# "Food for the 21st Century: How EU Research impacts on food quality and safety" Conference

**8th of July 2010 from 9:00 am to 17:00 pm** - European Parliament, Rue Wietz/Wiertzstraat 60 B-1047 Brussels - Belgium **Room JAN 6Q2 ( József Antall Building )**

The conference is the occasion to analyse the impact of the Food quality and safety projects in EU research and presenting eight success stories with concrete research results touching several aspects of this filed: from epizootic disease to healthy food for human consumption or new method for detection and control.

**A press point is organised at 13:30 pm in the conference room. Experts in charge of each of the 8 projects will be available to answer at your questions.**

**Summary**

# ISAFRUIT

## Two apples a day keep the doctor away

***Current research on rats demonstrates that 300gr of apples a day reduces cholesterol rate by 10%***

**Two apples (300gr) a day reduce cholesterol rate by 10%. This is one of the findings of the European research project "ISAFRUIT", financed by the European Commission Sixth Research Framework Programme by 13.8 million euro. The project findings include also ways to reduce allergic components in fruits, developing new environmental friendly and safer technologies to fight against fruits pests and diseases without using pesticides or diminishing their use.**

ISAFRUIT goal is to increase fruit consumption in Europe in order to contribute to improve consumers' health. It is well documented that a regular consumption of fruit and vegetables contributes to good health, preventing several diseases such as the cardiovascular ones.

According to project's findings tested on rats and preliminary results on humans, a regular consumption of apples can help to drop the cholesterol rate and lower the risks of suffering of cardiovascular disorders. Researchers participating at ISAFRUIT underlined that a regular consumption of fruits decreases the cardiovascular diseases risk by 4-11% per 100 Gram. Scientists do not know yet all the factors responsible for this positive effect, but the EU project's findings will contribute to improve knowledge in this regards.

Another breakthrough of the project studies is the identification of some key components of apples and peach responsible for allergic reactions, and this will facilitate the attempt to create an "allergy free" variety of apple, so giving consumers with allergy the possibility to safely eat apples. A dedicated web site on fruit and allergy with a simple test to evaluate own allergy risk has been created at this purpose by a project partner (http://www2.warwick.ac.uk/fac/sci/whri/fruitallergy).

The ISAFRUIT project developed also a new protocol to control postharvest fruit rots using an existing technique, the so called "hot water treatment". This technique is safer for consumers and will enable them to eat fruit's skin, by reducing use of pesticides and environment's contamination. The technique and the new protocol, already industrially tested in Spain and Italy, are based on the simplest tool: hot water. Researchers demonstrated that dipping peaches for 20 second in hot water at 60 degrees can reduce the brown rots by 80%. For apples the treatment is 40 seconds at 50-52 degrees. The treatment shows its efficiency for removing fruits rot agents, human pathogens such as *Escherichia coli*, salmonella and listeria and allowing energy saving by heating water with hot gas from cooling plants.

Finally, ISAFRUIT's researches focused also on the development of new dried fruits appealing products to increase fruit consumption among young people.

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## EPIZONE

### A unique European-led network of researchers in support of the prevention and control of epizootic diseases

**Epizootic diseases as avian influenza, foot and mouth disease, swine fiver are a concern for the whole society, from the farmers to the consumers, and generate huge economic looses along the animal production chain causing food security issues and public health concerns. Research into prevention and control of epizootics is more than ever necessary. However, the need to reduce fragmentation of research seeking synergies by transnational co-operation and collaboration is urgent. In this framework, EPIZONE has been created and financed by the European Sixth Research Framework Programme by 14 million euro, providing a structure at the European level to unite research in this field.**

Some infectious diseases of farm and aquaculture animals can quickly spread without respecting borders and causing devastating economic and social consequences. Good examples in Europe have been the outbreaks of foot-and-mouth, avian influenza H5N1 and bluetongue in the past decade. In developing countries, these diseases have a major impact on the livelihood of farmers given the multi-functionality of livestock. Furthermore, in some cases these diseases are of public health concern. According to the World Organisation for Animal Health (OIE) the impact of animal diseases on losses on animal production (and on animal products) worldwide exceed 20%.
The research into preparedness, prevention, detection, and control of epizootics has to result from transnational cooperation, tackling the problem across the whole production chain of animal-related food.

