

EcoBioCAP

ECOefficient BIOdegradable Composite Advanced Packaging

Grant agreement number: FP7-265669

**Collaborative project
SEVENTH FRAMEWORK PROGRAMME**

Priority: Food, Agriculture and Fisheries, Biotechnology

Milestone MS22 EcoBioCAP Final Seminar

Workpackage(s) concerned: WP7

Beneficiary concerned: Lead Beneficiary 16 (IT)

Due date	Submission date	Comments
M46	M48	Seminar Minutes

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Summary

A public seminar dedicated to the building of the next generation of sustainable food packaging in Europe was organized in the premises of SUPAGRO-Campus in Montpellier on the 26th of February 2015 (M48 of the project).

The main themes of this event were devoted to **Resource efficiency, Innovations and Safety** in food packaging with discussions and debates involving invited guest speakers, EcoBioCAP partners and outside participants.

The objectives were to define together R&D priorities and to lay down the basis of future collaborations and projects.

The seminar was organised in the following way:

Sessions	Theme (focus)
Morning session More “research” focused session	Food (bio-) Packaging in Europe <ul style="list-style-type: none">- Flash focus: presentation of key results from WP1 to WP6- Flash focus from young scientists working on themes related to EcoBioCAP project- Talks from key speakers
Lunch session Interactive session	<ul style="list-style-type: none">- DSS demonstration (results from WP1)- Poster presentations by young scientists- EcoBioCAP stand- exhibition
Afternoon session More “industry” focused	Bridging the gap between science and industry <ul style="list-style-type: none">- Talks from key speakers from the industry- Testimonies from SMEs which participated in the project

The detailed agenda is found at the end of this document (Annex I).

Talks presented

All the presentations are available to the public on: ecobiocap.eu

Organization of the day

Nathalie Gontard, the project coordinator, welcomed participants and gave an overview of general organisation of this day of debates and discussions. She highlighted that a **collective discussion** was planned at the end of the day among all the participants.

To organise this interactive session, paper was distributed to the audience and participants were invited to write up questions related to the presentations and drop them in a special box in the lecture theatre.

At the end of the day, these questions were presented in the plenary session and a collective discussion took place with the presenters and the audience.

This Q&R session is summarized below.

Collective discussion-Q&R

1. Polymer production

Is HV content modulation possible by varying the source of carbon? What are the processing parameters?

- IBET: Yes, it is possible to modulate. In EcobioCAP project, the carbon source was cheese whey. If for example, sugar from molasses is used, different profiles of fatty acids and other precursors are obtained. As regards the processing parameters, pH is very important. If the pH of the fermentation is changed, this has an effect on the precursors formed. At the end, the composition of the polymers obtained is different.

Up-scaling: how much time to produce a batch?

- IBET: 1 month with a 100L reactor. This gives 100g/batch which gives 1kg of polymer.

Is extraction of PHBV from the biomass an issue?

- IBET: Not really an issue. 89% purity was obtained and no solvent was used.

Discussion:

- BioTrend: It all depends on the raw materials. In BioTrend facility, they have obtained around 13kg in less than 2 days but then purification is an issue.
- IBET: A different technology was used and processes differ too. In EcoBioCAP, less energy was used (less O₂), less raw materials too, so overall the process was more cost-efficient.
- UNIROMA: In another project, they have tried extraction from mixed microbiological process; it was the first time. It can be an interesting option.
- Nathalie Gontard: Extraction can be a tricky issue sometimes. Research ongoing to bypass this purification process (or at least the steps associated with the purification).

2. Formulation

Which plasticizer for PHBV? Are they eco-sustainable?

- Marie-Alix Berthet: Biosourced molecules were used and yes, they are eco-sustainable. PHBV is a highly crystalline polymer, you don't have a big manoeuvre margin to improve its flexibility. There is a publication on it.

Is Novamont considering the use of agro-food wastes as raw materials for their biodegradable films?

