

Innovative fully biodegradable mulching films & fruit protection bags for sustainable agricultural practices LIFE14 ENV/ES/00048

LIFE MULTIBIOSOL



“Aula Dei Science and Technology Park as partner in projects of agro-food industry and environmental sustainability”

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About Aragón

- *Area: 45.720 km². 50% bigger than Belgium*
- *1.350.000 residents: 8 times less than Belgium*
- *50% of the residents live in the city of Zaragoza*
- *Population density:*
 - *Aragon: 28,28 inhabitants/ km²*
 - *Spain: 93,42 inhabitants / km²*
- *Agri-food Industry: 2nd largest sector in the Aragonese economy*



Knowledge areas integrated in the Aula Dei institutions

GENETICS AND ANIMAL PRODUCTION - GENETICS AND PLANT PRODUCTION - PLANT HEALTH - PLANT NUTRITION - FRUIT PRODUCTION - QUALITY AND FOOD SAFETY - SOILS AND IRRIGATION - FORESTRY RESOURCES - POMOLOGY - AGROFOOD ECONOMY - ECOLOGY - BIODIVERSITY AND RESTORATION - BIOECONOMY - BIOFUELS - AGROFORESTRY MODELS - AGRICULTURE OF CONSERVATION - REVALORIZATION OF AGRO-FOOD SUB-PRODUCTS - DEVELOPMENT OF MORE SUSTAINABLE PROCESSING TECHNOLOGIES - BEST PRACTICES IN THE AGRICULTURAL SECTOR - FOOD CONTAINERS - INCREASE OF USEFUL LIFE - TRANSFER OF KNOWLEDGE - SUPPLY CHAINS MORE SUSTAINABLE ... among others.

Expanded
capabilities
for PCTAD

Access to specialized knowledge

Infrastructure for agri-food R&D

Multidisciplinary teams



CREATION of Aula Dei Science and Technology Park (PCTAD)

The REFERENCE AGENT in ARAGON to boost INNOVATION in the AGRI-FOOD and environmental sector



WHY?

- 8 R&D Centers (CITA, EEAD-CSIC, IPE-CSIC, IAMZ, CSPV, CPV, Agroenvironmental Laboratory, CTA)
- 400 scientists
- No good neither efficient knowledge transfer to the agri-food sector
- Companies: Who can help me?

OBJECTIVES

- Collect all the scientific offer
- Identify the technology needs of the sector
- Connecting supply and demand and promote the development of joint projects that enhance the competitiveness of the sector

MISSION

To contribute decisively to the development of a new model of sustainable competitiveness of Aragon by means of the innovation and the technological development, favoring the exchange of knowledge and transfer of technology between companies, university and technological agents, stimulating the creation and development of new companies and innovative practices and promoting the development of a culture orientated to the innovation and management of the knowledge.

INNOVATION FACILITATORS



- PROPROJECTS OF INNOVATION
 - Identification of partners
 - Acces to resources
 - Assistance in the management, dissemination of results, ...
- TRANSFER OF KNOWLEDGE
 - Organization of courses, technological events,...

Our PARTNERS

Aula Dei Foundation: a strong public-private partnership to support innovation in the agri-food sector

Main official R&D Spanish agency
Regional Government of Aragon
Leading companies
University of Zaragoza
International agri-food postgraduate school (IAMZ-CIHEAM)
City councils
Agri-food technology center

FOUNDING PARTNERS



PARTNERS



Universidad
Zaragoza



R&D Centers



Department of
Innovation,
Investigation and
University



Department of Rural Development and
Sustainability



Center of
Investigation
and Food-
processing
Technology of
Aragon (CITA)



Experimental
Centre Aula
Dei (EEAD)



Institute
Pirenaico of
Ecology (IPE)



Mediterranean
Agronomic
Institute of
Zaragoza
(IAMZ)



Center of
seeds and
plants
nursery(CSPV)

Center of Plant
Protection
(CPV)

Food-
processing
laboratory (LA)

Center of
Food-
processing
Transfer(CTA)

University of
Zaragoza (UZ)

What we do

- Technical support for entrepreneurs
- Specialized training
- Marketing strategies

**Competitiveness
and business
development**

- Validation for the market for co-products and by-products
- Treatment and reuse of slurry

**Valorisation
of products
and waste**

**Sustainable
productivity**

- Smart Fertilization
- Agriculture 4.0
- Control of pathogens and pests
- Food safety

**Quality of
plant origin
food**

- New formats and varieties
- Fresh-cut and pre-cooked products
- Optimization of packaging and transport conditions

**Organic
production**

- Zero waste production
- Market Access
- New crops

**Fostering
innovation in the
agri-food sector
of Aragón**

R&D projects by numbers

17 ongoing projects (2013-2020 associated to public funding)

992,500 € of public funding for PCTAD

10,597,000 € total mobilized funding

32 partners from 9 European countries

COMPANIES

FERTINAGRO
SYRAL IBERIA S.A
ORCHARD FRUIT CO
SEMILLAS BATLLE S.A.
MOLENDUM INGREDIENTS
LAFUENTE TOMEY
FINCA VALLELUZ
SEIPASA
BODEGAS SAN VALERO
XTREM BIOTECH
ZERYA
FACA
FENIX FRESH
EXPLOTACIONES AGRARIAS
LOS MASOS, S.L.
JOSE MARÍA LÁZARO (OTRI)
SAT 4.155 DYMA
PORCINO TERUEL, S.A

NETWORKS

IASP / APTE
BIOVEGEN
FOOD FOR LIFE
CLUSTER
INNOVALIMENT
CLUSTER ZINNAE

R&D PARTNERS

University of Zaragoza
EEAD (CSIC)
CIRCE
Fundación AITIIP
Tecnopackaging-Aitiip
CSIC
CITA

EUROPEAN PARTNERS

TOP B.V (Holanda)
IMaR (Irlanda)
Georgia Tech Ireland
KÖLLA GmbH & Co. (Alemania)
Transfer Latin Business Consultancy S.L. (Holanda)
Universita degli Studi di Catania (Italia)
Marketmentor Ltd (Chipre)
Centre de Recherche Public Henri Tudor (Francia)
Groencreatie BVBA (Bélgica)
Laboratori ARCHA s.r.l (Italia)
LULEA TEKNISKA UNIVERSITET (Suecia)

Research & Development Department

Innovation-Laboratories



Integral Control of Plant Origin Food

The purpose of this laboratory is to offer integral solutions for the vegetable sector to achieve a greater product quality as well as the optimisation of the productive processes. All the agents involved in the production chain are potential users of this service. Among them are farmers, first and second grade cooperatives, distributors, stockists, wholesalers and retailers.