From its creation in May 2006, the EPIZONE Network of Excellence has provided a structure at the European level to facilitate this united effort. It brings together the research of 17 institutions from ten European countries, along with China and Turkey, an international organisation (FAO) and an SME. It is the largest international network of researchers on major infectious animal diseases. It gathers over 300 scientists working to improve and provide the knowledge and tools for the prevention and control of epizootic diseases. A special attention is dedicated to new emerging epizootic diseases threatening the EU borders.

The network strongly enhances sharing expertise and spreading excellence between scientists, including a mayor effort on young scientists through the sub-network YOUNG EPIZONE. This integration is achieved through a variety of communication channels, meetings, training and continuous professional development.
EPIZONE also manages its own scientific work programmes through jointly funded and executed research by network members. The research covers four main themes: diagnostics methods, intervention strategies, surveillance and epidemiology, and risk assessment. Given the network structure, the technical resources and the scientific excellence at its disposition, EPIZONE ensures strategically driven state-of-the-art research of world-renown quality.

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## ECNIS

## Dietary impacts on risk of cancer

***How diet and hereditary factors can influence the risk of cancer from environmental factors***

**Explore the risk of cancer associate to environmental factors exposures and how dietary elements and individual genetic makeup can have a protective or harmful influence on this disease killing 1.8 millions Europeans annually. These are some goals of the EC funded project "ECNIS", a network of excellence, which brings together experts in different scientific disciplines (molecular biology, medicine, epidemiology…). The project has been supported with 11 million euro by the European Sixth Research Framework Programme and it will ended by October 2010.**

Life style factors including diet, smoking habits, alcohol drinking and environmental exposure are some very well know factors having an influence on the development of cancer. ECNIS aims to create a dynamic network of research institutions which will work to decrease cancer incidence by identifying chemicals or other factors in the environment and food which cause cancer, but also elucidating mechanisms by which dietary and lifestyle patterns increase or decrease cancer. Biomarker-based methods for the study of the role of environmental and food-related carcinogens were developed, validated and applied in population studies. Examples are: PAHs and nitroso compounds found in contaminated, smoked and/or grilled food, alcohol/acetaldehyde.

It aspire also to help facilitating the development of new foods with cancer-preventive properties, discovering hereditary factors which make individuals more o less susceptible to cancer and formulating improved approaches to the risk assessment of carcinogens.

To improve the scientific basis for the creation of health-promoting foods, for example, within the project relevant biomarkers have been developed and validated in humans. They can be used for population screening in the assessment of the effects of various foods or in development of functional foods (therapeutic food, designer or nutraceuticals). In this case the project offers an opportunity to have better basis for dietary advice formulation.

Researchers carried out by ECNIS researchers analysed, for instance the role of fruit consumption on cancer prevention, stressing that it can be eating some fruits, vegetables and plants has a clearly preventive role on cancer development; or the effects of smoking cannabis on human health discovering that this can damage human DNA in ways that could potentially increase the risk of cancer development.

The project has also provided scientific support to regulators and other stakeholders, at European and national level, in connection with the formulation of policies to protect the public from environmental carcinogens.

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**EuroFIR**

**EU research unveils food products nutrient composition on the supermarkets' shelves**

***Online food composition databases providing information on the nutrient and non-nutrient content of raw foods or prepared and composite foods***

**European food composition databases publically accessible online containing information on the nutritional composition of foods have been standardised and harmonised within the European research project EuroFIR. The project, funded under the EU Sixth Research Framework Programme with 12 million Euro, allows scientists and consumers to check the nutrient composition of products: from fresh tomato to pre-packed pasta's. To broaden the list of products analysed and more transparency several big private companies have been involved.**

EuroFIR provides the first comprehensive pan-European food information resource. Thanks to the project EuroFIR eSEARCH, (http://esearch.eurofir.org/) it is easy to retrieve detailed information on the nutritional composition of foods, for example the Vitamin C content in a tomato (17mg/100g ) or the energy value of a raw grapefruit (131kj/31kcal*), but also the nutrient content of 100g of baked beans in tomato sauce on the supermarket shelves (4.8g protein, 0.6g fat, 15.1g carbohydrate, 5.8g sugar and 92.9g water).

