Aquamer. As a super absorbent polymer, it has a large water storage capacity (250 times its weight). Thus it promotes moisture retention, improves irrigation efficiency, reduces soil erosion and improves the quantity and quality of agricultural crops.
- It decomposes in a period of approx. 2 weeks.
- The use of BountiGel is recommended in areas of low rainfall or poor soils, damaged by salinization processes.
- The effectiveness of the BountiGel is conditioned by the characteristics of the soil to be treated: pH, conductivity, among others.
- The company offers 2 types of product (with the same function):
  -BountyGel: product pre-hydrogelized
  -BountyPowder powder product, which needs to be mixed with water to produce hydrogel "in situ" to be injected into the soil
-BountiGel is patented: WO2014032189A1 (Patent published on 6 March 2014)

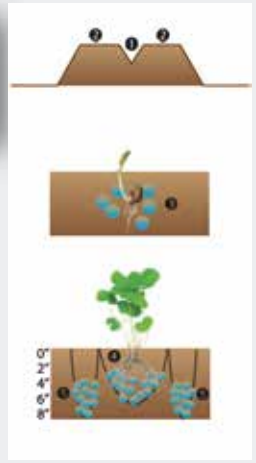
IMPLICATIONS FOR "END USER"

- The injection of the BountyGel requires common equipment that farmers work with:
  -Tractor with chisel plough
  -Dispersion hoppers with tubes through which BountyGel is distributed in the field.

- Reference prices:

  - The cost of use is USD 370/Ha approx.

PHOTOS / IMAGES



REFERENCES ALREADY INTRODUCED IN THE MARKET

- Currently mOasis customers are farmers in 10 counties in California, Arizona Baja and Mexico.

- In the following image you can see the tomato plantation where mOasis is used (with application of BountiGel) in California (USA) in 2016

C/7
Bioska Mulching film

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FINLAND

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Farmers that use traditional mulch films	Time and cost savings. BioAgri is biodegradable and compostable mulch film, so no collection from the field, nor disposal of the film, is required.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies that offer solutions to the first sector.	Opportunity to distribute this product. Currently working in Spain and France but are willing to do so with more companies.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Public entities linked to the environment - Entities fostering Circular Economy in general	- Reduction of environmental pollution due to incomplete collection of traditional agricultural mulching film. - Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Minimum environmental impact (no contamination of the substrate)

- Since the film is biodegraded at each harvest there is no need to transport waste.

CONTRIBUTION TO ECONOMIC IMPACT

- There is no initial investment for machinery, it is used like conventional films.

- As the film is composted, the customer reduces the cost of labour, as there is no need to remove it

- The product itself is more expensive than conventional.

CONTRIBUTION TO SOCIAL IMPACT

- It avoids the remains of polluting polymer in the crops, providing a better quality and healthy product.

- Reduction of pollution in surroundings adjacent to crops (rivers, mountains, animals, etc.)

VALUE PROPOSITION FOR "END USER"

- Compostable and biodegradable agricultural mulching film
- Produced with biopolymers based on potato or corn starch (natural raw material)
- EN 13432 industrial compostability certificate
- Customisable **shelf life** (up to decomposition)
- Prevents weeds and controls moisture and temperature
- Due to its permeability, it allows the soil to breathe, avoiding undesirable moisture and improving the growth of the plantation
- Accelerates growth and retains water in the soil.
- **Faster** production. **Simple operation**
- It is **implanted in the same way** as the normal film, only the tension of the machine needs to be regulated
- **Prevents** agricultural mulching film **waste** in the soil
- **Saves time and costs** as it does not have to be removed
- Company with over 20 years experience in compostable mulching film.
- Depending on the composting speed requirements, corn or potato starch can be used. Potato starch composts faster than corn starch.

IMPLICATIONS FOR "END USER"

- **Change of material** and likely minor adaptation. The main and biggest change is the reduction in tension of the machine spreading the mulching film. In addition, there are changes in staffing cycles as there is no need to collect the film.

- **The stored material does not degrade**, but it can lose mechanical properties over time. It is recommended to use it within the first 6 months from the production date.

- **Minimum order** 1000 kg film. Group purchases can be made with different film widths for different applications.

- The price ranges between € 5-6/kg

PHOTOS / IMAGES

Bioska Biodegradable mulch film

REFERENCES ALREADY INTRODUCED IN THE MARKET

- Originally designed for use in Finland:
  Given the climatic nature of Finland, these materials are only used from April to August at best. Degradation must be done in a short period of time because of frost, from late September to April composting is completely stopped.

- They also have references of applications in Austria.

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

C/8

BioAgri mulching film

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NORWAY

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Farmers that use traditional mulch films.	Time and cost savings. BioAgri is biodegradable and compostable mulch film, so no collection from the field, nor disposal of the film, is required.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies that offer solutions to the first sector.	Opportunity to distribute their product. They do not have distributors in Spain or France, but they are very interested.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Environmental public entities - Entities fostering Circular Economy in general	- Reduction of environmental pollution due to incomplete collection of traditional agricultural mulching film. - Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Minimum environmental impact (no contamination of the substrate)

- Since the film is biodegraded at each harvest there is no need to transport waste.

