



EcoBioCAP: 2 years of fruitful cooperation!

EcoBioCAP has just completed 2 years and already has promising results! Some of the progresses are reported in this issue. Our General meeting will take place in from 17 to 19 April 2013 in Budapest where we will have the possibility to review the first results and have the feedback from our Stakeholder's Advisory Board members in a dedicated session.

If you would like to know about our EcoBioCAP progresses and news, a public meeting open to ALL stakeholders (retailers, representatives of the food & packaging/manufacturing industry, consumers, scientists), will take place in November 2013 in Brussels where we will be able to show you our preliminary results and get your feedback and questions. Don't miss it!

More information will be available along time on the website. Do not hesitate to contact us to know more! We hope to see you there!

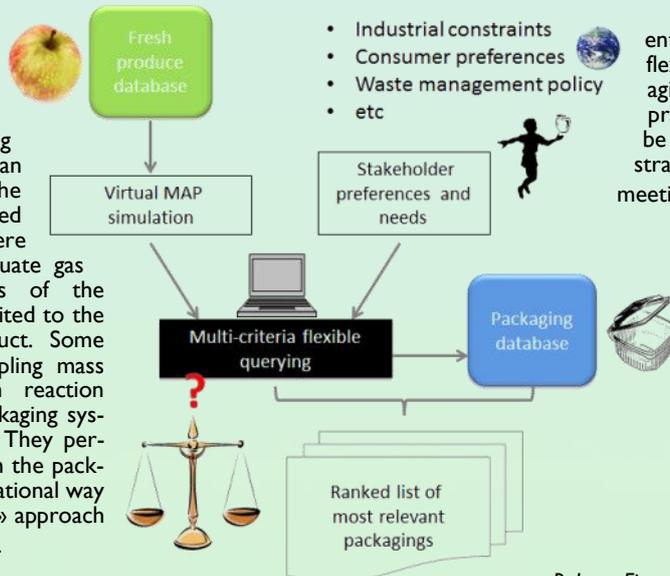
Prof. Nathalie Gontard (INRA), EcoBioCAP coordinator



Above: EcoBioCAP prototype packaging

A Decision Support System (DSS) for the fresh fruits and vegetables chain based on a knowledge engineering approach

To extend the short shelf life of fresh fruits and vegetables, reducing O₂ content in the atmosphere surrounding the product could be an alternative solution to the intensive use of the chilled chain. Modified atmosphere packaging relies on adequate gas (O₂/CO₂) permeabilities of the packaging material well suited to the respiration of the product. Some mathematical model coupling mass transfer and respiration reaction models in the food / packaging system are already existing. They permit to properly dimension the packaging material in a more rational way than the « pack-and-pray » approach classically used in industry.



ent scenarii thanks to a flexible querying of a packaging database. A first prototype of this DSS will be presented and demonstrated at the next plenary meeting in Budapest.

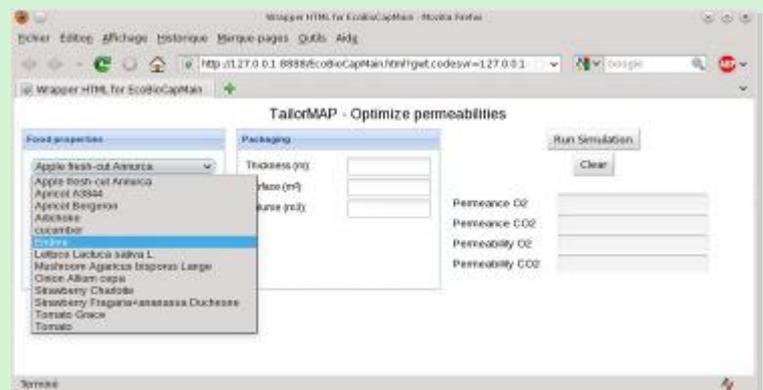
Contacts:

[Dr Patrice Buche](#)
[Dr Valérie Guillard](#)

In the framework of the EcoBioCAP european project, these modelling tools will be integrated to a more complete decision support system that will take into account the preferences, acceptances and needs of the different stakeholders of the food packaging chain. This decision support system aims at proposing some argued and ranked packaging solutions for a given product, with a special emphasize on bio-sourced and biodegradable material. The design of this tool relies on knowledge engineering models to realize a multi-criteria analysis of argued constraints and preferences

of the different stakeholders and to assess differ-

Below: First screen copy of this software (prototype)





Exploiting available food industry by-products (WP2)

WP2 is aimed at **exploiting available food industry by-products** to make them **usable** elements in the **constitution of novel food biopackaging**. In this context, both **polymeric matrices and fillers** are being developed in order to use them for the formulation of food packaging in WP3.

