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Food Testing News

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PAH and Benzo(a)pyrene

By Wiebke Puschmann, Eurofins Analytik, Germany

On 1 April 2005 the Commission Regulation (EC) No 208/2005 amending EU-Regulation 466/2001 took effect, imposing maximum levels for benzo(a)pyrene in different types of food.

Benzo(a)pyrene is used as a marker for the presence and effect of carcinogenic PAHs. Polycyclic aromatic hydrocarbons (PAH) are a group of different organic compounds, each of which contains two or more aromatic rings. Many of these compounds are considered to be carcinogenic and genotoxic. Benzo(a)pyrene itself also demonstrates carcinogenic effects.

PAHs are generated by the incomplete combustion of organic materials such as wood, oil, and animal fats. PAH are less water-soluble, less evaporable and less degradable and adsorb on organic particulate matter such as fly ash and soot from the exhaust of motor vehicles, the processing of coal and petroleum etc. Food can be contaminated by environmental PAHs present in air, soil or surface water. If PAH-containing particles are dispersed in surface water, they are transported in suspension and traces finally reach fresh water or marine sediments. These sediments constitute a pollution reservoir from which PAH may be released. Filter-feeding bivalves such as mussels and oysters may accumulate particles contaminated by PAHs. The contamination of crops by PAH is affected by their location and the emission sources in the ambient environment. Food can also be contaminated during processing such as smoking, drying, frying, grilling, roasting and baking. The presence of PAHs in vegetable oils is related for the most part to the drying processes of the seeds where combustion gases may come into contact with the seeds.

Maximum levels for benzo(a)pyrene

Oils and fats intended for direct human consumption or used as an ingredient in foods	2.0 µg/kg
Baby food	1.0 µg/kg
Smoked meats and smoked meat products	5.0 µg/kg
Muscle meat of smoked fish and smoked fishery products	5.0 µg/kg
Muscle meat of fish, other than smoked fish	2.0 µg/kg
Crustaceans, cephalopods, other than smoked	5.0 µg/kg
Bivalve molluscs	10.0 µg/kg

According to Regulation (EC) 2065/2003 maximum levels for benzo(a)pyrene (10 µg/kg) and benzo(a)anthracene (20 µg/kg) in smoke flavourings exist within the EU. In Germany, there is a maximum level for benzo(a)pyrene of 1 µg/kg in smoked meats and smoked meat products defined within the “Aromen-Verordnung”.

Benzo(a)pyren is officially categorised as harmful contaminant. Exceeding the maximum level implies that the food does not comply with European law and is therefore excluded from sale. Within the scope of quality assurance measures the level of benzo(a)pyrene in food should be controlled. Eurofins Analytik GmbH, Hamburg (Germany), using accredited methods, is able to analyse for benzo(a)pyrene by GC-MS in all relevant matrices as well as for all relevant PAHs.

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Sudan dye contamination initiates biggest product recall in UK history

By Elizabeth Moran, Eurofins UK

Toxic red dye used in floor paint has been found in hundreds of foods.

A batch of Worcester sauce, which is used as flavouring in a wide variety of dishes, was seasoned with chilli powder which was contaminated with the illegal dye Sudan I. The affected Worcester sauce then went on to be used in the manufacture of hundreds of products including ready meals, convenience foods and snacks. In February 2005, the UK Food Standards Agency instigated a recall of over 500 products known to contain the contaminated Worcester sauce and is still investigating further possible contamination.

The Sudan dye problem was first identified by authorities in France early in 2003. Chilli powder and other processed chilli products imported from India had been found to contain the dye, a genotoxic carcinogen more usually found in shoe polish, floor paint and waxes. The European Union passed Emergency Control Measures to try to prevent its proliferation through the food chain by ensuring that all chilli powder imported from outside the EU was accompanied by a certificate of analysis confirming that it was free of the dye. These measures were extended to curry powder at the beginning of 2004, and then to the non-permitted dyes Sudan II, III and IV which were also discovered in foods.