CONTRIBUTION TO ECONOMIC IMPACT

- There is no initial investment for machinery, it is used like conventional films.

- As the film is composted, the customer reduces the cost of labour, as there is no need to remove it

- The product itself is more expensive than conventional.

CONTRIBUTION TO SOCIAL IMPACT

- It avoids the remains of polluting polymer in the crops, providing a better quality and healthy product.

- Reduction of pollution in surroundings adjacent to crops (rivers, mountains, animals, etc.)

VALUE PROPOSITION FOR "END USER"

- Mulching film compostable and biodegradable made with a mixture of corn starch based polymers.
- **EN 13432** and **ASTM D6400** Certified
- **Experience** with a wide variety of crop types
- **Useful life** (up to decomposition) customised according to the requirements of the crop. Maximum: **24 months**
- Avoids the use of **pesticides or herbicides**
- **Simple operation**
- **Faster and more efficient** production
- It is **implanted in the same way** as the normal film, only the tension of the machine needs to be regulated
- **Prevents** agricultural mulching film **waste** in the soil
- **Saves time and costs** as it does not have to be removed
- **Accelerates** growth and retains water in the soil.

IMPLICATIONS FOR "END USER"

- **Change of material** and likely minor adaptation. The main and biggest change is the reduction in tension of the machine spreading the mulching film. In addition, there are changes in staffing cycles as there is no need to collect the film.

- **Tight stock management** due to likely material degradation if storage conditions are not correct.

- The adaptation of the product to each type of harvest generates the need to have **different product references**.

- **The price of the roll ranges between € 260 and € 370 (€ 8-10/kg) varying according to the duration of the crop and the meters of the roll**

PHOTOS / IMAGES

BioAgri

REFERENCES ALREADY INTRODUCED IN THE MARKET

Finnerödja-Sweden
(Strawberries farming)

Granja Hvidlykke - Denmark
(Vineyard)

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

C/9
Agro Biofilm mulch

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PORTUGAL

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Farmers that use traditional mulch films	Time and cost savings. BioAgri is biodegradable and compostable mulch film, so no collection from the field, nor disposal of the film, is required.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies that offer solutions to the first sector.	Opportunity to distribute their product. They do not have a distributor in Spain and France, but they are interested. Currently, they sell the product directly to the interested farmer.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Environmental public entities - Entities fostering Circular Economy in general	- Reduction of environmental pollution due to incomplete collection of traditional agricultural mulching film. - Benchmark of Good Practice to spread in its region

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Minimum environmental impact (no contamination of the substrate)

- Since the film is biodegraded at each harvest there is no need to transport waste.

CONTRIBUTION TO ECONOMIC IMPACT

- There is no initial investment for machinery, it is used like conventional films.
- As the film is composted, the customer reduces the cost of labour, as there is no need to remove it
- The product itself is more expensive than conventional.

CONTRIBUTION TO SOCIAL IMPACT

- It avoids the remains of polluting polymer in the crops, providing a better quality and healthy product.

- Reduction of pollution in surroundings adjacent to crops (rivers, mountains, animals, etc.)

VALUE PROPOSITION FOR "END USER"

- Mulching **film compostable and biodegradable based on corn starch**.
- EN 13432, DIN 54900, UNI 10785 **certified**
- **Useful life** (up to decomposition) according to the requirements of the crop. There are 4 different Rolls based on usage time
- **Avoids** the use of pesticides or herbicides
- **Simple operation**
- **Faster and more efficient** production
- **No** need to add **structuring** products
- It is **implanted in the same way** as the normal film, only the tension of the machine needs to be regulated
- **Avoids** mulching film **waste** in the soil
- **Saves time and costs** as it does not have to be removed
- **Accelerates** growth and retains water in the soil.
- **Company with over 50 years experience in the sector**

IMPLICATIONS FOR "END USER"

- **Change of material**

- **Ordering agricultural mulching film producers more frequently (no storage)**

- **Land occupied until decomposition**

- **No minimum order**

- **Prices based on stock**

- **The most common film (3 to 6 months cycle): € 500/ roll (according to season)**

- **Roll sizes: 1.8m x 2.2km**

PHOTOS / IMAGES

Agro Biofilm Mulch

REFERENCES ALREADY INTRODUCED IN THE MARKET

- Vine: Biodegradable mulch film as an alternative to PE mulch film used in southern France.
- Melon: Hortofrutícolas Campelos, in Benfica-do-Ribatejo, Portugal.
- Pepper: Hortofrutícolas Campelos, in Benfica-do-Ribatejo, Portugal.
- Strawberry: In Portugal and Spain. Hortofrutícolas Campelos (Portugal), Explotaciones Agrarias Garrido Mora (Huelva) and experimental fields of ADEVSA (Agroindustry Technological Centre, Huelva).

In France it is used mainly in vineyards, and they have films for crops with durability of 3-6 months, 6 months-1 year. Marketed since 2013.

The disinfectant can accelerate the biodegradation process of the film.

