

Work package list

WP no.	Work Package Title	Main content (keyword)	Total effort (Person-months)	Work package leader	Participating Project Partners
1	Preparation of the nanomaterials	Preparation of the nanomaterials such as: Au/TiO ₂ , Ag/TiO ₂ , Pt/TiO ₂ , and xerogels and aerogels of Ag/TiO ₂ -SiO ₂	111	Anca Peter – P1 Romania	CO, P1, P3
2	Preparation and characterization of nano-materials. Packages preparation.	Preparation, morpho-structural characterization, eco- and cytotoxicity of the photocatalysts - preparation of packages	103.5	Virginia Danciu – P1 – Romania	CO, P1, P3, P4
3	Physical-chemical, sensorial, microbiological evaluation of the quality of milk and other dairy products and of meat and meat products, deposited in nano-packages.	Physical-chemical, microbiological analyses on milk, dairy products, meat, meat products	167.5	Alexandru Ciric – P2 - Romania	CO, P1, P2, P3, P4
4	Physical-chemical, sensorial, microbiological evaluation of the bakery products, pastries, fruits and fresh fruits juices quality, deposited in nano-packages.	Physical-chemical, microbiological analyses on bakery products, pastry, fruits, fruits juices	89.5	Mihaela Begea – P2 - Romania	CO, P1, P2, P3, P4
5	Homologation of the most efficient nano-packages in preservation and security of food. Market study regarding the commercialization of the food in the new obtained nano-packages.	Homologation of the most efficient nano-packages Market study	126.5	Teodora Casulschi – P2-Romania	CO, P1, P2, P3, P4
6	Training activities (practical seminars)	Training activities	54.5	Leonard Mihaly-Cozmuta – CO – Romania	CO, P1, P2, P3, P4
7	Dissemination of the project results	Articles publishing, participation to international conferences, website, promoting the results in media	52.5	Wanda Ziemkowska – P3 – Warsaw University of Technology Poland	CO, P1, P2, P3, P4
8	Management of the project	Coordinating the activities	37	Anca Peter – CO – Romania	CO, P1, P2, P3, P4

Work packages description

WP number: 1
WP title: Preparation of the nano-materials.
Leader: Anca Peter – CO – Technical University of Cluj Napoca, Romania
Partners involved: CO, P1, P3
Start date: 1.10.2012
End date: 31.12.2012
Objectives: preparation of the Au/TiO ₂ , Ag/TiO ₂ , Pt/TiO ₂ , and xerogels and aerogels of Ag/TiO ₂ -SiO ₂
Expected results: preparation of the nanomaterials and monitoring of the gels characteristics function of the preparation parameters (reactants ratios)
Milestones: elimination of the aerogels which were not very well dried and of the other nanomaterials which do not present the aspect of a homogeneous dispersed nano-material
Deliverables: Technical, financial and end stage report, in December 2012.

WP 1.1. Preparation of photocatalysts (Ag/TiO ₂ , Pd/TiO ₂ , Au/TiO ₂ and xerogels and aerogels of Ag/TiO ₂ -SiO ₂)
WP number: 2
WP title: Preparation and characterization of nano-materials. Packages preparation.
Leader: Virginia Danciu – P1 – Babes Bolyai University, Romania
Partners involved: CO, P1, P3, P4
Start date: 1.01.2012
End date: 30.09.2013
Objectives: preparation and morpho-structural characterisation of the photocatalysts, performing eco- and phytotoxicity analyses on photocatalysts; packages preparation
Expected results: the obtained materials to present high: porosity, homogeneity, specific surface area, pore volume, degree of crystallinity and low toxicity
Milestones: a selection of the photocatalysts with high physico-chemical characteristics and low toxicity will be made; these materials will be used for the preparation of nano-packages and those found eco- and/or cyto-toxic will be rejected.
Deliverables: Technical, financial and end stage report, in Sept 2013.
WP 2.1. Preparation of photocatalysts (Ag/TiO ₂ , Pd/TiO ₂ , Au/TiO ₂ , Ag/TiO ₂ -SiO ₂ , Ag/ TiO ₂ /C, Ag/TiO ₂ -xN _x xerogels and aerogels composites and ZnO-TiO ₂ .
WP 2.2. Morphological characterization of the obtained photocatalysts by determining BET specific surface area, BJH nanoporosity (pore volume, pore size), density, external aspects and morphological details (SEM, FEG-SEM, TEM, FEG-TEM/STEM, HR TEM), stereological analysis (statistic), agglomeration tendency.
WP 2.3. Structural characterization of the obtained photocatalysts by determining the qualitative phase structure and composition (Raman and FTIR analyses, X-ray diffraction, XPS, WDS), chemical analyses (EDS), concentration of OH groups on the surface, spectroscopic analyses.
W.P. 2.4. Eco- and cyto-toxicity of the obtained photocatalysts. The toxicity of the obtained photocatalysts will be performed before the experiments of evaluation of food quality stored in nano-packages.
WP 2.5. Packages preparation. All the obtained photocatalysts will be included in paper and in polypropylene containers.
WP number: 3
WP title: Physical-chemical, sensorial, microbiological evaluation of the quality of milk and other dairy products and of meat and meat products, deposited in nano-packages.
Leader: Alexandru Ciric – P2 – ICA Research and Development, Romania
Partners involved: CO, P1, P2, P3, P4
Start date: 1.10.2013
End date: 31.05.2014
Objectives: establish the most efficient nano-package for milk and dairy products and for meat and meat products preservation
Expected results: Establish of the nano-package that confers the best preservation of qualities and the highest safety of milk and of dairy and meat products.
Milestone: The selection and retention for further research of the combinations nano-packaging & food conferring to the food category thus packed higher security and longer storage capacity than a conventional packaging solution.
Deliverables: Technical, financial and end stage reports, in May 2014.
WP 3.1. Selection and/or lab scale manufacturing of the milk and the other dairy products depending on the products prepared by S.C. Multilact S.R.L., Baia Mare, Romania
WP 3.2. Selection of the meat and meat products depending on the products prepared by S.C. Cetina