The chosen polymeric matrices are polyhydroxyalkanoates (PHAs), which are microbial biopolyesters. The challenge is to **produce PHAs using food industrial wastes or by-products as feedstocks by economically viable and industrially scalable processes**. The partners UNIROMA and IBET have investigated and optimized the production of PHAs by **microbial mixed cultures** using olive mill wastewater and cheese whey

as feedstocks. A **purification method** has been developed to guarantee the thermal **stability** of these PHAs, which can be processed by conventional melt compounding techniques. Additionally, the properties of these PHAs may be adapted to the product requirements by changing the valerate content or by combining them with several nanofillers.

INRA, UMINHO and Fraunhofer have successfully produced fibre-based fractions as well as cellulose rich additives from wheat straw, brewing spent grains and olive pomace, optimizing the extraction processes. Additionally, CSIC has produced highly crystalline cellulose nanofillers by using these different food by-products and keratin with nanometric dimensions extracted from chicken feathers. These additives are aimed to be incorporated into PHAs to tune their barrier and

mechanical properties. Olive mill wastewaters and olive pomace have been further used by UNIBO and Fraunhofer to extract polyphenolic compounds which have been utilized by NBM to produce nanoclays with antioxidant and oxygen scavenging properties.

Finally, CSIC has developed bio-based adhesives by means of the electrospinning technique. These adhesives have been shown to reduce the oxygen and water permeability when combined with PHAs in multilayer systems, while preserving the transparency and mechanical properties of the pure PHAs.

Contacts:

[Msc Marta Martinez](#) (CSIC)

WP2 leaders:

[Dr JM Lagaron](#) (CSIC)

[Dr Mauro Majone](#) (UNIROMA)



EcoBioCAP project at the International Agricultural Show, Paris 2013

EcoBioCAP was present at the International Agricultural Show that took place in Paris from 23 February to March 3, 2013 and which was celebrating its 50th anniversary. EcoBioCAP members from INRA and from the University of Montpellier 2 were present on the EcoBioCAP stand to talk about the project, show

the different steps of how we produce PHA and what the specificity of EcoBioCAP is. A game destined to children on recycling was developed which included an EcoBioCAP packaging (see left). In addition a survey on consumers preferences on packaging properties was conducted thanks to many visitors.



Above: Dr Valérie Guillard (UM2) at the EcoBioCAP stand. Integrated in the INRA stand
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Who are we? Focus on University College Cork, National University of Ireland Cork (UCC)



University College Cork, UCC is the comprehensive globally-oriented research-led university of the south of Ireland. With approx. 20,000 students pursuing undergraduate and postgraduate studies, UCC is Ireland's first five-star university (QS), now ranked in

the top 2% of universities worldwide. The research theme at the Department of Process & Chemical Engineering (PCE) in UCC is continuous process and product improvement, focused on foods, bioproducts and pharmaceuticals. PCE has strategically developed

expertise in the areas processing and packaging, modified atmosphere packaging (MAP), packaging design, simulation and shelf-life determination, web-based software for packaging design (Pack-in-MAP®; www.packinmap.com), development of sustainable packaging, and novel



processing technologies for fresh produce, as evident from the on-



EcoBioCAP packaging prototype
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going projects funded by FP7, FIRM, EI. PCE has been involved in a number of National and European projects and has close relationships with other Universities and research institutes, in Ireland and abroad and with leading companies of the Irish food and drinks manu-

facturing sector.

In EcoBioCAP, UCC is involved in defining the packaging specifications (WP1) and in the upscaling (industrial applicability, WP6).

Contact: [Dr Maria de Sousa Galagher](#) (UCC)

What's up: Formulation and structuration of finalized materials (WP3)

The objective of WP3 is to develop finalized packaging materials by **combining and structuring** the different **constituents developed in WP2**, in order to achieve the intended targeted final properties. The targeted properties in terms of processability as well as barrier and mechanical properties are derived from the chosen applications of strawberries, mushrooms, cheese and sandwich packages (defined in WP1). To fulfil these targets three objectives are focused: A development of:

- a **flexible barrier film** > with high oxygen and medium water vapour permeability
- a **flexible respiring film** > with high perm selectivity (carbon dioxide/ oxygen permeability ratio) and high water vapour permeability
- a **rigid tray** > with water resistance and low oxygen permeability.

For a first approach a **commer-**

cial base material was selected according to availability, grade and processing properties. Three grades from different suppliers were evaluated. The most prospective grade for project purposes was a PHBV from Tianan, China, with a HV content of 3 %.

In this base material the different composite materials from WP2 were incorporated in various concentrations: **fibres from wheat straw, olive residue and beer spent grain as well as polyphenols from olive residue and bacterial cellulose nano whiskers**. The partners investigated the aspects of **processability** of these materials aiming to cover the various targets. Finally for each type of composite material the compounding of the most promising formulation and the extruding of a monolayer composite material at larger lab scale was performed. With a full characterization of these samples (barrier against water vapour and oxygen, mechanical properties) a first mate-

rial selection for the next steps was made.