The project has created a network of information, available for all the consumers, collecting and interlinking twenty-six authoritative European Food Composition Databases (FCDB) containing more than 50,000 data points.

EuroFIR also provides EuroFIR eBASIS (http://ebasis.eurofir.org/), which is an Internet deployed food composition and biological effects database for plant-based bioactive compounds with putative health benefits. Over 300 major European plant foods are listed and information on 17 compound classes (e.g. phytosterols, polyphenols, glucosinolates and lignans) is provided covering multiple bioactive compound classes and plant foods, with data sourced from peer-reviewed literature.

Data reporting from EuroFIR eBASIS uses a sophisticated data retrieval software system, searchable by compound, food or biological effect, allowing users full control over the data selected for output. Outputs can be downloaded as spreadsheets, allowing the user to perform calculations, create graphs and manage the data as required. The database represents a unique comprehensive resource on bioactive compounds for researchers, health professionals, health educators, the food industry and policy makers.

Additionally, a project funded by the European Food Safety Authority (EFSA) has allowed the inclusion of information on the toxicity of plant foods, which is available via a linked database. This information is available together with figures on bioactive compounds with effects on human health.

Furthermore, traditional and ethnic foods have been analysed to define their characteristics, nutritional composition, and preparation methods. This is important for helping to ensure continued existence of these foods and to preserve their place in each country's culture. As regards traditional food, information was gathered in 13 European countries: Austria, Belgium, Bulgaria, Denmark, Germany, Greece, Iceland, Italy, Lithuania, Poland, Portugal, Spain and Turkey. For ethnic food, the project researched, collected and studied 131 foods from Asia, Africa, the Mediterranean region, Turkey, Romania, Latin America and Surinam.

A committee on Food Composition Data was launched in 2008. The committee, which will develop the new standard for food composition description, is led by Swedish Standards Institute (SIS) and the Swedish National Food Administration (NFA). EuroFIR has contributed to recommendations that form the basis of this framework

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## EUFRESHBAKE

### Fresher bread on the shops with improved nutritional quality and energy savings

**An innovative concept of baking oven has been developed by the EU-FRESHBAKE European research project. The concept is based on infrared technology and has been developed with the objective of saving energy compared to a conventional baking oven while maintaining at the same time high quality level of freshness. The EU research project EU-FRESHBAKE was supported by the European Commission Sixth Research Framework Programme with 2 million Euro; the project focused on all the domains of industrial baking and in particular on back off technologies, which allow to sell fresh baked bread made from frozen products. Specialties such as gluten free bread have also been considered.**

EU-FRESHBAKE focused on the bake off technology, which consists in preparing bread from semi finished products which are most of the time made at industrial scale (but also by craft bakers). Most emblematic products are the frozen fully baked bread, the frozen (or non frozen) part baked bread and the non-fermented frozen dough. Preparation times are respectively 30 min, 1 hour and 3 hours. One can find these products in baking stations (shopping mall, train station, small supermarket…) or even in craft bakeries.

EU-FRESHBAKE developed a special infrared oven based on targeted pre-heating functionality. Tests have been done to compare the energy consumption in comparison with a similar electric oven. A reduction by around 30% of the energy (not including steaming) and of around 70% of the pre-heating times have been obtained with a higher installed power for the infrared oven. A patent has been filled in France in July 2009 and is at present under extension to selected countries. Industrial partners are searched to market the oven. The concept, which can be installed also in the existing ovens, is based on the same principle as conventional oven: preheating followed by baking. The difference comes from the efficiency in heat transfer. Instead of heating the whole body of the oven, the energy is applied only where it is demanded; the energy savings come from reduced losses to the ambience thanks to the concept. Further developments are carried out in particular for the process control and the operation of the oven in the case of a baking station or of a bakery.