Food safety and cereal quality

Food safety is currently a demand of today's consumers as well as an imperative to open new markets. From the laboratory services of PCTAD we can help you to comply with these requirements and carry out shelf life studies which are of great use in food and agricultural products. Moreover, this laboratory has the necessary equipment to carry out the cereal-specific quality analysis.



Molecular Biology Services

The Molecular Biology Service provides the physical framework with the appropriate infrastructure to solve in a fast and precise way the main demands in genetic and genomic studies required by the transformation and marketing processes in the agricultural and food sector. The laboratory also provides scientific-technical support and assessment in the field of specific Molecular Biology services and research.



The purpose of this laboratory is to offer integral **solutions for the fruit and vegetable sector** to achieve a greater **product quality** as well as the **optimization of the productive processes**. All the agents involved in the production chain are potential users of this service. Among them are *farmers, first and second grade cooperatives, distributors, retailers, etc...*

SERVICES we offer

Post-harvest assessment of fruit and vegetables and shelf-life studies depending on the target market :

- ✓ Choice of the right **moment to harvest** depending on the market
- ✓ **Organoleptic and nutritional characterization** of fruit and vegetables. **Shelf-life postharvest studies** adapted to new markets.
- ✓ Application of **post-harvest technologies** (1-MCP, AM, AC, edible coatings, active packaging, etc.) to extend the shelf life of fruits and vegetables

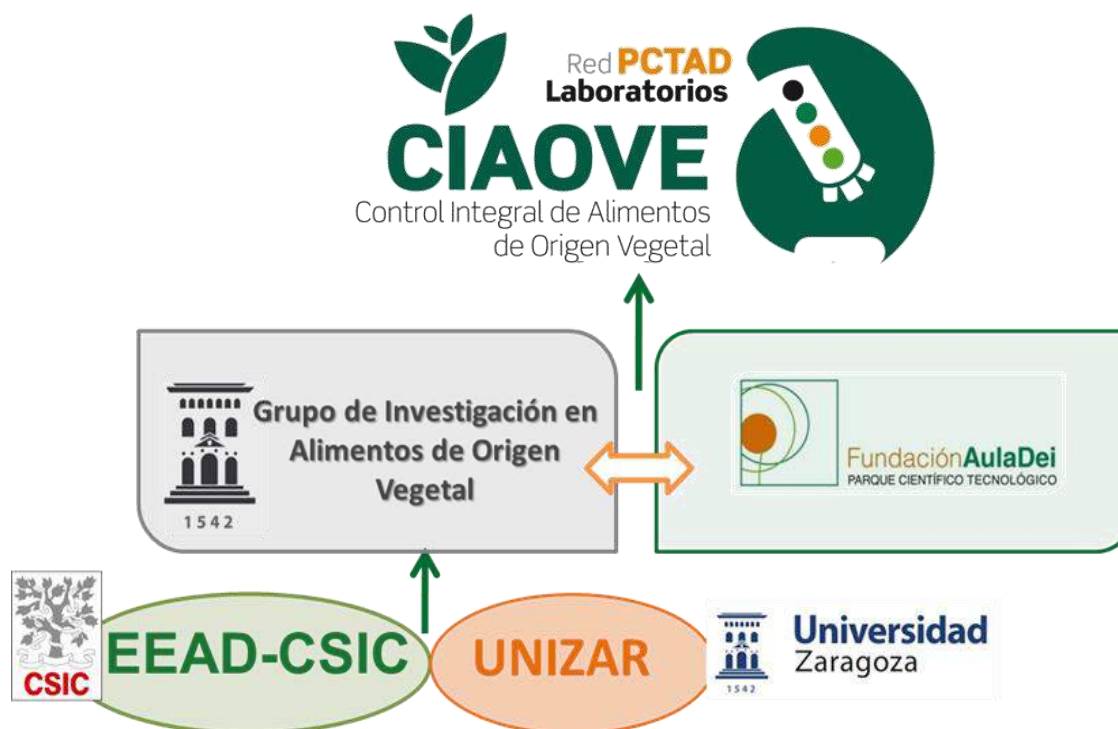
Reduction of the use of plant phytosanitary products:

- ✓ Determination of latent infections. Design of low-impact decontaminant treatments. Application of **zero residues protocol**.
- ✓ Application of **decontamination treatments alternative to the use of chlorination**.

Development of new products of plant origin:

- ✓ Fresh cut, dehydrated, natural fruit juices, smoothies...
- ✓ Optimization of the process to obtain fresh cut fruits and vegetables: *selection of the most suitable varieties, choice of the preservation treatments, design of modified atmosphere packaging.*
- ✓ Development of new products and formats adapted to the market.

CIAOVE: Group of Investigation



Service offered across a mixed laboratory PCTAD and the **Group of Investigation in Food of Vegetable Origin** that joins research staff of the Experimental Station of Aula Dei of the Top Advice of Scientific Research in Aragon (EEAD-CSIC) and of the University of Zaragoza.

General Services

Quality
parameters of
the fruit

Determination
of **compounds**
bioactives

Postharvest
Tecnolgies

Technical services
under demand

Quality parametres of Vegetables



✓ **Physical and chemical analysis:**

- ✓ Intensity and coordinates of the color ($L^*a^*b^*$ and LCH)
- ✓ Extension of the color: Percentage for fruit
- ✓ Size and weight: Diameter, esfericidad, loss of weight
- ✓ Firmness of the fruit (destructive or not destructive measures)
- ✓ Determination of the acidity of the fruit
- ✓ Solid soluble ($^{\circ}\text{Brix}$)
- ✓ pH

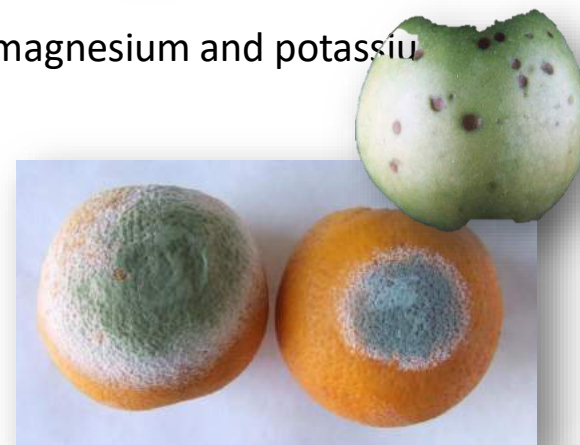
✓ Indexes of ripeness: classic and for not destructive methods (NIR)

✓ Concentration of minerals in skin and flesh of the fruit: calcium, magnesium and potassium

✓ Evaluation of external and internal hurts and rottennesses.

