

# International Workshop

## **“Eco-sustainable Food Packaging Based on Polymer Nanomaterials”**

Can Nanotechnology Help Delivering  
Good Quality & Safe Food to Everyone?

Programme and Extended Abstracts

International Conference  
26 - 28 February 2014 CNR Rome Italy  
Book of the Abstracts

# Final International Conference

## "Eco-sustainable Food Packaging Based on Polymer Nanomaterials"

**COST ACTION FA0904**

26 - 28 February 2014, Sala Marconi - CNR - Piazzale A. Moro, 7 - 00185 - ROME

### ORGANIZING COMMITTEE

#### Conference Chairs

Clara **Silvestre**  
Sossio **Cimmino**

#### Scientific Board

Cosimo **Carfagna**  
Qasim **Chaudhry**  
Sossio **Cimmino**  
Jeannette **Dexpert-Ghys**  
Donatella **Duraccio**  
Emanuele **Fiore**  
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Marek **Kozlowski**  
Josè Maria **Lagaron Cabello**  
Ramesh Babu **Padamati**  
Marilena **Pezzuto**  
Ramune **Rutkaite**  
Clara **Silvestre**  
Alex **Sivan**  
Mika **Vaha-Nissi**  
Cornelia **Vasile**  
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#### Local Organizing Committee

Anna Rita **Appetito**  
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## Final International Conference

### "Eco-sustainable Food Packaging Based on Polymer Nanomaterials"

The International Conference is organized in the framework of COST Action FA0904, "Eco-sustainable Food Packaging Based on Polymer Nanomaterials", an International Scientific and Technological Network funded by EC, focused on issues related to polymer nanomaterials for food packaging (PNFP) application. The Action began on 29 March 2010 for a period of 48 months and involves 320 participants from 33 Countries. The Action has generated excellent scientific knowledge strongly underlining that post-processing protection through novel packaging based on nanotechnology is an innovative and valuable methodology to ensure food safety, reduce post harvest losses and facilitate international trade in a sustainable and environmentally responsible manner, and to contribute to feed the growing world population with safe and nutrition food, meeting the 2020 European targets to combat poverty and to reduce waste. The envisioned direction is to look at the complete life cycle of the PNFP by the combined efforts of leading research and industrial groups.

The Conference will close the activities of the Action, with the aim at highlighting and disseminating the achievements of the Action with regards to efficiency and effectiveness, environment, health, safety and cost of novel PNFP.

The Conference will join scientists and technologists working in different fields of PNFP bringing together methodologies, processing, structure–characterization techniques, properties, health, regulation, economic and environmental considerations in order to support the design of innovative PNFP with controlled structures and properties and to face the challenges that still remain open, identifying the barriers (in research, technology, safety, standardization, eco-sustainability, trained workforce and technology transfer), that prevent a successful development of PNFP and suggesting strategies necessary to progress. Finally the Conference will constitute a further opportunity to strengthen the Action Network and will act as launching platform to establish new fruitful cooperation in Europe.

Information at [www.costfa0904.eu](http://www.costfa0904.eu)





# PROGRAMME



## WEDNESDAY 26 FEBRUARY

- 8:30 **Registration**
- 9:00 - 9:30 **Welcome** Chair: Sossio **Cimmino**  
Luigi **Nicolais**, CNR President  
Luigi **Ambrosio**, Head of CNR Department: Chemical Science & Materials Technology  
Francesco **Loreto**, Head of CNR Department: Biology, Agriculture & Food Science  
Cosimo **Carfagna**, Director of ICTP/CNR
- 9:45 - 10:10 **Opening**  
Ioanna **Stavridou**, COST Science Officer Food and Agriculture Domain, Belgium  
"European Cooperation in Science and Technology- COST"  
Clara **Silvestre**, COST Action FA0904 Chair  
"COST ACTION FA0904 "Eco-Sustainable Food Packaging Based on Polymer Nanomaterials": It is Time for the Final Appraisal"
- 10:10 - 10:40 **Coffee break**
- 10:40 **Session 1** Chair: Mika **Vähä-Nissi**  
**WG1: Development of New Safe PNFP**  
**Introduction Key lecture**  
Mika **Vähä-Nissi**, VTT Technical Research Centre of Finland  
"Atomic Layer Deposited Thin Films For Packaging"  
Josè **Kenny**, University of Perugia, Italy  
"Advances in PLA Matrix Nanocomposites for Food Packaging"  
Mikko **Tuominen**, SP Technical Research Institute of Sweden  
"Multifunctional Nanoparticle Coating Using (LFS)-Technique"  
Hynek **Biederman**, Charles University in Prague, Czech Republic  
"Low Pressure Plasma Coatings for Food Packaging"  
Ana Rita **Ferreira**, Universidade Nova de Lisboa, Portugal  
"Characterization of Fucopol Films for Food Packaging"
- 13:00 - 14:30 **Lunch**