- Sebastia Gestí: No commercial plans; only on a lab-scale basis. Novamont works mostly with local exploitations and use their biomass wastes. Food wastes is more difficult to use as well.

3. Functionality

How are oxygen scavenging functionalities activated?

- IVV Fraunhofer: Activated by humidity coming from the product itself; a moisture sensitive system.

RFID: for moisture OK. Are there any other applications?

- Fabien Bibi (PhD IATE): Yes with CO₂; evaluation of its effect on shift of frequency and ultimately power. Also there are ongoing tests with ethanol, ammonia.

Why put the antimicrobial molecule only inside the lid film?

- Mia Kurek (PhD student IATE): It was the design of the lid we wanted to create. It can of course be incorporated elsewhere.

If this molecule is released in the headspace, it is in contact with the food anyway; why not spray the molecule directly on the strawberries?

- MK: The aim was to create a headspace; we didn't want to put preservative in the food.
- Alterbio: Food legislation is strict; the molecule might not be compatible with food.

4. Safety

Are NIAS of EcoBioCap packaging solutions tested?

- HACoussy (IATE): Yes they have been investigated by IVV Fraunhofer. They are identified in the project, but migration has not been done in the project.
- NGontard: NIAS are new substances created during the process. These substances are not very well investigated. This is not easy; we can sometimes predict what will come but it is still difficult.
- CLoriot: This is a problem in bio-based polymers. We have to continue working on them. Sometimes synergy effect of the mixture of substances cannot be known as investigation is mostly on one molecule at a time, not on a mixture.

Are nanoparticles able to migrate from Food Contact Material?

- NGontard: it depends on the shape of the nanoparticles and the nanoparticles which are imbedded in the materials are not very likely to migrate. There is a risk with spherical particles. This was not investigated in EcoBioCAP but in another project.
- CGrandfils: Yes the shape is important but also the matrix (inner / outer) and also the way the polymer will interact with the food, the storage conditions... There are many factors and it is still very difficult to predict accurately. Labelling of the particles can be a way to follow them. Particle loading can be used too.

What is the impact of the high and often very reactive, specific surface of nanoparticles on the stability of polymer matrix and additives?

- Novamont: nanoparticles are modified to be compatible with the polymer. But what are the impacts of this chemical modification? The stability need to be investigated further.

Is sensitivity of PHBV to micro-organisms (e.g. Listeria) modified by sucrose?

- HACoussy: We have studied the evolution of the survival of this kind of organism. We have demonstrated a clear survival at high humidity; this declines when water activity is less than 50%. Sucrose has not been investigated but we can expect a higher survival rate of the bacteria.

Are vegetal polyphenolic resins stable and safe (migration) compared to chemical polyphenolic resins?

- LRoumeas (PhD INRA): Yes, they are stable. pH and temperature affect stability. Research is still ongoing in this field

Do we agree with the French ban on Bisphenol A (BPA)? EFSA recently said it was safe. What other substances can be used? Replacement such as BPS have been shown to be worst!

- It is good to replace something when it is really dangerous but now we have to see with what we are replacing this substance!
- CGranfils: completely agrees. Just to make a link w another example: PBC (plastifying with phthalates; the consequence of phthalates diffusion in blood and increasing with storage time. This was different when blood was stored in glass vials. So replacing with these PBC vials, we are transfusing red blood cells plasticized w phthalates. But we should always take into consideration the dose and time to assess the effects.
- NGontard: Often decisions are taken based on emotions and not reasoning.

What is the origin of heavy metals in packaging materials? Is it possible to proceed with a decontamination step?

- GMertoglu: Several sources: type of paper, ink, coating of the paper... It is possible to decontaminate. The first step is at the collect point and of course research must continue on this.

5. Usage

Are there differences between food and non-food application of, for example, the EcoBioCap packaging solution?