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

C/10
MATER-BI mulching film

MATER-BI

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http://materbi.com

ITALY

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Farmers that use traditional mulch films	It enables to save time and costs in the collection of the material as it is a biodegradable and compostable film in the soil, according to the European standard UNE EN 17033, so it is not necessary to remove it at the end of the crop as it is biodegradable once added to the ground.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector		
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Environmental public entities - Entities fostering Circular Economy in general	- Avoids environmental pollution due to incomplete collection of traditional agricultural mulching film. - Benchmark of Good Practice to spread in its region - Eliminates the problem of managing waste film with soil, very expensive to recycle.

FIT IN CIRCULAR ECONOMY

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Minimum environmental impact (no contamination of the substrate)

- Since the film is biodegraded in each crop there is no need to transport or manage waste.

CONTRIBUTION TO ECONOMIC IMPACT

- There is no initial investment for machinery, it is installed like conventional films.
- As the film is biodegraded in the soil, the farmer reduces the labour costs, as there is no need to remove it, also saving the cost of waste management.
- The product itself is more expensive than the conventional one if the price of the latter does not include the associated cost of removing the film, waste management and environmental impact, which is avoided with the use of biodegradable film.
- There are subsidies for biodegradable mulching of 50% of its cost, defined in the Royal Decree that regulates the operational funds for FVPOs.

CONTRIBUTION TO SOCIAL IMPACT

- It avoids the remains of polluting polyethylene in the crops, providing a better quality and healthy product.

- Reduction of pollution in surroundings adjacent to crops (rivers, mountains, animals, etc.)

VALUE PROPOSITION FOR "END USER"

- Agricultural mulching film based on corn starch **biodegradable in soil**.
- "**Biodegradable in soil**" certificates from TUV AUSTRIA and certificate from DinCertco that certifies the fulfillment of the European standard **UNE EN 17033**.
- **Experience** with a wide variety of crop types.
- **Useful life** (up to decomposition) customised according to the requirements of the crop.
- Avoids the use of **pesticides or herbicides**.
- **Simple operation**
- **Faster and more efficient** production
- It is **installed in the same way** as the normal film, only the tension of the machine needs to be regulated.
- **Avoids the accumulation** of non-biodegradable film **waste** in the soil.
- **Saves time and costs** as the film does not have to be removed at the end of the crop.
- **Accelerates** growth and retains water in the soil.

IMPLICATIONS FOR "END USER"

- **Change of material** and likely minor adaptation. The main and biggest change is the need to reduce the tension of the machine spreading the mulching film.

- **Tight stock management** due to likely loss of mechanical characteristics of the material if storage conditions are not correct. It is advisable not to store the biodegradable mulching film for more than one year, and to keep it in its original packaging, in a dry place, without moisture or direct contact with the sun light.

- With a purchase price **2.5 times more expensive** than the traditional film. Although the thickness can be reduced using film of 15 microns instead of 25 microns, making it more competitive.

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

Video references in the peninsula
https://www.youtube.com/watch?time_continue=253&-v=FX32Moyc89k

Video Cal Valls farm
https://www.youtube.com/watch?time_continue=17&-v=blhGVlNwRx8

Video Santiago Apostol cooperative (Nafarroa)
https://www.youtube.com/watch?time_continue=101&-v=v1Q7F_vV4N4

Video Santiago Apostol cooperative Tomato (Nafarroa)
https://www.youtube.com/watch?time_continue=9&-v=m5SfP_p2F7w

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UNIÓN EUROPEA
UNION EUROPÉENNE

C/11
Elite Biotwine 100% Biodegradable

Lankhorst Yarns

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Email: jvc@lamkhorstyarns.com
/https://www.lankhorstyarns.com
[The distributor in Spain is located in Las Palmas. The company name is Hidroteq: hidroteq@gmail.com]

NETHERLANDS

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Farmers who use rope to hold crops.	Reduction of harmfull waste to the environment and the possibility of being able to treat the waste themselves by composting.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies that offer solutions to the first sector.	Opportunity to distribute the product in France. They do not have a distributor in France, but they are open about having it.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Environmental public entities - Entities fostering Circular Economy in general	- Reduction of environmental contamination derived from the incomplete collection of traditional ropes. - Benchmark of Good Practice to spread in its region.

CONTRIBUTION TO ENVIRONMENTAL IMPACT

✓ Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
Revaluation
Recycling
Energy recovery
Product as a Service

- Minimum environmental impact (no contamination of the substrate)

- The biodegradability of the material reduces the need to transport the waste.

CONTRIBUTION TO ECONOMIC IMPACT

- Direct application. The material does not require any adaptation, it is used as regular rope.

- The ropes compost, so their retirement is a lot more simple and reduces working time.
- The product can be sold as a generator with a lower environmental impact.

- The product itself is more expensive than conventional.

CONTRIBUTION TO SOCIAL IMPACT

- It avoids the remains of polluting polymer in the crops, providing a better quality and healthy product.

-Reduction of pollution in surroundings adjacent to crops (rivers, mountains, animals, etc.)