14:30

## Session 2

Chair: Josè Maria **Lagaron**

### WG2: Development of New Processing Technologies

#### Introduction Key Lecture

Josè Maria **Lagaron**, Spanish Council for Scientific Research (CSIC), Spain

“Nanocellulose-Based Renewable Packaging Materials”

**Mustapha Kaci**, University Abderrahmane Mira, Algeria

“A Study of the Combined Effects of PHBV-g-AM Compatibilizer and Cloisite 30B on PHBV/PLA Blends”

**Pilic Branka**, University of Novi Sad, Serbia

“The Influence of Physical Modification on the Properties of PLA Films as Green Packaging Materials”

**Miguel Cerqueira**, University of Minho, Portugal

“Reinforcement of Polysaccharide-Based Films: Evaluation of Physic-Chemical Properties”

**Daniela Pamfil**, “Petru Poni” Institute of Macromolecular Chemistry, Romania

“Thermal Characterization of Hydrogels Based on Anhydride Modified Collagen and 2 - Hydroxyethyl Methacrylate”

16:40 - 17:00

### Coffee break and Networking

#### Panel 1: Antimicrobial Packaging

Moderator: **Mustapha Kaci**

#### Key Lecture

**Louise Deschênes**, Agriculture & Agri-Food, Canada

“Challenges in Investigating Nanoparticles as Antimicrobial in Food Packaging. ZnO Case Study”

**Marc Verelst**, Université Paul Sabatier Toulouse III and CNRS, France

“Preparation and Characterization of Several Polymer/Zinc Oxide Microcomposites with Antibacterial Activity”

**Ramune Rutkaite**, Kaunas University of Technology, Lithuania

“Production Technologies of Antimicrobial Silver-Containing Packaging Materials”

**Bogdanel Silvestru Munteanu**, AL.I. Cuza University, Romania

“Antibacterial Membranes Based on Polyurethane and Biological Polymers”

**Paola Del Serrone**, Consiglio per la Ricerca e la Sperimentazione in Agricoltura CRA, Italy

“Evaluation of a Mono-Component and a Multi-Component Herbal Extracts as Candidate for Antimicrobial Packaging of Fresh Retail Meat”

#### Panel Discussion



9:00

## Session 3

Chair: Selcuk **Yildirim**

### WG 3: Development of New Strategies to Identify any Critical Interaction of PNFP with Food

#### Introduction Key Lecture

Selcuk **Yildirim**, Zurich University of Applied Sciences, Switzerland

“Critical Interactions between Palladium Based Oxygen Scavenger and the Food”

Stefanie **Gaengler**, Cyprus University of Technology, Cyprus

“Influential Factors of Bisphenol A Leaching from Polycarbonate Containers into Drinking Water: a Simulation Study”

Maurizio **Avella**, Institute of Chemistry and Technology of Polymers, CNR, Italy

“Plasticization of PLA with Esterified Oligo-PLA”

Federica **Aureli**, Istituto Superiore di Sanità, Italia

“Single Particle-ICP-MS and Asymmetric Flow Field Flow Fractionation-UV-MALS-ICP-MS for the Analytical Determination of Inorganic Nanoparticles Released from Polymer Nanomaterials for Food Packaging”

Marit Kvalvåg **Pettersen**, NOFIMA, Norway

“Evaluation of Suitability of Some Biomaterials for fresh food. Case Study: Biomaterials for Fresh Products”