S.A, Baia Mare, Romania.

WP 3.3. Packaging of milk in the above obtained packages. The food will be maintained at 20-22⁰C and in refrigeration conditions (0-4⁰C) in illuminated refrigerators. At different intervals (3-14 days for food maintained at room temperature and up to 2 months for refrigerated food) sensorial, microbiological (Total Bacterial Count, *Enterobacteriaceae*) and physical-chemical investigations will be performed (acidity, content of fat, salt, dry mater, ash, proteins and nitrogen, amino-acids structure, vitamins, energetic value, dissolved oxygen, lipid oxidation, fatty acid structure)

W.P. 3.4. Packaging of cheese in the above obtained packages. The cheese will be maintained and characterized as above. Additionally, microbiological will be performed (Yeasts and Molds, *Salmonella*, *Listeria monocytogenes*, *Bacillus cereus* etc.).

W.P. 3.5. Packaging of the yogurt in the above obtained packages. The yogurts will be maintained and characterized in the same conditions as in W.P.2.1. Studies on the survival capacity of probiotic micoflora in yogurt, bottled in different types of packaging materials, will be tested.

WP 3.6. Packaging of meat in the above obtained packages. The meat will be maintained at room temperature (20-22⁰C) and in refrigeration conditions (0-4⁰C) in illuminated refrigerators. At different time (3-14 days for food maintained at room temperature and up to 6 months for refrigerated food) sensorial, microbiological and physic-chemical investigations will be performed (acidity, content of fat, dry mater, ash, proteins and nitrogen, aminoacids structure, vitamins - B1, B2, B5, B6, B12 -, energetic value, dissolved oxygen, lipid oxidation, fatty acid).

WP 3.7. Packaging of the meat products in the above obtained packages. The meat products will be maintained and characterized as above.

WP number: 4

WP title: Physical-chemical, sensorial, microbiological evaluation of the bakery products, pastries, fruits and fresh fruits juices quality, deposited in nano-packages.

Leader: Mihaela Begea– P2 – ICA Research and Development, Romania

Partners involved: CO, P1, P2, P3, P4

Start date: 1.06.2014

End date: 30.09.2014

Objectives: establish the most efficient nano-package for bakery products, pastries, fruits and fruit juices preservation

Expected results: Establish of the nano-package that confers the best preservation of qualities and the highest safety of bakery products, pastries, fruits and fruits juices.

Milestone: The selection and retention for further research of the combinations nano-packaging & food conferring to the food category thus packed higher security and longer storage capacity than a conventional packaging solution.

Deliverables: Technical, financial and end stage reports, in Sept. 2014.

WP 4.1. Selection of the bakery products and pastries depending on the products prepared by S.C. Roman S.N.C. Somcuta Mare, Romania.

WP 4.2. Packaging of the bakery assortments in the above obtained packages. The food will be maintained at 20-22⁰C. At different time (3-14 days), sensorial, microbiological and physical-chemical investigations will be performed (acidity, pH, content of dry matter, ash, proteins and nitrogen, vitamins—from flour or from fortifying agents, dissolved oxygen, rheological characteristics, fatty acids)

WP 4.3. Packaging of the pastry assortments in the above obtained packages. The food will be maintained and analyzed as in W.P. 4.2.

WP 4.4. Selection of the fruits and fresh fruits juices (apples, pears, berries, apricots, orange fresh juice, kiwi fresh juice, ...)