- ✓ It stains vitrescente (peaches)
- ✓ Bitter pit (apples)

✓ Sensory analysis: Panel of experts, consumers Aceptación.



Correlation: pre-harvest & post-harvest

From the field to the consumer

- ✓ Determination of the **chlorophyll in leaves**

SPAD 502



- ✓ Determination of **PHOTOSYNTHETIC POTENTIAL ACTIVITY** (fluorescence of chlorophyll)

Pocket PEA Fluorimeter



- ✓ **Total photosynthesis** and Perspiration

Meter appraises of photosynthesis Lci
(IRGA: Infrared Gas Analyzer)



General Services

Quality

parameters of
the fruit

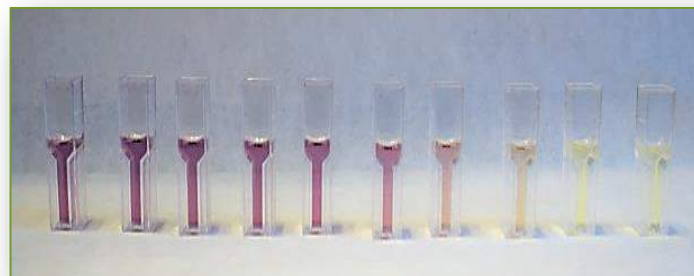
Determination
of compounds
bioactives

Postharvest
Tecnolgies

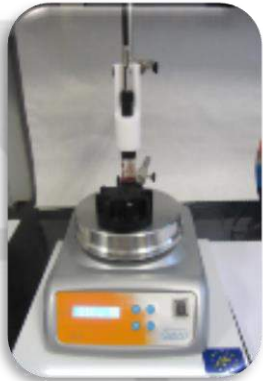
Technical services
under demand

Determination of BIOACTIVES substances

- ✓ Identification and quantification of the **sugars and organic acids** of the fruits.
- ✓ Determination of **Carotenoides**
- ✓ Determinación's **Antocianinas**
- ✓ Cuantificación of **Chlorophylls**
- ✓ **Licopeno** Determinación's
- ✓ Concentration of the **Phenolic Total Compounds**
- ✓ Quantification of the **Vitamin C** (acid ascórbico)
- ✓ **Antioxidant Capacity**

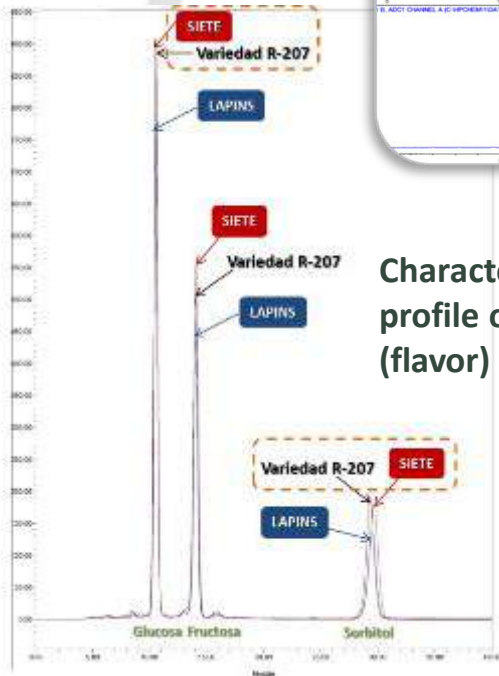
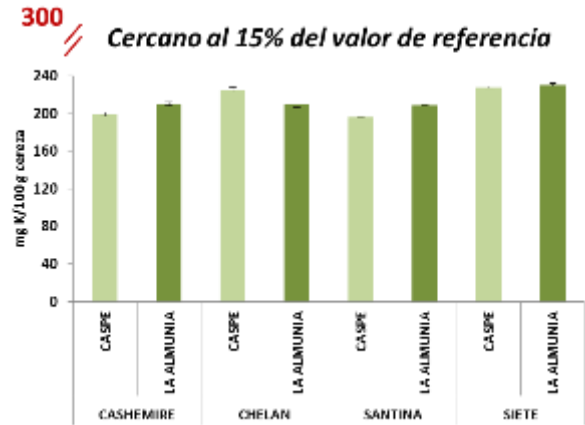


Organoleptic and functional characterization of fruits and vegetables



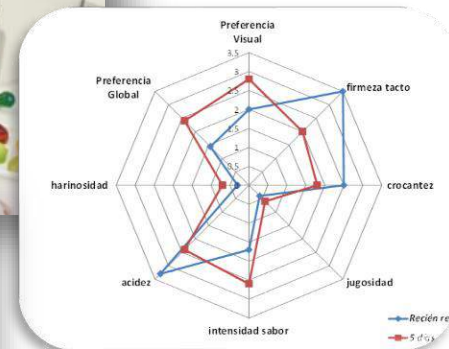
Olfatometric profile

Nutritional labeling



Characterization of the profile of azúcares and acids (flavor) of new varieties

Panel of experts



General Services

Quality
parameters of
the fruit

Determination
of **compounds**
bioactives

Postharvest
Tecnolgies

Technical services
under demand

Postharvest Technologies



- ✓ Quality evaluation by means of **digital technologies of image**
- ✓ Studies of **long life use**
- ✓ Develop of **fresh cut and ready-cooked** products (IV and V)
- ✓ Application **protective atmospheres**: Packaging in modified atmospheres, Conservation in controlled atmospheres



General Services

Quality
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Determination
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Postharvest
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Technical services
under demand

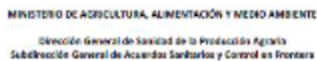
Technical Services under demand



- ✓ **Nutritional** diagnosis of the cops (analysis foliate)
- ✓ Certification of quality parameters and **export requirements** of fruits
- ✓ Evaluation of **disorders**
- ✓ **Commercial Valuation** of Varieties
- ✓ Follow-up **good agricultural practices**
- ✓ Optimization of **postharvests process** (manipulation, cooling, cleaning ...)
- ✓ Integral Advice for experts in projects R&D: Technical Management, economic Management, Tools of financing.