Christos **Pandis**, National Technical University of Athens, Greece

“Water Sorption and Dielectric Study of Chitosan Films with Various Degrees of Deacetylation”

11:40 - 12:00

### Coffee break and Networking

12:00

### Panel 2: Foresights: Filling the Gap Between Science and Technology

Moderator: Erich **Kny**

#### Key Lecture

Geoffrey **Mitchell**, Institute Polytechnic Leiria, Portugal

“A Comparison of Nanocomposites and Nanostructured Polymers for Safe and Effective Food Packaging”

Christoph **Schick**, University of Rostock, Germany

“Crystal Nucleation in Poly(epsilon-caprolactone) - Multiwalled Carbon Nanotube Composites”

Gaetano **Guerra**, Nano Active Film S.r.l., Spin-off Company of the University of Salerno, Italy

“Food Packaging Based on Nanoporous-Crystalline Polymers”

Francesco **Marandino**, Penelope SpA, Italy

“Intelligent Packing to Support Supply Chain Food Traceability”

Remo **Merijs Meri**, Riga Technical University, Latvia

“Characterization of Polyethylene Terephthalate Based Hybrid Nanocomposites”

#### Panel Discussion

13:30 - 15:00

### Lunch



15:00

## **Session 4**

Chair: Geoffrey **Hunt**

### **WG4: Ethics, Environment , Standardization, Science-Society Dialogue, International Cooperation**

#### **Introduction Key Lecture**

Geoffrey **Hunt**, St Mary's University College, United Kingdom

"The Convergence of New Food Technologies: Social & Ethical Issues"

Eddo **Hoekstra**, Joint Research Centre of the European Commission, Italy

"Eco-sustainable Plastic Food Contact Materials Using Nanomaterials from Development to Final Product"

Marlena **Kwiatkowska**, Wroclaw University of Technology, Poland

"Biodegradation of PLA and PLA Composites"

Tiziana Maria P. **Cattaneo**, Consiglio per la Ricerca e la Sperimentazione in Agricoltura, Italy

"New Features in Food Packaging Sector: Italian Research Updating"

Emanuele **Fiore**, Embassy of Italy, Canada

"International Cooperation in Science and Technology: the Example of Italy and Canada"

16:30 - 17:00

### **Coffee break and Networking**

17:00 - 18:30

### **Panel 3: Complementary Platforms for Interactions**

Moderator: Clara **Silvestre**

#### **Key Lecture**

Agnes **Safrany**, International Atomic Energy Agency UN, Austria

"Preparation of New Food Packaging Materials by Radiation-Initiated Reactions and IAEA Support to Member States Institutions"

Erich **Kny**, Kemyk, Austria

"COST Action MP1206 on Electrospinning Nanofibers"

Robert **van Otterdijk**, Food & Agriculture Organization- UN, Italy

"FAO Activities in the Field of Food Waste and Loss"

Cecilia **Bartolucci**, National Research Council (CNR), Italy

"A Foresight Perspective to the Role of Packaging in the Sustainability of Food and Environment"

Andrea **Porcari**, Center for Nanotechnologies and KETs, Italian Association for Industrial Research (AIRI/Nanotec IT), Italy

"Nanotechnology in Italy and the Role of Nanotec IT"

#### **Panel Discussion**

20:00

### **Dinner**





## FRIDAY 28 FEBRUARY

9:00 - 10:30 **MC Meeting**

10:30 - 11:00 **Coffee break**

11:00 - 12:30 **Action Evaluation**

9:00 - 12:30 **Session: Poster Presentation**

Chairs: Cornelia **Vasile**  
Donatella **Duraccio**

Lorena **Affatato**, Institute of Chemistry and Technology of Polymers, CNR, Italy  
"Smart City"

Aida **Benhamida**, University of Bejaia, Algeria  
"Morphology and Mechanical Properties Polyamide 11/OMMT Nanocomposites Prepared by Melt Mixing"

Isabel **Bourbon**, Universidade do Minho, Campus de Gualtar, Portugal  
"Incorporation of Nanohydrogels in Polysaccharide-Based Films: Effect on Physic-Chemical Properties"