The project also makes available another energy saving oven system based on vacuum baking using low pressure. Partial baking is made at lower temperature resulting in lower bread volume. This technique is efficient in case of partial baking of bread and permits to save energy (because of the lower baking temperature). In addition, the bread volume is higher and the water losses during baking are reduced (respectively + 30% and -30 to -50% vs. conventional). The exposure of the fermented dough to a reduced ambient pressure results in an expansion of the dough. The stabilization of the dough (dough to crumb transition) is then obtained via a conventional heat transfer.

Another very important finding was on the impact of baking condition on the glycaemic index (GI). The GI gives information on the glycaemic response (sugar in the blood) after eating a food. The reference value is 100 in the case of a glucose solution. Tests have been done with healthy volunteers. It has been shown that frozen part baked bread had a significant lower GI than conventional breads. This was explained by the fact that starch granules (which contain carbohydrates) are less affected in the case of partial baking. In combination, the freezing process tends to provide to starch a better resistance to digestion. This is related to major health problems such as obesity and diabetes type 2 problems. Obesity is often related to a combination of high glycaemic foods and an excess of lipids in the gut. Conferring low GI permits to reduce the energy intake and contributes to a reduction of the body mass index. An important outcome of the project is that breads sold in bakery or in

baking stations (which use bake off technology) are not accompanied by any information or nutrition facts on a label. Most breads developed during EU-FRESHBAKE might be able to support nutrition claims such as “source of fibers”, “high fibre”, “source of proteins”, or “low glycaemic index food”.

Fresh bread represents 73% of the EU-27 tonnage bread production (data of 2006 - Girafood). However, the bake off technology is growing fast (10 to 20% per annum), in particular in EU-15, whereas fresh packed bread is the growing market in the 12 New Member States. The market is growing at a much higher level than any other bakery products (between 10 and 20% per annum). Even though frozen part baked bread demands roughly 2.2 times more energy than conventional direct baking (not considering frozen transport and frozen storage), it offers the unique advantage to prepare the bread on demand and finally to reduce the leftover breads.

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## AQUAMAX

### Alternative fish feeds for safer seafood, healthy consumers and sustainable aquaculture

**Consumers are generally recommended to increase their fish consumption, to maintain a healthy diet. The worlds' fisheries stagnation and decline struggle to meet this growing global demand for fish. Aquaculture has thus far managed to make up the deficit but its growth is becoming increasingly constrained by the limited industrial supply of fish on which aquaculture feeds are so heavily dependent. In this context, EU has funded AquaMax, a project aiming to develop alternative fish feeds to replace the fish meal and fish oil. Supported under the Sixth Research Framework Programme by 10.5 million, this project will lead to multiple benefits focused on healthier farmed fish and safer consumers.**

Aquaculture as currently practiced in Europe is being increasingly criticised for its over dependence on scarce and frequently polluted marine resources. This is because the feeds used for the major fish species farmed in Europe - Atlantic salmon, rainbow trout, sea bream and sea bass - are composed to a large extent of fish meals and fish oils derived from global marine fisheries that are at best stagnating and at worst declining.
Moreover, marine fisheries can be contaminated with persistent organic pollutants that are de facto present in fish meals and fish oils and so can be transmitted directly from the feeds to the farmed fish and hence to the consumer. Consequently, there is justified concern that the claimed health benefits to consumers derived from eating fish, especially oily fish and including farmed fish, can be offset by risks, however slight, associated with ingesting marine environmental pollutants. This concern is illustrated by some national nutritional authorities recommending that care be taken when consuming fish, especially oily fish, during pregnancy.

Numerous previous studies have investigated and recommended potential alternatives to fish oil and fish meal in fish feeds, most notably the EU Framework 5 - funded projects RAFOA and PEPPA. The former programme established that fish oil in fish feeds containing fish meal could be very largely replaced with vegetable oils; the latter programme established that fish meal in fish feeds containing fish oil could be largely replaced with vegetable meals. However, the extent to which fish oil and fish meal can both be replaced, simultaneously, in fish feeds is far from clear. Moreover, it is axiomatic that such replacement must not prejudice the health and welfare of the farmed fish, it must retain the health benefits of the product and its acceptability and quality to the consumer and, above all, its safety to the consumer.