Eurofins Laboratoires Ltd. Birkenhead has performed the analysis of Sudan dyes for several food producers and can offer routine testing of foods by HPLC with diode array detection (DAD) for confirmation. Screening of a variety of foodstuffs led to the discovery of widespread contamination of unrefined palm oil from Ghana with Sudan IV. The laboratory also performs analysis of other non-permitted colours.

In Germany, Eurofins Analytik GmbH offers analysis of Sudan dyes and other non-permitted colours in food by LC-MS-MS.

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GMO certification: Identity Preservation

By Fayçal Bellatif, Eurofins Certification, France, and Katrin Schröder, Eurofins GeneScan, Germany

Is there still room for GMO certification (Identity Preservation) as well as the existing "voluntary-compulsory" certifications? Decisions to go for GMO certification are usually voluntary decisions. However, the numbers of different standards have multiplied. Several professional institutions have created and are promoting standards for quality management systems or private standards for the management of food safety (BRC, IFS…). In the latter case, certification is virtually compulsory for companies providing private label products.

Why comply with several standards? Which are the most relevant? Since neither a detailed analysis nor long-term experience is available, most of the current standards are influenced by commercial factors instead of by the expected added value. "Voluntary-compulsory" certifications have become inevitable, as they are now prerequisites for sales success.

GMOs present an additional problem, as even retailers do not regard them as a food safety issue. But as long as the European consumer rejects GM foods, retailers are anxious to avoid them. However, the numbers of both authorised and non-authorised GMOs are proliferating in addition to the extent of areas of cultivation of GM crops (20% increase during the last year). In view of this coexistence of GM and conventional planting, the risk of adventitious and technically unavoidable presence of GMOs in any supply chain increases significantly.

The only way to preserve non-GM products is to implement global measures of control, segregation

and traceability within the supply chains for food and feed.

These measures are both organisational (risk assessment, training, supplier management etc) and physical (segregation, sampling, analysis etc). Specifications for these measures may be complex as they are dependent on regions and stages of production, product categories and numbers of stakeholders.

Therefore an initial individual assessment is required prior to the definition of the scope and measures of the control programme. Consequently, the expertise of global analytical laboratory networks and their unique databases are crucial in the assessment of the risk specific to a supply chain and in the definition of a suitable analytical strategy for verification. Regular testing, adverse event management and audits will all ensure that the objectives of the programme can be achieved.

These programmes will provide the most substantial added value to the stakeholders if certified. This certification can include all or part of the supply chain. Implementation of such programmes has already demonstrated that both coexistence and preservation of different supply chains are possible.

The Eurofins Group has for several years offered a private standard (GeneScan General Standard for IP), which is accepted in Brazil, China, USA and Europe. Recognition of Eurofins certification is further strengthened by the use of test methods accredited to EN 45011.

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Multi-method for detection of Fusarium toxins

By Scarlett Biselli, Eurofins WEJ Germany

Fusarium toxins are produced by several field fungi, including Fusarium graminearum and Fusarium culmorum. These toxins are common in cereals and grains, particularly in wheat, barley and maize.

Toxins such as Deoxynivalenol among the group of trichothecenes occur to some extent in high concentrations while others occur in extremely small quantities (e.g. T2-toxin).

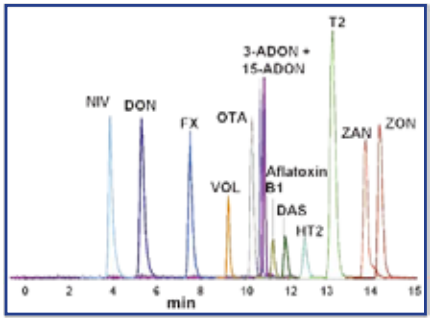
Trichothecenes are responsible for a wide range of disorders in animals, including feed refusal, weight loss and vomiting. In particular, deoxynivalenol (vomitoxin) inhibits protein biosynthesis and has been reported to suppress immune responses (EFSA, 2004). Deoxynivalenol is the most prevalent mycotoxin, but it is less toxic by several orders of magnitude than many other trichothecenes. Among naturally occurring A-trichothecenes, animal studies proved T2 and diacetoxyscirpenol (DAS) to be the most potent toxins.

