

## NOVELQ

### *Novel Processing Methods for the Production and Distribution of High-Quality and Safe Foods*

In today's fast-paced world, we sometimes lack the time to shop for fresh food on a daily basis. This is one reason why people increasingly shop at irregular intervals. The result of this new habit is increased waste; for fresh produce, which globally amounts to 35%. NovelQ's goal is to develop new processing technologies to keep food fresh over a longer period of time, thereby minimising waste. Europe already has a competitive position based on expertise, patents and pilot-scale facilities in this area. NovelQ aims to extend and strengthen this competitive advantage. The project receives funding of more than 11 million euro from the EU.

#### **Background**

The scientific base for novel food processing methods is substantial in Europe. However, the number of innovations actually applied in the food industry is rather poor compared to the USA and Japan. It is well known that traditional heating processes for food preservation are not the most suitable methods in terms of maintenance of the food's functional ingredients texture and its environmental impact. Other processing conditions may be more favourable, e.g. elevated pressure or electrical energy. These alternative processing conditions have been researched in the multi-disciplinary five-year integrated project NovelQ with the objective to keep to highest product quality and safety requirements.



NovelQ aims to develop and demonstrate new products and processes that enhance freshness and storage life. To this end, it applies existing — but not yet widely applied — methods such as high pressure, pulsed electrical fields, cold plasma, advanced heating technologies and new packaging concepts, which are sustainable and eco-friendly. Key emphasis is put on solid and liquid plant-based products, including carrot, tomato, strawberry, apple and broccoli. In addition, whole meals are taken into account in the applied research and demonstration activities.

The project is very ambitious in its quest for innovation in the area of food preservation. It has developed a comprehensive knowledge database offering mechanistic and kinetic insights into the effect of novel processing and packaging materials on the safety and quality of complex food products. The project considers also consumer perception of novel processing. In parallel, NovelQ project participants try to better understand bottlenecks and opportunities of the novel processing technologies as regards their application in the industry. Based on these results, best practices are disseminated to industry, government, consumer organisations, and research and education centres, while an emphasis is also put on the training and career development of young scientists.

The NovelQ consortium consists of 35 participating universities, research centres, industry and NGOs. An Industry Advisory Platform has been set up to ensure that the project results meet the industry needs. It has got 75 members now, which receive information about the latest developments and provide feedback on NovelQ findings.

#### **Objectives**

NovelQ has the overall objective to formulate strategic solutions for technical and basic research hurdles in order to develop and successfully demonstrate novel processing in EU, through:

- Substantially extending shelf-life of food products;
- Responding to the demands of consumers for food with fresh characteristics that contribute to health, convenience, well-being;
- Enhancing eco-friendly innovative processing (reduction of water, energy, chemicals, and of fresh produce loss), and solving migration problems.



## Results

After four years, the NovelQ project has led to the following results.

A. In the incremental innovation domain:

- New market introduction of high pressure pasteurised products such as juices;
- Software models for shelf-life, recipe development for microwave and ohmic heating and decision support tool of selection of appropriate novel processing tools;
- Life-cycle-analysis tool for novel processed foods;
- A demonstrator for surface disinfection by cold plasma;
- Business cases with detailed information about the pros and cons of novel processing.

B. In the basic science domain:

- Insight in high pressure / high temperature and pulsed-electric-field-driven chemical reactions;
- Spore inactivation (*Clostridium sporogenes*) by high-pressure-driven compression heating;
- Extended shelf-life achieved for orange juice by pulsed electric fields;
- First prototype of an indicator for high pressure sterilisation to monitor homogeneity of treatments;
- Novel biodegradable nanocomposite packaging films developed with improved properties suitable for high-pressure treatment;
- Knowledge about the consumer acceptance of novel food processing technologies.

C. In the overall management domain:

- Establishment of Industry Advisory Platform with >70 companies and industry associations;
- Establishment of the Training and Career Development Network with over 30 young scientists;
- Organisation of the 1<sup>st</sup> European PhD conference in food science and technology;
- Over 100 publications and conference contributions;
- Procedures for the integral demonstrations of a wide range of novel food technologies.

## Impact

The impact of the NovelQ project is considered as substantial in terms of:

- Reduced environmental load due to a change from surface to volumetric heating and introduction of new processing means;
- Extended shelf-life and maintenance of fresh-like character, e.g. of carrots and convenience meals;
- A stimulus to innovation at the cross-sector of food manufacturing and equipment suppliers, especially driven by SMEs;
- A wealth of new scientific and business opportunities using high pressure, electrical energy, cold plasma, etc.

## To follow

The Final NovelQ - Industry Advisory Platform meeting will be held in Wageningen (The Netherlands), from 5-6 October 2010. This industry-oriented event will include, amongst others, a mini-symposium on new scientific insights in novel processing and packaging, and a technology market place with demonstrations on practical applications.

**For more information, please visit the website:** [www.novelq.org](http://www.novelq.org)

**Or contact the project co-ordinator:**

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**Project partners:** Agrotechnology & Food Innovations (Netherlands), Berlin University of Technology (Germany), Katholieke Universiteit Leuven (Belgium), Institute of Food Research (U.K.), Universitat de Lleida (Spain), Technical Research Centre of Finland (Finland), University of Copenhagen (Denmark), University of Zaragoza (Spain), Institute of Composite and Biomedical Materials (Italy), University of Naples Federico II (Italy), Central Food Research Institute (Hungary), Slovene Consumer Association (Slovenia), Nofima AS (Norway), University of Aarhus (Denmark), Swedish Institute for Food and Biotechnology (Sweden), Centre Technique de la Conservation des Produits Agricoles (France), Campden BRI (U.K.), TNO Quality of Life (Netherlands), Food Research Institute Prague (Czech Republic), Resato International B.V. (Netherlands), I&L Invest (Belgium), Unilever (Netherlands), European Federation of Food Science and Technology (Europe), Struik Foods Europe (Netherlands), Ouest Process Alimentaire (France), CGPA PENY (France), Université Montpellier II (France), Friedrich Alexander Universität Erlangen-Nürnberg (Germany), INTI-Plásticos (Argentina), CSIR Biosciences (South Africa), Koldsteril AG (Switzerland), Icimendue S.r.l. (Italy), TOP B.V. (Netherlands), NC Hyperbaric (Spain), University of Sheffield (U.K.).