It was to address and resolve these complex and inter-related issues that AquaMax was established in 2006 as a major integrated project in FP6. The AquaMax project consisted of 32 partners from 14 countries and was completed in 2010 at a total cost of 15.9 (10.5 EU contribution) million euros.

The primary applications of AquaMax have been to develop new feeds that enhance the sustainability of the industry and that ensure minimal levels of contaminants in the product and hence its safety. The health benefits of fish fed the new feeds and their acceptability to the consumer have been demonstrated. These applications have been underpinned by developing an extensive body of basic and applied scientific knowledge. In addition, AquaMax has contributed with knowledge to improve the feed and food legislation as well as nutritional recommendations. Thus, AquaMax has substantially enhanced the visibility of European aquaculture and its supporting research and development capabilities and expertise worldwide.

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## HEALTHGRAIN

### Cereals as a weapon against metabolic disorders

**Cereals and wholegrain foods can reduce the risk of developing certain diseases. Growing scientific evidence shows that the daily intake of cereal foods classified as wholegrain and/or high in fibre plays an important role in human health. While consumers across Europe are increasingly aware of this, refined white wheat flour foods still forms an important part of their cereal intake. Through HEALTHGRAIN, the European Union is pushing to change this trend, acting right at the beginning of the food chain through the production of new grain traits. This € 17 million EU funded project joined 44 partners from 15 countries working to increase availability of high-quality cereal-based foods and the average European citizen's intake of protective compounds of whole grains or their fractions.**

HEALTHGRAIN is providing European grain producers with new technologies to develop globally competitive, healthier grain traits while helping the processing industry, including a large number of small and medium-sized enterprises, to develop new competitive healthy grain foods. These include foods for individuals sensitive to particular cereal constituents, for example, gluten-free products.

Nutrition epidemiology research increasingly demonstrates that a diet rich in whole grain and grain fibre based foods protects against the development of diet-related disorders, such as obesity, cardiovascular diseases, and the rapidly expanding epidemic of type 2 diabetes.

Analysis of a wide range of wheat varieties within the HEALTHGRAIN project has shown substantial variation (up to four-fold) in the content and composition of these components.
Furthermore, a significant proportion of this variation, particularly for dietary fibre content, is highly heritable and hence can be exploited by plant breeders to produce new types of wheat with enhanced health benefits.

The industrial feasibility study of 'Healthflour' production, carried out in HEALTHGRAIN, revealed that 'Healthflour' has less potential food safety issues than whole wheat flour and bread-making companies are already showing interest in using this new flour concept.
The project will give European grain producers and the processing industry new technologies to develop healthier grains and products that can significantly contribute in combating obesity, heart diseases and type-2 diabetes

Over 40 HEALTHGRAIN related industries, universities, institutes and organisations communicating to consumers have established in June 2010, directly after the end of the project, the HEALTHGRAIN Forum aiming at further pursuing the HEALTHGRAIN objectives after the end of the project.

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## MoniQa

### A common approach to food integrity?

***A world wide network improves methods to assure that food is safe and provides reliable information to consumers and policy makers***

**Developing world wide protocols to validate methods of analysis and testing the food quality and safety and so doing guaranteeing at the final consumers that a product on the supermarket shelves is safe. This is one of the major achievements of the European research project MoniQa supported under the Sixth Research Framework Programme by 12.3 million euro and to be completed in 2012 and including partners from all over the world.**

How to be sure that a food product is safe? Ensuring that foods we can buy in shops and supermarkets are of a high quality and safe to eat when they reach the consumer requires reliable food analysis techniques. Recent food scares such as BSE, Salmonella and E. Coli outbreaks, Listeria monocytogenes, Acrylamide, Avian influenza, Sudan red, melamine, Ochratoxin, and others have emphasized the importance of protective legislation and powerful analytical test systems to ensure safety of foods.

The MoniQa Network aims to make the food chain safer by contributing to the development and validation of reliable test methods and by harmonising safety and quality testing schemes on a global basis. The achievements of MoniQa will help prevent future food scares and will ascertain safe foods for all of us.

