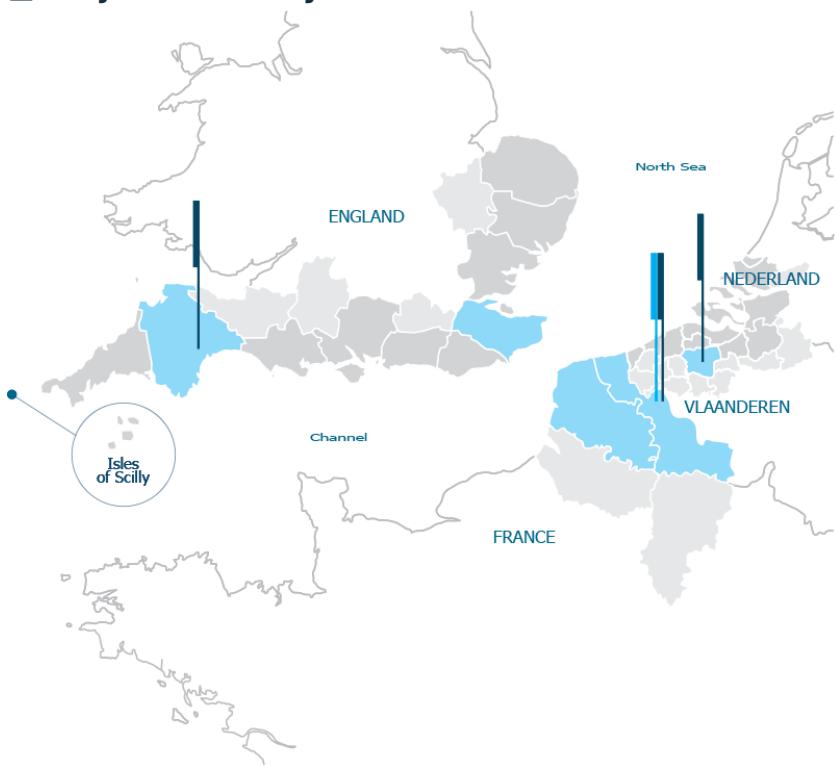


# meCagrO2

**meCagrO2 - Safe products, sustainable Processes and employment increased attractiveness for companies from the 2 Seas agro-food area**



## ■ Project summary



development of alternative and breakthrough solutions in terms of products, processes and working conditions in these sectors. This development will be sustainable, which means limiting the environmental footprint of food processing and developing innovative applications for any by-products derived from the processes related to food production.

## ■ Activities

### What was the project trying to achieve?

The food processing industry traditionally relies on skills centered on the product and the link with products and consumers. And yet, innovation and research represent important levers for the evolution of the business sector and the increase of company competitiveness in the Two Seas cross-border area. In addition, health represents an important development priority on the European level: the links between food and health obviously represent a focus for research, which is at the heart of the problem for the choice and evolution of food products, and to this notion of healthy food adds a growing interest for foods replacing synthetic additives with natural additives. Moreover, the European Union has fixed clear objectives in regards to the

The MeCagrO2 Project brings together an important network of academic partners involved in research and the transfer of technologies related to food processing. The project will ultimately result in the creation of a shared laboratory facility to find answers to the research, innovation and competition issues faced by food companies in the 2 Seas area, while improving health, nutrition and food safety for residents and consumers. The project will make great steps towards allowing industries such as agriculture and aquaculture to be major exponents of bio-economic growth and MeCagrO2 will enable the

reduction of energy and water consumptions. The meCagr02 project worked on specific design or modeling to suggest updated industrial solutions that minimize the environmental impact of processes of food chains. The utilization or development of co-products or by-products for a new use dedicated to food represents another target for the project. This area has been investigated with a research focus both in order to find new or optimized extraction techniques or specific solutions in the valorization chain. Finally, working conditions in the food sector was investigated proposing new specific methods and/or tools for the analysis of work situations with regards to musculoskeletal disorders. Specific collaboration with ergonomic services was carried out in order to validate and promote the methodology. Even if general promotion of the results is expected, the major impact of the studies was expected on the scientific community and on companies / SME's working in the food production and distribution area. Through the project, we expected to build synergies between various research teams focused on different but complementary areas: life sciences, chemistry, mechanical engineering.

