



PROJECT COORDINATOR.

Tecnoalimenti (TCA) is an Italian consortium of food industries for Research and Innovation that integrates horizontally and vertically the main industrial players of the agro-food chain. As a non-profit research organisation, Tecnoalimenti S.C.p.A. is composed of 28 food sector industries and one financial institution, Intesa, as trustee of Ministerial funds. Its member industries account for 12% of Italian food sales. Established in 1981, Tecnoalimenti has a record of over 500 research projects in almost any domain related to agro-food, acquiring high-level skills in project envisioning, design, management and research execution. It has a wide experience as coordinator.

It will participate to the project its shareholder Corsini Biscotti S.r.l. for validating the new packaging solution in a real industrial environment.



Bio-on was founded in 2007 and works in the field of modern biotechnologies applied to widely used materials to create natural products and solutions, totally obtained from renewable sources or agricultural processing waste materials. The Company holds the proprietary rights for producing linear polyesters, namely Polyhydroxyalkanoates-PHAs (truly biological plastic), through an innovative biotechnology completely based on natural bacterial fermentation of agricultural wastes (Bio-on has designed and patented such technology).



Icimendue represents a benchmark in the flexible packaging industry since the late 19 Century, employing a wide range of materials such as paper, cellulose film, polypropylenes and other advanced technological solutions. Nowadays, the rotogravure and flexographic printing, together with the modern equipment and metallization facility allows IM2 to print and produce many types of laminate film structures for all kinds of market sectors. The current capacity allows the Company to print any type of flexible film with an overlapping up to 11 colours, by coupling in line and off line in order to achieve different typologies of multilayers for the most varied market requirements.



The National Centre for Food Technology and Safety (CNTA) is a Spanish private non-profit Research Centre set up in 1981 as an initiative of the agrifood sector. The main aim of CNTA is to contribute to the development and innovation of the agrifood industry, offering technical support to improve their quality and competitiveness. CNTA acts as a key provider for knowledge, innovation and R&D&I services for over 500 industries (over 200 of which are members). CNTA staff includes over 100 scientists and technologists. Research scientists at CNTA are actively involved in numerous national and international networks.

Kao Chimigraf

Kao Chimigraf is an international company that has centered its enterprise in the Graphic Arts sector since 1970. Since then, it has been dedicated to the production, distribution and sales of superior quality flexographic liquid inks, rotogravure and Ink Jet that are intended for a variety of markets. This includes both the national and international industrial graphic sector. Kao Chimigraf offers a large range of series of inks for all types of applications at an excellent price/quality relationship; it also produces concentrates to manufacture ink. During its manufacturing, rigorous standards of quality are applied to insure the consistency and traceability of each batch.



Research group of Paper Converting and Packaging Technology of Tampere University of Technology, offers high quality teaching and research on paper and paperboard converting, technology and products. R&D work is focused on extrusion coating, laminating, dispersion coating and applications. Major fields of research include e.g. high-barrier coatings, surface treatment and modification, thin nanoscale coatings, and biodegradable/renewable/recyclable products. The unit has over 20 years of experience in R&D of wide range of polymers and their processing including both oil-based and bio-based polymers. PCPT has a well-equipped laboratory and pilot scale equipment for both research and education and it has collaboration with other universities, research institutes as well as paper, paperboard and plastics converting industry and related raw material manufacturers in Finland and abroad.



Technical University of Denmark is the leading engineering faculty of Denmark with 2300 researchers, 700 PhD students and 6000 bachelor and master students. The Department of Management Engineering at DTU focuses on innovation and organization of innovation processes and technological and environmental aspects in a business and social perspective. The department's Division for Quantitative Sustainability Assessment (QSA) focuses on the development of scientifically based engineering methods and tools for analysis and application in decision support concerning environmental and social sustainability of products and technologies. The tools include life cycle assessment (LCA), social life cycle assessment (S-LCA) and cost-benefit analysis (CBA). QSA is a research group with a high scientific standing; DTU is the most cited university internationally within quantitative sustainability assessment.

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For more information,
please fill out the form on
the QR code and we come
in contact with you.



