Call 1

Integrated Project

Grain Legumes

Promoting grain legumes for European livestock

Animals need both energy and protein in their food. BSE or mad cow disease, which led to the removal of animal-derived protein from livestock feed, has highlighted the shortfall in vegetable protein sources. Europe imports 75% of its plant-derived protein, mostly as soyabean meal. For this reason, the European Union wants to encourage farmers to grow protein-rich legume crops like peas and faba beans for animal feeds. Such plants are currently under-used in European agriculture, despite having the advantage of reducing fertiliser and pesticide inputs, which is better for the environment. A large Integrated Project called "Grain Legumes" is combining the efforts of scientists from 18 countries in order to make legume crops more competitive for European agriculture, using the latest progress in genomics and ranging from plant improvement and crop management to feed processing.

Tempting farmers

Peas, faba beans, chickpeas, lupins, common beans and lentils are the main legume crops most suited to European agriculture. They offer farmers several environmental benefits. First, by fixing nitrogen due to natural symbiosis they reduce the need for industrial fertilisers. They increase the diversity in crop rotations, breaking the annual cycle of cereals and reducing the build-up of cereal weeds and pests and the corresponding need for pesticides.

With all these benefits, why are farmers reluctant to grow them? Currently, they represent just 5% of Europe's arable land, compared with 15 to 30% elsewhere. Farmers complain that their yield is lower than that of other crops and is variable. Foliar diseases and root rots are largely to blame and pea-like plants tend to collapse under their own weight, making harvesting more difficult.

The overriding aim of the Grain Legumes project is to provide tools to facilitate genetics and to develop new varieties of legumes alongside new ways of growing, treating, processing and using them. The strategy is to accelerate plant breeding by harnessing the progress in the description of legume genes and their genome organisation.

The legume code

Progress towards understanding the genetic code of legume crops lags behind other crops such as cereals. A species adopted as a genetic model for legumes, the barrel medick, is about to have its gene content fully sequenced and the partners in Grain Legumes will contribute to these international efforts. This will provide the gene order of this model species, which will in turn provide a blueprint to analyse the genetic organisation of legume crops. The project will also create a library of pea genes and mutants and will develop microarray methods to tell which genes are active in key cell pathways. These genomic tools will pave the way to identifying genes, or sets of genes responsible for important attributes such as plant shape, disease resistance, and content of protein or other constituents in seeds. This information will enable the monitoring of plant breeding and the identification of genetic diversity for breeders to work with.

Meanwhile, agronomists and agro-ecologists will measure the impact of legume crops, in terms of agronomic and economic criteria, cost and energy use. Animal nutritionists will study their potential to improve animal feed and will test feed, that is processed using novel methods, on pigs and salmon to establish whether or not animal health can be improved, and to provide new sources of protein so urgently needed for fish farming.

The project will develop links with other international programmes on legume genomics, to avoid duplicating effort. European plant breeding, food and animal feed companies will be kept informed of results and have access to these publicly funded activities through an interactive Technology Transfer Platform so that the results can be developed into real products. The predicted outcome should be legume crops that are more attractive for European agriculture and industry so that, in future, Europe's citizens and animals can look forward to eating more locally-grown grain legumes with the benefits of enhanced traceability and health.

Full title: New strategies to improve grain legumes for food and feed

Acronym: Grain Legumes

Contract n°: CT-2004-506223

Website: www.eugrainlegumes.org

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EU contribution: €14.2m

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- Consejo Superior de Investigaciones Cientificas (Spain)
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- Royal Veterinary and Agricultural University (Denmark)
- Genome Research Limited, Sanger Centre (UK)
- University of Frankfurt Biocentre (Germany)
- University of Dundee (UK)
- Institute of Genetics, BRC, Hungarian Academy of Sciences (Hungary)
- ID Lelystad BV (The Netherlands)
- University of Córdoba (Spain)
- Technische Universität München (Germany)
- De Schothorst Institute of Animal Nutrition (Germany)
- University of Aarhus (Denmark)
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- Flanders Interuniversity Institute for Biotechnology (Belgium)
- IPK, Gatersleben (Germany)
- RISØ National Laboratory (Denmark)
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- Nutreco Aquaculture Research Centre (Norway)
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- Plant Research International (The Netherlands)
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- CNR, Consiglio Nazionale delle Ricerche (Italy)
- IPBO, Institute for Plant Biotechnology for Developing Countries (Belgium)
- Commonwealth Science and Industry Research Organisation, Division of Plant Industry (Australia)