Zearalenone (ZON) is a nonsteroidal estrogenic mycotoxin which has been identified as the causative agent in several mycotoxicoses affecting farm animals, especially pigs (SCF, 2003).

In order to reduce the levels of biogenic toxicants, European authorities are discussing further regulations on mycotoxins. Within the EU, harmonised legislation will set maximum limits for aflatoxins and ochratoxin A in cereals and cereal products. Limits for fusarium toxins (DON, ZON, HT2, T2) are currently drafted in the EU member states. In Germany, maximum limits for fusarium toxins have been imposed since February 2004.

Analysis

The identification and quantitative assessment of these compounds generally requires sophisticated sampling, sample preparation, extraction, and detection techniques. The natural coexistence of several mycotoxins in cereals and related products demands simultaneous analysis of these substances.



The most common multi-methods for determination of type A and B trichothecenes include GC-ECD, GC-MS detection. Eurofins Wiertz-Eggert-Joerissen laboratory recently developed a multi-method for simultaneous detection of trichothecenes as well as zearalenone based on HPLC-MS/MS. The main advantages of this method are the general applicability, high sensitivity and outstanding selectivity. Altogether 12 toxins can be identified by application of this method.

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Food Testing

in brief

Eurofins becomes the largest dioxin-testing laboratory in the world

Eurofins has acquired ERGO (Hamburg), one of the largest and most advanced dioxin-testing laboratories in Germany. ERGO has earned an international reputation in the analysis of dioxins at low concentrations in natural products and biological specimens.

Through this acquisition Eurofins has strengthened its position and has become the largest dioxin-testing laboratory in the world. Together with GfA, Oekometric and MPU, Eurofins now performs more than 15.000 analyses of dioxins and furans annually and has well established customers among leading international producers of food and feedstuffs as well as in the chemical, steel, energy and waste management industries in 40 countries.

Eurofins holds the appropriate accreditations (ISO 17025) and government approvals for dioxin testing and sampling in several countries including Germany, Belgium, France and Luxembourg. Eurofins is not only the largest private laboratory, but also a major contributor to Research & Development in this field, as demonstrated by more than 260 scientific publications.

Dioxin and furan analysis requires state-of-the art technology to detect even minute traces of these POPs. Such sensitivity is necessary, because even very small amounts can cause severe damage to human and animal health. Consequently, strict maximum values are imposed by the European Community.

Eurofins' very strong position in dioxins and POPs testing enables the Group to offer its clients a unique combination of advantages:

- Exceptionally high sensitivity and precision, more reliable data and enhanced quality due to large investments in R & D over the last decade and the benefit of very experienced staff.
- Most cost-effective dioxin and POPs testing due to economies of scale resulting from the very high volume of sample throughput.
- The ability to guarantee rapid analysis in less than 5 days.

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Eurofins Certification (France) received IEC guide 65 accreditation

Eurofins certification, created in mid-2004, undertakes the certification of food standards for clients in the food industry and, following an initial audit in January, has recently achieved French COFRAC accreditation according to EN 45011 standard (ISO / IEC Guide 65). Certificates issued since November 2004 will therefore benefit from this international recognition. Certification according to additional standards relevant for food / feed supply chains will be available in the next few months.

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Direct Laboratories (UK) has joined the Eurofins Group

Direct Laboratories Services Ltd provides chemical and microbiological testing services, research and consultancy to government agencies and the food, agricultural and environmental management industries in the UK and overseas. Its food testing services comprise pesticide residues and contaminants, trace elements and vitamins as well as authenticity and various analyses of milk and dairy products. Direct Laboratories holds UKAS accreditation for a wide range of chemical and microbiological tests and is also GLP compliant.

In addition to helping food companies produce safe products, its expert food scientists take part in numerous government research projects to ensure that the food industry constantly works to the highest standards and satisfies the requirements of UK and EU regulations.

Direct Laboratories is based at Wolverhampton, near Birmingham in the West Midlands, and employs over 100 staff.

Customers of Direct Laboratories will continue to receive the personal, professional service that they have come to rely on and trust, with the added benefit of access to Eurofins' international network of laboratory and IT facilities.

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