

## Analysis of sweeteners

By Friederike Heising, Eurofins DILU GmbH, and Dr. Torben Küchler, Eurofins Analytik GmbH, Germany

Sweeteners are a group of food additives used to impart a sweet taste to foods without added sugar, or with reduced sugar content, or which are present in table-top sweeteners for the individual consumer to use. In general, sweeteners can be divided into two sub-groups, namely the sugar alcohols such as sorbitol and mannitol, which are used in foods with further technological intent besides their sweet taste, and artificial sweeteners. Artificial sweeteners have no physiological energy content or it is negligible in comparison to their sweetening power whereby they may be used for energy-reduced sweetening. The most important and widely used artificial sweeteners are aspartame, saccharin, acesulfame K, sodium cyclamate and sucralose.

For many years there has been a steadily increasing interest of consumers in food additives from natural sources and therefore also from the food industry. On December 2<sup>nd</sup> 2011, steviol glycosides (E 960), which are extracted from the leaves of the stevia plant (*Stevia rebaudiana* Bertoni), were approved as a new sweetener by the European Union. In the course of the approval the market interest emerged offering plenty of potential uses for steviol glycosides e.g. in flavoured drinks, edible ices, cocoa and chocolate products, as covered by directive 2000/36/EC, and breakfast cereals.

However, attention has to be given to the quality, the composition and purity of this group of food additives – especially in these times of rapidly rising demand, since the steviol glycosides on offer on the world market may be of variable quality.

The use of sweeteners is currently regulated by directive 94/35/EC and for steviol glycosides in regulation (EU) N°1131/2011. The specific purity criteria for the

artificial sweeteners are given in the directive 2008/60/EC. Both of these directives will be repealed by the commencement of regulation (EU) N°1333/2008 (replacement of 94/35/EC) from 1<sup>st</sup> June 2013 and of the regulation (EU) N°231/2012 from 1<sup>st</sup> December 2012 on (replacement of 2008/60/EC).

Eurofins offers several types of analyses for the determination of the content or purity of the above mentioned sweeteners and can advise on the legal basis with respect to labelling and the transition periods. Eurofins is also currently establishing a sensory determination of the sweetening power of raw materials to assist with product development. The determination of the sweetening power is especially of interest for stevia products, since the raw material is a mixture of different steviol glycosides, so that the sweetening intensity and the quality of the sweet taste of the stevia products on the market depend on the kind of processing, the composition and purity of the applied basic raw material.

Eurofins is therefore your partner of choice for the analysis and evaluation of sweeteners.

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# Contracting out your due diligence program

By Brian McLean, Eurofins Food Testing, UK



Eurofins often acts on behalf of retailers and manufacturers to carry out their “own brand” due diligence sampling and testing program. In the UK, the defence of due diligence means that a company has taken all reasonable precautions to ensure that an offence has not been committed. In some instances, the retailer will contract Eurofins to carry out a full program allowing access to their databases in order to properly plan

suppliers are used. A good knowledge of sampling, statistical protocols and the requirements for specific foods are also required.

Shopping for samples sounds idyllic but there are often difficulties in trying to find the correct coded products and ensuring they are identical to that required. Once the samples have been transported to the laboratory, under

the approach. Staff travel to stores, supermarkets and distribution depots to carry out sampling and shopping for specified samples. This can involve nationwide coverage to ensure representative samples are taken where local

controlled conditions, information can be extracted from the labels, and the samples can be prepared and sub-sampled ready for analyses.

Such programs are often supplemented with hot food temperature monitoring, and smaller sampling and testing projects on non routine emerging issues, topical matters, food emergencies and complaints that arise outside of the planned program.

With over 20 years of experience in implementing testing schemes and due diligence programs with retailers and industrial groups, Eurofins’ experts are well qualified to be your partner for implementing your control scheme in all countries where Eurofins is present.

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# Monitoring of foreign compounds and additives: Novel approach using High-Resolution NMR analyses

By Dr. Eric Jamin, Eurofins Analytics France

Sometimes it is difficult for laboratories to provide analytical solutions to specific client’s needs, because there are either no suitable tests available, or they require cumbersome and costly methods. However, in many cases, High-Resolution Nuclear Magnetic Resonance (HR-NMR) of hydrogen or carbon 13 can be used as an efficient tool to complete the normal range of tests usually performed by chromatography and other “conventional” techniques.