Anticipated participant:

- GenXPro GmbH (Germany)
- Technology Transfer Platform (to be created)

SIXTH FRAMEWORK PROGRAMME

Food Quality and Safety - Call FP6-2002-Food-1

Call 1

Integrated Project

LIPGENE

Reducing the burden of obesity

The population of Europe is growing older and fatter. By 2030, nearly a third of Europeans will be over 60. The European Council of Ministers has expressed grave concern about the social and economic impact of increasing obesity in Europe. In several countries, the cost of obesity is already 5% of total public health expenditure, largely due to the treatment of older people suffering from high blood pressure, diabetes and high levels of fat in the blood. These conditions characterise what is known as the metabolic syndrome which affects overweight people, generally in middle and old age. By 2010, some 31 million Europeans will require treatment for diabetes. But recent research shows that diet and exercise are better than drug treatment at preventing development of obesity-related diabetes.

LIPGENE, a five-year Sixth Framework Programme Integrated Project, is helping to reduce the economic and social burden of obesity by assessing the potential for diet-based prevention of metabolic syndrome. It involves 21 partners from ten countries, including scientists, economists and business.

Food For thought

One major scientific aspect of LIPGENE is to find out whether our genes modify the way diet affects our body. Can everyone benefit from a better diet, or are some people at risk whatever they eat? Using the data from a population-based study of 13 000 people, scientists will search for genes that predispose us to suffering ill effects from obesity. Are some people more sensitive to certain types of fat? Some fats, such as saturated fats, enhance the ill effects of being overweight. Other types of fat, notably the n-3 long chain polyunsaturated fatty acids which are found mainly in fish oil, are healthier. LIPGENE will carry out a large study on what happens to those people at risk of metabolic syndrome if they change the fats in their diet. How much of an improvement is possible using diet alone? Do the genes associated with metabolic syndrome make a difference? The scientists will also study key mechanisms in fat and muscle tissue to find out how these genes work.

If some fats are better than others, why not use modern technology to modify the fat composition of food? LIPGENE scientists will engineer genes from marine algae into linseed plants so as to produce oil with a higher composition of healthy fatty acids. Another group will try to improve the composition of milk and meat fats by changing animal diets. Following this research, the project will produce a range of demonstration foods containing the improved fats, such as milk, cheese, poultry meat and margarine. This consumer test will be addressed not just to the general public, but also to companies which might be willing to develop such products.

A balanced approach

On the social and economic front, LIPGENE will assess the true European cost of obesity-related health problems and weigh up both the costs and benefits of introducing modified fats in food. It is crucial to ask how the general public feels about dealing with obesity in this way. Are we happy to change the nutritional content of foods? Are genetically modified foods acceptable in this context? Equally, how do Europeans feel about accessing the information in our genes which tells us whether we are likely to suffer complications from being overweight? LIPGENE will survey opinions of metabolic syndrome sufferers across Europe to find out whether introducing these technologies would be popular, effective and would have a high cost benefit. The consortium will work hard to publicise all its findings and hopes to stimulate debate on the future of food policy at the highest level.

Full title: Diet, genomics and the metabolic syndrome: An integrated nutrition, agro-food, social and economic analysis

Acronym: LIPGENE
Contract n°: CT-2004-505944
Website: www.lipgene.tcd.ie

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- The Jagiellonian University Medical College (Poland)
- Uppsala University (Sweden)
- Unilever Bestfoods (The Netherlands)
- BASF Plant Science GmbH (Germany)
- University of York (UK)
- Rothamsted Research (UK)
- Rowett Research Institute (UK)
- MTT Agrifood Finland (UK)
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- University of Ulster (UK)
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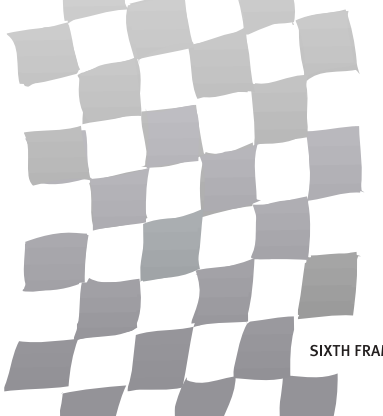
- British Nutrition Foundation (UK)
- LMC International (UK)
- Hitachi Europe Ltd (Ireland)



