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Food Testing News

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The importance of water quality in food and beverages

By Andy Eaton, Eurofins US

Water constitutes over 90% of most beverages, and water quality can have a significant impact on taste, and can also be important in brand protection. The Food and Drug Administration (FDA) regulates bottled water in the United States, but only has limited requirements for monitoring water as an ingredient in foods (mainly microbial safety). Globally, the monitoring requirements and acceptance limits vary tremendously among the primary regulators – the USEPA, the EU, and WHO. This makes it difficult for a multi-national company to maintain uniform standards across the globe. Companies need to protect their brands, and be aware of emerging contaminant issues.

Furthermore, multi-national companies have to rely on water from a variety of sources, some with more documented water quality data than others. In the United States, even though municipal water may be the primary source for most food manufacturers, the amount of water quality data available may be severely limited, due to the waivers available to the Authorities. With the expansion of water re-use, the challenges of maintaining quality become even more significant.

There have been numerous issues in the past decade where lack of sound information on water quality has had a major impact on food manufacturers. A few years ago, the City of Los Angeles discovered that their water contained nearly ten times the permissible level of bromate, which caused a major beverage manufacturer to switch their water treatment to reverse osmosis. Similarly, a multi-national company in India was accused of having pesticides in their product. Due to the lack of monitoring on the source it was difficult to refute. In the US Municipalities, changes to chlorination practices caused supply of water containing high levels of chlorate, a WHO regulated disinfection byproduct, which is not yet regulated in the United States.

Eurofins has assisted several of the major multi-nationals who rely on water as a key component of their product to establish their own standards and monitoring programs to protect their brand from these emerging issues, and offers a range of comprehensive testing.

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Eurofins launches innovative veterinary drug screening

High-Resolution LC-MS allows for cost efficient screening with high selectivity and sensitivity

By Carina Bartz, Dr. Susanne Rathjen, Lutz Hartig, Dr. Scarlett Biselli, Eurofins WEJ Contaminants, Hamburg

Veterinary drugs constitute a complex group covering a couple of hundred active substances representing different chemical classes and therapeutic areas. Not all of the veterinary drugs are of equal importance or relevance for risk monitoring. In fact the relevance of certain actives depends on the nature of the sample, the country of origin, the country of destination and the stage of sampling within the food supply chain.

Today more than 250 veterinary drug residues are included in Eurofins' analytical method portfolio including risk-orientated multi-class test strategies using LC-MS/MS (cf. Eurofins Food Newsletter No. 40).

In addition to this, an innovative known-unknown screening technique using high-resolution LC-MS now offers unique opportunities and provides improved cost efficiency in the complex field of veterinary drug residue testing.

Compared to conventional screening methods such as inhibitory tests or other biotests, HR-LC-MS covers a large set of targeted substances

including transformation or metabolic products with high selectivity and sensitivity. Due to a higher level of automation and the fact that quantification in addition to verification has, based on our experience, only to be carried out for the small number of positive findings, the method is very cost efficient. With its broad range of substances and efficiency, the method minimises the risk of overlooking health hazards associated with veterinary drug residues.

The newly developed method has been validated in accordance with EU Commission Decision 2002/657/EC. In the first stage the screening procedure can be applied to meat and fish and covers more than 100 compounds including all relevant antibiotics, anthelmintics and antiparasitics. Future developments will focus on a screening method covering all relevant veterinary drugs for milk and dairy products as well as a comprehensive screening for hormones and hormone analogues.

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Authenticity testing of agave syrup

By Eric Jamin, Eurofins Analytics France and Lars Reimann, Eurofins USA

Apart from its use as a raw material when producing the famous Mexican drink tequila, agave syrup is an emerging sugar source, both as a final product and as an ingredient in various foods. This is due to its pleasant taste and very high fructose content, leading to a low glycemic index (a potential health benefit versus other sugar sources). However as for any trendy and high value product, the incentive for fraud is high and authenticity should be verified.