VALUE PROPOSITION FOR "END USER"

- Produced with **PLA fibers derived from corn starch**.
- They are **highly resistant**
- They do stand **moisture** well
- Compostable and biodegradable rope for greenhouse.
- **Botanical** origin. It is a Bio-based material, coming from the plants.
- Compatible with food.
- To know **how much** does the material take to compost under industrial circumstances (60-70 degrees celcius and 95% humididty) they have made some tests with the help of "Wageningen University" in Holland.
- The result is that 99% is biodegraded in 8 weeks to microfibers. These microfibers are mixed with soil and do not affect to animals or organisms.
- It can be composted with the rest of organic waste from the crop
- Same use as **conventional ropes**
- **Saves time and costs** as it does not have to be removed
- Helps with the **growth** of plants without contaminating the substrate
- Over 200 years experience in the sector. More than 200 years manufacturing ropes, since 1803.

IMPLICATIONS FOR "END USER"

- **Tight stock management** due to likely material degradation if storage conditions are not correct.

- **Price can be double the conventional ropes**.

PHOTOS / IMAGES

Elite Biotwine 100% Biodegradable

REFERENCES ALREADY INTRODUCED IN THE MARKET

Gardener's Pride- Netherlands
(Cultivation of tomatoes and cucumbers)

Gemapa- Belgium
(Cultivation of peppers)

Philippe Févre (CEO)
Tél: (34) 672/66.86.64 Milagros Cuenca (Sales Dept.)
Email: info@packbenefit.eco
www.packbenefit.eco

ESPAÑA

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Agricultural producers (fruit, vegetables) who pack at source, catering companies, food processing companies (meat, fish packaging companies), etc.	Use of environmentally friendly packaging, ensuring the use of natural materials, without causing any effect on the organoleptic properties of food. Differential sales argument for a food packer.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector		
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Entities fostering Circular Economy in general	- Benchmark of Good Practice to spread in its region

CONTRIBUTION TO ENVIRONMENTAL IMPACT

✓ Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
Revaluation
Recycling
Energy recovery
Product as a Service

- Support the sustainability of their customers' activities
- Materials of vegetable origin (100 % compostable). OK-Compost certification
- Reduces the level of waste in the agri-food sector

CONTRIBUTION TO ECONOMIC IMPACT

They allow, for example, that a food packer that processes 3.5 M pcs/year saves € 46,000 on fee to ECOEMBES for management of the yellow container.

CONTRIBUTION TO SOCIAL IMPACT

- The trays are harmless and do not affect the organoleptic properties of the food
- Sustainable material (cellulose) with ease of processing (to blue or organic container)

VALUE PROPOSITION FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- Highly innovative company in the production of food packaging
- Produces cellulose trays by thermoforming from virgin cellulose from sustainable forest mass.
- They are containers compostable in 90 days, complying with all food safety regulations.
- They have product range (adapting the solution to the expected life of the package)
- Created in 2013 as a company with high degree of technical training
- It has: 11.000 m², 8 thermoforming lines and 7 surface treatment lines, € 12 M investment, 75 employees
- Capacity to produce 100 M containers (90 % export)
- They are investigating the addition of tomato or straw waste
- It also offers sealing films (compostable) and sealing machines

IMPLICATIONS FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- Containers that allow freezing (-40°C), oven (45 min at 150°C), microwave (5 min at 750 w), no loss of rigidity.
- Ensure compliance with food safety standards (no migrations)
- The waste is poured in organic matter container (as it is compostable) or blue (as it is cellulose).
- Even after being in the oven at 150°C, the package does not exceed 47°C ("cold touch").
- The price of the containers is between 20-30% more expensive than the alternative in conventional plastic.

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

-MONTPELLIER: School canteens
1st municipality in France to use biodegradable trays for transport and menu service in all school canteens

- GASTRONOMÍA BASKA
https://www.gastronomiabaska.com/
Catering service for communities
Use 100% compostable packaging format

- XUMUXUA (Deba)
https://xumuxua.com/
Business establishment selling prepared dishes

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

C/13

PlastiRoll
Bioska 506 Packaging

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https://www.plastiroll.fi/

FINLAND

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Companies packaging fresh products ready for consumption (Eg: Salads, fruits, etc.).	Increases the value proposition for its support to the environment because it is compostable and recyclable.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies that offer packaging solutions.	Currently working in Spain and France but are willing to do so with more companies.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Entities fostering Circular Economy in general	- Benchmark of Good Practice to spread in its region

CONTRIBUTION TO ENVIRONMENTAL IMPACT

✓ Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
Revaluation
Recycling
Energy recovery
Product as a Service

- Minimum environmental impact due to the use of compostable polymers

- At the end of its life, it decomposes in several months.

CONTRIBUTION TO ECONOMIC IMPACT

- Increases the value proposition of the product, due to its compostable nature.

- There is no big initial investment, just a product change as it is designed for standard horizontal and vertical packaging machines.

