

Summary of the presentation:

Risk assessment strategies of chemicals in food and diet to support health and safety decisions

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According to the European legislation (Regulation No 178/2002 of the European Parliament and of Council of 28 January 2002), Food means any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be, ingested by humans.

Food should not be placed on the market if it is “unsafe”, i.e. it is injurious to human health or unfit for human consumption. In determining whether any food is injurious to human health, regard shall be had: (i) not only to the probable immediate or short term or long term effects on the health of a person consuming it, but also on subsequent generations; (ii) to the probable cumulative toxic effects; (iii) to the particular health sensitivities of the specific category of consumers to whom the food is intended.

Risk analysis, a process based on three components – risk assessment, risk management and risk communication - , is the operational tool developed to achieve the goal of food safety.

When considering chemicals in food and diet, the following main categories are of concern:

- natural toxins
- additives
- contaminants migrating from packaging
- contaminants from water
- environmental contaminants, including pesticide residues
- medicines, hormones and growth factors.

Apart from additives (colouring and flavouring agents) that are deliberately added to food, all the other chemicals are “unwanted” components of foods, the presence of which has to be controlled and reduced to a minimum. However, since it is virtually impossible to avoid and totally prevent the presence of such chemicals, the main effort of the current regulations is to assess the health risk posed by each individual component and set limit values that can be tolerated in the diet.

The strategies for risk assessment of chemicals in food in place within the European Union are based on a multi-step process that generally includes:

1. definition/identification of the substance to be assessed
2. characterisation of its hazardous properties in terms of type of effects and dose-response relationship
3. assessment of the dietary exposure (current or future)
4. risk characterisation.

This process provides for a ‘one-by-one’ substance risk assessment. Combined or multiple exposures to different substances in the diet requires a further iteration of the process taking into consideration all the mixtures and their environmental and metabolic interactions.

To explain the basic operating principles of risk assessment for chemicals in food, the case of pesticide residues will be analysed in detail by examining the existing regulations, the way the acute and long-term risk is assessed, and the health implications of the existing data.

Then some related issues will be discussed:

The adequateness/accuracy of the risk assessment:

- Problems and issues of animal toxicological testing to predict toxicity in humans
- Strategies to assess unpredicted adverse reactions and allergies
- Strategies to assess interactions and combined exposures

The role of pre-marketing and post-marketing assessment

- Pre-marketing risk modelling versus post-marketing risk monitoring
- the different techniques of risk modelling (deterministic – probabilistic)
- whole food chain control

The practical implications of food risk assessment

- who has to do what in risk assessment, risk management and risk communication
- the role of the regulatory Agencies and the forthcoming ESFA
- resources, cost and time in food risk assessment
- future trends, possibilities and gaps for research.