Some specifications for agave syrup are given by the Mexican government (Ref: NORMA NMX-FF-110-SCFI-2008). Agave varieties used for syrup production are limited to Blue Agave and Salmiana. Basic composition parameters are defined, such as sugar levels, ash, pH, and HMF (a sugar breakdown product). However, fake agave sugar meeting these specifications can be produced using chemically manipulated sugars from cheaper plant sources. Recent studies have confirmed frequent occurrences of adulteration.

Therefore advanced methods should also be used for an in depth authenticity evaluation. The first is the chromatographic profile of some oligosaccharides, which can detect marker peaks from various sugar syrups in agave (as it does in fruit juices). The second is Carbon 13 SNIF-NMR[1], which upon its initial publication in 2010 represented a significant improvement in the state-of–the-art of authenticity testing by allowing the first ever discrimination between sugars from CAM (Crassulacean Acid Metabolism) plants like agave and C4 plants such as cane and maize.

These complementary analyses are now included in Eurofins portfolio as efficient tools to monitor the authenticity of agave syrups.

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[1] Improved Characterization of the Botanical Origin of Sugar by Carbon-13 SNIF-NMR Applied to Ethanol. J. Agric. Food Chem. 2010, 58, 11580-11585.

Essential oils: characterisation and authenticity testing

By Eric Jamin, Eurofins Analytics France

Essential oils are high-value ingredients extracted from plants. They are not only used in cosmetics, but also in many food and feed applications for their flavouring and preservative properties. The oil's quality and its extraction from a natural source needs to be carefully checked by advanced analytical means to ensure that a product's description reflects its true composition and origin, and the value of those ingredients is in accordance with what is expected.

Compositional analysis

The analysis of essential oils by Gas-Chromatography (GC) is a well-established method for checking the composition of essential oils: ISO and AFNOR norms describe the typical GC profiles of more than 80 different oils. When combined with a Mass Spectrometer (MS) detector, this technique becomes even more discriminatory as the peak identification is further validated. Using suitable extraction procedures it is possible to perform precise and accurate quantitative analyses, and to monitor the oil's quality and stability.

Authenticity testing

Another issue is the authenticity of the main components found in essential oils: are they from the plant source they are claiming or have they been added as synthetic nature-identical compounds? The first technique available to solve this challenge is a chiral GC-MS analysis, allowing the separation of isomers of the same compound, which can provide information on the oil's natural or synthetic origin.

However, not all molecules are chiral, and natural racemisation can occur for some compounds. In this case isotopic testing will help: monitoring isotope ratios in key molecules (by SNIF-NMR[1] and IRMS[2]) allow for the detection of added synthetic or biotechnological substitutes. Examples of essential oil components for which authenticity testing using isotopic methods have proven effective are benzaldehyde, cinnamaldehyde, anethole, etc.

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[1] *Site-Specific Natural Isotopic Fractionation determined by Nuclear Magnetic Resonance*

[2] *Isotope Ratio Mass Spectrometry*

Sterol analysis for the authenticity of fats and oils

By Dr. Torben Küchler, Helge Dümmong, Eurofins Analytik GmbH, Hamburg

Along with the profile of fatty acids, triglycerides and tocopherols, the sterol profile is an important parameter to assess the identity and authenticity of fats and oils. In many cases, the individual sterol profile as well as the total content of sterols can determine the quality and marketability of fats and oils. For example, in the European Regulation (EEC) No 2568/91 limits are given for the total sterol content as well as the individual sterol distribution for different types of olive oils. Other guidelines such as the Codex Alimentarius or Pharmacopoeia regulate individual limits or ranges for sterol contents.

Many methods are used to determine the total amount of sterols and the individual distribution of various isomers. The standard methods are the ISO 12228:1999 and the method described in Regulation (EEC) 2568/91. Both methods are very time-consuming and require several hours of man-power. Furthermore, it is necessary to have well-trained staff to obtain reproducible results.