CONTRIBUTION TO SOCIAL IMPACT

- Easy recycling through organic matter container (for composting)

- Same features but with better environmental impact

VALUE PROPOSITION FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- Produced with **bio-based polymers derived from corn**.
- **Certificates** EN13432 and ASTM D7081 on industrial compostability
- At the end of its shelf life it **descomposes** in only a few months
- The **ink** is biodegradable.
- Prevents condensation due to its breathable condition.
- Packaging for IV Range and packaging in general.
- Extends the shelf life of the product. Dependind on the product: New potato 2-4 days; Various vegetables: up to 1 week (cabbage, lettuce, herbs, mushrooms, strawberries); Root vegetables: 1-2 weeks; Cherries: up to 1 month.
- Biocompatible with both food and people.
- Company with experience in compostable films.

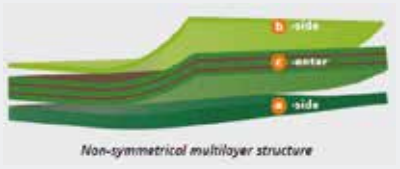
IMPLICATIONS FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- The price of the film is € 7.5/kg
- Substitution of the initial product with the new one, made from compostable Biopolymers.
- The stored material does not degrade, but it can lose mechanical properties over time. It is recommended to use it within the first 6 months from the production date.
- Orders must be placed with les quantity and more frequently.
- Works with most of the standard machines available in the market.
- It is important to inform the final consumer that the container to which it must be removed is the brown container (for treatment of organic matter)
- Valid only for use in ambient or refrigerated temperatures.

PHOTOS / IMAGES

Bioska 506 Biofilm



Non-symmetrical multilayer structure

REFERENCES ALREADY INTRODUCED IN THE MARKET

Empresa Abel & Cole- England
Vegetable packaging

Kesko food Ltd-Finland
Vegetable packaging

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

C/14

Fres-co Green packaging

fres-co SYSTEM ESPAÑA S.A.U.
GOGLIO GROUP

Silvia Delgado (Area manager)
Tel: +34 686 947 694|
Email: Silvia.Delgado@goglio.it/https://fres-co.es
It is distributed both in France and Spain.
Fres-Co distributor in Spain. The distributor in France is Goglio. www.gogliocap.com

SPAIN

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Packing companies for ready-to-eat products (E.g. coffees, teas, etc.)	Increases the value proposition due to its recyclable and compostable nature and contribution to the environment. Emphasizes that all packaging, including the valve is recyclable
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector		
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities fostering Circular Economy in general	Benchmark of Good Practice to spread in its region. It can be applied to a sector that generates considerable waste in municipalities such as the hospitality industry.

CONTRIBUTION TO ENVIRONMENTAL IMPACT

✓ Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
Revaluation
Recycling
Energy recovery
Product as a Service

- Minimum environmental impact, due to the elimination of plastics in the packaging design.

- Easy recycling (in the organic matter container, for later composting?)

CONTRIBUTION TO ECONOMIC IMPACT

- Increases the value proposition of the product, due to its compostable nature

- There is no large initial investment, just a product change as it is originally designed for use with industry standard machines.

- The product can be sold as a generator of better environmental impact.

CONTRIBUTION TO SOCIAL IMPACT

- Easy recycling and compostability

- Same features but with better environmental impact

VALUE PROPOSITION FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- **Multilayer** material combining biopolymers, regenerated cellulose and green tea extracts
- General packaging
- Same **mechanical properties** as traditional packaging
- EN13432 and OK Compost **certified**
- At the end of its life it is completely **compostable**
- **Reduction** of packaging
- Prevents contamination by gases thanks to its **valve**, also compostable
- Biocompatible with both food and people.
- Film **customisable** according to the machinery available to the customer.
- Spanish company (**Fres-co** company, belonging to the Italian Goglio group)

IMPLICATIONS FOR "END USER"

- [Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- **The price varies according to the machine available with the coffee producer** (depending on factors such as: speed of the machine, width of the reels, printing colours, discards to be produced, etc.)

- **The price can double that of conventional packaging**. This depends on factors such as: what type of machine is used, the size, how many colours it has, etc.

- **Substitution of its initial product with the new one, made from renewable and compostable materials.** It is made from the biopolymer PLA (Extracted from starches) and cellophane (cellulose) to which a metallic lacquer is applied.

- **It is important to inform the final consumer that the container to which it must be removed is the brown container (for treatment of organic matter)**

- Designed for coffee packaging.

PHOTOS / IMAGES

Fres-co Green

REFERENCES ALREADY INTRODUCED IN THE MARKET

Caffè Molinari

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

C/15

TP 302 Film

Ayellet Zinger (Sales Manager)
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https://tipa-corp.com/

ISRAEL

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Companies packaging frozen and fresh products ready for consumption (Eg: Salads, fruits, cereals, etc.)	Increases the value of the product because it offers good product performance and is also compostable (better enviromental impact)
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector		
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities fostering Circular Economy in general	Benchmark of Good Practice to spread in its region

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- ✓ Design for Circularity
- Maintenance/Repair
- Reuse and recirculation
- Remanufacturing
- Revaluation
- Recycling
- Energy recovery
- Product as a Service

Minimum environmental impact, because it is compostable and also biodegradable.

CONTRIBUTION TO ECONOMIC IMPACT

- Increase of the product proposal value due to its better environmental impact.

