LIFE14 ENV/ES/000486/ MULTIBIOSOL

MULTIBIOSOL: ADVANCED BIODEGRADABLE PLASTICS FOR THE AGRICULTURAL SECTOR: MULCHING, PROTECTION BAGS AND CLIPS

Final Conference LIFE Multibiosol,

29th May 2019, Zaragoza, Spain.

#Multibiosol

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LIFE MULTIBIOSOL

Innovative fully biodegradable mulching films & fruit protection bags for sustainable agricultural practices.

Framework: EU Life Programme
Partnership: Coordinator: AITIIP. Beneficiaries: 7 partners.
Date: 01/09/2015 to 31/05/2019
Budget and project grant: 2.036.680€ / 1.222.002€

The overall objective of the project is to demonstrate that the **sustainability and efficiency of agricultural practices** can be achieved by introducing an **innovative**, economically viable and soil biodegradable plastic that **eliminates waste** completely.

Co-funded by the European Union through the LIFE Programme

We help companies to overcome their present and future technological challenges in the frame of sustainability by applying commitment and latest technology, innovation and knowledge.

2019 — 20 European projects

2012 — New facilities

2006 — First EU coordinated project

2003 — 100% private Technology Centre

2001 — First big mould manufactured for automotive sector

1995 — Aitiip foundation

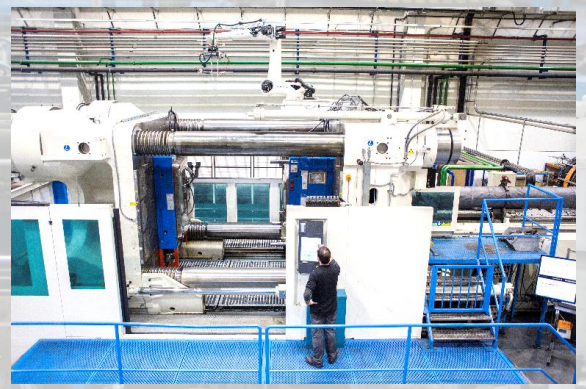
MATERIALS DEVELOPMENT AND CHARACTERIZATION

We prepare **materials on demand** to meet whatever requirement from all sectors. We are specialists in high performance termoplastics, bio-materials, nano-aditives and materials functionalisation.

We **caracterise materials** with capillary rheometer as well as mechanical characterization (traction, flexion and compression).

PLASTIC TRANSFORMATION

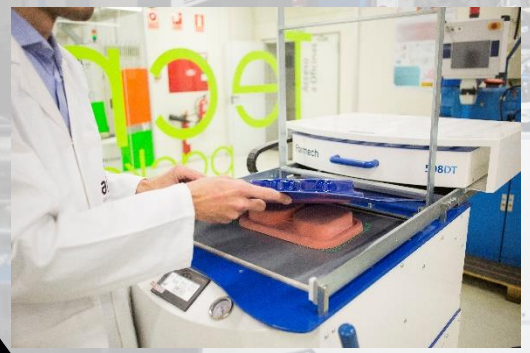
We have all available technologies for plastic transformation: thermoplastics injection (25t to 4000t), blow extrusion, thermoforming, film blowing, composites, thermosets, bio-based and bio-degradable.



PILOTS PLANTS

We offer all our capacities to install pilot demonstration plants in our industrial facilities.

Different technologies: injection, blow molding, extrusion, casting, thermoforming, 3Dprinting.



DEVELOPE YOUR PROJECT WITH US

01 Materials design

More than 10 years working with materials till **industrial scale (tons)** for validation.

02 Engineering and product design

Design and engineering for **molds and tools**. CAD, CAM y CAE.

03 Mechanical manufacturing

Machining workshop with all machining options available.

04 Plastic transformation

For **thermoplastics**, **thermostable** plastics and **composites**. Injection workshop from 25tn till 4000tn, thermoconforming and blow injection.

05 Project management

Innovation and **project management**, partners and program research for your idea.

06 Dissemination of results

Dissemination and communication is nowadays crucial for all entities and Project. We are social!