QUALITY FOR EXPORT



**Campaña de Exportación de fruta de hueso
procedente de España con destino a Sudáfrica**

Guía para Productores y Almacenes de Confección



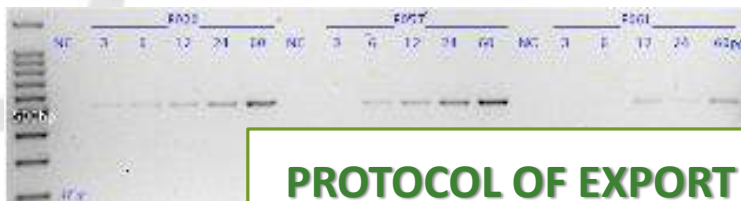
CELLULOSE TRAPARIN
WIT: PIRENOLE
DOMECELLIN: Arita, Emar, Nigunda, 3-TR, 20001 Euzepa
POBILACOBIN: Faragata
CUNILACIG: Barner, Sanata Nive

Nome do candidato:
 Número de inscrição:
 Finalização da inscrição:

Monitoreo de 726 índices de radiación B29 TSP, que pertenecen a la UIC Número 1 (el UIC 1318101), receptores durante la inspección de manipulación en el centro de manipulación (FRANCIA, 2014, 2015).

Radomysia ulmeri *radomysia* 813 705.

ANÁLISIS REALIZADO	RESULTADO	RECURSO
<p>Química de Plantas acu.</p> <p>«Servicio de Internet de la Universidad de Murcia»</p> <p>«Servicio de Internet de la Universidad de Murcia»</p>	<p>«Servicio de Internet de la Universidad de Murcia»</p> <p>«Servicio de Internet de la Universidad de Murcia»</p> <p>«Servicio de Internet de la Universidad de Murcia»</p>	<p>«Servicio de Internet de la Universidad de Murcia»</p> <p>«Servicio de Internet de la Universidad de Murcia»</p> <p>«Servicio de Internet de la Universidad de Murcia»</p>
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PROTOCOL OF EXPORT TO SOUTH AFRICA

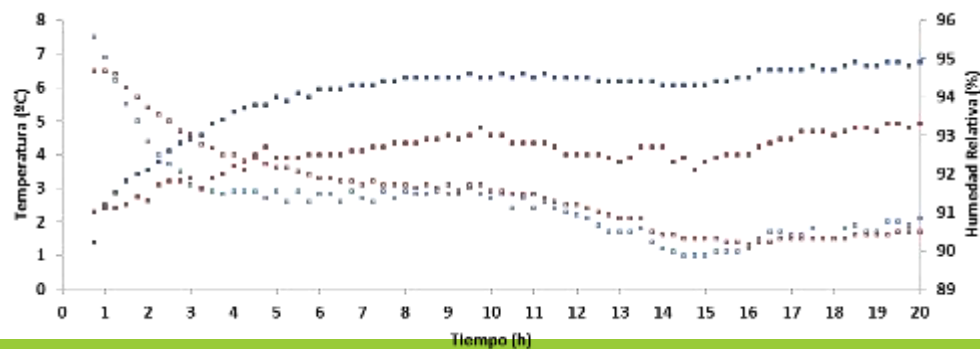


November 2017

STUDIES OF SIMULATION OF TRANSPORT

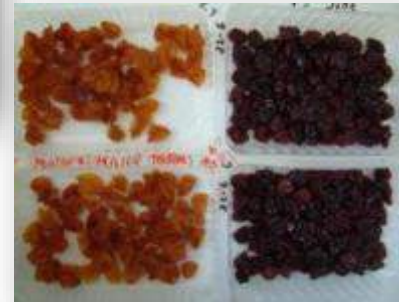
- ✓ Aptitud de nuevas variedades para la exportación
- ✓ Selección del tipo de envasado según destino

TIPO DE VARIEDAD	COLOR	FORMATO DE COMERCIALIZACIÓN		TRANSPORTE DE CORTA DISTANCIA	TRANSPORTE DE MEDIA DISTANCIA	TRANSPORTE DE LARGA DISTANCIA
TEMPRANAS	5	AIRE (macroperforado)			✓	
		AM (microperforado)			✓	
	6	AIRE (macroperforado)		✓		
MEDIA ESTACIÓN	5	AIRE	barquilla tapa		✓	
			bolsa abierta	✓		
		AM (microperforado)			✓	
	6	AIRE	barquilla tapa		✓	
			bolsa abierta	✓		
			formato Asia		✓	
TARDÍAS	5	AM (microperforado)				✓
	6	AIRE (formato Asia)			✓	



Estudios de simulación de transporte: velocidad de enfriamiento y seguimiento de T y HR en el interior de los envases

New Products Development in IV and V packaging



Research & Development Department

Innovation-Laboratories



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Food safety is currently a demand of today's consumers as well as an imperative to open new markets. From the laboratory services of PCTAD we can help you to **comply these requirements** and carry out **shelf life studies** which are of great use in food and agricultural products. Moreover, this laboratory has the necessary equipment to carry out the **cereal-specific quality analysis**.

SERVICES we offer

Cereal quality parameters Analysis:

- ✓ **Cereal** cleanness, packaging and milling.
- ✓ Ground common **grain**: Determination of humidity, gluten, specific weight and protein by NIR, weight of one thousand grains, % of impurities.
- ✓ **Durum grain wheat**: Determination of humidity, gluten, specific weight and protein by NIR, Weight of one thousand grains, % of impurities and vitreousness.
- ✓ **Soft wheat flour**: Alveogram (Strength (W), Extensibility (L) and Balance (P/L)), Gluten extraction, Hagberg falling number, Zeleny index.
- ✓ **Flour and durum wheat semolina**: Yellow index, sedimentation index (SDS), Gluten extraction, Hagberg falling number.