- Less constraint for non-food applications, for example in terms of transparency. We didn't work on non-food usage.

Weight of EcoBioCap trays compared to commercial plastic trays (PET, etc.)?

- SIK: Clam was 30g; EcoBioCAP packaging (tray+cover) was heavier. They can surely be made lighter. This was not the focus of the project.
- Fursplast: polypropylene is 23g and EcoBioCAP tray is 30g

What is motivating users/companies for bio-packaging?

- Novamont: Supermarket can save money in waste treatment. With biodegradable and compostable packaging you throw all with food for composting; no need for prior sorting.
- EEichner: customer habits are changing slowly. Customers can push for this. It's important to know how to anticipate the change in customers wants.
- CGrandfils: Advertisement also can play a role: e.g. before water bottles had to be transparent but now, colored bottles are common and people don't mind not seeing the purity of water.
- CSchoenweitz: About the transparent film, PLA film also based on fermentation of waste. Research is ongoing but it takes time. Furthermore, LCA assessment must be done on this.

(To BUMAGA) Tomato plants have a strong odour. Have you tested the off-flavour released from the new bio-packaging?

- SBousios: normal pulp with 10% tomato so there is not enough tomato to bring odour. 2nd point, it is a layered product and tomato pulp mixture is in the middle of multilayer.

6. End of life

Did you test the biodegradability of EcoBioCap packaging solution?

- Yes in the project benchmarking.

Why is compost the preferred end of life option? Does it depend on the product?

- Novamont: Composting is being improved; biodegradable materials return to “soil” as compost.
- CSchoenweitz: anaerobic can be a good option. Methane is produced and can be used as energy.

Compostable under what conditions and in what time scale? Are there EU standards?

- Novamont: European standard EN13432 describes the characteristics that a materials should have to be considered biodegradable and compostable. For example as a disintegration test is indicated the ISO20200 Plastics- Determination of the degree of disintegration of plastic materials under simulated composting conditions in a laboratory-scale test as a method of determining the degree of disintegration of plastic materials when exposed to a laboratory-scale composting environmental. The material in this conditions should disintegrate in 3 months.

Won't recyclable material be a better option to create a circular chain?

- NGontard: recycling is beneficial but impact can be high (decontamination, water use, downstream purification). For example, plastics are mixed with “pure” plastics. CSchoenweitz: Yes. If you want to use recycled materials, you have to take the “whole” chain into consideration.

Spyros Bousios: What happens if your new bio-packaging end together with paper and board in the recycling system? What is the cost of separating them?

- SB: No use to separate them.

7. Environment impact

(To Spyros Bousios) How do you handle/assess/anticipate the environmental impact (including maintaining soil quality) of global management of tomato wastes? Especially for new products like active molecules involving complex treatments with high environmental impact.

- For the 1st part: plans to do LCA. It will be done at a later stage. For the 2nd part, also at a later stage. The project is not there yet.

How can the new biomaterials (PLA, PHBV ...) compete with “drop-ins” such as bio-PE, bio-PET?

- Novamont: These are 2 completely different materials. Bio-PE and PET are not biodegradable or compostable, they have been produced using monomers from renewable origin. On the contrary, PLA and PHBV are both from renewable origin and biodegradable. They can be competitors in some applications. Hence end-of-life options are not the same because the inherent materials properties are different.

8. Other

How much money is allocated to RMT ProPackFood?

- In 2014, the Food & Agriculture Ministry allocated 48k€ for the coordination and for specific missions: (travels for meeting, etc.); this is not enough.

