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Food Safety: risk assessment, communication & cooperation beyond borders: the European approach

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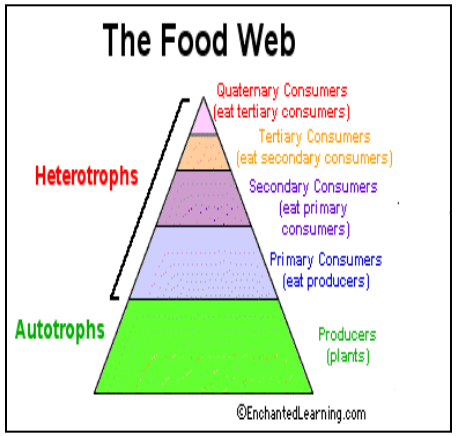


Outline

I. Food Safety *vs* Security

II. Gathering knowledge on risk factors and risk analysis

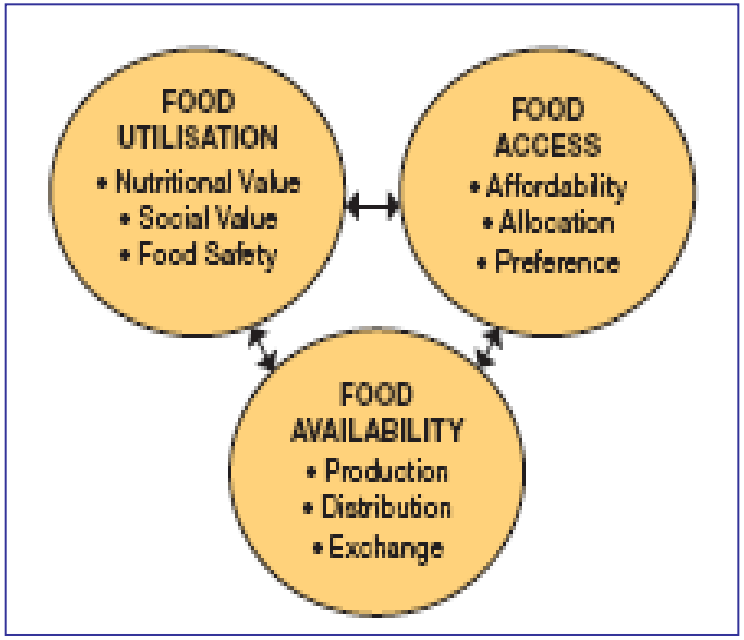
III. Safety in the food chain

IV. Risk communication and cooperation across Europe

V. The step ahead …. European Safety by risk prevention in the food chain, beyond borders

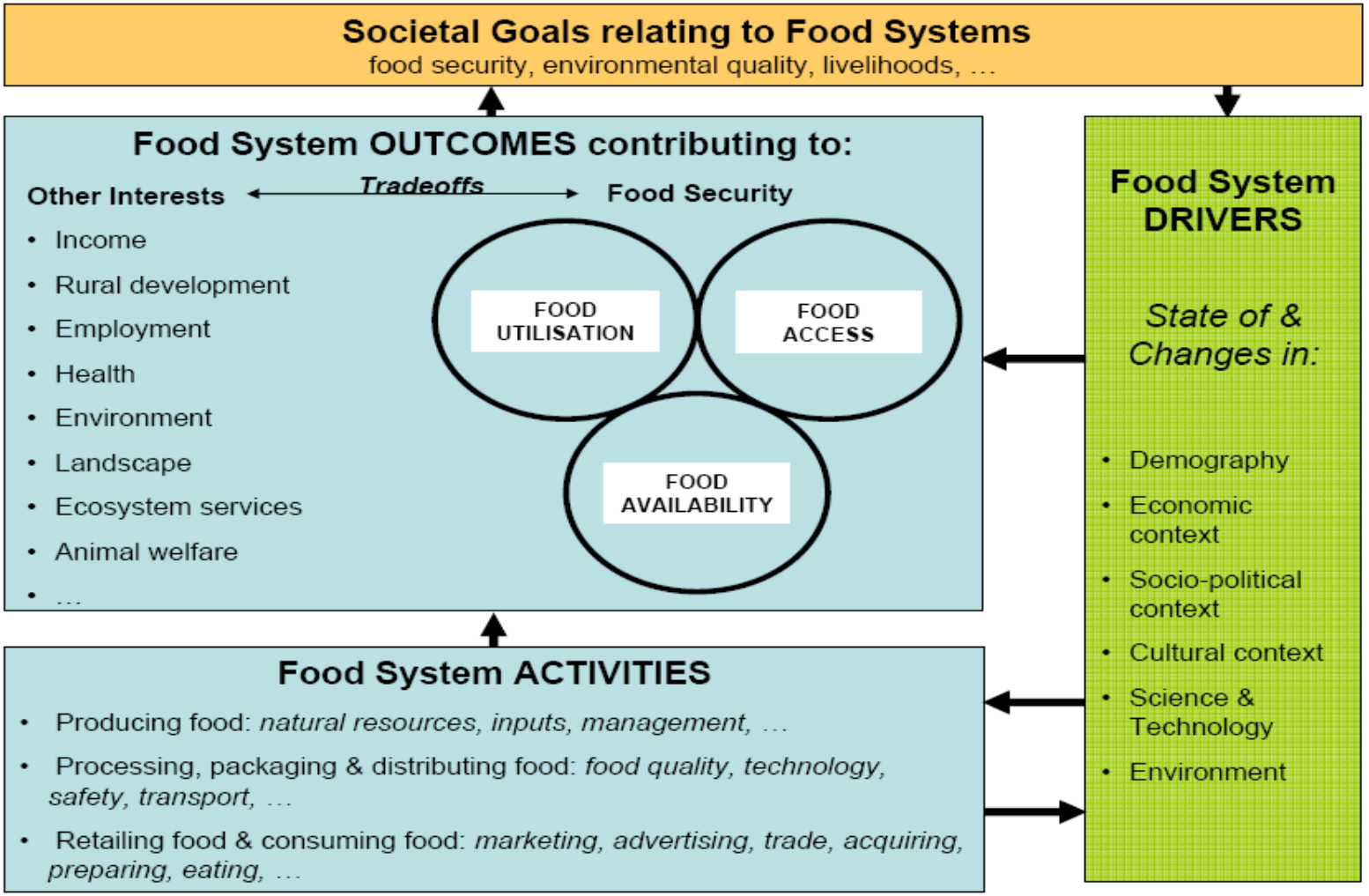
WHAT IS FOOD SECURITY?
WHAT IS FOOD SAFETY?