Food Safety

- ✓ Food safety (**chemical** contaminants)
- ✓ Food safety (**biological** contaminants)
- ✓ Different customised **analytical techniques** at the customer's request.

The aim of the SACC is of offering to the sector (*farmers, cooperatives, distributors*) the specific analyses of quality for cereals as well as shelf life studies

Cereal Quality

Food Safety

Useful life of food

Adjustment of analytical technologies



Research & Development Department

Innovation-Laboratories



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Services we offer...

- **Agricultural and food sector :**
 - ✓ Detection of transgenic agents (GMO).
 - ✓ Food frauds
 - ✓ Genetic traceability
 - ✓ Detection of allergens
 - ✓ Molecular characterisation of fermented micro-organisms
- **Food Safety:**
 - ✓ Identification of pathogenic species by PCR
 - ✓ Analysis and identification of spoilage species
 - ✓ Determination of latent infections
- **Veterinary and Animal production Diagnosis: Bird sexing**
 - ✓ Detection of pathogens in animal biological samples
 - ✓ Paternity and genetic profile tests: pedigree
 - ✓ Breed upgrading: Genotype associated to a Breed of Sheep upgrading (gene ROA)
 - ✓ Genetic markers



LIFE FreshBox: a sustainable transport solution
conserving quality of fresh produce, reducing waste and fuel
consumption



LIFE Fresh Box: <http://fresh-box.info/>

OBJECTIVE:

Development of a container (Freshbox) for the transport of fruits and vegetables, which allow to create appropriate atmospheres of agreement to the respiratory rate of certain types of fruit / vegetable.

Advantages:

- ✓ Reduce amount of **food waste**
- ✓ To anticipate **emission of dioxide** of CO₂ on having used more light and sustainable material; leading to a reduction in the consumption of energy / fuel.
- ✓ It improves in the **quality of fresh products** offered to consumers.



BUDGET: 1.851.396€

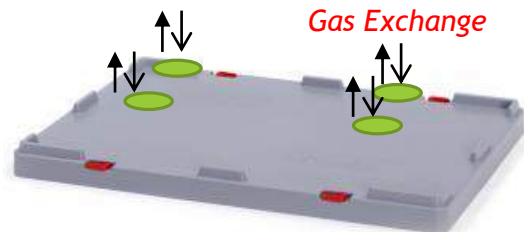
50 % UE Co-financiación

PARTNERS:



Project description

The aim of the project is to **improve the sustainability of the transport** of fruits and vegetables in order to increase the competitiveness of the sector and to offer to the consumer products of **better quality**. On having **increased the useful life** of the transported products, the development of the Fresh Box will contribute to the reduction of the food waste generated during the transport and distribution (one of the stages with major % of food waste). In addition, on having been made by a biodegradable and more light material, the consumption of diesel oil during the transport will be minor



Main characteristics

- FreshBox is an **active and intelligent container**. It includes an **innovative system of membranes** of gaseous exchange across macroperforations that an AM allows to generate, of passive form, inside the container. In addition, it takes built-in **active substances**, since absorbents of ethylene and antimicrobial compounds.
- The conditions of **T, related humidity and atmosphere (%O₂, %CO₂)** are monitored during the whole transport by means of sensors integrated to the lid of the container (tecnologia RFiD).
- It is a light container realized with **recyclable, biodegradable and compostables materials**.



Some results of the project

The activities of the project have been directed to demonstrate the capacity of the new container Fresh Box to contribute to a major sustainability and efficiency of the distribution sector of fruits and vegetables, by means of.

- **Reduction of the food waste**, which was monitored during the tests of validation, so much to laborator level as in real transport.



- During the test of laboratory and real transports, the quality of the product stored in the containers Fresh Box will be compared with that of the same product transported of conventional form, **evaluating the days extra of useful life of the product**.

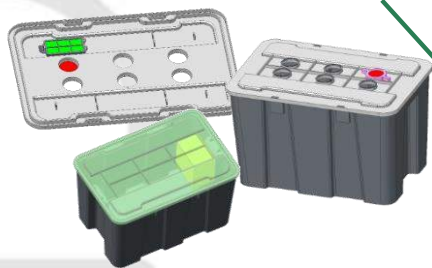
- The productive process of the container Fresh Box allows to **reduce 20 % the energy and consumption of materials**, using in **addition biodegradable materials, compostables and recyclable**.



CONSORTIUM



- Design of the model of prediction of the permeability.
- Incorporation of the active substances.
- Development of the container Fresh Box.



Fundación **AulaDei**
PARQUE CIENTÍFICO TECNOLÓGICO

- Study of the respiratory metabolism of the selected products and selection of the AM most adapted for each one.
- studies of simulation of transport (to laboratory level)
- collaboration in the real transport Spain
- Germany and Germany - Spain



TRANSFER

Latin Business Consultancy

- Management and coordination between partners.
- Activities of diffusion and networking.



IMaR
Technology Gateway
INTELLIGENT MECHATRONICS AND RFID

- Development of the sensor that will join in the Fresh Box: monitoring of the T, HR, %O2 and %CO2.
- design of an application for mobiles and real time follow-up.



KÖLLA
THE FRUIT COMPANY

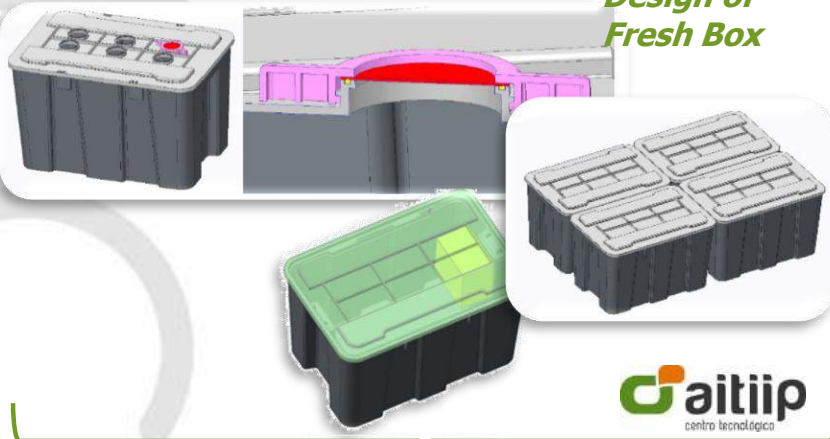
- Selection of the fresh products for the tests and advice in the definition of the commercial criteria.
- Person in charge of the organization of the royal transport of Germany to Spain

