Food and feed safety

Food needs to be nutritious, fresh and above all safe. Consumers should be able to have trust in the products they buy. Recent "food crises" such as dioxins in food and feed, mad cow disease, melamine in milk products, plasticisers in sport drinks and the contamination with enterohemorrhagic E. coli EHEC have emphasised the importance of safety in the food chain.

Since food from animal origin represents a significant part of our diet, the feed necessary for raising livestock needs to comply to strict quality and safety standards. Assuring safety along the food supply chain, including materials coming in direct contact with food, is a key priority for the European Commission.

The JRC provides analytical tools that allow Member States to achieve reliable and comparable measurement results to support the harmonised implementation of the strict rules set up in EU food safety legislation. These tools include validated methods, reference materials, proficiency testing and competence building. They are available to laboratories across and beyond the EU. Their activities are facilitated within the framework of the European Union Reference Laboratories.

The JRC hosts six European Union Reference Laboratories (EURLs) working on food and feed related issues; four in the area of food safety control (heavy metals [1], mycotoxins [2], polycyclic aromatic hydrocarbons [3], and food contact materials [4]) and two in the area of control as well as the pre-marketing authorisation of certain products (feed additives [5] and genetically modified organisms [6]).

Discover some of the areas we are currently working on, they are accompanied by a list of scientific publications:

- Food allergy and gluten intolerance
- Smoke flavourings
- Animal by-products
- Veterinary drugs in feed
- Phthalates
- 3-MCPD (3-monochlor-1,2-propanediol) esters and glycidyl esters

See also our list of Food and feed safety related scientific publications.
**Food allergy and gluten intolerance**

Food allergy is recognised as a serious health problem that affects about 17 million people in Europe, 3.5 million of them younger than 25 years old.

Undeclared allergens such as milk, egg, peanuts, tree nuts, soya, or lupin in food products, often introduced unintentionally during processing, represent a major health threat to allergic consumers.

Besides allergy sufferers there is also a considerable amount of consumers that do not tolerate gluten which is contained in cereals.

Appropriate labeling of allergens and gluten in food products is therefore of utmost important for the well-being of these individuals. The JRC has a diversified portfolio of research activities, all directed to the development and validation of analytical methods to ensure compliance of food products with label declaration.

Read more in one of our latest scientific publications:


**Smoke flavourings**

Smoking is a traditional technique to preserve food and give it a specific flavour. It is increasingly replaced by the use of smoke flavourings which need to be assessed for safety and registered. EU legislation establishes maximum levels for each of the authorised products in certain food products. However, currently no analytical methods exist for checking compliance with legislation.

The JRC has set up advanced analytical methods to unravel the chemical composition of smoke flavourings to identify marker compounds which can help in controlling the levels added to food.

**Animal by-products**

Animal by-products are derived from parts of slaughtered animals that are in principle fit for human consumption but are not used for production of food (e.g. udder, ovary, bones). If properly sterilized, these products, called processed animal proteins (PAP), are a valuable protein source in animal nutrition. Improperly heated animal by-products fed to cattle were identified as the root-cause for mad cow disease. Therefore, in 2001 all animal by-products were banned as feed ingredients to eradicate the mad cow (bovine spongiform encephalopathy, BSE) disease.

On the basis of scientific evidence, the re-introduction of PAPs as fish feed was authorised. The test methods developed by the JRC provided the grounds for lifting the ban.
Veterinary drugs in feed

Veterinary drugs are used to cure and prevent diseases in animals. Excessive use antibiotics in food producing animals may lead to an increase of antimicrobial resistance of pathogenic bacteria that can be a risk to human health. Therefore, EU legislation has banned all of them as feed additives with the exception of coccidiostats for which maximum limits have been set.

The JRC developed the necessary methods to determine coccidiostats at the authorised level of usage.


Phthalates

Phthalates are used as plasticizers, primarily in the production of polyvinyl chloride (PVC). Their use in plastic toys and childcare products is restricted in the EU. The reason for concern is they have been linked to developmental problems in children as it affects their endocrine system [14]. However, they became ubiquitous contaminants in the environment and in food. The presence of phthalates in food may also be the result of migration from materials coming into contact with food [15].

Recent EU legislation has established limits for migration of phthalates from materials coming into contact with food; now much stricter than in the past. Wine and spirits, in particular those produced many years ago, might have come into contact with processing equipment containing phthalates, which lead to contamination.

The JRC together with the International Organisation of Vine and Wine (OIV) is validating an analytical method for the determination of several phthalates in wine. Once available, the method can be used for resolving dispute over alcoholic beverages in international trade.
3-MCPD (3-monochlor-1,2-propanediol) esters and glycidyl esters

3-MCPD esters and glycidyl esters are carcinogenic substances that may be formed in small amounts during the production of edible oils.

The JRC has recently investigated which analytical methods are best suited for monitoring and surveillance programmes. In addition, the European Food Safety Authority (EFSA) has commissioned JRC to produce preliminary occurrence data for 3-MCPD esters and glycidyl esters in a variety of food products. Once available the data will feed into EFSA’s upcoming risk assessment of 3-MCPD esters and glycidyl esters.


Related scientific publications

- Cordeiro, F. et al. (2013), "Setting maximum limits for trace elements in baby food in European