Andrei **Choukourov**, Charles University in Prague, Czech Republic  
"Effect of DBD Plasma Treatment on Properties of Poly(ethylene terephthalate) Foils"

Doina **Constantinescu**, SC ICEFS COM SRL, Romania  
"Project Eureka- Compounding with Alimentary Additives For Layers with Antimicrobial and Antioxidant Properties – Pilot Phases"

Elena **Fortunati**, University of Perugia, Italy  
"Combined Effect of Cellulose Nanocrystals Extracted from Phormium Tenax Leaves and Limonene on the Properties of PLA Films"

Jan **Hanuš**, Charles University in Prague, Czech Republic  
"Fabrication and Characterization of a-C:H/Cu Nanocomposites Prepared by PECVD Combined with Gas"

Evgeni **Ivanov**, Bulgarian Academy of Sciences, Bulgaria  
"Polypropylene Composites Based on MWCNT and Organoclay"

Tatjana **Ivanova**, Riga Technical University, Latvia  
"Structure and Properties of Zinc Oxide Containing Polymer Nanocomposites"

Claudio **Larosa**, University of Genoa, Italy  
"Ceria oxide nanoparticles in Lexan polycarbonate: new films nanocomposite prospective for food container"

Artur **Martins**, University of Minho, Portugal  
"Diffusion of Different Molecular Weight Proteins through Poly  $\epsilon$ -caprolactone Films With Encapsulated Trypsin"

Ramesh Babu **Padamati**, Trinity College Dublin, Ireland  
"Effect of Layered Nanomaterials and Nanofibers on Mechanical and Barrier Properties of Biobased Polymer Composites"

Elena **Paslaru**, "Petru Poni" Institute of Macromolecular Chemistry, Romania  
"Lactoferrin –Coated Poly(Lactic Acid)"



## FRIDAY 28 FEBRUARY

- 9:00 - 12:30 **Elisa Passaglia**, Istituto di Chimica dei Composti OrganoMetallici-UOS-CNR, Italia  
"The Use of Plasticizers as Coupling Agents in Preparation of PLA-based Nanocomposites"
- Marilena Pezzuto**, Institute of Chemistry and Technology of Polymers, CNR, Italy  
"Study of the Effect of Ionizing Radiation on the Properties of Polypropylene Nanocomposites for Food Packaging Applications"
- Ana Cristina Pinheiro**, University of Minho, Portugal  
"K-Carrageenan/Chitosan Nanolayered Coating as a Vehicle for Incorporation of Bioactive Compounds"
- Frederika Popovska-Pavlovska**, Integrated Business Institute, R.Macedonia  
"A Contribution to Rheological And Relaxation Properties of Polymer Nanocomposite Materials"
- Tanja Radusin**, University of Novi Sad, Serbia  
"Development of New PLA/Silica Nano Composites with Potential Use for Packaging of Fresh Meat"
- Marcella Salvatore**, Institute of Chemistry and Technology of Polymers, CNR, Italy  
"Effect of Ionizing Radiation on the Nanocomposites Based on Polylactic Acid/Montmorillonite for Food Packaging Applications"
- Amhed Swilem**, Ain Shams University, Cairo, Egypt  
"Development and Radiation Processing of Polycaprolactone/Chitosan (Pcl/Cs) Blend for Active Food Packaging"
- Cornelia Vasile**, "P.Poni" Institute of Macromolecular Chemistry, Romania  
"Study of Thermal Properties and Heat-Induced Denaturation of Hybrid Hydrogels Based Collagen"
- Cornelia Vasile**, "P.Poni" Institute of Macromolecular Chemistry, Romania  
"PLA Nanocomposites as Potential Antimicrobial Materials"
- Selcuk Yildirim**, Zurich University of Applied Sciences, Switzerland  
"Electrospun Nanofibers as A Food Contact Layer for Iron Based Oxygen Scavenging Films"
- 12:30 - 13:00 **Concluding Remarks and Closure**  
**Clara SILVESTRE** and Rumiana **KOTSILKOVA**  
**Lunch and farewell**