LT

- Selection of the fresh products for the tests and advice in the definition of the commercial criteria.
- person in charge of the organization of the royal transport of Spain to Germany

SOME RESULTS. Studies of simulation of transport to laborator level

Design of Fresh Box



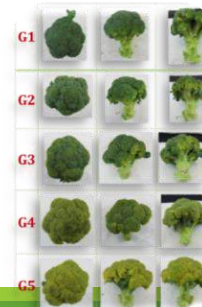
aitiip
centro tecnologico



Prototypes developed for the laboratory test programs and transport



Rapid evaluation records of the quality



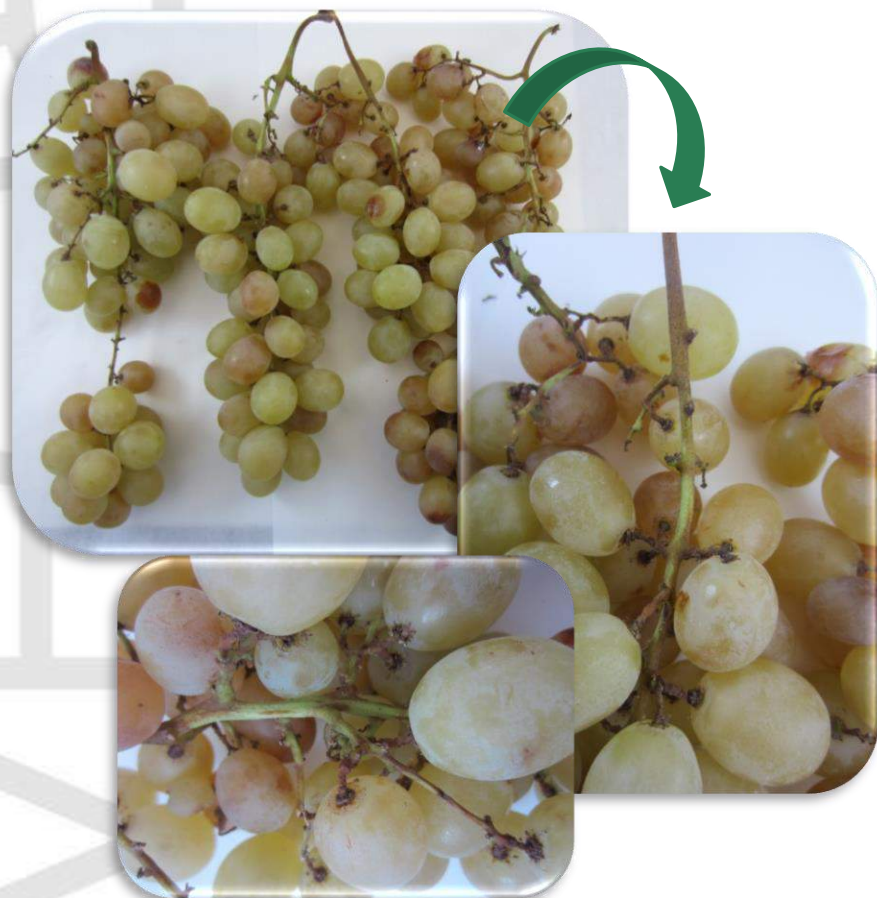
Design of a specific sensor



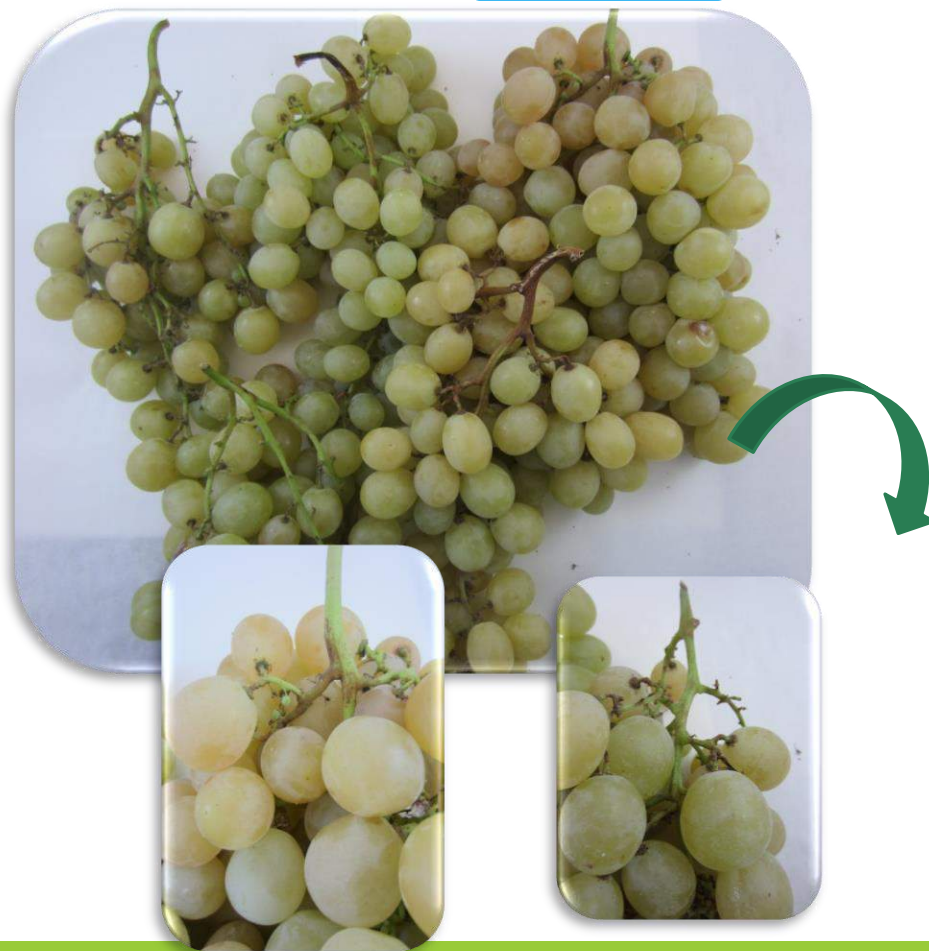
Fresh Box's validation to laboratory level