Food security = physical, social and economic **access of people to sufficient, safe and nutritious food** for their dietary needs and preferences, for an active and healthy life.



Food safety = actions which ensure that all **food is safe** (no risks for food-borne diseases or food hazards) **along the food chain**, from production to consumption.

Food Security System: drivers/activities/outcomes/feedbacks[1]



[1]Ericksen et al., 2005 and 2008

The Elements of Food Safety

Law

Policy

Science

Safety

- ✓ Risk Analysis
- ✓ HACCP /Quality Systems

(prevention)

General Problems to solve

- Resistance and virulence of emerging pathogens
- Patchwork system of food safety regulation
- Lack of an effective, low cost method of ensuring safety of food products
- Lack of regulatory oversight beyond commercial facilities
- Lack of effective consumer education programs

WORLDWIDE PLAYERS FOR FOOD SAFETY
(legislation and implementation)

- **UN** (United Nations): virtually all nations → peace and cooperation
- **FAO** (Food and Agriculture Organization): Nutrition & Trade
- **WHO** (World Health Organization): Health care & Nutrition
- **Codex Alimentarius: joined FAO/WHO Committee to establish food standards program** (since 1961) to harmonize national standards, protect health and promote trade

WTO (World Trade Organization): Trade → eradication of barriers to trade

EFSA (European Food Safety Agency)

US Federal Food Safety agency and **FDA**

[1]*Ericksen et al., 2005 and 2008*

THE FEDERAL FOOD SAFETY WORKING GROUP PROGRESS REPORT

European Food Safety Authority

RISK ASSESSMENT 1987

2000

3D APPROACH
PREVENTION -SURVEILLANCE- RESPONSE

A. Prevention of Foodborne Illness . . . . . .

1. Reduce Bacterial Pathogens in Foods . . . . . .
2. Improved Produce Safety . . . . . .
3. Preventing Intentional Adulteration . . . . . .
4. Other Preventive Measures in Food Safety . . . . . .

B. Enhanced Food Safety Surveillance and Compliance . . . . . .

1. Disease surveillance . . . . . .
2. Reportable Food Registry . . . . . .
3. Antimicrobial Resistance . . . . . .
4. Import Safety . . . . . .

C. Food Safety Response . . . . . .

A. Greater Prevention . . . . . .

1. Pre-Harvest Food Safety. . . . . .
2. Upcoming Preventive Control Standards . . . . . .
3. Retail Food Safety . . . . . .

B. Enhanced Surveillance and Compliance . . . . . .

1. Domestic Inspection and Compliance . . . . . .
2. Import Safety . . . . . .
3. Foodborne Illness Surveillance and Incident Investigation

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DEFINITIONS: Hazard *vs* risk

Hazard = A biological, chemical or physical agent in, having **a potential to cause an adverse** health effect.

Hazard identification = The identification of known or potential health effects associated to a specific chemical, biological or physical agent.

Hazard analysis = Collection and evaluation of information on hazards and conditions leading to hazard, deciding if they are significant for food safety and should be addressed by HACCP.

Hazard characterization = qualitative and / or quantitative evaluation of the adverse effects associated with a specific agent.

Exposure assessment = qualitative and / or quantitative evaluation of intake by humans.

Risk = probability of an adverse effect and the severity of the hazard effect

Risk assessment: scientific evaluation of known or potential adverse health effects, resulting from human exposure to food-born hazards.

Risk analysis = A process consisting on three components: risk assessment + management + communication.

Risk characterization = the integration of hazard identification, characterization and exposure assessment to estimate the adverse effects to a given population.

Risk management = to choose best policy alternatives to accept/minimize or reduce assessed risks and to select /implement options.

Risk communication = interactive process of exchange of information and opinion on risk among risk managers

RISK ANALYSIS

Risk Assessment

Provision of scientific advice. Extensive information gathering and analysis = a pre-requisite for sound and up-to-dated scientific advice

- *Hazard identification*
- *Hazard characterization*
- *Risk evaluation*
- *Exposure analysis /assessment*

Risk Management

Includes legislation and control: implies political decisions and involves judgments (not only based on science) but on wider appreciation of society wishes and needs

Risk Communication

Key element in ensuring that consumers are kept informed, and in reducing the risk of undue food safety concerns

FOOD HAZARDS

1. **food pathogens**
2. **environmental contaminants**
3. **pesticide residues**
4. **food additives**
5. **natural toxicants**
6. **nutritional imbalance**

RANKING OF FOOD HAZARDS *

By scientists

1. **Microbiological pathogens**
2. Nutritional imbalance
3. Environmental contaminants
4. Natural toxicants
5. Pesticide residues
6. Food additives

By consumers

1. Pesticide residues
2. Hormone residues (new)
3. Chemical residues / Antibiotics (new)
4. Food additives
5. Irradiated foods (new)
6. Microbiological organisms

*** This order of ranking seems to be universal**, but the s**ize of problem for each category of hazard is far greater in developing than in industrialized countries**