EN 9100 BUREAU VERITAS Certification

ISO 9001 BUREAU VERITAS Certification

ISO 14001 BUREAU VERITAS Certification

EXAMPLES OF RESULTS FROM PROJECTS

5,6M€ on EU funds in H2020

5ª Spanish entity successful in BBI

<500 EU ranking

+ de 150 European partners

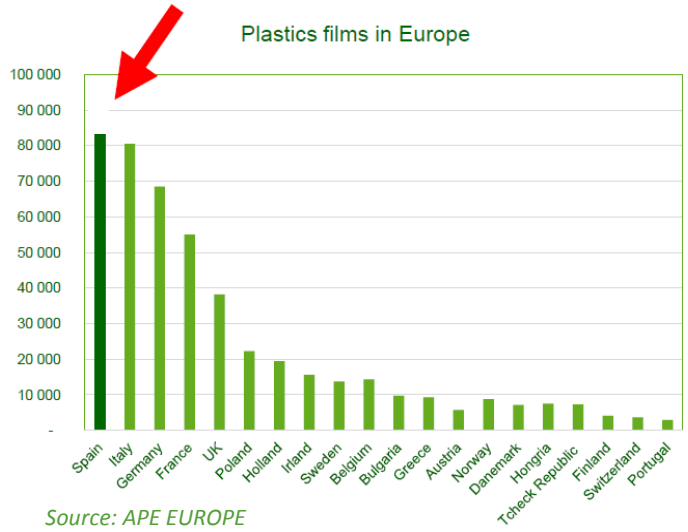
aitiip centro tecnológico

GENERAL OVERVIEW OF THE PROJECT

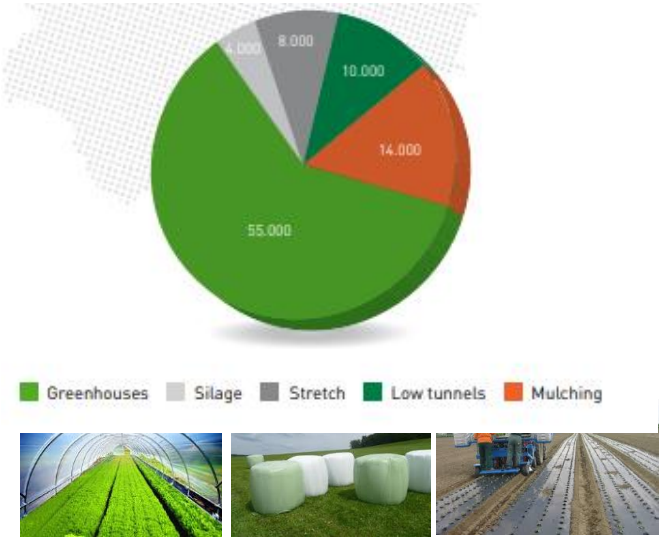
Agroplastics are needed: *Innovations* *Sustainability*

- Conserve water and nutrients
- Prevent weed growth
- Permit adequate temperature in the rhizosphere

Trace elements



Source: APE EUROPE



Source: APE EUROPE

Conventional LDPE mulching film (15-50 µm)

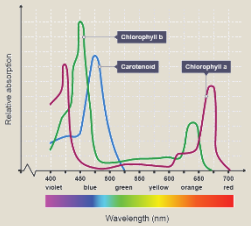
- **Single-use plastic**
- **Removal** is costly and labor **intensive**
- **Contamination** hinders recycling
- **Accumulation increases** with **decreasing thickness:**
  - 25µm PE film: 10% remains in/on soil
  - 20µm PE film: 25% remains in/on soil
  - 10µm PE film: **68%** remains in/on soil

Source: OWS

GENERAL OVERVIEW OF THE PROJECT

Agroplastics are needed: *Innovations* *Sustainability*

- Protection against pests and infestations
- Isolate fruit from plant protection products
- Fruits with uniform skin colour



Macro-perforations
Coloring bags

SOIL OK bio-degradable TÜV AUSTRIA SOIL

Data:

250 million bagged peaches

2,504 million Kg. In 2018

4,654 Km² of cultivation

45 municipalities

15 certified companies

Single use plastic

Colouring between yellow cream and yellow straw totally **uniform** due to the protective effect of the **waxed paper bag.**

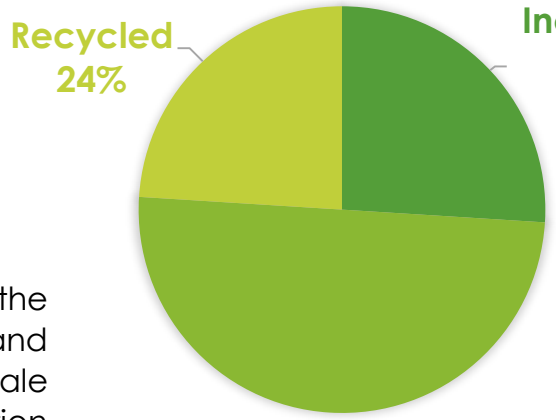
This operation requires great expertise and absorbs **50% of the labour of the crop**, representing the **25% of the total** production **costs**.