10 days of simulation of transport/5°C + 1 day/21°C

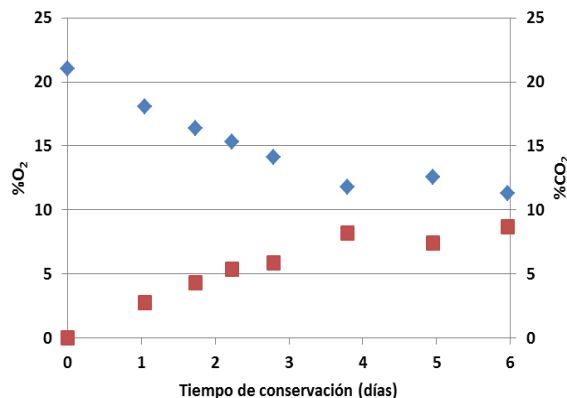
CONTROL



FRESH BOX



Fresh Box's validation to laboratory level



% weight loss T10F0 (10 days/5°C)

Nº sample	CONTROL	FRESH BOX
1	6,44	0,32
2	4,95	0,97
3	7,89	0,77
4	8,86	0,90
5	6,82	0,73
6	4,95	0,25
7	8,14	0,39
8	7,51	0,32
9	5,39	1,06
10	2,07	0,63
Media	6,30	0,64
Desv Est	3,38	0,05



Important effect on the maintenance of the firmness

% of fruit in each range

		CONTROL		FRESH BOX	
		T7F0	T7F3	T7F0	T7F3
	Firmness				
	<1,5 kg	28,3%	50,8%	18,3%	30%
	1,5-2kg	26,6%	33,8%	43,3%	50%
	2-2,5	28,3%	15,2%	31,6%	15%
	>2,5 kg	13,3%	0%	8,3%	5%

**LIMITE
COMERCIAL**

Environmental Impact

The assessment included a study on the direct environmental impact of the decrease in food loss, the changes in transport weight conditions using the Freshbox and the material used to produce the container. In order to simplify the results, 3 sample commodities were used to calculate the environmental impact of the Freshbox container.

The aggregated results estimate that the total savings of

Each ton of transported cherries = 14.90 Kg-CO₂ savings

Each ton of transported grapes = 420.74 Kg-CO₂ savings

Each ton of transported strawberries = 40.03 Kg-CO₂ savings

A. Improvement of shelf life and **reduction of fresh produce waste** during transportation and distribution:

▪ **1ST STAGE:** Calculation of the CO₂ emissions in production and transport of fruits

	Kg-CO ₂ / Kg fruit		
	Production CO ₂ emission	Transport CO ₂ emission	Total
Cherry	0,24	0,15	0,39
Grapes	0,83	0,15	0,98
Strawberry	0,27	0,15	0,42

▪ **2nd STAGE:** CO₂ footprint related to reduction of food waste (% rejected at destination) due to Fresh Box

		Cherry		Grape	Strawberry
COMMERCIAL REJECTION REASON		Mold growth (day 0)	Mold growth (day 1)	Dehydration	Mold growth
Kg-CO ₂ saving due to food waste reduction	Lower limit confidence interval*	0,07	1,37	104,53	11,15
	Estimation	0,71	2,49	408,33	27,62
	Upper limit confidence interval*	1,67	3,97	653,33	51,26

B. Reduction of fuel consumption: new design and material that makes it lighter, reducing the total weight during transportation.

C. Use of biobased and biodegradable material.

Saving on container weight (Pallets vs. FreshBox)	10	Kg
Pallets/FreshBoxes/truck	99	Units
Kg fruit/truck	25.000	Kg
Saving on weight/truck	990	Kg
Weight saving/Tonne fruit transported	39,6	Kg

Reduction of weight (fuel consumption)

Saving on CO ₂ emission/container due to reduction of fuel consumption (Pallets vs. FreshBox)	0,8	Kg
Number of FreshBox/truck	99	units
Kg fruit/truck	25.000	Kg
kg-CO ₂ saving/Tonne fruit transported	3,168	Kg

Biobased materials (60% PLA)

Saving on KgCO ₂ /Fresh Box	2.31	Kg
Kg fruit/Fresh Box	250	Kg
kg-CO ₂ saving/Tonne fruit transported	9,24	Kg

Total kg CO₂ saving/Tonne of product transported: SUMMARY

SUM		Cherry	Grape	Strawberry
1. Kg CO ₂ eq saving due to reduction of food waste	Límite inferior IC	1,37	104,53	11,15
	Estimación	2,49	408,33	27,62
	Límite superior IC	3,97	653,33	51,26
2. Kg CO ₂ eq saving due to reduction of fuel consum		3,17	3,17	3,17
3. Kg CO ₂ eq saving due to use of biomaterial		9,24	9,24	9,24
TOTAL Kg-CO ₂ saving/ Tonne fruit transported	Conservative scenario	13,78	116,94	23,56
	Estimated scenario	14,90	420,74	40,03
	Optimistic scenario	16,38	665,74	63,67

Environmental Impact

Forecasted to a larger European context, if the Freshbox container were applied at an international scale, the potential annual savings in CO₂ kg for these fruits according to the export data from Spain to Germany during 2015 reported by Fepex would be:

	Cherries	Grapes	Strawberries
Tons exported from Spain to Germany	4,256	31,334	94,513
Total Kg-CO ₂ savings	63,414	13,183,467	3,783,355
Monetary value	337,998 €	70,267,879 €	20,165,284 €
*according to cost of CO ₂ /ton emission calculated by the SENDECO ₂			

Main Conclusions and results

- The Freshbox container serves as a valuable instrument to conserve fresh produce quality, by prolonging shelf life and therefore reducing food loss along the supply chain.
- The results of the Freshbox testing are not equally beneficial for all types of fresh produce- **the controlled atmosphere and permeability levels work better for some commodities than others.**
- More specifically, the Freshbox testing in the laboratory showed that more commercial advantages are obtained when transporting more delicate produce such as **spinach, grapes and strawberries**. In these cases, using the Freshbox under the correct atmospheric conditions can **prolong commercial shelf life from 4-8 days**.
- The transport tests under real conditions validated these results in the case of **strawberries (50% less mold in the Freshbox)** and **grapes** (significant improvements during sensory tests), although the spinach test results were discarded as unreliable due to problems in 2 of the trips.
- Furthermore these tests also included **mushrooms and raspberries** transport, in which the Freshbox outperformed the control pallets in both cases (**improved commercial quality and sensory results as well as absence of mold, weight and texture loss**).
- Specific utilities and designs of the Freshbox have been considered extremely innovative for the sector, the developers of the material are currently pursuing the possibility of patenting the designs.