SIXTH FRAMEWORK PROGRAMME

Food Quality and Safety - Call FP6-2002-Food-1

Call 1

Integrated Project

QUALITY LOW INPUT FOOD

Low input for high returns

As recognised by the European Action Plan on Organic Food and Farming, organic food has experienced a boom over the last decade. But farmers and the whole supply chain still have some way to go. An Integrated Project under the European Commission's Sixth Framework Programme (FP6) brings together European research on a wide range of low-input and organic farming research, from consumer perceptions of quality to individual activities on the farm. The overall objective of the project is to improve the quality and safety of organic and 'low-input' food, whilst reducing its cost to the consumer. By involving the entire supply chain – from farmer to shopper – it hopes to align producers better with the expectations of their markets.

According to the FP6 project, 'Quality Low Input Food', the research challenges are: to improve the match between what producers aim at, and what consumers want; to increase cost efficiency (but not at the expense of quality, or food safety); and to draw all possible environmental and energy use benefits from organic and 'low-input' farming.

The project will address these issues by rigorously investigating consumer behaviour, testing the safety and quality of organic and low-input food, and by applying Europe's research expertise to improving the cost-effectiveness of low-input production. The project involves 31 partners – eight are European companies, including six SMEs, involved in the production, processing and quality assurance of organic food.

What do consumers want?

The first phase of the project is to ask consumers what they want from low-input foods, to measure what they actually buy, and to use the results in planning the research. To complement this, the project will compare the nutritional value and quality of low-input and conventional products. This will be followed by a carefully programmed series of studies, among them a comparison of the nutritional content of milk, and a test to demonstrate the effect of fungicide residues on animal fertility. The risk of pathogens reaching food from animal manure fertilisers, and of fungal toxins on organic grain will be quantified, and solutions sought. The research will help identify points in the low-input food chain where such hazards occur, and the new control measures will be disseminated to professionals in the food industry. It is planned to follow up the first results with studies focused on consumer health.

What can producers do?

The research continues back down the chain to the primary production systems themselves. There will be focused research packages in the cereal, vegetable, dairy, poultry and pork sectors. Scientists will try out novel techniques to produce better and cheaper products in line with consumer requirements. For example, agronomists will test different weeding methods and crop rotations, while livestock experts will assess whether housing animals differently can reduce their worm burden.

Each year of the project, the partners will hold a major colloquium to present their results to user- and consumer-representatives. The colloquium will be used to measure progress towards the project's overall goal of improving quality, ensuring safety, and reducing cost along the European organic and low-input food supply chains.

Full title: Improving quality and safety and reduction of costs in the European organic and low input supply chain

Acronym: QUALITY LOW INPUT FOOD

Contract n°: CT-2004-506358

Website: www.qlif.org

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EU contribution: €12.4m

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- Campden and Chorleywood Food Research Association (UK)
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- Roger White and Associates (UK)
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- Anidral SRL (Italy)
- Gilchesters Organics (UK)
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SIXTH FRAMEWORK PROGRAMME

Food Quality and Safety - Call FP6-2002-Food-1

Call 1

Integrated Project

SAFE FOODS

Boost for consumer confidence

Risk analysis has three main components: risk assessment (scientific advice and information analysis), risk management (regulation and control), and risk communication. For consumers to have confidence in the food they buy and eat, they need access to all the important information and must put trust in risk analysis as a viable procedure ensuring that the food is safe and that the consumer can make her/his informed choice. Increased transparency in risk analysis can help to solve the problem of a lack of consumer confidence in the safety of food, and restore trust. Consumer trust in the food chain has declined as the result of a number of highly publicised scares like BSE, but is now improving in some European countries thanks to the hard work of all parties involved in risk analyses.

If risk analysis could be applied to new processes in food production, such as changes in breeding programmes, potential dangers could be spotted before they become serious. It is vital not only to carry out such checks, but to take public opinion into account when accepting their conclusions, to avoid food scares in the future.

A new Integrated Project within the Sixth Framework Programme, SAFE FOODS (Promoting Food Safety Through a New Integrated Risk Analysis Approach) seeks to refine risk analysis practice for food safety. Lasting four years, it combines the skills of natural and social scientists, stockbreeders, food producers, and regulatory bodies, coming from 33 institutions, not only in Europe but from other continents, too.