ENVIRONMENTAL PROBLEM

Agri-waste management is a priority for every country for the next decade.

END OF LIFE AGRIFILM (EUROPE)

The recycled LDPE is used in the production of plastic bags and sacks, silage plastics (bale wrap), agricultural irrigation pipes, industrial packaging, etc.

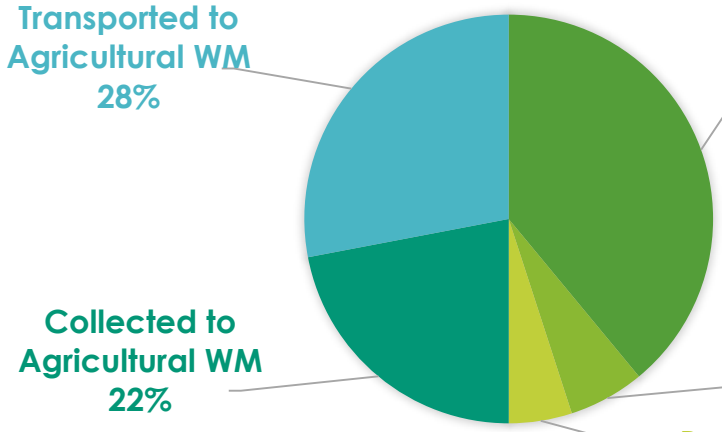


20 µm LDPE film – 1 cultivation period/year

463 kg/hectare after 10 years
4.6 tons/hectare after 100 years
(accumulation continues over time)

Zero waste to landfills

MULCHING WASTE MANAGEMENT (SPAIN)



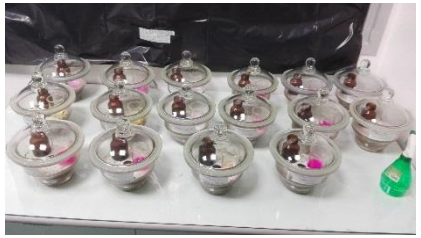
The **50%** of farmers who used mulching films or bags to protect the stone fruit **do not know the final destination** of the produced waste. *Source: LIFE Multibiosol*

DEMONSTRATION CHARACTER

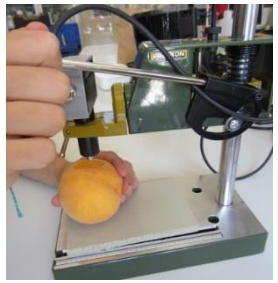

Raw materials
-100% biodegradable
-Polymers based on natural sources

Production processes
-Materials extrusion
-Film blowing


Validation of plastics in laboratory
-Mechanical tests of materials
-Tests for certification OK BIODEGRADABLE SOIL



Validation of plastics products in fields
-Tomato (Spain and France), pepper and cucumber in Spain and sweet potato in Belgium
-Bags for apple and peach (Spain)

Validation of quality:
- Soil
-Crop (Pre-harvest)
- Product (Post-harvest)

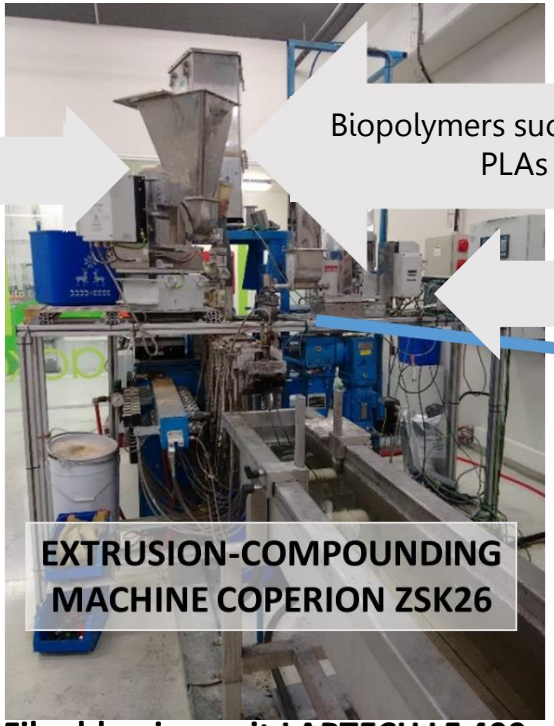
Dissemination & Communication

Expected results
- Reduction of plastic waste
- Less CO_2 emitted during the production of plastics/Non-emissions from disposal
- Improvement of soil quality
- Improvement in crop quality
- Certification OK BIODEGRADABLE SOIL