Food safety in EC: supported R&D activities , to boost the quality and safety of Europe's food

Aims:

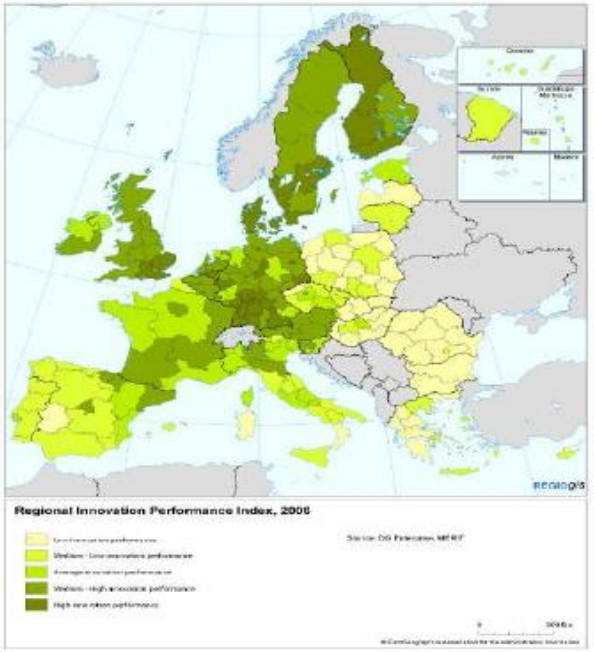
✓ To improve health and well-being of Europe's consumers

✓ To boost the development of the food industry

In FP6/7 more than 340 projects funded with > 1250 MEUR

The 'Food quality and safety' program introduced new 8 scientific areas:

1. Environmental health risks
2. Epidemiology of food-related diseases and allergies
3. Impact of animal feed on health
4. Impact of food on health
5. Traceability processes along the production chain
6. Methods of analysis, detection and control
7. Safer and more environmentally friendly production methods and technologies
8. Total food chain.



Biological risk factors

Trichinella spiralis, a parasitic nematode sometimes also referred to as the 'pork worm'. Trichinellosis, the disease caused by this roundworm, manifests initially through intestinal problems, which, if untreated, can develop into muscular or neurological symptoms.

Yersinia bacteria, with the subspecies *Y. enterocolitica* and *Y. pseudotuberculosis* specifically linked to food-borne disease. Both cause a form of enteritis occasionally mistaken for appendicitis.

- *Bacillus* bacteria, including the species *B. cereus*, which can trigger gastrointestinal symptoms, and *B. anthracis*, which causes anthrax (which however is extremely rare, and declining, in Europe).
- *Brucella* bacteria, exposure to which can cause contagious abortion in cattle, and which for humans can translate into the febrile disease brucellosis.
- *Campylobacter*, and *Campylobacter*-like pathogens such as *Arcobacter* and *Helicobacter*, associated with diarrhoeal disease.
- *Clostridium*, a genus of bacteria linked to various forms of food poisoning, including botulism, and colitis.
- *Echinococcus*, a type of tapeworm which can affect many animals including humans. The eggs, ingested through undercooked or unwashed food, develop into larvae in the host and can cause a dangerous parasitic disease.
- *Escherichia coli* bacteria, which are very common in the gastrointestinal tract. However, some strains originating mainly from grass-feeding animals can produce toxins that cause severe infections.
- Influenza viruses, including the strains linked to avian flu.
- *Listeria monocytogenes*, a bacterium that passes unnoticed for most people, but which can have tragic consequences for individuals with impaired or developing immune systems, pregnant women and their unborn children.
- *Mycobacterium bovis*, which causes tuberculosis in cattle and can potentially be transmitted to humans via infected milk or meat.
- Prions, more specifically misfolded prion proteins (PrPSc), the causative agents of variant Creutzfeldt-Jakob disease (vCJD).
- *Salmonella* bacteria, which are most frequently associated with enteric infections. Salmonellosis can produce particularly severe symptoms in patients with fragile immune systems, and comes with a one-in-ten risk of post-infectious complications.
- *Shigella* bacteria, which can cause enteric infections of varying degrees of severity in humans, sometimes followed by joint inflammations and urethritis.
- Staphylococcal enterotoxins, i.e. toxins which can be released into the intestine by various strains of *Staphylococcus* bacteria, causing gastroenteritis.
- *Toxoplasma gondii*, a species of parasitic protozoa responsible for toxoplasmosis.

Veterinary drug residues in animals and food

Traces or "residues" of both authorised and prohibited veterinary drugs, as well as contaminants are sometimes detected in live animals and in foods derived from animals, including meat, fish, eggs and dairy products. These residues can pose a risk for public health if they are present in food.

- Hormones
- Beta-agonists
- Prohibited substances
- Antibacterials
- Other veterinary drugs
- Other substances and environmental contaminants