- There is no a large initial investment because it is designed to be handled with standard machinery. TIPA's products can be used with standard thermal sealing machines, as well as low temperature sealing machines.

CONTRIBUTION TO SOCIAL IMPACT

- Easy to recycle with the organic flow.

- Same features but with better environmental impact.

VALUE PROPOSITION FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]
- Packaging for IV Range and packaging in general
- **Certificates** EN 13432, ASTM D6400, OK Compost Home on industrial composting
- Produced with **materials** of natural origin and compostable polymers.
- Closures and valves are also compostable
- **Industrial composting**, it decomposes in 180 days, but depending the circumstances it can take up to 365 days.
- Good **mechanical properties**
- Reduction of packaging and easy transportation
- **Production time** of 8-12 working days
- Extends the **shelf life** of the food. These packagings have a guarantee to last 6 months, then it starts degrading slowly. The fresher the product in the inside, the later will the degradation process begin.
- Can be used in standard sealing machines
- **Biocompatible** with both food and people
- Company with experience in sustainable packaging products

IMPLICATIONS FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- **Minimum order of final product: 25,000 pieces per reference**

- **Minimum roll order: 20,000 m**

- The **price** depends on various parameters such as quantity, the product that goes inside the packaging, the material thickness, printing options, shelf life needed, etc. The company works to make high quality products, so the price of these can be double or triple than the conventional ones.

- **It is important to inform the final consumer that the container to which it must be removed is the brown container (for treatment of organic matter)**

- **Valid only for fresh products (non-hot)**

PHOTOS / IMAGES

TP 302 Film

REFERENCES ALREADY INTRODUCED IN THE MARKET

Empresa Waitrose & Partners-
England- Banana packaging

Empresa Sun&Swell- California
Healthy snacks packaging

Arbor tea-Michigan
Tea packaging

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

C/16
Earthpouch

sirane Group

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Email: thierry.soto@sirane.com/

ENGLAND

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	Companies that pack fresh products ready for consumption that require a controlled atmosphere (E.g.: Salads, fruits, seeds, etc.)	Increases the value proposition due to its recyclable, compostable nature and manufactured based on renewable raw material contributing to the environment.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector	Companies that offer packaging solutions to the agri-food sector	They don't have official distributors. Open to potential collaboration relations with companies in the sector for the distribution of the product in Spain/France.
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	Entities fostering Circular Economy in general	Benchmark of Good Practice to spread in its region Facilitates intensive waste management as paper is easier to recycle than plastic

CONTRIBUTION TO ENVIRONMENTAL IMPACT

✓ Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
Revaluation
Recycling
Energy recovery
Product as a Service

- Minimum environmental impact (100% recyclable through "paper" container)

- Does not use any plastic

- Reduces food waste, as it helps keep food in good condition. Thus it can be consumed during more time avoiding waste.

CONTRIBUTION TO ECONOMIC IMPACT

- Increases the value proposition of the product, due to its recyclable nature.
- The raw material is renewable/forest sources, i.e., a tree uprooted, a tree is planted but can come from recycled pulp.
- It is designed for direct use in standard machinery. The company also supplies specific machine if necessary.
- The waste is composted, which facilitates the work of conventional recycling plants, while increasing the number of jobs in composting plants.

CONTRIBUTION TO SOCIAL IMPACT

- Easy to recycle (with paper flow)

- Elimination of plastics, which are a serious problem for society

- Same features but with better environmental impact

VALUE PROPOSITION FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- **Suitable for cereals, granola, flours, dry or low moisture products that do not necessarily require a controlled atmosphere.**
- Does **not** contain **plastic** and is recycled with **paper**
- **Certificates** EN13432 and ASTM D7081 on industrial compostability
- **Heat-sealable** coating, barrier against fat, water and moisture
- It is possible to print with **organic inks**
- Manufactured from a source of **renewable material**
- At the end of its shelf life it **descomposes** in only a few months
- **Reduction** of packaging and sustainable transport (occupies and weighs less)
- Extends the **shelf life** of the product depending on many criteria, especially the product. For example, if you need a protected atmosphere, if you need to put a barrier in the film, etc.
- Biocompatible with both food and people
- Water-based **ink** also degrades
- Company with experience in making products for the packaging and protection of food.

IMPLICATIONS FOR "END USER"

[Information addressed to USER PACKING COMPANY in its production process, rather than to END CONSUMER]

- **Substitution of its initial product with the new one, made from recycled and renewable materials such as paper/cardboard.**
- The **price** depends on different factors: what type of food goes inside, measures, place a window to see what is inside
- It is designed for direct use in standard machinery. The company also supplies specific machine if necessary.
- **It is important to inform the final consumer that the container to which it must be removed is the blue container (for treatment of paper matter) or brown (organic matter)**
- **Valid only for packing fresh products.**
- They are developing several formulas to obtain a packaging that can even be placed in an oven, contain liquids or food with a lot of fat.