Eurofins now has a new method for the determination of the sterol profiles described in Codex Alimentarius and other compendia sources, as well as the total content of sterols using LC-GC-FID. This chromatographic technique combines the separative ability of HPLC and GC reducing the necessity for complex sample preparation steps. With this method the analysis of sterols is largely automated. The main benefits are rapid analysis time, more reproducible results as well as a reduction of costs and hence price. A comparative study between the established international standard methods and the new LC-GC-FID method demonstrated that the results are comparable.

Eurofins recommends the new method for the analysis of the sterol profile as well as the total content of sterols. This method can be a valuable tool for assessing the identity and authenticity of fats and oils.

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Food Testing

in brief

International Convenience Food Conference

Eurofins will hold its International Convenience Food Conference on topics around challenges in the supply chain on October, 30th in Amsterdam. Expert speakers from Coca Cola, Unilever, DSM and the Dutch Food Authority (VWA) will discuss issues and offer approaches to solving problems.

For more information:
www.foodconferences.com

New microbiology laboratory in Germany

In autumn 2013, Eurofins will open a modern microbiology laboratory in Hamburg, Germany. The laboratory will have the capability to analyse all food-related pathogenic microorganisms as well as hygiene parameters and spoilage organisms, providing classical microbiological methods and modern PCR-analytics. Due to the use of modern equipment and the laboratory's structure following a "Lean-Process-Model", the laboratory's will be able to react rapidly to urgent testing requirements and cope with a high sample throughput. Currently DAkkS accreditation to the DIN ISO 17025 standard is planned.

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New EU recommendation on mycotoxins T-2 / HT-2

T-2 toxin and HT-2 toxin are mycotoxins produced by various Fusarium mould species. The EU has now adopted Commission Recommendation 2013/165/EU defining a comprehensive monitoring program for T-2 and HT-2 toxin in cereals and cereal products. Indicative levels for both toxins in cereals and cereal products are defined except for rice. Where these levels are exceeded, investigations are required in order to elucidate factors behind the occurrence of T-2 and HT-2 toxin. Eurofins offers the analysis of T-2 and HT-2 and all other important Fusarium toxins in all relevant matrices using HPLC-MS/MS.

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Perchlorate in food products

Over the last few months there have been regular inquiries and reports concerning the presence of perchlorate in fruit, vegetables and other food. These were triggered by a report from a state laboratory in Southern Germany on findings in lettuce at the beginning of the year. The topic recently found its way into German public media reports which increased the pressure on the food retail trade and suppliers in this country to take action. Perchlorate is used as a component in rocket fuel and fireworks as well as in medicine as active ingredient for the regulation of thyroid dysfunctions. Public awareness of this matter is high. There are currently only theories about how this chemical has found its way into the food supply, but the ubiquitous and persistent presence of perchlorate is significant. Indications pointing towards fertilizers are apparent since perchlorate has been shown to occur in certain fertilizers. At the beginning of June, the BfR (Federal Institute for Risk Assessment) issued a recommendation for a health assessment and referred to the fact that whilst perchlorate is not a plant protection agent (herbicide/ pesticide) it should tentatively be regarded and assessed as such in terms of toxicology, as the entry pathway has not been clearly identified. Since there is currently no established legal maximum allowable quantity, the laboratories are working with "action-limits". Eurofins Dr. Specht Laboratory has been involved in the development of these "action-limits" from the outset and offers a corresponding analytical method for perchlorate.

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COMING EVENTS

EVENT	DATE & PLACE	MORE INFO	CONTACT
SPACE	10-13.09 - Rennes, France	*www.space.fr*	*EventsFR@eurofins.com*
ANUGA	05.-09.10 - Cologne, Germany	*www.anuga.de*	*LuisaMehl@eurofins.de*
Food Ingredients	19.-21.11 - Frankfurt am Main	*www.foodingredientsglobal.com*	*LuisaMehl@eurofins.de*

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