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SAFE FOODS

Progress and Results





The EU 6th Framework Integrated Project SAFE FOODS has been underway since April 2004 and is pleased to present its progress and results. The development of a new framework for food risk analysis, the heart of all SAFE FOODS activities, is at an advanced stage. The theoretical risk analysis model is now being put to the test via different feedback exercises. These involve a wide range of stakeholders to ensure that the SAFE FOODS risk analysis framework can be applied in a practical way.

An international research team, comprising over 100 natural and social scientists, has produced many new insights and valuable results relevant to food risk analysis. These research outputs from SAFE FOODS will help to increase the safety of our food supply and to restore consumer trust in food risk management within Europe.

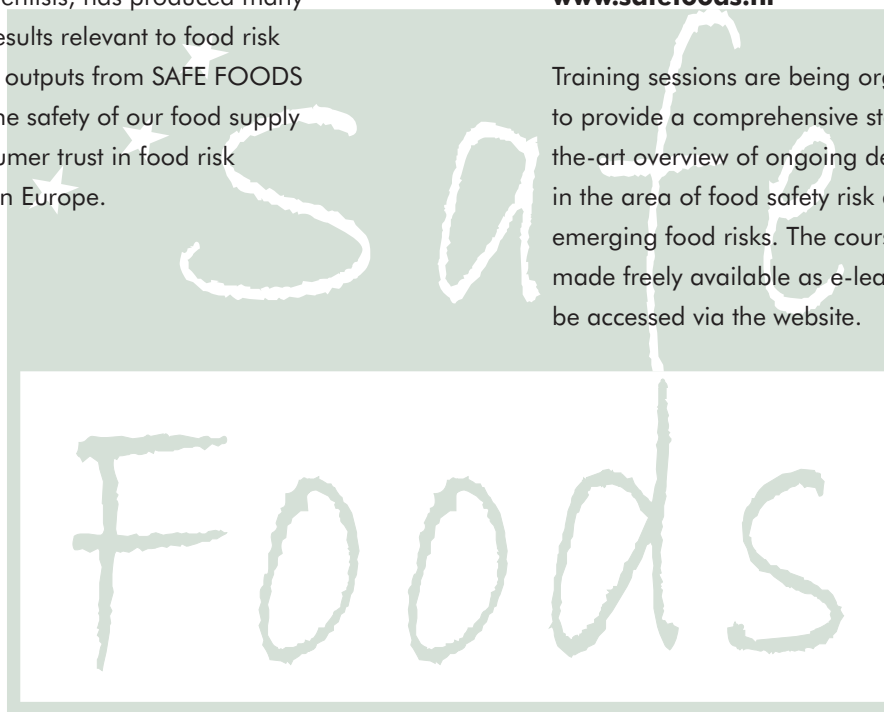


At this stage, many research results are in the process of being published in scientific journals. The variety of topics illustrates the broad range of different research disciplines that are included in the SAFE FOODS project, ranging from plant molecular biology and toxicology to the social and political sciences.

SAFE FOODS also informs society more broadly about its activities through publications in popular magazines, participation in outreach activities and film material. An updated overview of the project results can be found on the website:

www.safefoods.nl

Training sessions are being organised to provide a comprehensive state-of-the-art overview of ongoing developments in the area of food safety risk analysis and emerging food risks. The course materials are made freely available as e-learning modules that can be accessed via the website.



Comparative Safety Evaluation of Breeding Approaches and Production Practices

In an unprecedented global effort, SAFE FOODS has gathered over 3000 potato and maize samples of known experimental pedigree, building an exceptionally diverse collection. Potato and maize were chosen as model crop species for a large-scale comparative safety analysis study. The samples were derived from a wide range of selected lines, developed through conventional breeding and biotechnology approaches, including both GM and non-GM routes. SAFE FOODS has collected samples all over the world. This plant material was derived from a wide range of cultivars, grown in replicated trials under high- and low-input agricultural systems or gathered from commercial sources. In parallel, a major effort was undertaken to compare loads of mycotoxins.

In observations over several growing seasons, these analytical approaches begin to confirm that agricultural practices have a clear influence on the composition of the maize or the potato. For example, crops from organic sites can be systematically differentiated from conventional ones. On the other hand, it has proven quite difficult to consistently separate GM lines from their non-GM counterparts, indicating that the amount of natural variation is far more extensive than the impact of the GM traits included in our analysis.

The overall aim of this comparative analysis work in SAFE FOODS is to examine how useful the current “omics” technologies are as tools for risk assessment practices.



These samples have been analysed in different laboratories using the newest “omics” approaches. The compositional profiles generated by these highly sensitive methods were fed into huge comparative databases, posing a tough challenge for the bio-statisticians in SAFE FOODS.

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Early Detection of Emerging Risks associated with Food and Feed Production

SAFE FOODS is developing a system for the early identification of emerging food-borne risks that allows a more preventive food safety approach, rather than dealing with a crisis when it occurs. To do so, experts in SAFE FOODS have analysed existent early warning systems from all over the world, including predictive models for mycotoxin contamination. They have also carried out a trend analysis on 3 years of data coming from the Rapid Alert System for Food and Feed, to verify whether this information can be used to identify emerging food safety issues.

Furthermore, SAFE FOODS researchers have made a comprehensive literature review on emerging chemical and microbial risks. Subsequently, several specific case studies have been analysed in detail, to get a better understanding of how exactly food safety problems arise. Based on these reports, experts are making recommendations for improved methods to identify the emergence of these hazards in an early stage. All this

work is being compiled for a unique publication on emerging food risks. This material also forms the basis for specific training courses organised by SAFE FOODS, dealing with emerging risks in food and feed production.

