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Food Testing News

N° 28 - November 2008

Analytical detection of melamine in food and feed products

By Silke Heimbecher, Eurofins Analytik GmbH, Germany

High levels of melamine, a plastic-making industrial chemical, were found in milk products from China

In spring of 2007, several dogs and cats died in North America due to the adulteration of wheat gluten with melamine. The pets died due to damage caused by crystals forming in the kidneys from the combination of melamine and its metabolite cyanuric acid. Eighteen months later, adulteration of milk products with melamine in China has led to one of the biggest food scandals of recent decades, with several deaths and thousands of babies and infants having kidney problems, in many cases irreversible. Currently melamine is being detected in many countries in sweets, cookies and eggs from East Asia.

In response to this issue, the EU has imposed an import ban on all baby and infant food as well as composite products containing Chinese milk and requires the analysis of melamine in these products. The maximum level of melamine specified in the EU has been set at 2.5 mg/kg.

During the initial melamine contamination issue in 2007, three Eurofins laboratories - Wiertz-Eggert-Jörissen in Hamburg, Sofia in Berlin (Germany), Central Analytical Laboratories in New Orleans (USA) - established a method of analysis for melamine (gas chromatography combined with mass spectrometry, GC-MS), based on the method developed by the US Food and Drug Administration. Limits of quantification (LOQ) for this method are in the range of 2 to 20 mg/kg for melamine and its metabolites ammeline, ammelide and cyanuric acid.

In response to the recent issues, Eurofins has developed a new LC-MS/MS method (liquid chromatography combined with double mass spectrometry), which is much more sensitive than the original method with LOQs of 0.1 mg/kg for melamine and 1 mg/kg for cyanuric acid. Eurofins furthermore has increased the laboratory capacities for melamine and established the analysis in the Eurofins laboratories in Suzhou, China. Due to high equipment capacities, Eurofins laboratories are now able to analyse over 400 samples per day.

Minor amounts of melamine in food and feed are harmless. Melamine can migrate from resins in packaging materials into the product. The insecticide Cyromazine is a derivative of melamine and can release this compound during decomposition. Eurofins provides a broad spectrum of analytical methods including specific migration studies for packaging material to evaluate the source of such minor contaminations.

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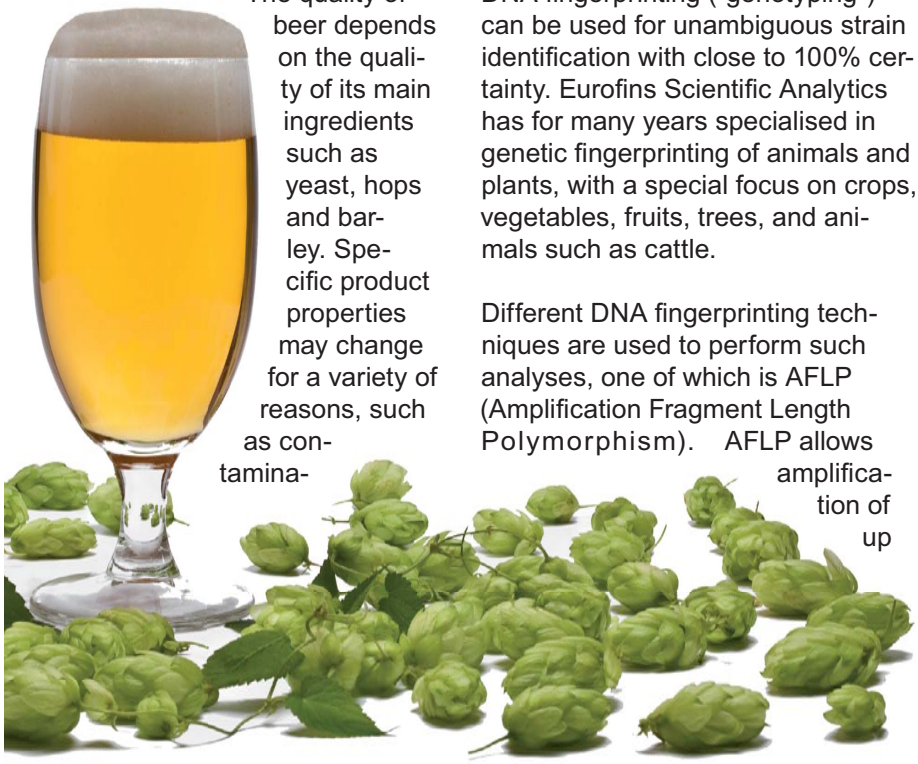
AFLP: DNA-based quality control of production strains in the beer industry

By Andreas Pardigol, Eurofins Scientific Analytics, France

The particular properties of each ingredient determine the quality of beer, especially in terms of taste and the capacity to form foam.



The quality of beer depends on the quality of its main ingredients such as yeast, hops and barley. Specific product properties may change for a variety of reasons, such as contamination of the production yeast strains or ingredients or genetic alteration. It is therefore critical to regularly check the identity and purity of the production strains used.

