



COST Action no. FA0904

Eco-sustainable Food Packaging Based on Polymer Nanomaterials

2010 | 2014

Objectives

- To constitute an international scientific and technology network on issues related to eco-sustainable Polymer Nanocomposites Food Packaging (PNFP) for the preservation, conservation and distribution of high quality and safe food.
- To contribute to exploit the potentiality of polymer nanotechnology in the area of food packaging treating in a complete way the demanding needs of the users, such as health, environment, taste, cost and the specific requirements of the food industry.
- To look at the complete life cycle of the PNFP by the combined efforts of leading research and industrial groups.
- To contribute to identify the barriers (in research and technology, safety, standardisation, trained workforce and technology transfer) that prevent a complete successful development of PNFP and the strategies to proceed further.

Main Achievements

In the short time of life of the Action (14 months) innovative knowledge has already arisen with very encouraging results, mainly through the STSMs that took place with topics related to the WGs on basic and applicative science from the investigation of the morphological properties and their influence on rheological, electrical, mechanical properties, to the study of recyclability of some PNFP for increase ecosustainability, to the new approach for setting up novel nanosensors to measure temperature and humidity based on fiber optic sensor. To mention:

- the development of a new film based on isotactic polypropylene and zinc oxide that has not only improved properties, but shows also antibacterial activity against *Escherichia-coli*. This significant scientific breakthroughs, still in a preliminary stage was obtained with a multidisciplinary approach from networking of 8 institutions of 4 countries;
- the identification through designed and implemented special experimental apparatus (quantitative scattering techniques complemented with scanning, transmission electron and scanning probe microscopy) of the shape and minimum number of nanoparticles required to influence the polymer matrix properties and the range of processing conditions in the case of a polymer matrix containing either nano-platelets or spherical nanoparticles.

Food and Agriculture (FA)

Participating countries

COST Countries: AT, BE, BG, CH, CZ, DE, DK, ES, FI, FR, GR, IE, IL, IS, IT, LT, LV, MK, NL, NO, PL, RO, RS, SI, SE, UK.

Non COST Countries: USA, CA

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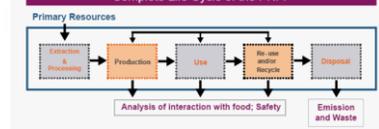
Website

www.ictp.cnr.it/index.php?option=com_content&view=article&id=108&Itemid=104

The Unique COST Action FA0904 Technology Network



Complete Life Cycle of the PNFP



COST is supported by the EU RTD Framework Programme



ESF provides the COST Office through a European Commission contract



Working Group activities

WG1 Development of new safe PNFP

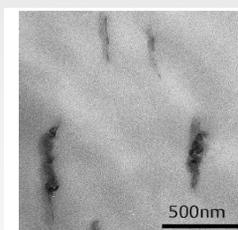
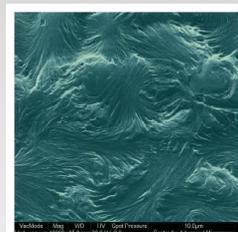
WG2 Development of new processing technologies including modelling and simulation

- One day workshop for WP2 was organized in March 2011 in Naples. Many issues relevant to the topics were discussed and new personalities coming from several countries joined to present their views;
- A mapping of the research and industrial Institutions/Universities interested in WG1/WG2 with their main competence and expertise is in preparation;
- The initial steps for organization of a WG 1 workshop in Finland in September 2011 and WG1/WG2 workshop in Spain in March 2012 were taken. It was suggested that presentations by the industry, EFSA people and other legislation bodies should be included;
- Plan for the future includes presentation of demonstrator projects, to highlight the importance of proving the concepts, to go beyond the materials development/processing/characterization and to evaluate food shelf-life, biodegradability and other application related aspects.

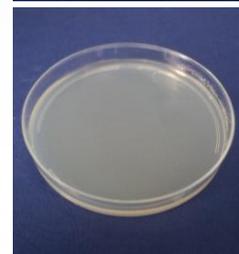
WG3 Development of new strategies to identify any critical interaction of PNFP with food

WG4 Ethics, Standardization, Science-society dialog

- Organization of a Technological Seminar in London September 2010 on Polymer Nanomaterials for Food Packaging: Characterization Needs, Safety and Environmental Issues;
- WG3 distinguished between two domains of communication within its remit: 1) intra-technology communications between different fields of science, and 2) Extra-technology communication between the scientists and other relevant parties such as industry, consumers, NGOs, regulators, policy-makers and insurance companies;
- Plan for the future includes a seminar to be held late in 2012 focused on migration, food impact and food quality and the preparation of a booklet for consumers that explains the development of safe nanomaterials-based.



Improved packaging: Films of polypropylene (above) and polypropylene with embedded clay nanoparticles (dark objects) below), used for food protection.



Active packaging: Antibacterial effect of ZnO in iPP films
a) Control plate; b) iPP/ZnO 5%



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