EcoDESforFOOD Project: Training in Ecodesign for the food-processing industry



<https://www.ecodes4food.com/es/>

Why?

- ✓ Packings and packings it is one of the major **environmental impacts** derived from the food-processing industry
- ✓ European policies focused towards the **minimization of residues**
- ✓ Using Ecodesign's tools, it is possible to produce more **sustainable packings**

The best residue is the one that does not take place



Program: Erasmus + KA2

“Strategic partnership for the cooperation and innovation for the development of good practices



Title: EcoDESforFOOD+

Duration: From 01/11/2015 to 31/10/2017

Partners:

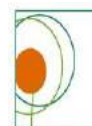
- Fundación PCTAD (España). Coordinador
- Universidad de Zaragoza (España)
- Marketmentoro (Chipre)
- Universidad tecnológica de Luleå (Suecia)



Universidad
Zaragoza



Budget: 197.196 €



Fundación Aula Dei
PARQUE CIENTÍFICO TECNOLÓGICO



EcoDESforFOOD: OBJECTIVE



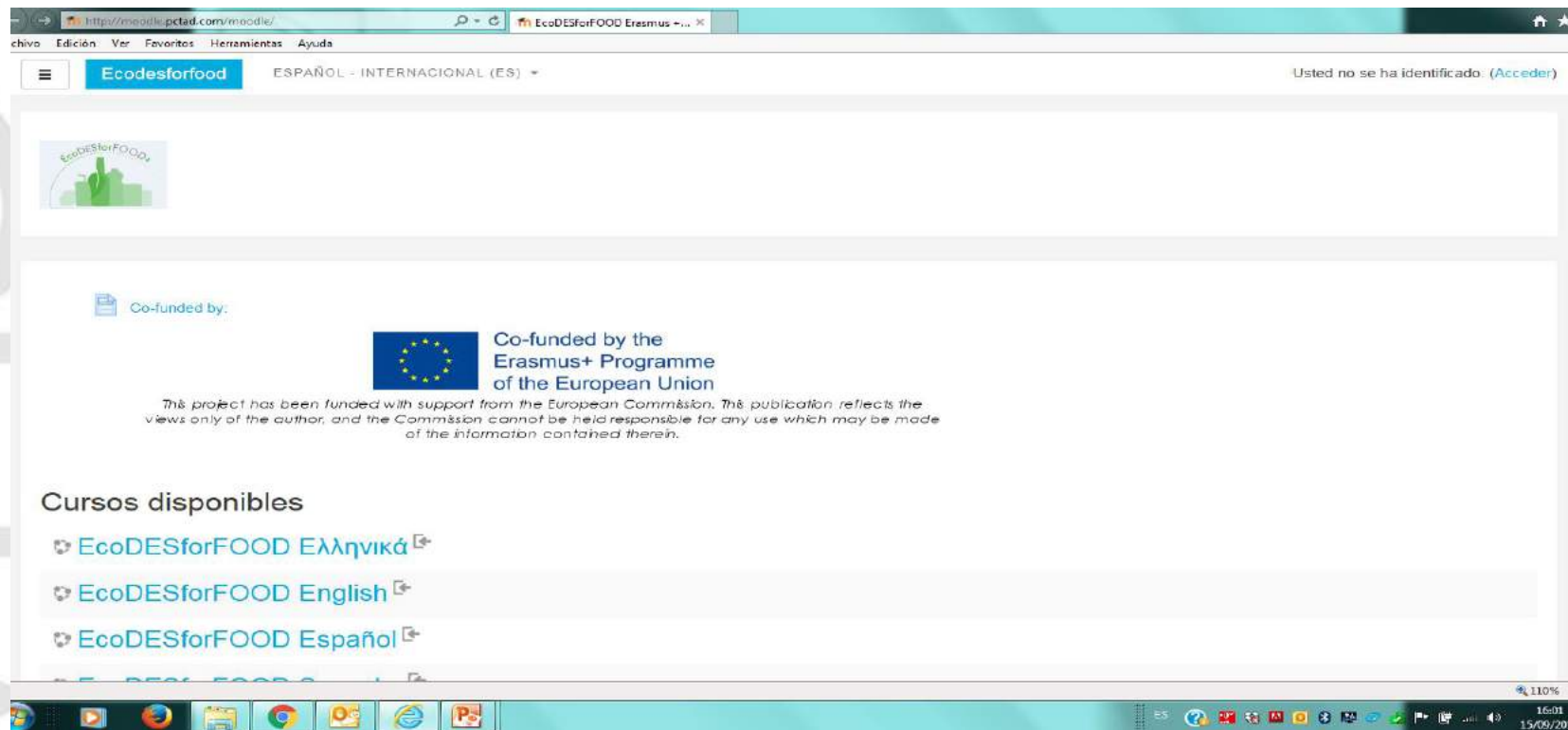
To develop a platform online of opened formation and free access, that includes knowledge on different matters related to the ecodesign:

- Technologies and methodologies of evaluation of environmental impact
- Evaluation of environmental impact
- Alternatives of waste management of packings, technologies of valuation and final elimination of materials of packaging
- New material and better alternatives for the food-processing industry
- Ecopackaging and food packings Interactions packing-food, sensory quality, and time of useful life depending on the secondhand packing
- Better technologies available
- Cases of study

EcoDESforFOOD: PLATFORM



Erasmus+



EcoDESforFOOD: PLATFORM



Erasmus+

7.1 Strategies of minimization of packings in the food processing Industry



★ PRET A MANGER ★
ORGANIC COFFEE • NATURAL FOOD

7.2 Ecomarketing

DIAGEO

7.3 Green Enterprise



7.4 Innovative experiences in the area of the ecological design and the prevention of the environmental impact



7.5 Interactions food - packing



7.6 Design of containers for food products

THANK YOU!

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