## What were the activities implemented?

In activity 1, KULeuven did research about food safety. The occurrence of carcinogenic N-nitrosamines in food cannot be ignored as food safety issue. Also in meat products N-nitrosamines can regularly be detected, although mostly in low concentrations. Generally, it is assumed that N-nitrosamines are formed by the nitrosation of a secondary amine with a nitrosating agent. Therefore KU Leuven did research about the occurrence and formation of N-nitrosopiperidine and the formation of the natural occurring pigment zinc protoporphyrin IX (Zn(II)PPIX) in meat tissue as an alternative for nitrite as coloring agent in dry fermented sausages. In activity 2, KULeuven explored the opportunities to reduce waste streams in food industry and to valorise by-products using membrane technologies such as membrane distillation and pressure driven membrane filtration in order to stimulate industry to apply greener methods and conduct business in a more ecologically-friendly manner. This would automatically lead to added value of existing processes, resulting in a sustainable economic growth of the Two Seas region. The main aim of activity 3 is to develop the processes and their operations in order to improve the ergonomic work conditions and promote employment. We used a holistic approach which means that we won't focus on one detail but we will take into account every factor even environmental ones. A launch event was organised in Icam, then the closing project meeting was held at ISA, gathered all partners plus clusters representatives and companies. This was an occasion to present to all parties present the newly-founded Charles Viollette regional research institute. This allowed the partners to present the project results to the Charles Viollette researchers. Management and financial meetings were held during each semester of the project, either in France, Flanders or UK.

## ■ Results

### What were the key results of the project?

Activity 1: Different analysing methods for the determination of Zn(II)PPIX, but also the interrelated protoporphyrin IX and total heme, was optimized and validated. Several dry fermented sausages were prepared and evaluated during production in order to obtain more knowledge about the formation mechanisms of Zn(II)PPIX in these kind of meat products. Antimicrobial activity of several natural extracts (essential oils) on various types of bacteria

(food pathogens and phytopatogens) was demonstrated and quantified. Activity 1 lead to 8 publications and 5 poster communications. The defense of 1 PhD also occurred during the project. Activity 2: Several reports were written on the best strategy to increase sustainability of the food industry and to valorise by-products in non-food applications. These reports were case-specific and comprised not only the method or process itself but also searched for the best economical and ecological techniques. Eco-friendly (solvent free) techniques for extracting valuable molecules (polyphenols with anti-oxydant functionality) from waste or by-product (potato peels, sugar beet seeds, chicory ground) were designed, tested and optimized. Techniques for purification and concentration of the extract were designed and tested ; the sustainability of these techniques lay in the fact that they use waste heat and membrane techniques instead of classic purification/concentration methods. Activity 2 lead to 1 publication and 10 poster communications. 3 PDRAs were involved in activity 2 and 2 PhD's are in progress. Activity 3: a methodology is written for the analysis of working conditions. Experiments were done and reports were written and communicated to companies. Contacts, then collaborations were established with regional "health at work" services. The activity lead to 1 communication during the "santé travail" conference and 2 poster communications.