Coherent research

The tenor of the research is to design new and effective procedures for analysing risks for foods produced by different production practices (high- or low-input systems) and with different breeding technologies (traditional, molecular, and genetic modification). New systems will be compared with traditional methods to see if they introduce greater risks; for example, high-input, intensive animal rearing will be contrasted with low-input traditional methods. Projects will seek ways to detect emerging risks associated with food and feed production, and to make quantitative assessments of the risk of human exposure to mixtures of food contaminants.

The potential role of regulatory organisations in managing risks in the food chain will be explored and, ultimately, a new integrated risk analysis approach for foods will be designed. A wide range of concerned organisations – food producers, plant and animal breeders, and national and international organisations associated with risk analysis – will all test this new framework.

More confidence in food chain

The project acknowledges the importance of consumer confidence for the societal acceptability of effective risk analysis practices in foods. In fact, an entire work package is dedicated to consumer confidence in risk analysis practices regarding novel and conventional foods. The public debate on GM foods has shown that there is a good deal of public information and education needed. Consumer organisations will be asked to trial the risk analysis approach developed in the research, and due publicity will be given to the results.

This Integrated Project will put assessing risks associated with food production on a firm basis with transparent, effective and balanced procedures. These will form the foundation for further development of this novel approach to food safety. A clear demonstration of the safety of European food, breeding and rearing practices will make them more competitive in world markets. The inclusion in the project of researchers from South Africa and China will give it an international direction so that the risk analysis strategies developed could be applied globally. The net result will be to restore consumer confidence in the safety of European food, both within our borders and on a global scale.

Full title: Promoting food safety through a new integrated risk analysis approach for foods

Acronym: SAFE FOODS
Contract n°: CT-2004-506446
Website: www.safefoods.nl

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EU contribution: €11.4m

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SIXTH FRAMEWORK PROGRAMME

Food Quality and Safety - Call FP6-2002-Food-1

Call 1

Integrated Project

SEAFOODplus

Focus on fish

The benefits to human health of eating a reasonable quantity of seafood regularly are well known and have led to an increase in fish farming to meet market demand. The EU wants to maintain the quality and safety of farmed and caught seafood, tailor products to give consumers what they want, and encourage them to eat a greater variety of fish. Consequently, it has set up SEAFOODplus, a large-scale integrated project to study the production, marketing and consumption of seafood, and its effects on health. Research institutes and organisations from all over Europe are working on the programme, which could last up to five years, and is initially being divided up into three 18-month reporting periods.

Six main themes

The programme is structured around the following six main themes:

1. **Seafood and nutrition:** Doctors recommend fish as part of a healthy diet because the polyunsaturated fatty acids it contains can reduce the risk of heart disease and cancer. The project will also investigate the possible role fish consumption could have in helping to prevent other chronic diseases such as inflammatory bowel disease, irregular heartbeat, along with its role in younger people's health, and in combating obesity, post-natal depression and brittle bones.
2. **Consumer health:** Although many consumers already know that seafood is good for them, the amount they eat varies widely. The project will study attitudes and preferences in detail, and the results will be used to develop new seafood products which offer health benefits and are able to meet consumer expectations. This should encourage more people to eat more fish and improve their health.
3. **Safety and risk/benefit analysis:** Shellfish can sometimes cause food poisoning or histamine reactions. SEAFOODplus will develop standard universal methods to detect certain viruses in susceptible shellfish, and develop early-warning systems for viral contamination. These risks will be balanced against health benefits and the results will be publicised.
4. **New seafood consumer products:** Sources of wild fish are limited and some stocks are under threat, while fishing and fish farming produce by-products that are not being used to their full potential. The aim is to extract compounds beneficial to health from such sources and develop them into new functional food products. The approach taken will also enhance the consumer appeal of fish products while identifying new types of convenience and functional foods.
5. **Aquaculture:** Intensively reared fish can create problems of pollution and product quality. The public is concerned that farmed fish should be well treated and that wild species are not adversely affected. SEAFOODplus will study what goes into producing high-quality fish products, including genetics and what the fish are fed. It will establish a framework for farming European fish to a standard that is acceptable on quality, ethical, and environmental grounds.
6. **Traceability:** Consumers want reassurance about where their food comes from, that the environment has not been damaged in its production, and that it is safe to eat. Across all the research projects, a systematic approach will be developed to ensure that every fish on the European market can always be traced back to its source. A standard vocabulary of terms will be devised and integrated into a traceability system which will be tested on several seafood chains and validated for wider use.