WP 4.5. Packaging of the mentioned fruits assortments in the above obtained packages. The fruits will be maintained at 20-22⁰C and in refrigeration conditions (0-4⁰C) in illuminated refrigerators. At

different time (3-14 days for fruits maintained at room temperature and up to 2 months for refrigerated fruits), sensorial, microbiological and physical-chemical investigations will be performed (acidity, content of dry matter, ash, proteins and nitrogen, dissolved oxygen, colour measurements, browning index, firmness and weight loss, vitamin A, B1, B2, B3, B5, B9, C and E, total and reducing sugars) WP 4.6. Packaging of the mentioned juices fruits assortments in the above obtained packages. The fresh fruits juices will be maintained and characterized as in W.P. 4.5.
WP number: 5
WP title: Homologation of the most efficient nano-packages in preservation and security of food. Market study regarding the commercialization of the food in the nano-packages.
Leader: Teodora Casulschi – P2 – ICA Research and Development, Romania
Partners involved: CO, P1, P2, P3, P4
Start date: 1.10.2014
End date: 30.09.2015
Objectives: homologation of the selected nano-packages, performing the market study; establish the costs for the selected nano-packages
Expected results: obtaining the authorization of using the nano-packages in food industry; better sell of the food deposited in nano-packages as compared to that deposited in the conventional packages. Milestone: Final selection of the promotion/advertising content and information dedicated to businesses potentially interested to produce packaging containing nano-materials and to build awareness among consumers about the benefits of a new packaging solution.
Deliverables: Technical, financial and end stage reports, in Sept. 2015.
WP 5.1. Homologation of the most efficient nano-packages in preservation and security of food, according the European Rules on Food Security. Preparing documentation and obtaining the food packaging certification for the packaging materials selected in the earlier stages (packaging that had the best results in preserving each food matrix chosen in the study). This stage will also consider the realization of any additional laboratory tests required by European legislation and/or national legislation of each partner (e.g. migration of general or basic compounds of the packaging materials that were not the subject of the present research). The food packaging certification will be obtained at local level (as the Romanian legislation requires), and based on this certificate each partner can gain local recognition for each packaging material. WP 5.2. Market study regarding the commercialization of the food in the new obtained nano-packages. The homologated nano-packaging systems are proposed to be delivered for regular use to a number of producers in the food sector, for the packaging of milk and dairy products, meat and meat products, bread and bakeries and of fruits.
WP number: 6
WP title: Training activities (practical seminars)
Leader: Leonard Mihaly-Cozmuta – CO – Technical University of Cluj Napoca, Romania
Partners involved: CO, P1, P2, P3, P4
Start date: 1.10.2012
End date: 30.09.2015
Objectives: to improve the knowledge of young and experienced researchers
Expected results: organization of the training activities as follows: • January 2013 – organized by CO and P1, Theme: Preparation and characterization of Ag/TiO ₂ -SiO ₂ , Ag/TiO ₂ /C, Ag/TiO _{2-x} N _x , TiO ₂ -ZnO composites; • September 2013 – organized by P3 – Theme: Preparation and characterization of Au/TiO ₂ , Ag/TiO ₂ , Pd/TiO ₂ composites; • March 2014 – organized by P2 – Theme: Physical-chemical and microbiological analyses on food. Milestones: All partners implied in this activity will strive to ensure a more efficient organization.
Deliverables: Report on training activities (practical seminars) within the framework of technical,

financial and management reports.	
WP number: 7	
WP title: Dissemination of the project results	
Leader: Wanda Ziemkowska – P3 – Warsaw University of Technology, Poland	
Partners involved: CO, P1, P2, P3, P4	
Start date: 1.02.2013	
End date: 30.09.2015	
Objectives: publishing articles, participating to international conferences, promoting the results in media and on internet; submitting the documentation for European patentation of the most efficient nano-package	
Expected results: will be published 3 articles in journals from ISI WEB database; 2 articles BDI; participation to 2 international conferences (2013 - 2015); submitting documentation for the European patentation of the most efficient nano-package; project website; communication of the results through a few media channels after obtaining the patent protection; dissemination to the business community	
Milestones: is there possible that some article will be not publish until scientific report;	
WP number: 8	
WP title: Management of project	
Leader: Anca Peter – CO – Technical University of Cluj Napoca, ROMANIA	
Partners involved: CO, P1, P2, P3, P4	
Start date: 1.10.2012	
End date: 30.09.2015	
Objectives: establish collaboration network between partners for a good management of the project	
Expected results: Efficient collaboration between all partners for planning work packages, organization of training activities and meetings.	
Deliverables name/Delivery Date	Dissemination level
The adoption of all the exchange information mechanisms with the aim to ensure a smooth progress of the project.	Consortium
Annual technical, financial and management report	Funding institutions
Final technical, financial and management report, in Sept. 2015.	Funding institutions
The work package regroups the activities in <i>Figure 2: Project Management General Structure</i> . • November 2012 , Management meeting, organized by CO – Romania; • October 2013 , Management and Scientific meeting, organized by CO – Romania; • November 2014 , Management and Scientific meeting, organized by P1 – Romania; • August 2015 , Final Management Meeting, organized by CO – Romania; Discussion on the scientific reports and project balance.	