PHOTOS / IMAGES

Earthpouch

REFERENCES ALREADY INTRODUCED IN THE MARKET

Empresa The Cornsih Seaweed- England
Packaging of dried seaweed

Empresa John McCambridge- Dublin
Oatmeal porridge

Empresa EatTroo- England
Granola packaging

4.SERVICES

We now present the 2 references of Services identified by ORHI in SUMMARY SHEET format.

In the below TABLE we specify for each one of the identified Services, their location, the entity that has been the source of their identification and a brief description.

In the subsequent slides we provide a summary sheet for each one of them, where besides reflecting the "value" that the solution offers to the different ORHI Stakeholders, we also provide a contact person of the company to get in touch if you wish to obtain further details and/or request additional information.

	SERVICES			SHORT DESCRIPTION	
	IT	LOCATION	SOURCE OF IDENTIFICATION		PÁG.
ORHI	1 PRS	Navarre	Ain	Repair service for damaged plastic products: Boxes, jumbos and pallets	47
	2 PHENIX	P.Atlantiques	Apesa	Brokerage between companies that allows the recovery of discarded or expiring food	48

Interreg POCTEFA ORHI

UNIÓN EUROPEA
UNION EUROPÉENNE

S/1 PRS (PLASTIC REPAIR SYSTEM)

PRS PLASTIC REPAIR SYSTEM

PLASTIC REPAIR SYSTEM 2011 S.L
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Email: gestion@plasticrepair.es
Web: www.plasticrepair.es

NAVARRE (SPAIN)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	PRS offers its repair service to any company in the food, meat, and fishing industries that work with repairable plastic products: Boxes, jumbos and pallets for storage and transport, reefer boxes and containers, plastic parts for vehicles and machinery, and tanks and reservoirs for liquid storage.	Plastic repair solutions that are performed using thermowelding with a supply of high-density virgin material manufactured exclusively. The wire is also made of food-grade material in accordance with European regulations. The core value of the repair can be summarised as cost reduction, reduction of environmental impact and generation of positive social impact.
Companies that process organic matter and plastic outside the agri-food sector	Companies that process plastic outside the agri-food sector. PRS offers its repair service to any company that works with repairable plastic products.	Plastic repair solutions that are performed using thermowelding with a supply of high-density virgin material manufactured exclusively. The core value of the repair can be summarised as cost reduction, reduction of environmental impact and generation of positive social impact.
Companies that offer technological solutions and services to the agri-food sector	PRS offers its repair service to any company that works with repairable plastic products: Companies in the auxiliary industry (offering machinery and capital goods), the primary sector (agricultural production, livestock, fishing companies and fish farms) and distribution companies (superstores, traditional distribution).	Plastic repair solutions that are performed using thermowelding with a supply of high-density virgin material manufactured exclusively. The wire is also made of food-grade material in accordance with European regulations. The core value of the repair can be summarised as cost reduction, reduction of environmental impact and generation of positive social impact.
Companies that want to invest (or diversify) in other activities	Investment companies looking for opportunities to diversify and create new business activities inside and outside Spain. Possibility of entering new countries through collaboration with industry professionals and alike.	PRS is a company with a vast potential, with a patented and certified repair system and an easily replicable business model. PRS has the potential for new operations in Spain and abroad, with business agreements that allow the transfer of its repair technique, computer application, business model, technical advice, and training of new workers.
Local authorities, R&D centres, entities that promote circular economy in general	- R&D Centres - Organisations, collectives and promoters related to the subject of interest of the project: Circular Economy, plastics...	- PRS is open to R&D partnerships with other centers on new materials and continuous improvement. Its patented repair system is backed by independent scientific studies. - Reference of Best Practice in EC: Repair is the primary mechanism for preserving the value of products and materials. Plastics are particularly polluting and abundant materials and contribute to the generation of positive social impact. Collaboration with public entities has been crucial in its success (it has received financial support from FEDER funds, Start Up Capital Navarra and Sociedad de Promoción de Empresas)

	CONTRIBUTION TO ENVIRONMENTAL IMPACT	CONTRIBUTION TO ECONOMIC IMPACT	CONTRIBUTION TO SOCIAL IMPACT
Design for Circularity ✓ Maintenance/Repair Reuse and recirculation Remanufacturing Revaluation Recycling Energy recovery Product as a Service	- PRS business is part of the circular model that promotes efficient use of resources, which, among other consequences, limits the environmental impact associated with the production process that would lead to the manufacture of a new product and the management of the product considered as waste. Thus, we can say that repairing and reusing goods made of plastic produces a significant reduction in waste (minimisation of polluting waste by preventing repaired products from going to landfill), in the consumption of raw materials, water and energy. - The environmental impact associated with the consumption of fossil resources related to plastics deserves to be highlighted. In general, it can be said that 1 kg plastic → 3.5 kg CO_2. The reduction of carbon footprint in plastic repair is greater than that of recycling. In 2017 alone, PRS repaired more than 100 different products such as: pallets, boxes, containers, tanks, kayaks, etc., which in total amounted to more than 1,263 tons of recovered plastic, which represents a CO_2 retention of more than 1,126 tons. It is also ISO 14001 certified.	- Permanent focus on the needs and preferences of the customer. Attraction and loyalty of customers because by repairing their products they are increasing their efficiency which translates into a reduction in costs. It is estimated that repairing a product with respect to its replacement by a new one entails an average cost reduction of 65% – 70%. - Maintaining top quality levels in its services and products. The method it uses, named "PRS Thermowelding System", is the only patented and certified method. The Technological Institute of Plastics (AIMPLAS) and the Multidisciplinary Centre of Technologies for Industry (CEMITEC) provide this certification	- Local development of the area, generation of local employment. - **Corporate Social Responsibility** (CSR), PRS is based on the basic principles of social responsibility, sustainability, and honesty such as providing support for the social inclusion of people with disabilities through their employment in the Approved Workshop Network. 8 of the 20 PRS workshops are CEE - Easy accessibility to services, expanding the Approved - - Workshop Network