DNA fingerprinting ("genotyping") can be used for unambiguous strain identification with close to 100% certainty. Eurofins Scientific Analytics has for many years specialised in genetic fingerprinting of animals and plants, with a special focus on crops, vegetables, fruits, trees, and animals such as cattle.

Different DNA fingerprinting techniques are used to perform such analyses, one of which is AFLP (Amplification Fragment Length Polymorphism). AFLP allows amplification of up to 100 DNA markers in a single experiment with a very high resolution at the whole genome level. No DNA sequence information is needed to setup a new assay, which makes it possible to develop customized applications very quickly, within a 2 to 3 weeks time frame.

Setup of a customized AFLP test requires characterisation of a specific customer's strain (DNA extraction & determination of a strain-specific AFLP fingerprint) as a first step. After this initial validation, the analysis can be performed routinely.

The fields of use of the AFLP technique are widespread as the technique can be applied to various types of production strains (yeasts, fungi, plant species etc.). In addition to the production strains used in breweries, the AFLP technique may be applied in other food production areas, including the genetic profiling of bioengineered strains or the determination of fruit and vegetable species.

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Shelf life testing of food products

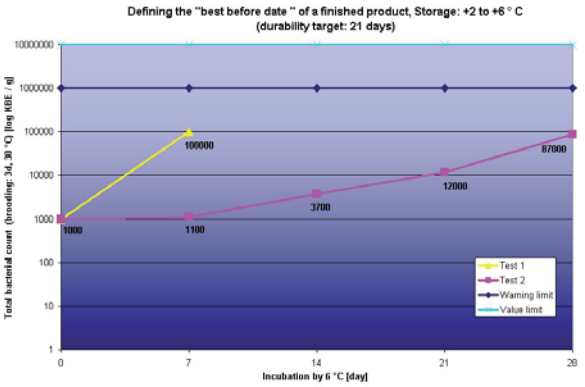
By Liane Plank, Eurofins - OFI Lebensmittelanalytik GmbH, Austria

Stability testing is conducted to monitor product quality under exactly defined storage conditions.

Determination of a "best before" date

Legislative requirements and customer specific criteria are used to define critical parameters and threshold values for the product when stored under varying conditions such as temperature or exposure to light and oxygen. The storage stability protocols include at least two different storage conditions, one of which corresponds to those the product would experience during normal storage, but also more "stressful" conditions (e.g. raised temperature) in order to validate the results.

The products are tested at specified times to determine their organoleptic and/or chemical, physical and microbiological properties. For instance, chemical analyses might include the determination of the vitamin content of fortified foods or rancidity levels of fat or oil. In the case where the defined threshold values are exceeded, possible causes are discussed with the customer and corrective actions suggested.



The diagram shows the microbiological results for two convenience products. The target "best before" date was 21 days. The test interval was defined as "upon arrival", after 7, 14 and 21 days of storage at 6° C. For Test 1 the curve progression indicates that it is likely to exceed the threshold value and the trial was halted. Test 2 resulted in the definition of an appropriate "best before" date.

Stability testing is performed by several laboratories in the Eurofins Group. For more details contact the laboratory in your country.

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Eurofins OnLine - New release

By Eleanor Long, Eurofins UK

The latest development in web-based design allows a new and exciting level of interaction.

Eurofins OnLine (EOL) has been developed on a secure website to provide customers with a state-of-the-art, fast, efficient and easy method of access to information regarding their samples, from any worldwide location.

EOL was originally implemented in the UK for access to results from our Pesticide Residues team and is now being rolled out to include all Food Chemistry and Food Microbiology results.

Right from the Welcome page, EOL provides customers with added value, from alerts for new services developed by the expert scientists at Eurofins, to breaking issues within the food industry. The intuitive interface provides a modular approach to enable customers to follow their samples through the laboratory from start to finish.

Online Ordering

Sample information can be registered through this module, with customer specific data fields. The analysis for each sample is chosen from a pick list, and the final order is then submitted to the laboratory. This electronic transfer of data ensures that customer details on final certificates are correct.

Results

All the details for samples can be viewed via EOL, including analyses requested and expected dates of results. When results have been validated by the laboratory they will be uploaded into EOL and can be viewed on screen. Final certificates can also be viewed and downloaded and all data can be exported to Microsoft Excel for incorporation into customer data systems.

Summary Reporting

This module of EOL gives customers the added benefit of being able to get more value from their data. The “at a glance” traffic light systems highlight issues and can be used for comparison with legislative or customer specific limits. Customers can also view data trend in graph form for fast, visual impact.

EOL is available for Eurofins customers in various countries. For more information do not hesitate to ask your local Eurofins contact.