Pesticide residues in food

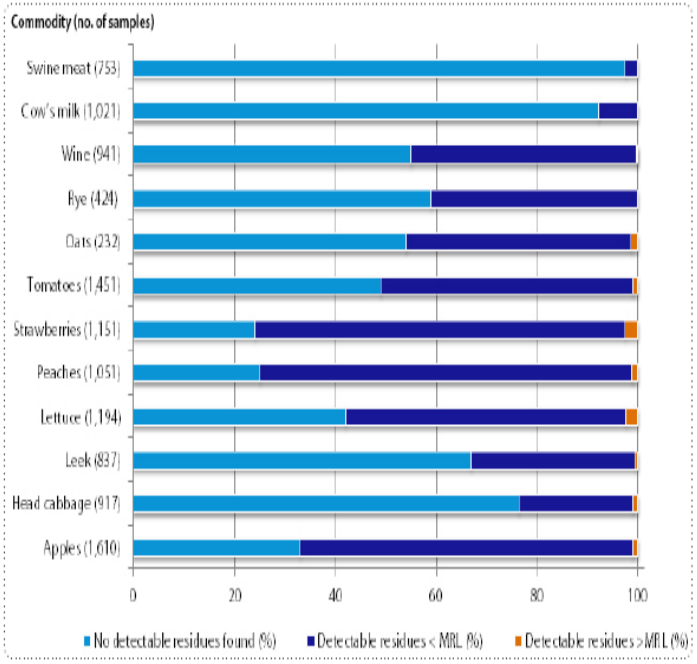
Food containing pesticide residues may pose a risk to public health. A comprehensive legislative framework has therefore been established in the European Union for approving the chemicals used in pesticides, and for setting levels of pesticide residues that are acceptable in food. EFSA provides scientific advice during the assessment of pesticides; EU Member States use this information when deciding the conditions under which pesticides may be marketed in their territories. This legislative framework is complemented by an **annual pesticides monitoring programme**. Every year EFSA publishes an overview of this programme, which is carried out by EU Member States plus Iceland and Norway.

Ethyl carbamate in spirit drinks

Ethyl carbamate, also known as "urethane", occurs in alcoholic beverages including wine, beer and spirits, particularly in brandies made from stone fruit (mainly plums, cherries, mirabelles and apricots). Fermented foods such as bread, soy sauce and yoghurt may also contain ethyl carbamate. It forms when other chemicals present in these foods and drinks are naturally broken down during food processing and/or storage.

In 2014, EFSA reported on ethyl carbamate levels in food and drink in Europe, based on the analyses performed in the Member States in the years from 2010 to 2012. The report did not assess the risks for consumers as this had been tackled in previous work by EFSA and also by other food safety assessors, including the UN's Food and Agriculture Organization and World Health Organization. (see *How much ethyl carbamate?*).

2013 EU co-ordinated programme: Product by product



Arsenic in food and drinking water

Arsenic is a semi-metal, or "metalloid" (a chemical with properties somewhere between a metal and non-metals). It is a widely found **environmental contaminant** that occurs both naturally and as a result of human activity. It appears in many forms, which can be either organic – i.e. containing carbon – or inorganic, which is more toxic. Food and drinking water are the main sources of exposure to arsenic for the general population in Europe. Arsenic enters food and drinking water through contaminated soil and/or ground water.

Estimated inorganic arsenic levels in some foods and drinking water, and human dietary exposure based on high consumption of these foods

Foods and drinks	Estimated levels in food (µg/kg)*	Arsenic intake in food (µg/kg bw/day)*
Highly consumed foods		
Liquid milk	4.1	0.05
Wheat bread and rolls	14.3	0.06
Soft drinks	6.9	0.13
Beer	6.8	0.25
Drinking water	2.1	0.08
Foods with higher arsenic levels		
White rice	88.7	0.23
Brown rice	151.9	0.38
Selected other foods		
Fish meat	11.3	0.03
Crustaceans	36.2	0.06
Molluscs	50.9	0.10

Research on Food safety and security: FP6, FP7, H2020

ACE-ART	Assessment and critical evaluation of antibiotic resistance transferability in the food chain
BIOCOP	New technologies to screen multiple chemical contaminants in food
BIODET	Networking in the application of biosensors to pesticide detection in fruits and vegetables
BIOTOX	Development of cost-effective tools for risk management and traceability systems for marine biotoxins in seafood
BIOTOXMARIN	Development of novel analytic tools for the detection of marine biotoxins
BIOTRACER	Improved bio-traceability of unintended microorganisms and their substances in food and feed chains
CO-EXTRA	GM and non-GM supply chains: their coexistence and traceability
CHILL-ON	Developing and integrating novel technologies to improve safety, transparency and quality insurance of the chilled/frozen food supply chain
DELIVER	Design of effective and sustainable control strategies for liver fluke in Europe
DETECTOX	Development of a surface plasmon resonance-based biosensor for the detection of lipophilic phycotoxins in shellfish residues
DIALREL	Religious slaughter: improving knowledge and expertise through dialogue and debate on issues of welfare, legislation and socioeconomic aspects
DOUBLEFRESH	
EADGENE	
EPIZONE	
EUROMED-CITRUSNET	
EU-US-SAFE-FOOD	
FEEDING FATS SAFETY	
RESISTVIR	Coordination of research on genetic resistance to control plant pathogenic viruses and their vectors in European crops
RHIBAC	Rhizobacteria for reduced fertiliser inputs in wheat
SABRE	Cutting-edge genomics for sustainable animal breeding
SAFEED-PAP	Detection of presence of species-specific processed animal proteins in animal feed
SAFIR	Safe and high-quality food production using poor-quality waters and improved irrigation systems and management
ICHAIN	Developing a stakeholders' guide on the vulnerability of food and feed chains to dangerous agents and substances
SEAFOODPLUS	Health-promoting, safe seafood of high eating quality in a consumer-driven fork-to-farm concept
SUPASALVAC	*Salmonella*-free broilers by live vaccine-induced innate resistance to colonisation and invasion and novel methods to eliminate vaccine and field strains
TESTMETEDECO	Development of test methods for the detection and characterisation of endocrine-disrupting chemicals in environmental species
TRACE	Tracing food commodities in Europe
TRACEBACK	Integrated system for a reliable traceability of food supply chains
TRANSCONTAINER	Developing efficient and stable biological containment systems for genetically modified plants
TRUEFOOD	Traditional united Europe food
WELFARE QUALITY	Integration of animal welfare in the food quality chain: from public concern to improved welfare and transparent quality

>50

Details and contact information for these and all other FP6 food safety projects:

- http://cordis.europa.eu/food/projects.htm

Information on FP7 food safety projects:

- http://cordis.europa.eu/fp7/projects_en.html (Theme: FP7-KBBE)