NMR is versatile and can be applied to liquids or extracts from solid foods. After limited sample preparation, a complete spectrum of the proton or carbon resonance can be obtained within a few minutes, offering a direct access to a wide range of key-analytes without the need to isolate them from the matrix.

One example of application in the laboratory is for the monitoring of detergent residues in various liquid



matrices such as dairy products or drinks. A frequent request from food technologists, which is poorly covered by conventional analytical methods, is the need to validate their cleaning procedures to avoid cross contamination of their next production batches. A tailor-made HR-NMR test can be quickly set-up to check the removal of the active compounds from the production line.

Another routine application in the laboratory is the use of <sup>1</sup>H-NMR to determine additives such as sweeteners (e.g. cyclamate, sucralose), in drinks and confectionary, as well as taurine, glucurono-lactone and sulfite ammonia caramel (E150d) in soft drinks. This can avoid the use of several specific chromatographic procedures whilst offering a comparable level of accuracy and precision in quantification.

The main advantages of this novel approach are: direct access to specific compounds,

the possibility of multi-component quantification and short turn-around times.

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# Botanical impurities

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Due to the global sourcing of raw materials, GM (genetically modified) varieties may enter the transport chain as admixture or cross contamination, leading to labelling questions such as how to handle the question of GM soy in corn. An admixture may be determined by physical means, but such a method would not detect traces of GM material that would lead to positive results in the standard qualitative PCR analysis.

A very important aspect of the GM analysis with respect to labelling is the quantitative determination. The standard method (realtime quantitative PCR) determines the ratio of the GM against the relevant species, e.g. GM soy in relation to soy. In the case of botanical impurities another relevant concern is the amount of botanical impurities present in the raw material which can be measured with the modified method of multiple standard addition.

In several European countries GMO-free labelled products can be found on the shelves of retail stores. This claim is increasingly being used as a relevant marketing instrument, influencing customers buying decisions. The claim therefore needs to be proven by

appropriate testing. In Germany products can only carry this claim when they conform to the national legislation (EGGentDurchfG). This legislation stipulates the length of time animals need to be fed with GMO-free feed, before the animal products can be labelled as GMO – free. To make sure that the feed conforms to the legislation, appropriate testing has to be conducted by the market operators. The analytical strategies for feed need to take into consideration the approval situation of different GM varieties. This also includes the varieties that are in the approval process and covered by EU

N° 619/2011. Furthermore, the presence of GM containing material in botanical materials has to be taken into consideration as part of any negative / positive labelling strategy e.g. non GMO (please note that national legislations can differ). Eurofins offers methods that provide reliable percentage by weight results in unprocessed raw materials that enable operators to make informed decisions with regards to quality criteria and labelling.

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# Growth and ripening regulator in fruits and vegetables

By Monika Dust, Eurofins SOFIA GmbH, Germany

The worldwide trade of plants and other fresh products is a challenge for food traders as the goods must always be fresh in spite of the long distances transported and long transport times.

1-Methylcyclopropene (1-MCP) is a plant growth and ripening regulator. It acts as an inhibitor of ethylene by blocking the receptor of ethylene in the tissues of plants, flowers, fruit and vegetables, thus preventing the ripening process.

According to reports, the toxicological relevance of 1-MCP does not appear to be an issue. However, consumers have the right to be fully informed about foreign substances on their fruits and vegetables. As an example, 1-MCP is used in the SmartFresh™ system, which is registered in 38 countries and commercialised on apples, kiwifruit, plums, pears and persimmons, tomatoes, melon, avocado and banana. In Germany the use of 1-MCP is only allowed for apples.

The analysis of 1-MCP has not been possible so far, because no analytical standards were available for sale. Eurofins has now implemented an optimised GC-MS measurement to give a limit of quantification of 0.005 mg/kg for 1-MCP in fresh products. The method has currently been validated for apples, bananas and tomatoes. Further matrices will be implemented on request.