In recent years the market already developed fast and easy test systems to verify for example the presence of allergenic compounds or mycotoxins produced by moulds, in a product: simple test strips or pens generating a few blue lines, such as the ones used to check for pregnancy, are commercially available and within few minutes they can detect the presence of possible dangerous substances in foods or drinks. However who can be sure that consumers can trust the test and that the results are reliable? This is the role of the MoniQa international network. The project developed strategies, guidelines and protocols to make sure that foods right from the farm to the fork are safe in all aspects and meet the desired quality requirements.

One of the strengths of this network is to have a strong international dimension allowing setting food safety and quality standards to be used world wide and so doing harmonizing the rules and the procedures globally. The next steps is to have these standards accepted and adopted by global organisations such as ISO, CEN and Codex Alimentairus in order to validate them for implementation in European and national laws elsewhere in order to enhance the food safety at the same level all over the world.

Finally the project is open to provide information to industry and consumers on food safety and quality. For example, companies can have access for free to the MoniQa data base and having information on methods for testing the safety of the products, or knowing the legal requirements. Consumers can check on the web site (www.moniqa.org/factsheet) for reliable validated information on potential risks, prevention measures and other details on the major food related diseases and safety risks such as listeria, allergens or melamine.

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**Number of organisations from each country taking part in the projects**

| EU COUNTRIES | AQUAMAX | EUROFIR | ISAFRUIT | HEALTHGRAIN | EPIZONE | EU-FRESHB. | MoniQa | ECNIS |
|---|---|---|---|---|---|---|---|---|
| Austria | | 2 | | 3 | | | 3 | |
| Belgium | 1 | 4 | 1 | 4 | 1 | 1 | 2 | 2 |
| Bulgaria | | 1 | | 1 | | | 1 | |
| Cyprus | | | | | | | | |
| Czech Republic | | | | | | | | |
| Denmark | | 2 | 5 | 3 | 1 | | | 1 |
| Estonia | 1 | | | | | | | |
| Finland | | 2 | | 4 | | | 1 | 1 |
| France | 4 | 1 | 7 | 2 | 2 | 2 | | 1 |
| Germany | 1 | 2 | 3 | | 2 | 2 | 2 | 3 |
| Greece | 3 | 2 | 1 | | | | 2 | 1 |
| Hungary | 4 | | | 2 | | | 1 | 1 |
| Ireland | | 1 | 2 | 1 | | | | |
| Italy | 1 | 2 | 11 | 5 | 3 | 1 | 4 | 2 |
| Latvia | | | | | | | | |
| Lithuania | | | | | | | | |
| Luxembourg | | | | | | | | |
| Malta | | | | | | | | |
| Netherlands | 1 | 2 | 7 | 4 | 3 | | 1 | 2 |
| Poland | | 1 | 6 | 1 | 1 | 2 | 1 | 3 |
| Portugal | | 1 | | | | | | |
| Romania | | | | | | | | |
| Slovakia | | | | | | | | |
| Slovenia | | 1 | 1 | | | | | |
| Spain | 4 | 2 | 5 | | 1 | 1 | 1 | 1 |
| Sweden | 1 | 2 | | 4 | 1 | | | 3 |
| United Kingdom | 6 | 8 | 3 | 6 | 2 | | 3 | 4 |
| **OTHERS** | | | | | | | | |
| Norway | 3 | 1 | 2 | | | | | |
| India | 1 | | | | | | 1 | |
| China | 1 | | | | 2 | | 2 | |
| Croatia | | | | | | 1 | | |
| Iceland | | 1 | | | | | | |
| Israel | | 1 | | | | | 1 | |
| Turkey | | 1 | | | 1 | | 2 | |
| Switzerland | | | 5 | 1 | | | | |
| New Zealand | | | 1 | | | | 1 | |
| USA | | | 1 | | | | | |
| Russia | | | | | | 1 | | |
| Egypt | | | | | | | 1 | |
| Norway | | | | | | | 1 | |
| Vietnam | | | | | | | 1 | |