FEED FOR PIG HEALTH	Development of natural alternatives to antimicrobials for the control of pig health and promotion of performance
HIGHQ RTE	Innovative non-thermal processing technologies to improve the quality and safety of ready-to-eat meals
IMAQUANIM	Improved immunity of aquacultured animals
MED-VET-NET	Network for prevention and control of zoonoses
MONIQA	Towards the harmonisation of analytical methods for monitoring quality and safety in the food chain
NEUROPRION	Prevention, control and management of prion diseases
NOVELQ	Novel processing methods for the production and distribution of high-quality and safe foods
OTAG	Operational management and geodecisional prototype to track and trace agricultural production
PARASOL	Novel solutions for the sustainable control of nematodes in ruminants
PARATBTOOLS	Development of improved tools for the detection of paratuberculosis in livestock, *M. paratuberculosis* in food and for the assessment of the risk of human exposure
PETER	Promoting European traceability excellence and research
PHAGEVET-P	Veterinary phage therapies as alternatives to antibiotics in poultry production
POULTRYFLORGUT	Control of the intestinal flora in poultry for ensuring the products' safety for human consumers
PROSAFEBEEF	Improving the safety of beef and beef products for the consumer in production and processing
Q-PORKCHAINS	Improving the quality of pork and pork products for the consumer: development of innovative, integrated and sustainable food production chains of high-quality pork products matching consumer demand
QUALITYLOWINPUT-FOOD	Improving quality and safety and reduction of cost in the European organic and low-input supply chains
REPLACE	Plants and their extracts and other natural alternatives to antimicrobials in feeds
RESCAPE	Reducing egg susceptibility to contaminations in avian production in Europe

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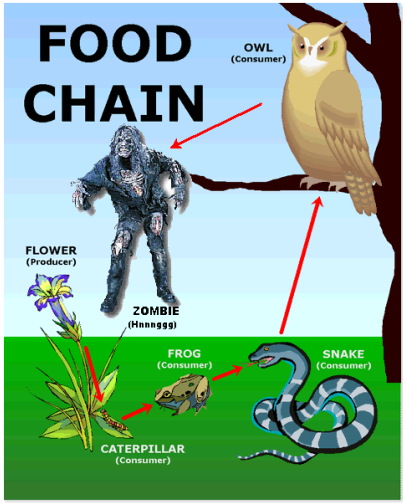
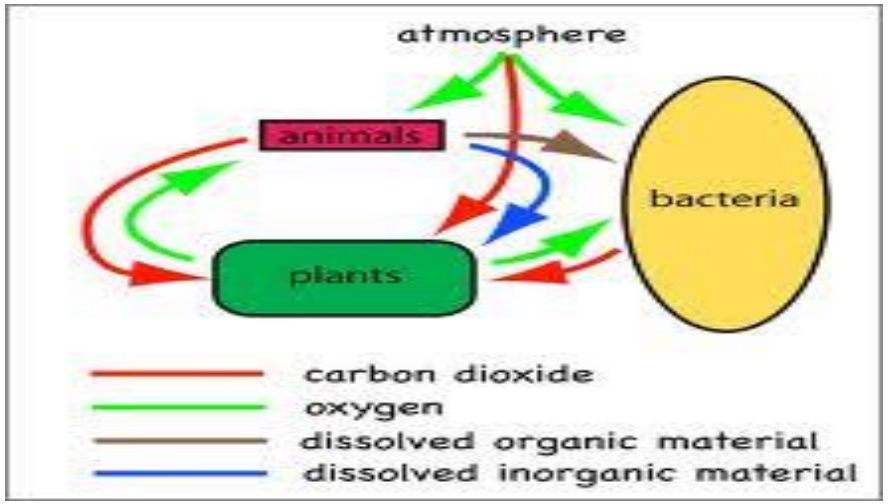
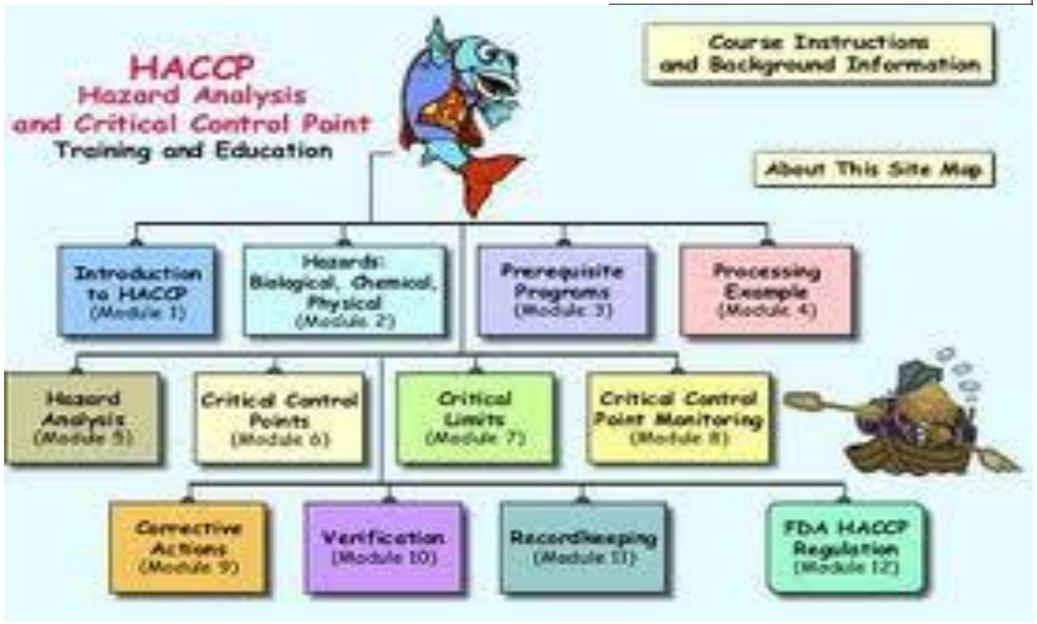
The Food Chain is the Life Chain





The Food Chain is related to food production and consumption



Consumer concerns about the food chain

The EU's 'farm-to-fork' approach to food safety, first introduced by EC White Paper on Food Safety in 2000[1], highlights that safety requires commitment from contributors, **EFSA was established**.