VALUE PROPOSITION FOR "END USER"

PRS is responsible for the repair, maintenance, and adaptation of any goods made of plastic, both for companies and individuals.
Its value proposition is based on four commitments: Corporate Social Responsibility, Environment, Society, and Customers.
It seeks solutions adapted to the needs of the customer, offering top quality service at a very competitive cost.
Its repair method is patented and certified, and has been proven to be the best plastic repair method on the market.

IMPLICATIONS FOR "END USER"

The solution offered by PRS depends on the type of damage:
- Thermowelding method for repair of damaged objects
- Repair or replacement of accessories
- Reinforcement of weak points, preventing future damage
- Adaptation of solutions to suit every need.

To provide accessible and fast service, PRS has an extensive network of **Approved Workshops** that offer nationwide coverage.
It also has **mobile units** for the repair of objects that cannot be moved to the workshops

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

You can search the Approved Workshop Network of PRS through the following link:

https://www.plasticrepair.es/donde-estamos/

At present it works for the following sectors: Automotive, Beverages, Fruit and Vegetable, Meat, Pooling, Fishing, Food Retail, Chemical, Pharmaceutical, Solid Urban Waste, ...

S/2 PHENIX SECONDE VIE DES PRODUITS

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Web: http://www.wearephenix.com

PYRENEES-ATLANTIQUE (FRANCE)

TO WHOM IT OFFERS VALUE AND WHAT VALUE	TO WHOM	WHAT VALUE
Agri-food sector companies	- Mass retail sector - Secondary processing industries	- Phénix offers advice to companies to limit waste and recover their by-products, particularly in the voluntary sector. - Phénix handles the long-term management of unsold goods in warehouses (surpluses, unsaleable products, etc.) or the one-off operations to revalue surpluses (end-of-line items, order errors, etc.). - Through its web platform "Phénix Exchange", Phénix automatically connects all the suppliers' offers with the needs of the buyers.
Companies that process organic matter and plastic outside the agri-food sector		
Companies that offer technological solutions and services to the agri-food sector		
Companies that want to invest (or diversify) in other activities		
Local authorities, R&D centres, entities that promote circular economy in general	- Entities promoting the Circular Economy in general	- Benchmark of Best Practice for its dissemination in the territory.

Design for Circularity
Maintenance/Repair
Reuse and recirculation
Remanufacturing
✓ Revaluation
Recycling
Energy recovery
Product as a Service

CONTRIBUTION TO ENVIRONMENTAL IMPACT

- Advice to companies to limit waste and recover their by-products, particularly in the voluntary sector (structuring and simplification of donation flows, resale or recycling of food and non-food products).

- Phenix also plays a structuring role in the development of partnerships and innovation projects around food waste.

CONTRIBUTION TO ECONOMIC IMPACT

- Phenix saves money for its customers (mainly mass distribution) by optimising the management of their unsold stock and takes a % of the profits thus generated. This management of unsold goods and surpluses allows companies to :

  - Reduce the volume of their waste, and the costs that go with it, through various channels
  - Optimise their tax reduction via donations in kind to associations (tax exemption up to 60% in France)
  - To increase their turnover in case of resale of surpluses

- The company has also created a Phenix Lab, an initiative that incubates and accompanies the future start-ups of the circular economy.

CONTRIBUTION TO SOCIAL IMPACT

- Meeting the CSR objectives of your business strategy
- Donations to NGOs
- Reduced food waste

VALUE PROPOSITION FOR "END USER"

- Reduction of waste through circular economy channels
- Permanent, real-time connection between supply and demand
- Sustainable management of unsold goods and revaluation of surpluses
- Increase your turnover in case of resale of surpluses
- Reduction of handling time and simplification of administrative processes
- Meeting your CSR objectives
- Maximise your tax savings through donations in kind to associations

IMPLICATIONS FOR "END USER"

- Sustainable management of unsold goods and surpluses

- Facilitates through a collaborative tool matching supply and needs.

PHOTOS / IMAGES

REFERENCES ALREADY INTRODUCED IN THE MARKET

- Country and area of action : France – Spain – Portugal – USA

- Start-Up company 4 years old employing nearly 80 people in France and distributed in 10 regional branches.

- In South-West France there are 3 branches : Bordeaux, Toulouse and Biarritz

- A branch has just opened in Madrid (Miguel DIE GONZALEZ, Director PHENIX Spain)


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