FOOD SAFETY AND RISK MANAGEMENT
STRATEGIES & POLICIES

Prof. W. Kneifel
BOKU – University of Natural Resources
and Life Sciences Vienna
Department of Food Science & Technology

„...During lifetime we consume approx. 60 tons of food...“
How much of our budget do we spend on food at home?

FUNCTION AND QUALITY OF FOOD

NUTRITIVE VALUE

SENSORY VALUE

COVENIENCE, PREFERENCE

Energy
Macronutrients
Micronutrients
Essential Ingredients

Hazards:
(Micro)Biological
Chemical
Physical
Fraud

Taste
Flavour
Texture
Mouthfeel
Appearance

Experience
Recommendations
Prize, Value for Money
Authenticity, Origin

Source: ERS/USDA, Euromonitor (2010)
The public is increasingly getting worried about growing numbers of food crises, food product recalls and cases of fraud related to food.

Are you concerned about food safety?
(Survey Europe, 2010)
Consumers’ spontaneous responses to problems and risks associated with food

- Chemicals, pesticides, toxic substances: 10%
- Bacterial food poisoning: 12%
- Diet-related diseases: 10%
- Overweight, obesity: 0%
- Lack of freshness: 0%
- Food additives, colourings, preservatives: 0%
- GMO’s: 8%
- Too high in fat, sugar and calories: 7%
- We do not know what we eat: 7%
- Food is not natural, industrial is artificial: 0%
- Lack of hygiene controls: 5%
- Poor food quality: 5%
- Cancer: 5%
- Allergies related to food: 4%
- Prices too high: 3%
- Environmental concerns: 3%

Extracted from Special Eurobarometer 354 (2010)

Important questions

Are there, in fact, more crises notified than in former times?

Or is this just the consumers’ perception, which may have been misled, somehow?

Or are the modern surveillance and alert systems more effective than former ones?

Or do the media just exaggerate the cases?
Product recalls, market withdrawals, safety alerts

- Declaration problems
- Microbiological contaminations (definitely/potential)
- Chemical residues
- Concerns about product authenticity
- Foreign material particles
- Regulatory issues not met
Drivers of emerging risks

Compiled from EFSA Technical Report 2014:EN-588

Foodborne outbreaks

Strong evidence outbreaks
Suspected food vehicle is specifically addressed and evidence is clearly shown
Infections, intoxications, allergic reactions, injuries...

Weak evidence outbreaks
No particular food vehicle could be traced; only outbreak data are available
Infections, intoxications, allergic reactions, injuries...
## Foodborne outbreaks and human cases in the EU (year 2011)

<table>
<thead>
<tr>
<th>TOTAL OUTBREAKS</th>
<th>STRONG EVIDENCE CASES (TOTAL)</th>
<th>STRONG EVIDENCE CASES (DEATHS)</th>
<th>WEAK EVIDENCE CASES (TOTAL)</th>
<th>WEAK EVIDENCE DEATHS (DEATHS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.648</td>
<td>35.869</td>
<td>67</td>
<td>33.684</td>
<td>26</td>
</tr>
</tbody>
</table>

Example: Salmonelloses
- ~13%
- ~9%
- ~20%
- ~27%

Example: Campylobacterioses
- ~2%
- ~1.5%
- ~5%
- 0%

Source: EFSA Journal 2013; 11(4):3129

## FOOD POISONING CASES IN EUROPE (2012)

- N = 763
- 39.7% Household/domestic kitchen
- 23.9% Restaurant, café, pub, bar, hotel
- 8.0% School, kindergarten
- 6.3% Catering (canteen, workplace)
- 4.3% Residential institution (nursing home, prison, boarding school)
- 1.3% Take-away or fast-food outlet
- 1.2% At hospital, medical care facility, or care home
- 1.1% Unknown
- 1.0% Temporary mass catering

Source: EFSA Journal 2014; 12(2):3547
Distribution of strong evidence outbreaks by food vehicle in the EU (2012)

Outbreaks & cases: the identified sources

EFSA Journal 2014; 12(2):3547
### WHICH COSTS ARISE FROM FOOD POISONINGS?