Since the **processing** of these composite materials is **challenging** a further improvement step regarding the base material is ongoing. Therefore different **plasticisers** were **evaluated** according their efficiency to increase the flexibility. Another approach is to **improve the processing and the mechanical properties** by **blending the base material**. After this work the most promising formulation for each targeted application will be selected.

In parallel different setups of **multilayer structures** with the new composite materials are developed and evaluated at the moment. With the intended setups the different targets of barrier and respiring films as well as the tray should be provided.

Contacts: see Fraunhofer contacts below

Who are we? Focus on Fraunhofer IVV - Germany

The Fraunhofer-Institute for Process Engineering and Packaging (Fraunhofer IVV) develops products, processes and methods primarily in the food and packaging area. Fraunhofer IVV has in-depth know-how concerning fractionation of plant constituents as well as characterisation of the resulting fractions like fibres, proteins, sugars and secondary plant metabolites. Furthermore it has over 20 years of experience in extrusion, lacquering, laminating and vacuum coating of flexible polymer films and in developing multilayer structures thereof with high barrier properties. It is also working on

novel packaging with active functionalities like incorporated oxygen scavengers or using modified plant proteins as barrier coatings. Important to mention is also its longstanding expertise in testing and evaluating food packaging regarding safety issues.

Thus we contribute to WP2 (Exploiting available food industry by-products) by developing a wet fractionation process for by-products from olive oil industry to gain insoluble fibres and polyphenolics fractions. We also lead WP3 (see above) and

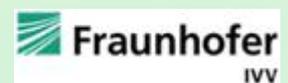
especially with regard to the development of suitable structures of flexible multilayers using mainly extrusion, co-extrusion and laminating technology. We also contribute to the upscaling (WP6) and to the evaluation of the new materials regarding their compliance with the requirements for food contact materials in WP4 (assessment of packaging physical-chemical stability and chemical safety).

Contacts:

[Dr Claudia Schoenweitz](#)

[Dr Cornelia Stramm](#)

[Msc Verena Jost](#)





Related Events in 2013:

31 January: Europe's leading Sustainable Foods workshop
Location: Brussels, Belgium **Website:** www.sustainablefoods.eu

9-21 March : ICE Europe 2013, 8th International Converting Exhibition
Location: Munich, Germany **Website:** www.ice-x.com

 **17-19 April:** EcoBioCAP Annual Meeting
Location: Budapest, Hungary

24-26 June: DREAM International Conference "From model foods to food models »
Location: Nantes, France **Website:** <http://dream.aaeuropae.org/conference>

13-16 July: IFT Annual Meeting & Food Expo
Location: Chicago, IL—USA **Website:** www.am-fe.ift.org

7 – 9 October: European Symposium on Biopolymers - ESBP2013
Location: Lisbon, Portugal **Website:** www.esbp2013.org

8-12 November: Polymar, the 1st young researchers platform for Networking in Polymer Science through the Mediterranean
Location: Cruise leaving from Barcelona returning to Barcelona, Spain **More Info:** lagaron@iata.csic.es

 **19 November:** EcoBioCAP Stakeholder workshop to present first results
Location: Brussels, Belgium



EcoBioCAP consortium is looking for a new partner!

We are looking for a **new partner** with the objective to collaborate to WP1 (integrated analysis of specification) and WP6 (industrial applicability).

The new partner must be a (ready to eat and/or fresh, preferentially sandwiches) food european industry/retailer (no matter the size, SME or not), interested in trialing novel biodegradable (and compostable) packaging.

Summary of tasks: the company should be interested to be involved in:

1) Discussing the ready to eat fresh food to be packed with a biodegradable packaging, based on the specifications of the packaging: fresh

fruits and vegetables based foods or other ready to eat and fresh food. The selected targeted food for the time being are : fresh strawberry, fresh mushroom, soft cheese and ready to eat sandwich.

2) Packing a selection of ready to eat food (10 -50kg) using the novel biodegradable packaging (trays and films) supplied by the project partners and also with usual packaging as a benchmark and then, sending part of packed food to project partners for quality/performance analysis (last year of the project, from 2013 until 2015)

3) Keeping other part (in usual conditions in terms of temperature etc) and compare its

performance with conventional packag-

ing. Providing feedback on the performance of the novel packaging and participate to discussion with a end-user point of view (last year of the project 2015).

Expected recruitment date: as soon as possible

Expected participation in project: until the end date of the project

Estimated staff effort:: 3-5 person-months.

Estimated total cost: € 40-50000 (supported by EU funding of 75 - 50%)

Total EC funding available: € 25 000

Interested? Contact [B. Ferreira](mailto:B.Ferreira) or [Prof. N. Gontard](mailto:N.Gontard)

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