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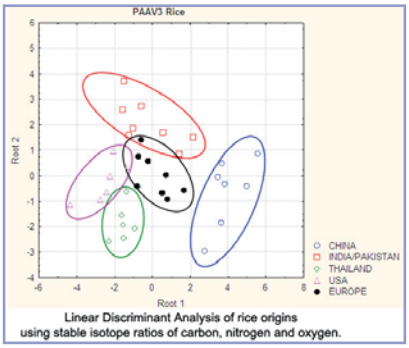
Confirming the origin and authenticity of rice

By Eric Jamin, Eurofins Scientific Analytics, France

The geographical origin of rice is currently included on rice labels. For this high value product, controlling the geographical origin needs to form part of any quality control scheme.

In Europe, there have been several crises in recent years due to the suspicion that either genetically modified rice or fake Basmati rice could be imported. Some producing countries in the EU also had pesticide residue issues. For these reasons, a frequent question is: “Can one determine the geographical origin of rice by analytical means?” Eurofins Nantes (France) has established a worldwide database of authentic rice of known origin. The data includes the stable isotope ratios of carbon, nitrogen and oxygen measured in these samples by Isotope Ratio Mass Spectrometry. Since these three elements are influenced by environmental factors and cultural practices, a satisfactory discrimination of the main countries of origin has been achieved through a multivariate statistical approach (see illustration).



Linear Discriminant Analysis of rice origins using stable isotope ratios of carbon, nitrogen and oxygen.

This analysis can be carried out on both brown and milled rice from the main producing countries. If required, further local discrimination can be obtained by the use of strontium isotopic ratio, which provides complementary information regarding the geology of the location where the rice has been grown.

Another authenticity issue is the confirmation of the rice variety. For the quantitative detection of faked Basmati rice, Eurofins Medigenomix in Munich (Germany) has established a DNA analysis which tests for microsatellite markers associated with grain length which occur in approved Basmati varieties. Additional DNA markers can also be tested, including the rice fragrance encoding gene. Tests for other rice varieties can be implemented on request.

Eurofins also performs analyses for detection of genetically modified varieties of rice and can monitor geographical origin for a wide range of food products.

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in brief

Detection of hazardous pesticides in spices and herbs

Recently, Greenpeace published the results of analysis of 33 items of popular German herbs and spices. The samples were bought in the German supermarket chains. In 82 percent of the samples pesticides were detected in significant amounts which lead to the Greenpeace evaluation of "yellow" or "red". Only six samples were found to be relatively free of pesticides namely, paprika, dill and dried parsley. One product paprika powder had to be taken off the market due to high content of insecticide methamidophos.

In total 53 different pesticides were detected, of which 35 are considered to be particularly hazardous to health of consumers, for example cyproconazol, which is classified as carcinogenic.

Eurofins | Dr. Specht Laboratorien extended their offer for the analysis of pesticides in herbs and spices and developed a screening package with over 500 substances.

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Solvent Orange 3 – another non-approved dye in spices

At the end of May 2008 rumours surfaced about the use of the dye Solvent Orange 3 (also called Chrysoidine) in whole star anise and Saigon cinnamon. Vietnamese suppliers were suspected of adding this dye to intensify the colour of the material intended for the Indian market. The conventional use for Solvent Orange 3 is in inks, wax for polishers, and alcoholic solvents.

In response to requests from several customers, Eurofins | WEJ quickly set up an LC-MS/MS method for the determination of Solvent Orange 3. To date, 10% of samples analysed have been found to contain Solvent Orange 3. Concentrations between 75 µg/kg and 10 mg/kg have been observed in the spices.

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Eurofins International Seminar – XVIIth session, February 25 & 26, 2009

The primary aim of the Eurofins International Seminar (EIS) is to keep abreast of the latest developments in the area of biotechnological crops, and will include the:

- Current worldwide status of GM crops and applications
- Latest Biotech developments in Europe and around the world
- Analytical tools for GM monitoring
- Emerging issues, techniques, concerns

The expert panel of speakers will include representatives of various segments of the biotech business, including regulatory bodies, the analytical sector.

Whilst most commercial transgenic crops are engineered for single gene traits, there is an increasing prevalence of "stacked" traits. Biotech development is moving into second generation GM crops, with new products targeting health, safety, nutritional and even environmental issues. Eurofins International Seminar will provide an ideal opportunity for you to catch up with all the latest news.

Contact: EIS@eurofins.com
Information and registration: http://eis.eurofins.com

Deadline for REACH pre-registration ends soon

December 1st 2008 marks the first milestone for the REACH programme (Registration, Evaluation, Authorisation and Restriction of Chemical substances). This date marks the end of the pre-registration period with the European Chemicals Agency (ECHA).

For those companies who have already entered the programme, pre-registration of chemicals has allowed up to ten years until the full and final registration must be completed. However, for those that have missed this deadline, full registration of chemicals will be required immediately. The zero tolerance policy of REACH – "no data – no market" means that substances that have not been pre-registered, or registered can no longer be sold.

In collaboration with an expert partner, Eurofins can offer advice on REACH pre-registration.

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