<table>
<thead>
<tr>
<th>Costs for medical investigation</th>
<th>Costs for hospitalization and medical therapies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer</td>
<td>Immaterial costs: e.g., losses of leisure time</td>
</tr>
<tr>
<td>Other costs: e.g., decontamination of houses etc.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Costs resulting from omitted consumption</th>
<th>Costs resulting from reduced or even closed production capacities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry Producers</td>
<td></td>
</tr>
</tbody>
</table>

- Costs resulting from quitted contracts

Other costs: e.g., decontamination of houses etc.

Immaterial costs: e.g., losses of leisure time

### Food Fraud – another threat

...where food safety meets crime
Today, food producers and retail organizations have to meet different regulatory standards as well as to fulfill established and proven concepts as well as quality and safety management systems.

Will it rain today?

Do I want to get wet?

Should I take an umbrella when I go out?

What is the risk?

Is the risk acceptable?

How do I prevent the hazard from doing me harm?

IDENTIFY

ASSESS

MANAGE
FOOD SAFETY

CAUSE

Hazards
Accidents
Problems

EFFECT

Outbreak
Damage
Problems
Consequences

FOODBORNE HAZARDS

regard

Substances
Ingredients

Processes

(People!)
FOODBORNE HAZARDS induce effects

- Doses
- Kind of residue/contaminant
- Individual sensitivity (human/animal)
- Carry over problem
- Metabolized toxins

Integrated (HACCP) systems are necessary to manage hazards
...HACCP concepts control and manage the diversity of hazards along the food supply chain

- Tailored
- Individual
- Responsive
- Sustainable

Once, an unsafe product has reached the market, a recall is inevitable...
PRODUCT RECALL

Has the product already reached consumers?

NO
silent recall
based on production and lot numbers via direct customers and trading organisations

YES
public recall
via public media and authorities

HOW TO COMMUNICATE A RISK

HOW TO CALM DOWN THE CONSUMER?
Potential Goals of Risk Communication

see also: Fischhoff et al.: Communicating Risks and Benefits (FDA User’s Guide 2011)
...did you know

that this product may contain 35 products from 60 countries and 5 continents

? 

Source: R. Evans, Budapest 2009
<table>
<thead>
<tr>
<th><strong>Dough</strong></th>
<th><strong>Yeast</strong></th>
<th><strong>Salt</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>Ireland</td>
<td>France</td>
</tr>
<tr>
<td>Poland</td>
<td>UK</td>
<td>Turkey</td>
</tr>
<tr>
<td>UK</td>
<td>Ireland</td>
<td>France</td>
</tr>
<tr>
<td>USA</td>
<td>Germany</td>
<td>Netherlands</td>
</tr>
<tr>
<td><strong>Sugar</strong></td>
<td>Brazil</td>
<td>Greece</td>
</tr>
<tr>
<td></td>
<td>Indonesia</td>
<td>Turkey</td>
</tr>
<tr>
<td></td>
<td>Jamaica</td>
<td>France</td>
</tr>
<tr>
<td><strong>Tomato paste</strong></td>
<td>Italy</td>
<td>Greece</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Italy</td>
</tr>
<tr>
<td><strong>Sugar</strong></td>
<td></td>
<td>Kenya</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morocco</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Egypt</td>
</tr>
</tbody>
</table>

**Toppings....**
Cheese from Switzerland, France, USA, Norway, Finland, Chili Peppers from Sudan, South Africa, Argentina
Anchovies from Peru, Falkland Islands, Iceland, Denmark, Spain, Portugal
Ham from Denmark, Austria, Germany, France, Sweden
Tuna fish from Spain, Morocco, Japan, Philippines, Thailand
Salami from Hungary, Italy, France, Belgium, UK, USA
Pepperoni from Poland, Ukraine, Ireland, Denmark, UK, Germany
Vegetables, garlic, mushrooms, sweet pepper, olives onions from Lithuania, Spain, Portugal, Croatia, Serbia, Turkey, Italy ...