Annexes

Annex I - Agenda

AGENDA – Thursday 26th February (Morning session)

Food (Bio-) Packaging Science in Europe

- 09:30-09:50 **Welcome Address**
by Pr. Nathalie Gontard - INRA-UM, Fr. Coordinator of EcoBioCAP project: Ecoefficient Biodegradable Composite Advanced Packaging
- 09:50-10:00 **Developing packaging constituents from food industry wastes** (WP2)
Flash focus by Mauro Majone - Univ. Roma, It. & José Maria Lagaron - CSIC, Es.
- 10:00-10:20 **BioBottle Project - Biodegradable solutions for packaging of liquid dairy products**
by Monica Perez - AIMPLAS, Es.
- 10:20-10:30 **Substitution of chemical phenols by plant polyphenol for processing phenolic bio-materials**
Flash focus by Laurent Roumeas - INRA-Montpellier, Fr.
- 10:30-10:40 **Packaging formulation & structuration strategy to fit food requirements** (WP3)
Flash focus by Cornelia Stramm - IVV Fraunhofer, Ger.
- 10:40-11:00 **Nextgenpack Project and Alliance (Active and Intelligent Bio-sourced Packaging)**
by Claudia Schoenweitz - IVV Fraunhofer, Ger.
- 11:00-11:10 **Intelligent food packaging-RFID bio-based sensing label to monitor food shelf life**
Flash Focus by Fabien Bibi - INRA-Montpellier, Fr.
- 11:40-12:10 **Biopolymer characterization: an essential step for their valorization in nanomaterials**
by Christian Grandfils - Interfaculty Research Center of Bio-materials, Univ. Liege, Be.
- 12:10-12:20 **Risk assessment of food packaging containing nanoparticles**
Flash focus by Viviana Golja - National Institute of Public Health, Ljubljana, Sl.
- 12:20-12:30 **Active packaging: Controlled release of microbial agents from packaging materials**
Flash focus by Mia Kurek - Univ. Montpellier, Fr.
- 12:30-12:40 **The content of heavy metals in the recycled paper for use in the packaging sector**
Flash focus by Gulnur Mertoglu - Univ. Istanbul, Tr.
- 12:40-12:50 **Stability & safety of wastes-based packaging materials** (WP4)
Flash focus by H el ene Angellier-Coussy - INRA-UM, Fr.
- 12:50-13:00 **Environmental impact of wastes-based food packaging** (WP5)
Flash focus by Katarina Nilsson-SIK-SP, Se.

AGENDA – Thursday 26th February (Afternoon session)

13:00-14:30 **Lunch buffet-style**

Poster presentations

DSS Demonstration (WP1) by Valérie Guillard & Patrice Buche, INRA-UM, Fr.

EcoBioCAP exhibition

Bridging the gap between science and industry

14:30-14:50 **Building a feasible business case on the valorization of agricultural waste streams**
by Spyros Bousios - BUMAGA BV, NL.

14:50-15:10 **RMT PROPACK FOOD: a network of scientific and technical experts dedicated to the food packaging industry**
by Catherine Loriot - LNE, Fr.

15:10-15:20 **How and why private companies make the choice of investing into collaborative research**
by Sebastia Gesti - Novamont, It.

15:20-15:30 **Industrial applicability** (WP6)
Flash focus by Csaba Baar - Campden BRI, Hu.

15:30-15:50 **Scale-up and process integration in Industrial Biotechnology**
by Bruno Sommer Ferreira - Biotrend, Pt.

15:50-16:00 **Spinning off academic research to commercialize Nanobiotech Products**
by José Maria Lagaron - IATA-CSIC, Es.

16:00-16:30 **Coffee Break**

16:30-17:00 **Testimonies of SMEs involved in European projects**
Fuerstplast, Nimes, Fr.: Plastic Trays manufacturer
Le Fedou, Hyelzas, Fr.: Traditional cheese maker
Alterbio, Perpignan, Fr.: Organic fruits and vegetables distributor

17:00-18:00 **Collective discussion on « Resource Efficiency, Innovations and Safety of Food Packaging in European projects and policy » - all together**

18:00-18:15 **Closing remarks**
by Nathalie Gontard - INRA-Montpellier, Fr.

Annex II

Selected photos from the seminar