In addition, a transfer point for information on emerging food safety problems has been set up. Currently, over 360 experts from 35 countries have been included in the electronic library, which is still expanding.



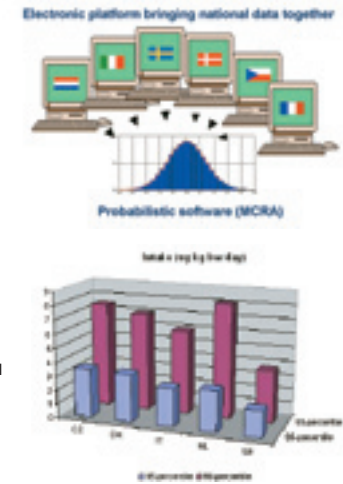
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Quantitative Risk Assessment of Combined Exposure to Food Contaminants and Natural Toxins

Researchers in SAFE FOODS have developed a unique electronic platform of harmonised residue and food consumption databases. In total, residue data of 80 pesticides, 10 mycotoxins and 10 natural toxins have been collected from different European countries and a uniform food coding system has been developed at the level of the raw agricultural commodity. For the first time, this platform allows for Pan-European probabilistic exposure calculations in a harmonised way.

Apart from further work on exposure and effect modelling, SAFE FOODS has worked out a new probabilistic risk assessment approach that integrates effect and exposure. In this first-time model, residue, consumption and toxicology databases are used simultaneously to quantify the risk as Margins of Exposure, including a measure for the severity of toxic effects. This method aims to specify the probability that a random individual, rather than a defined population, will have an exposure high enough to cause a particular health effect.

Furthermore, in the quantitative risk model a method is proposed to identify the major sources of uncertainty in risk assessment. Using statistical techniques, it also becomes possible to distinguish uncertainty (lack of perfect knowledge) and variability (heterogeneity in all data). To take the severity of effect into account in the risk model, a new toxicity classification of chemicals has been developed, allowing for the ranking of substances on their potential to induce health risks. The newly established integrated exposure and effect modelling, as well as the classification system for comparing toxic effects of different contaminants and natural toxins, are important steps towards the next ambitious goal: a risk assessment approach to quantify effects of combined exposure.



Intake (in mg/kg bw/day)

100



As part of the social science activities in the SAFE FOODS project, researchers have examined how key stakeholders perceive the effectiveness of food risk management, taking due account of individual and cultural differences between consumer groups. Focus group studies in five European countries were held in order to understand the range of arguments used to evaluate food risk management practices, and to identify similarities and differences in perceptions held by consumers and experts with an interest in food safety.

Subsequently, over 2500 consumers were questioned in a large survey, which was used to determine the psychological factors that influence consumer evaluations of food risk management practices.

In further experiments, SAFE FOODS researchers have investigated how communication about risk uncertainty and population level variation in vulnerability can effectively be incorporated into risk communication practices. Application of case study analysis on a set of past food incidents will provide proof of principles of what constitutes best practice in risk management.

Based on a better understanding of consumer perceptions, this research can help to increase confidence in food risk management, which is essential if public trust in the agri-food sector and institutions is to be developed and retained.



Since the turning point of the BSE crisis, major efforts have been undertaken by the EU and many Member States to re-examine food safety policy and to re-structure institutional risk regulation. In a detailed comparative study, researchers in SAFE FOODS have reviewed national and European institutional procedures and governance practices that deal with food risks. In particular, recent changes in regulatory procedures and structures have been analysed, using literature and document research and interviews with agency representatives, policy makers, and key stakeholders.

In this review, special attention was given to the allocation of risk assessment and risk management responsibilities, to measures for improved transparency and stakeholder involvement, and to the different ways of dealing with scientific uncertainties associated with food risks. The results of this empirical study on institutional reforms have been compiled in a recent book publication (Vos and Wendler, 2007).

Based on this work, the risk governance experts in SAFE FOODS have developed a coherent view on innovative procedures and structures of food safety governance, giving special attention to different risk assessment and management approaches as well as the involvement and participation of stakeholders and the wider public. The concept provides guidelines for risk assessors and risk regulators for dealing with scientifically uncertain risks and coping with highly controversial risks that are subject to divergent cultural attitudes, political perspectives or economic interests. These ideas have been presented and thoroughly discussed in a series of workshops with stakeholders (industry, NGOs, risk managers, risk assessors) and will be integrated in the SAFE FOODS risk analysis framework.



The outcomes of these different research tasks have been integrated into a new risk analysis approach for foods, produced by different breeding methods and production practices.

The overall objective of this new framework is to change the scope of decision-making on food safety from single risks to considering foods as sources of risks, benefits and costs that are associated with their production and consumption. The model integrates risk-benefit assessment of human health, ecological impact assessment, consumer preferences and values, as well as impact analysis of economical and ethical aspects.



A first draft of the SAFE FOODS risk analysis framework has been presented on a large stakeholder consultation event in Athens in October 2005. This input has been used to develop a second version of the model, which provides a basis for further optimisation. Extra rounds of feedback are ensured by the second consultation event in Brussels in March 2007 and by a large Delphi survey among European and international experts and stakeholders.

Novel elements in the SAFE FOODS model include:

- Identification and active involvement of relevant stakeholders
- The evaluation of new methods for risk assessment of food safety/nutrition issues (probabilistic risk assessment, genomics, profiling methods)
- Identification of Quality of Life parameters in the risk-benefit analysis of food/food production systems; how to weigh and integrate them in the risk analysis process
- Approaches to deal with uncertainty and ambiguity in food risk analysis, and the issue of acceptability of risks
- Inclusion of economical factors in the risk analysis process
- Criteria and strategies for risk-benefit analysis of novel foods/food production technologies
- Approaches for increased transparency in decision-making
- Recommendations for more effective communication throughout the risk analysis process