So, how can we find out, which control button (relating to an ingredient or to a supplier) is to be pressed in case of emergency

After: R. Evans, Budapest 2009
“Internal traceability systems assist in the rapid identification of failures at any stage in the production process.“

For details see the following documents:
SGS White Paper Managing Performance in Food Supply Chains (2013)

In case of an **Alert**: the ideal system is a centralised control system
The European Union

28 Member States and one market

that trades internationally

28 Member States, but one set of rules

Traceability is fundamental and legally established

Communication and collaboration are essential

…not always simple, but effective

….laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety…

Official Journal L 031, 01/02/2002 P. 0001 - 0024
**Overall mission:** The EU integrated approach to food safety aims to assure a high level of food safety, animal health, animal welfare and plant health within the European Union through coherent farm-to-table measures and adequate monitoring, while ensuring the effective functioning of the internal market.

Tasks include:

- To develop legislative and other actions
- To assure effective control systems and evaluate compliance with other EU standards
- To manage international relations with third countries and international organisations concerning food safety and related issues
- To manage relations with the European Food Safety Authority (EFSA) and ensure science-based risk management
European Food Safety Authority

has 3 main goals in general:

• Improvement of EU food safety
• Re-build consumer confidence in EU food safety
• Re-build confidence of trading partners in the EU food supply

www.efsa.europa.eu
European Food Safety Authority

Who can assign tasks to EFSA?

European Parliament

European Commission

EU Member States

Regulation on General Food Law (178/2002)

Article 50:

„A rapid alert system for the notification of direct or indirect risks to health deriving from food or feed is hereby established as a network…“
3 Types of Notifications

**ALERT Notifications**
- Risk has been identified
- Product is on the market
- Immediate action is required by members

**INFORMATION Notifications**
- Risk has been identified
- Product has not reached the market
- Immediate action is not required by members

**News Notifications**
- News notifications, information related to the safety of food and feed
- Not communicated as an “alert” or an “information”
- It is judged interesting for control authorities

---

RASFF Notifications in 2010

- **1.780 market notifications**
  - 592 ALERT
  - 1.188 INFORMATION
- **1.578 border rejections**

> 4.000 „additional“ notifications (& follow-ups)

in total >7.500 notifications

annual increase: >10% (2011: 9.157 notifications)
RASFF Portal

http://ec.europa.eu/food/food/rapidalert/rasff_portal_database_en.htm

For ensuring **Food Safety**, it is not condemnable to learn from former crises
A crisis is an **undesired and unscheduled** process of **limited duration**

- State of emergency
- Critical situation
- Normal situation

„A crisis is a productive situation. You just have to put away the aftertaste of a disaster!“

Max Frisch, Swiss writer, 1911-1991
Many solutions were born in a crisis

4-Phase Model of a Crisis

Preventive measures
Training
Case studies
Simulation

Early warning system
Monitoring programmes
Issues management

Clockwork-like actions to be taken
Emergency plan
Spokesperson

Recovery of normal situation
Trust re-building
Image promotion

Potential Crisis phase
Latent Crisis phase
Acute Crisis phase
Post-Crisis phase

W. Kneifel © 2011
ISSUES OF A CRISIS PLAN

• Knowledge about scenarios of possible crises
• Implementation of a crisis management group
• Spokesperson in case of a crisis
• Course of action in case of a crisis
• Other responsible persons
• Mode of documentations

_Note:_

*Supplementary material:* phone numbers and contact details of in- and external collaborators and consultants (medical, legal, scientific, insurance, PR agency etc.)

---

_The development of probabilistic theory by Pascal and Fermat revealed important building blocks for risk management._

---

_The probability of „food unsafety“ risks_
‘Only those who will risk going too far can possibly find out how far one can go.’

T.S. Eliot (1888-1965)

“Today’s complex and inter-dependent food supply chain makes food safety a shared responsibility more than ever before”

Frank Yiannas,
Food Safety President
at Walmart, Orlando 2012

Caroline Scott-Thomas
Orlando, Jan 2012