The Eurobarometer survey conducted in 2007[2] revealed that EU consumers ranked food safety as "NR 1" priority 'ensuring that agricultural products are healthy and safe' (45%) , the need to secure fair standards of farmers' living (37%), reasonable food prices for consumers'(35 %),encouraging quality production(23%).

[1] *White Paper on Food Safety, European Commission, COM (1999) 719 final, 12 January 2000*
[2] Europeans, Agriculture and the Common Agricultural Policy, Special Eurobarometer 276, EC, 2007.

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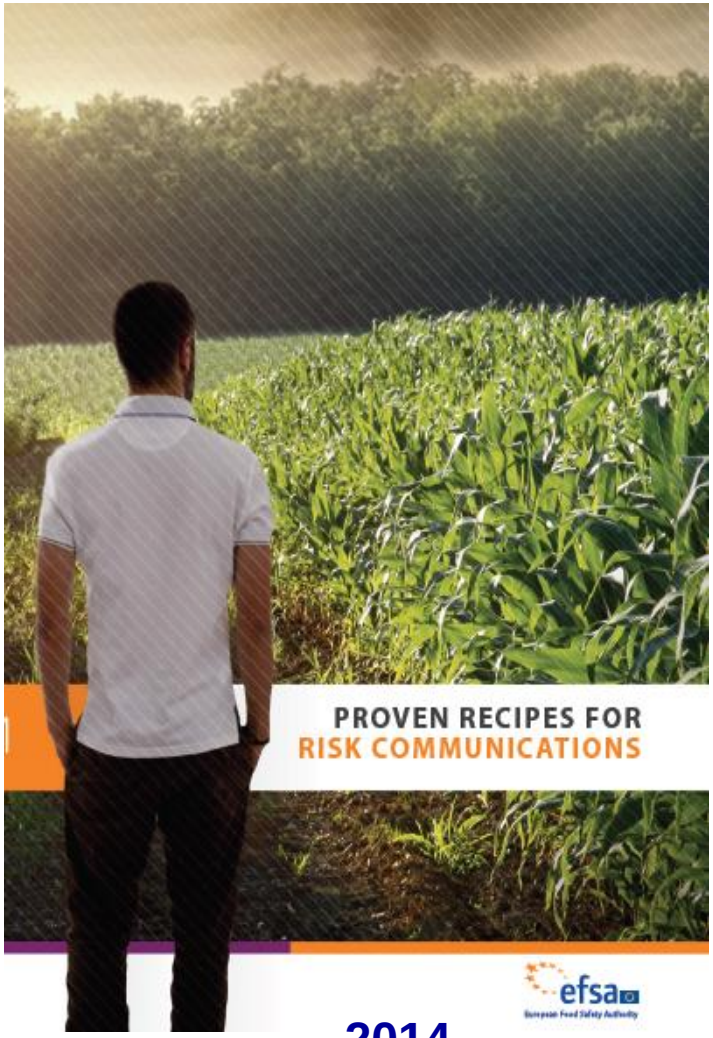
OPENESS-TRANSPARENCY-INDEPENDENCE-RESPONSIVENESS/TIMELINESS



2014

www.efsa.europa.eu/riskcomm

HOW TO:

- **Provide information to the public on hazards and risks**
- **Provide information on risk assessment & management decisions**
- **Organize 2-way communication**
- **Enhance trust & credibility**
- **Involve stakeholders in the process & resolve conflicts**

TOOLS AND CHANNELS

- Media
- Websites
- Printed/digital publications
- Meetings/workshops
- Public consultations
- Partners' networks
- Social networks (Facebook)

FOOD SAFETY COOPERATION BEYOND BORDERS

Working alongside the European Food Safety Authority

efsa European Food Safety Authority

Programmes for EU Pre-Accession countries

How can I get involved?

There is a range of possible practical activities open to food safety representatives from your country. These include:

- Training seminars e.g. on risk assessments, data collection and food safety crises.
- Study tours to food safety institutions in EU Member States.
- Information sharing and networking by participating in EFSA's Advisory Forum, Focal Points and other groups as observers.
- Meeting participation such as EFSA's scientific colloquia.
- Share in risk communication activities via participation as observers in EFSA communication working groups.
- Sign up to the expert database to potentially join the pool of experts assisting EFSA in its work.
- Apply to new calls for EFSA panel membership (duration 3 years).
- Apply to calls for seconded national experts within EFSA.

Want to know more?

Simply visit the EU enlargement area of the EFSA website at:
www.efsa.europa.eu/en/networks.htm

efsa European Food Safety Authority
Committed to ensuring that Europe's food is safe

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Home > Publications > EFSA Journal

- EFSA Journal
  - Just Published
  - Latest Issue
  - All Issues
  - Special Issues
  - Table of Contents
  - About the Journal
- Supporting publications

EFSA JOURNAL

The EFSA Journal is an open-access, online scientific journal that publishes the scientific outputs of the European Food Safety Authority. EFSA's various output types are devoted to the field of risk assessment in relation to food and feed and include nutrition, animal health and welfare, plant health and plant protection.

Issue: 4 (April) 2015

- Opinions
- Guidance

What are the benefits?

The programme will allow national food safety authorities to participate in EFSA's work before and after accession. In addition, it will lead to:

- Greater mutual confidence.
- Acceptance of research data and food safety measures among EFSA and pre-accession countries.
- Better understanding between national food safety authorities in current and potential future EU Member States.
- Future cooperation and harmonisation of food safety approached across the enlarged EU.