PRODUCTION OF BIOPLASTICS

Zn/Mn, Boron, Iron



Biopolymers such as: AAPE, PHA-PLAs or PBS

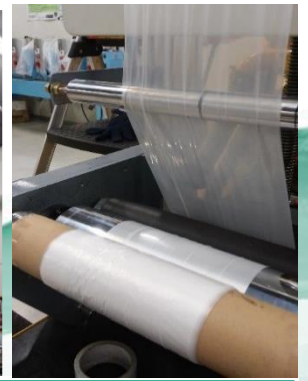
Additives

Moretto X DRY
AIR T Minidryers

Clip production for fruit bags closure

INJECTION MACHINE JSW 85 JELII

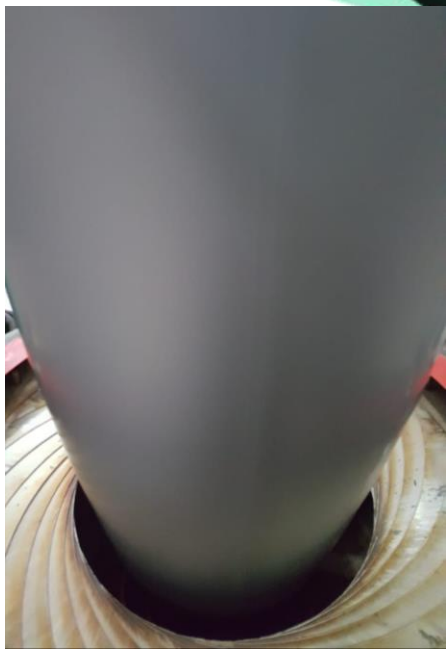
Film blowing unit LABTECH LF 400



Mulching

Film for fruit bags

Product	Demonstration Phase	TOTAL Kg compounded	TOTAL Lineal metres/uds	Formulations
Mulching	2016	60	975	9
Bio Bags		23	520	10
Clips		25	--	2
Mulching	2017	202	3,320	6
Bio Bags		52.76	1,830	16
Clips		50	3,700	2
Mulching	2018	542.10	13,323	1
Bio Bags		130.45	4,400	2
Clips		50	3,200	1
TOTAL		**1,110 Kg**	**24,368 m 6,900 clips**	**49**



TECHNICAL RESULTS

Multibiosol products improve the nutritional quality of the soil and the fruits/vegetables cultivated

- **Better soil**: Conventional eliminates soil (50-70%). Increased nutrient concentration.
- **Comparable production** but **Vegetables with less disorders and Fruits with better colouration.**

Polymers and biobased additives

- Equal technical performances.
- Bio materials are more expensive than conventional fossil based materials.
- Placement is done in the same way, whether done with machinery or manually. **Same costs.**
- **Reduces the environmental impact** (savings of 400 – 950 Kg CO_2 emissions/ ha).

Reduction of plastic waste

- **Multibiosol final products has been certified as OK Biodegradable Soil.**
  - Eliminates the **costs** (economic and time) of plastic waste management.
  - Eliminates the **impact** of transporting waste.
  - Reduces plastic waste to landfills or incineration.




OPPORTUNITIES

New regulation relating to fertilisers

By including this innovative product in the **Fertilisers Regulation as soil improver** the EU could help tackle several challenges at once including the need to produce **more food from less land** and to farm more sustainably using less resources.

Reviewed EN 13655 conventional mulch

EN 17033 is the new product standard for biodegradable mulch films (2018).

The standard EN 13655 was revised. A recommendation to only use **conventional mulch film thicker than 25µ** was to make sure they can be collected after use.

Studying the real costs

Materials: 35% of the material costs are **subsidised** in Spain through OPFV.

Managing costs: Comparing with LDPE (without waste managing, with waste managing, removal,…)

Opportunities for **added value products/ organic agriculture.**

CONCLUSIONS

1. **The negative effect on the soil's productive capacity should be enough argument** in favour of making the **complete management of waste mandatory** for farmers, and therefore **a strong support** for the use of other **biodegradable materials.**

2. **More information** is needed for farmers and suppliers to understand the **differences between materials and good practices** for good disintegration of these materials.
   - ✓ **Info days or workshops should be done** in collaboration with Cooperatives technical personnel.
   - ✓ The **importance of the labelling** for determining the absence of negative effects of bioplastics**.**

3. **More subsides and/or economic measures must be taken into account.**
   - ✓ **It should be given preference to biodegradable products and not oxo-biodegradable**.
   - ✓ **An alternative compensation** should be provided to cover the difference in cost with regard to conventional systems.
   - ✓ **It would be interesting to divide costs into two payments** (now management costs are done when the crop cycle is over).



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THANK YOU FOR YOUR ATTENTION

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