New Bio-based Food Packaging Materials with Enhanced Barrier Properties



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FOOD PACKAGING: TOWARDS A NEW BIO-PLASTIC

BioBarr project focuses its efforts to respond to the industrial and technological challenges of developing a new fully biodegradable food packaging with optimal barrier performances.

Traditional plastics are hugely used in the agri-food sector for packaging, thanks to their versatility, excellent and varied functional properties and low production and transformation costs. Nowadays, over 90% of plastics derives from virgin fossil feedstock (Oil and Gas origin).

Around the world huge concerns are emerging about plastics use and disposal: the accumulation of waste, the physical problems of wildlife, the loss of chemicals from products affect in different ways wildlife and human beings. The risks connected with the enormous and increasing use of plastic products (causing tremendous pollution of environment, e.g. macro and micro plastics in the marine environment) are leading both consumers and national governments to shift toward bio-based solutions.

However, despite the progress in biopolymers development, the

general performances for the innovative materials are not yet equivalent to those of the petro-chemical plastics in food-packaging applications. Of all the bioplastics, the only ones that are simultaneously bio-derived (obtained from renewable feedstock), biodegradable and compostable are polyhydroxyalkanoates PHAs, they can therefore be considered 'bioplastics' for both their origin and final destination. Moreover, thanks to their excellent physical, thermo-mechanical and rheological properties, PHAs are the best candidates in terms of sustainability for industrial and production processes, including food-packaging applications.

According to literature data, PHA shows medium values of oxygen and water vapour transmittance while some foods sensitive to oxygen and moisture require specific packaging conditions to sustain their freshness and overall quality during storage.

The consortium aims to overcome the obstacles in performances that have, up to date, limited the use of biodegradable biopolymers in food packaging.

OBJECTIVES AND RESULTS

The biopolymer is produced by Bio-on Company through an innovative biotechnology completely based on natural bacterial fermentation of agricultural wastes, co- and by-products. This biopolymer will represent the biodegradable film support on which further functionalization, based on coating treatments, will be developed. This approach will enable to obtain improved general performances and optimal barrier properties of the final material.

The novelty of the Project concerns the innovative combination of advanced technological elements such as:

- Regarding the PHA biopolymers:
 - 1) they are the only materials completely derived from renewable resources and agro-industry side-products or wastes with no competition with food nor feed chains;
 - 2) their macromolecular synthesis is completely developed and managed by non-pathogenic bacteria, without need of chemical approach or further modification to make it suitable for industrial applications;
 - 3) this material is biodegradable not only in composting station but also in water at ambient temperature (great improvement compared to the other bioplastics);
- new coating treatment technologies applied to PHAs;
- development and application of a completely biodegradable bio-ink for printing on the packaging.

The combination of these elements into an advanced food packaging represent the substantial technological advance compared to the existing because it allows to overcome performance, processing and economic drawbacks that current biomaterials tested for food packaging present.

The new proposed material will have the following properties tested in industrial conditions:

- resistance and reliability of biomaterials along producing cycle and during storage and distribution time
- capability to retard the kinetic decay of food products along producing cycle and during storage and distribution time
- capability of increasing the shelf-life, preserving organoleptic quality, taste, convenience and safety of food products
- safety for the consumer
- total biodegradability and compostability according to the EN13432 normative of the packaging after its use this information will be supported also by methods like LCA.
- compatibility with pre-existing plants already existing (at converter and productive processes of the food industry)
- capability to increase the product shelf-life, compared to currently adopted traditional plastics solutions

The final product will be **completely bio-based**, respecting the environment.

The innovative functionalisation treatments, to which PHAs will be submitted, will be validated in real industrial and processing conditions. It will be taken into account the criteria that apply to conventional packaging materials associated with foods, such as:

- barrier properties but also optical properties,
- strength, welding and moulding properties,
- marking and printing properties,
- migration/scalping requirements,
- chemical and temperature resistance properties,
- machinability,
- shelf-life in final applications,
- cost/benefit ratio and environmental sustainability of the process.

STAY TUNED: www.BioBarr.eu