TRAINING UP A NEW GENERATION OF FOOD SAFETY EXPERTS

What does it take to excel as a food safety researcher? Curiosity, no doubt. A creative mind, a passion for science. Dedication. Attention to detail. And more.

These are fine qualities indeed, which would certainly pave the way to a distinguished career in the field — and in many others. FP7 is supporting through research the development of precisely such attributes and skills an aspiring food scientist or technician will need. This investigation will also look into ways of making careers in food safety more attractive to promising candidates. The aim is to ensure that the next generation of food safety experts is duly prepared for working life, enabling them to fulfil their crucial role on behalf of the various stakeholders at any point along the food chain. In short, to place the future of food safety in capable hands.

Dedicated research projects FP7 and Horizon 2020

FP6 introduced a strong emphasis on consultation, dialogue with stakeholders and the promotion of research results. While all projects funded under the 'Food quality and safety' heading conducted communication activities, a whole rang of research projects and Specific Support Actions were explicitly devoted to dissemination. The following selection of projects may tempt you to access the complete catalogue online.

ALCUE-FOOD	From European fork to Latin-American farm: an innovative networking platform for EU-LAC partnerships in food quality and safety R&D
BIOPOLIS	Inventory and analysis of national public policies that stimulate research in life sciences and biotechnology, its exploitation and commercialisation by industry in Europe in the period 2001–2004
BIOPOP	Pilot study on innovative approaches to public communication on life sciences and biotechnology by students and young researchers
BIOPRODUCTS 4 FOOD	Disseminating the results of EC-funded research into food quality and safety to facilitate their transfer and exploitation into new products and processes to improve European health and well-being
BIOSAFENET	Biosafety research communication network
CDEUSSA	European platform for research on the prevention and treatment of coeliac disease: a multidisciplinary approach to integrate basic scientific knowledge in clinical applications and i the food industry
CLONING IN PUBLIC	Farm animal cloning and the public — a project to facilitate a European public debate and to make recommendations on regulation and on guidelines for research and applications of farm animal cloning
CODE-EFABAR	Code of good practice for farm animal breeding and reproduction
CONSUMER-CHOICE	Do European consumers buy GMO foods?
EAGLES FOOD FORUM	European action on global life sciences — food forum
ERMES	European research for Mediterranean seafood
EUROFIR	European food information resource network
EUFOOD4LIFE	European Technology Platform for the agro-food sector: food for life
EUROLATSEA	European research for the Latin-American seafood industry
FEED-SEG	Healthy feed for safety — dissemination of research results of EC-funded research on feed qual
FOOD-N-CO	Cooperation network of national contact points with a special focus on third countries in the area of food quality and safety
FORALLVENT	Forum for allergy prevention
GO-GLOBAL	Global platform on emerging risk in the food and feed chain
GMO-COMPASS	GMO communication and safety evaluation platform
INFOOD NETWORK	Sharing information on food-related environments, safety and traceability aspects among European small-medium farms
INPLISTA	Information platform on international standards for SMEs in the food sector
IRFOS	Integration of European food quality research from producers to consumers
MEDA GO TO EUROPE	Enhancing the participation of Mediterranean countries in the area of food quality and safety in FP7
MREFS	A multimedia repository on European food science: production, quality and safety
MYCO-GLOBE	Integration of mycotoxin and toxigenic fungi research for food safety in global systems
QUALITYMEAT	Survey on the research landscape in the associated candidate countries for monitoring and promoting good quality meat production — the whole food chain, from farm to fork, of poultry and pork meat
POLFOOD	Research and innovation in food technologies — brokering European partnership and transfer of knowledge to Poland by a series of practical workshops
SAFEFOODNET	Chemical food safety network for the enlarging Europe
SAFOODNET	Food safety and hygiene networking within new EU countries and associated candidate countries
SCIENCE 4 BIOREG	Global involvement of public research scientists in regulations of biosafety and agricultural biotechnology
SELAMAT	Safety enhancement of edible products, legislation, analysis and management, with ASEM countries, by mutual training and research
SMES-NET	SMEs networking European food safety stakeholders
TDC-OLIVE	Setting up a network of technology dissemination centres to optimise SMEs in the olive and olive oil sector
TECARE	Transregional cooperative platform for competitiveness in meat research and SMEs
TRAINNET FUTURE	Training network for national contact points and support organisations with special focus on candidate countries in the area of food quality and safety
YOUNG-TRAIN	Training and mentoring young scientists from candidate, associated and Mediterranean countries in a whole food chain approach to quality and safety

Details and contact information for these and all other FP6 food safety projects:

- http://cordis.europa.eu/food/projects.htm

Information on FP7 food safety projects:

- http://cordis.europa.eu/fp7/projects_en.html (Theme: FP7-KBBE)

>30

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Can RESEARCH & INNOVATION answer to for European FOOD SAFETY problems ?

- **How could crises (e.g., energy crisis, health crisis, water stress, terrorism) affect food systems**?

- **What dynamics govern risk perception and consumer response**?
- **How does society respond to food scares?**

- **Can local production methods, product variety, feed supply, etc. be maintained in a globalised market** and what is the role of SMEs in this?

- Would a continued move towards globalised markets clash with local preferences ? e.g. **"cultural back flash" against globalisation of food systems**?

- Can **we better substantiate the strengths/weaknesses of European agriculture**?

- What are trade-offs **implications for developing countries vs price vs health?**

Future benefits of RTD Prgrams: stimulating food security research across Europe

Leading scientists from different countries to pool their expertise for ambitious research goals, valorizing the research efforts to build up the critical mass of know-how, data and resources, to advance their goals.