A balanced approach

The strategy of the SEAFOODplus programme is to promote the production of better, safer fish of all kinds, and to increase their consumption across Europe. In the long term, it is expected that through increased consumption and awareness a quantifiable improvement in human health can be recorded.

Full title: Health promoting, safe seafood of high quality in a consumer driven fork-to-farm concept

Acronym: SEAFOODplus
Contract n°: CT-2004-506359
Website: www.seafoodplus.org

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EU contribution: €14.4m

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- Netherlands Institute for Fisheries Research (The Netherlands)
- Institute of Food Research (UK)
- SINTEF Fisheries and Aquaculture (Norway)
- AZTI Fundazioa (Spain)
- Wageningen University (The Netherlands)
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- Aarhus School of Business (Denmark)
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- BioMar AS (Denmark)
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- Royal Greenland Seafood A/S (Denmark)
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- Trace Tracker Innovation AS (Norway)
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SIXTH FRAMEWORK PROGRAMME

Food Quality and Safety - Call FP6-2002-Food-1

Call 1

Integrated Project

WELFARE QUALITY

Improving animal welfare and satisfying consumers

In the past, the main focus of animal production and related research in Europe was on ensuring an adequate food supply at a reasonable price, which led to increasingly intensive husbandry methods. When prompted, consumers in different EU Member States expressed grave reservations about how farm animals are kept. Problems such as BSE or swine fever increase their concerns and emphasise the fact that 'you are what you eat'. A growing number of consumers today want to be reassured that the animals that produce their food have been raised under humane conditions and with proper regard for the environment. Animal welfare has become both an integral part of the concept of food quality and a priority theme in the EU's Sixth Framework Programme.

A major new project, Integration of Animal Welfare in the Food Quality Chain (WELFARE QUALITY), aims to improve food quality by ensuring the welfare of farm animals. It will create standards for assessing the welfare of farm animals throughout Europe and develop practical strategies to improve it. A product information system will be drawn up to assure consumers that their food has been produced according to ethically sound procedures. Forty organisations and university departments throughout Europe will contribute to this five-year Integrated Project, using expertise from many areas of science.

Life on the farm

WELFARE QUALITY will investigate ways to improve the welfare of different species on the farm, for example by relieving the boredom and anti-social behaviour of pigs and chickens reared in groups. Breeding programmes will play a part in this improvement, as will better contact between humans and animals, and provision of a more stimulating environment that allows animals to express their natural behaviour. Innovative housing design is required to significantly improve animal welfare. Reducing stress, anxiety and boredom will not only enhance the animals' health and welfare but will also lead to better product quality.

The effect of welfare improvements will be interpreted through performance measures based on the actual health, physiology, behaviour and disease resistance of animals. Some methods of monitoring these conditions are already in use, and more will be developed. A continuous information loop will be established in which the results of the monitoring will be used to suggest practical welfare improvements. These are fed back to the farmer who can then take up the recommendations. The benefits to animal welfare should show up in future monitoring, the goal being to develop a European standard for assessing the welfare of animals on farms.

Informed consumers

Shoppers want more and more details about the source and quality of the food they buy. The project will analyse consumer concerns about animal welfare and find out what information they want on their packaging. In this 'fork-to-farm' approach, clear marketing and profiling of products will allow consumers to make an informed choice and to support animal welfare policies. A transparent and standardised information system will be vital to countries joining the EU to help them meet the requirements of European markets.

Europe is leading the World Trade Organisation and the Organisation for Economic Co-operation and Development in its commitment to introdu-cing animal welfare into the conditions for international trade.

WELFARE QUALITY will set up a dialogue between the stakeholders, including the public, academia, industry, welfare organisations and government, using traditional publications, school visits and the internet. Education and training will also be offered to key players along the supply chain.

Full title: Integration of animal welfare in the food quality chain: From public concern to improved welfare and transparent quality

Acronym: WELFARE QUALITY
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SIXTH FRAMEWORK PROGRAMME

Food Quality and Safety - Call FP6-2002-Food-1