ORGANIZATION

The work is divided into 5 work packages (WP):

WP1: Coordination and Progression of the Project
WP2: Characterization of Rosemary extracts
- Determination of the antioxidant activity of natural extracts of rosemary with pure compounds isolated from rosemary.
- Optimization and validation of an Ultra-high Performance LC method to determine antioxidant compounds composition of rosemary extracts from different origins.

WP3: Active film production and characterization
- Incorporation of Active Agents in the Packaging Materials.
- Assessment and characterization of the new prototype package.

WP4: Evaluation of the effectiveness of the new packaging material
- Study of the migration of the natural antioxidants from the new packaging to the foodstuffs.
- Evaluation of the oxidation status of foodstuffs packed with the active packaging.

WP5: Dissemination of results

MEMBERS

Rose4Pack is a collaborative effort of 5 institutions: **Centro de Estudos de Ciência Animal (CECA), University of Porto; Oporto, Portugal**; Department of Food and Nutrition, National Institute of Health Dr Ricardo Jorge (INSA), Lisbon, Portugal; **Center for Pharmaceutical Studies (CEF), Pharmacy Faculty, University of Coimbra (UC), Coimbra, Portugal**; IPC-Institute for Polymers and Composites/I3N, Department of Polymer Engineering, University of Minho (UM), Guimarães, Portugal; **PlastEuropa Embalagens, S.A.**

Find out more

Rose4Pack started in April 2013 and will be funded for two years.

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Rose4Pack

Biodegradable active packaging with rosemary extract (*Rosmarinus officinalis* L.) to improve food shelf-life

The challenge

to develop and evaluate the effectiveness of a biodegradable active food packaging that incorporates rosemary extract with antioxidant properties.

FCT Fundação para a Ciência e a Tecnologia
COMPETE
QREN Quadro de Referência Estratégico Nacional Portugal 2007-2013
União Europeia Fundo Europeu de Desenvolvimento Regional

OBJECTIVES

This research project will address outstanding questions concerning the new generation of food packaging: can packaging interact positively with the packed food? Can active packaging be safe and efficient simultaneously? Can active packaging help to promote the quality of food and consumer's health?

This project aims to develop and evaluate the effectiveness of a new active food packaging that incorporates a plant extract with antioxidant properties.

The critical success factor of the project is the use of rosemary extract, recently approved as food additive (Directives 2010/67/EU and 2010/69/EU). Therefore, it is intended that the new packaging has an antioxidant activity which allows preserving the quality of foodstuffs and increasing their shelf-life, and simultaneously food safety is assured. Moreover, the new active film prepared with rosemary extract may also be used to minimize the direct use of this food additive because this would be released along the storage period from the packaging to the foodstuffs.

METHODOLOGIES

Measurement of the antioxidant activity of both rosemary extracts and new packaging material using different methods, (e.g. DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging method; determination of the total content of phenolics compounds.

Optimization and validation of a liquid chromatographic (Ultra High Performance Liquid Chromatography, UHPLC) method to determine antioxidant compounds composition of rosemary extracts from different origins.

Optimization of the incorporation process by using: i) Differential Scanning Calorimetry (DSC) to study the thermal transitions; ii) Thermal Gravimetric Analysis (TGA); iii) a mini-extruder to prepare a concentrate of the active specie (masterbatch) with the aim of being subsequently used to produce samples films by compression molding. Evaluation of the mechanical properties (elastic modulus and tensile strength).

Evaluation of the safety. Migration tests will be carried out during different contact times and at different temperatures with different aqueous and fatty foods simulants.

Evaluation of effectiveness against lipid oxidation by determination of: i) Volatile profile and indicator of the lipid oxidation state by GC-MS; ii) Fatty acids profile of foods packed with the new packaging and in a control packaging will be compared by GC-FID.

EXPECTED RESULTS

To obtain a prototype of a new active packaging with demonstrated efficiency against lipid oxidation phenomena and safe for consumers.
The efficiency of the new active plastic film as a protector of foodstuffs will also be evaluated by measurement of the degree of oxidation during the storage at different conditions of time and temperature. Safety will be evaluated by means of migration studies.

To bring great advantages for food and food packaging industry such as extended foodstuffs' shelf lives and therefore, increased food quality and possibility of consumers' health promotion.

To find/demonstrate that some aromatic plants traditionally used as spices and/or vegetable products contain antioxidant compounds that give them added value that can greatly benefit food and food packaging industry.

To have impact at territorial level. The use of a plant extract like rosemary extract encourages the use of land, especially those with low agricultural suitability because is not soil demanding. Therefore, its use by food or food packaging industry could encourage the use of impoverished or desertified soils which are unsuitable for traditional cultures.

To have impact at social and population levels. The use of impoverished or desertified soils to cultivar added value plants could allow the setting of population, reversing desertification.