The European Research Area (ERA)[1] to maximise the outcome of the research, to overcome internal barriers, to avoid fragmentation of effort, data and resources, eliminate duplication of initiatives and stimulate the mobility of researchers and Knowledge, involving industry, in particular SMEs, in the research consortia.

[1] *http://cordis.europa.eu/fp7/kbbe*

New research & application opportunities 2015

- ✓ Research projects
- ✓ SME/farms involvement
- ✓ Spin offs
- ✓ Services for consumers
- ✓ Support actions for social benefits

Topic: Sustainable livestock production :ISIB-12e-2015
Call title: Innovative, Sustainable and Inclusive Bioeconomy — **Status:** Open
Call identifier: H2020-ISIB-2015-1 — **Deadline:** 11-06-2015

Topic: Monitoring and mitigation of agricultural and forestry greenhouse gases (GHG) :ISIB 12c-2015
Call title: Innovative, Sustainable and Inclusive Bioeconomy — **Status:** Open
Call identifier: H2020-ISIB-2015-1 — **Deadline:** 11-06-2015

Topic: Resource-efficient eco-innovative food production and processing:SFS-08-2015-1
Call title: Horizon 2020 dedicated SME Instrument Phase 1 and 2, 2014-2015 — **Status:** Open
Call identifier: H2020-SMEINST-1-2015 — **Deadline:** 25-11-2015

Topic: Resource-efficient eco-innovative food production and processing:SFS-08-2015
Call title: Horizon 2020 dedicated SME Instrument Phase 1 and 2, 2014-2015 — **Status:** Open
Call identifier: H2020-SMEINST-2-2015 — **Deadline:** 25-11-2015

Topic: FET-Open research projects:FETOPEN-RIA-2014-2015

Topic: Crisis management topic 1: potential of current and new measures and technologies to respond to extreme weather and climate events:DRS-01-2015
Call title: Disaster-resilience: safeguarding and securing society, including adapting to climate change — **Status:** Open
Call identifier: H2020-DRS-2015 — **Deadline:** 27-08-2015

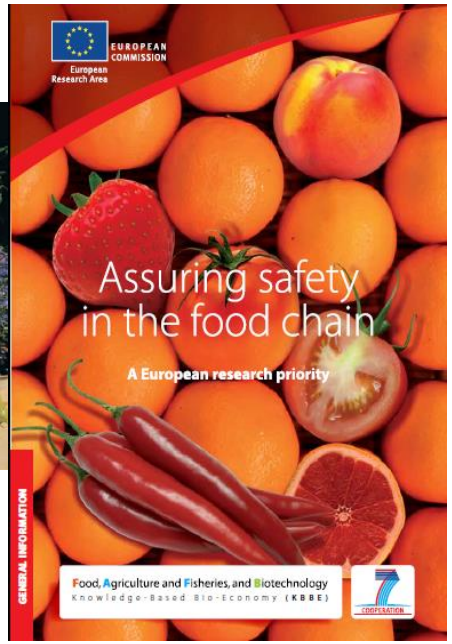
Topic: Authentication of food products :SFS-14b-2015
Call title: Sustainable Food Security — **Status:** Open
Call identifier: H2020-SFS-2015-1 — **Deadline:** 11-06-2015

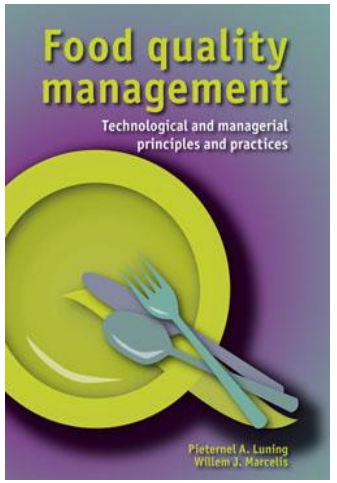
Topic: Coordination action in support of the implementation by participating States of a Joint Programming Initiative on 'A Healthy Diet for a Healthy Life':ISIB-13-2015
Call title: Innovative, Sustainable and Inclusive Bioeconomy — **Status:** Open
Call identifier: H2020-ISIB-2015-1 — **Deadline:** 11-06-2015

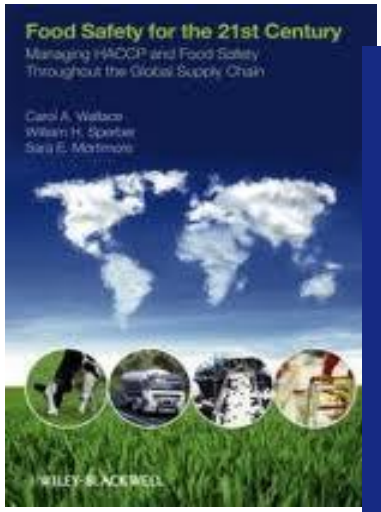
Topic: Biomarkers for nutrition and health :ISIB-12f-2015
Call title: Innovative, Sustainable and Inclusive Bioeconomy — **Status:** Open
Call identifier: H2020-ISIB-2015-1 — **Deadline:** 11-06-2015

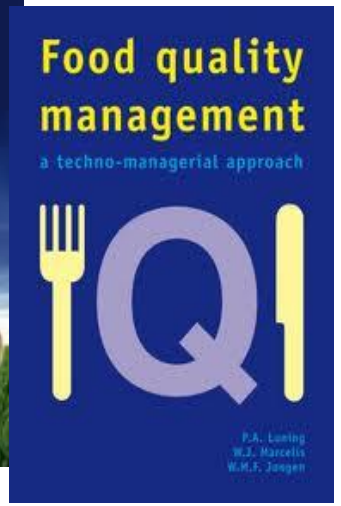
Message for the future: keep the safe food chain to live healthier...

Write down what you are doing,
do what you are writing….









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TRADITION and MODERNITY