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## in brief

### First webinars started

Eurofins Conferences successfully started its Focal Point webinar series with four webinars in German and English language on allergens and glutenfree labelling. Also, demonstrating fast reaction to current issues, a short notice webinar on dioxin and PCB was conducted due to the PCB issue in German eggs. The forthcoming webinars deal with mineral oil in food packaging materials, pesticides and authenticity. Read more on [www.eurofins-conferences/webinars](http://www.eurofins-conferences/webinars).

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### Eurofins builds up HR-ICP-MS capacities for metals in Germany

The global requirements on the safety of food are constantly changing. Toxicological re-evaluations may lead to a lowering or introduction of legally binding maximum levels – a process currently ongoing in the EU for cadmium.

To assist in ensuring that food products are in compliance with reduced

maximum levels, Eurofins has expanded its high-resolution mass-spectrometry measurement capacity (HR-ICP-MS) in Germany. We are now able to offer not only a more selective but also an essentially more sensitive analysis for lead, cadmium, mercury, arsenic, with further metals to follow.

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### Determination of rice whiteness by measurement of reflectance

A new test based on reflectance has been developed to determine the whiteness of rice. The whiter the sample, the more light is reflected and this has been found to be directly correlated to the percentage of the grinding / polishing. It is therefore an additional parameter to assess the quality of rice.

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### EU tightens radioactivity levels for imports from Japan

Revised requirements concerning the import of food and feed from Japan

entered into force on April 2<sup>nd</sup> 2012 in Regulation (EU) N° 284/2012.

Maximum levels for caesium-134 and caesium-137 were significantly reduced for the majority of products to align them to the Japanese maximum levels adopted in February 2012. The former implementing Regulation (EU) N° 961/2011 is repealed. Eurofins Competence Centre for inorganic contaminants offers the analysis of the isotopes mentioned and iodine-131 using gamma-spectrometry.

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### Eurofins acquires LabCo in the Netherlands

Eurofins announced on March 29<sup>th</sup>, 2012 the acquisition of all the activities of LabCo Laboratory Services (LabCo). This laboratory for physicochemical and microbiological analysis located in Rotterdam will now operate under the name Eurofins LabCo.

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## COMING EVENTS

EVENT	DATE & PLACE	MORE INFO	CONTACT
Dioxin 2012	26.-31.08.12, Cairns, Australia	<a href="http://www.dioxin2012.org">www.dioxin2012.org</a>	<a href="mailto:ClaudiaNeuenfeldt@eurofins.de">ClaudiaNeuenfeldt@eurofins.de</a>
SPACE	11.-14.09.2012, Rennes, France	<a href="http://www.space.fr">www.space.fr</a>	<a href="mailto:EventsFR@eurofins.com">EventsFR@eurofins.com</a>
CoTeCa	20.-22.09.12, Hamburg, Germany	<a href="http://www.coteca-hamburg.de">www.coteca-hamburg.de</a>	<a href="mailto:Marketing-food@eurofins.de">Marketing-food@eurofins.de</a>
Euro Fed Lipid Congress	23.-26.09.12, Cracow, Poland	<a href="http://www.eurofedlipid.org">www.eurofedlipid.org</a>	<a href="mailto:SebastianPaepke@eurofins.de">SebastianPaepke@eurofins.de</a>
Eurofins GMO Conference	19.10.2012, Hamburg, Germany	<a href="http://www.eurofins-conferences.com">www.eurofins-conferences.com</a>	<a href="mailto:conferences@eurofins.com">conferences@eurofins.com</a>
SIAL	21.-25.10.12, Paris, France	<a href="http://www.sialparis.com">www.sialparis.com</a>	<a href="mailto:Marketing-food@eurofins.de">Marketing-food@eurofins.de</a>
7 <sup>th</sup> World Mykotoxin Forum	05.-09.11.12, Rotterdam, Netherlands	<a href="http://www.wmfmeetsiupac.org">www.wmfmeetsiupac.org</a>	<a href="mailto:SusanneRathjen@eurofins.de">SusanneRathjen@eurofins.de</a>

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