## Did all partners and territories benefit from the results?

The main benefits encountered for each activity are the following ones: Activity 1:.The problem about carcinogenic N-nitrosamines formation and the interest to produce more natural and healthy meat products, is the same in the whole two seas areas. Thus all territories have benefit from the results. Activity 2: The productive sector greatly benefits from these results as the implementation of the suggested methods leads to direct improvement of their activities: more sustainable, more useful products, less waste production. Activity 3: the productive sector also had benefits from this activity. Study cases were performed, the methodology developed was assessed and the link with ergonomists was established. Target groups: o First target group was the scientific community. This was largely obtained considering the members of the team project, the contacts developed with other scientific laboratories and the scientific publications. o Second target group was companies from the food processing industry in the cross-border area, representing a minimum target of companies which will be met by one of the partners involved in the project. During the project each partner was in touch with companies. Workshops and participation in fairs also contributed to the dissemination of the results. Final beneficiaries: o students from the partner universities, whose training programmes will benefit from the results of the study o consumers through the improvement of product quality or the offer of new products o suppliers for food processing industry processes and professionals in the fields of logistics and distribution, for whom the supply or practices risk being changed o the companies or structures impacted by waste treatment, by energy and water consumption, by working conditions.

## What were the effects / outcomes for the territories involved?

Activity 1: By implementing the conclusions of the doctoral work of E. De Mey to avoid contamination of meat products with carcinogenic N-nitrosamines, and the worked out proof of principle by producing a naturally colored dry fermented pork sausage at pilot scale, the meat industry in the Two Seas region has the opportunity to innovate their products and they will become more competitive. Activity 2: By implementing the suggestions to reduce waste streams and valorize by-products, the food industry in the Two Seas region has the opportunity

to grow and will become more competitive with other regions. This can result in an increase in economic activity throughout the Two Seas region and increasing employment rate in a sustainable way. Producers of transformed potato products in all 3 territories can now consider potato peels, one of their main by-products, as a source of chlorogenic acid that can be extracted using eco-friendly, solvent free processes. Collaborations with companies in England for the optimisation of food chains, for implementation of solutions for energy optimisation and water use reduction were done. Activity 3: To validate and improve our method of analysis we worked with partner companies in the area between two seas, as well as the health services work. We have applied our methodology with 5 companies in the field of food industry, to compare our results we also work with occupational medicine.

## ■ Distinctiveness

### **What was the real added-value of doing this cross-border project?**

The cooperation between different laboratories has led to a whole approach of certain processes where each laboratory played its part. E.g. the valorisation of polyphenols from potato peel waste: an extraction of the components by Groupe ISA and the purification to obtain a valuable product stream by membrane technology at KULeuven. One constraint imposed by a cross-border project is to work in a common language (English). This constraint allowed us to get in touch more easily with international companies, as the entire project's outcome was always readily available in English. Moreover, the collaboration between partners from different countries leads us to develop interactions in competences impossible without such a collaborative cross border initiative.

### **Have any synergies been developed with other projects or networks?**

Yes, At cross border level: We participated in the cluster Taste 2 seas. In this cluster were partners from four 2 seas Interreg projects (Fish and Chips, 2 Seas Trade, Swap Now and meCagrO2). It introduced us to new interesting partners with which we are now collaborating, even outside the cluster. Other networks were also contacted following the Interreg meetings, and opportunities for a new project were given. At regional level: links and cooperation's with other laboratories were initiated, mainly with Institut Charles Viollette (FR). A specific collaboration on LCA methodology led to a new regional project (FR).

### **What are the key messages , key lessons learned you would like to share?**

The main key messages are the following one: Interest of such collaborative project to initiate or reinforce collaborations between partners at cross border level Good initiative to develop new common projects Good way to develop interactions between research laboratories and companies Necessary to have activities between partners and to have en effective collaboration on each activity

## ■ Project Information

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|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Title</b>                    | meCagrO2 - Safe products, sustainable Processes and employment increased attractiveness for companies from the 2 Seas agro-food area |
| <b>Total project budget</b>     | € 3 724 054                                                                                                                          |
| <b>ERDF</b>                     | € 1 862 027                                                                                                                          |
| <b>Priority &amp; objective</b> | Priority 1 c. Support innovation, research and cooperation between universities, knowledge institutes and businesses                 |
| <b>Timeframe</b>                | 2011-07-01 - 2014-09-30                                                                                                              |
| <b>Lead partner</b>             | ICAM                                                                                                                                 |
| <b>Project Coordinator</b>      | Jean-Michel RIGAUD(jean-michel.rigaut@icam.fr)                                                                                       |



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