

BiovisiON Honey

A dedicated solution for the detection of honey adulteration



Extreme durability



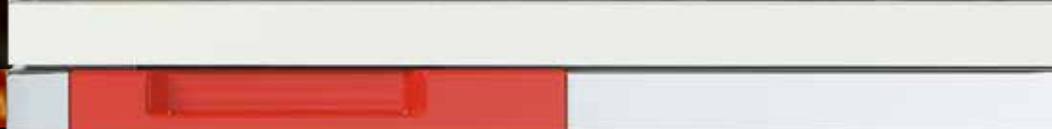
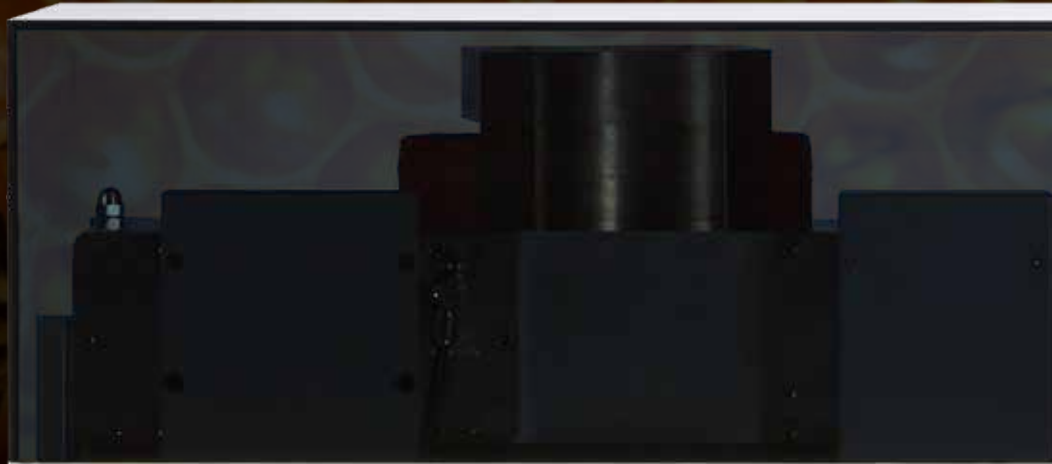
Ease of use



Low cost of ownership



High data quality



BiovisION Honey

Authentic or adulterated?

KEY FEATURES

- Dedicated solution for the detection of honey adulteration and authenticity
- Unique high-temperature combustion LC-IRMS technique for detecting C₃ honey adulteration
- Exceptionally robust and easy to use
- High return on investment due to significantly longer maintenance intervals
- Optional EA-IRMS for C₄ adulteration detection and geographic origin determination

Human civilization has sought out the nutritional and medicinal benefits of honey for thousands of years, placing great value on this natural, energy-rich product which is enjoyed for its purity. Today, the Codex Alimentarius (2011) states that no other substances or additives can be added to honey. But with increasing pressure from growing worldwide demand and declining honeybee populations, there is greater incentive to fraudulently improve honeys.

BiovisION Honey is a new, dedicated solution for the detection of C₄ (cane, HFCS) and C₃ (beet, rice) sugar adulteration of honey. Utilizing Elementar's extensive knowledge of high-temperature combustion chemistry, BiovisION Honey provides a significantly more robust and simpler solution than other technologies making it quicker, cheaper and easier to detect honey adulteration.

A powerful combination.

Market leading
isoprime vision
stable isotope analyzer

Market leading
iso **CHROM® LC**
inlet for LC-IRMS



The most robust IRMS for honey adulteration studies

isoprime vision is a compact, benchtop IRMS which offers market leading performance. Crucially, the instrument uses a thorium coated filament which makes it significantly more robust against oxidation failure so much so that we provide a 12 month guarantee against filament failure (T&C apply). Combined with a vacuum chamber constructed from stainless steel rather than aluminium, **isoprime vision** is ideal for LC analysis with high water and oxygen loads entering the IRMS. That means less time is lost venting and servicing your instrument and you run more samples generating higher return on investment.

BiovisION Honey CONFIGURATION

- Agilent 1260 Infinity II Liquid Chromatograph for separation of honey sugars
- iso **CHROM**[®] LC high-temperature combustion interface for conversion of separated honey sugars into CO₂
- **isoprime vision** stable isotope ratio mass spectrometer (IRMS) for ¹³C, ¹⁵N, ³⁴S, ¹⁸O & ²H analysis
- ion**OS**[®] stable isotope software for sample acquisition and data processing
- Optional vario ISOTOPE select elemental analyzer for the ¹³C, ¹⁵N, ³⁴S analysis of bulk honeys and honey protein
- **ArDB** cloud license for managing analytical results

isoprime vision is the most elegantly simple stable isotope analyzer ever created.

isoprime vision offers a completely new experience of stable isotope analysis. An experience where the user is free from the routine chores of maintenance allowing them to focus on the science, not the instrumentation.



① Market leading
Agilent 1260 Infinity II
Liquid Chromatograph



isoprime vision KEY FEATURES

- Thorium coated filament is substantially more resistant to oxidation failure during LC-IRMS analysis
- Stainless steel vacuum chamber provides better tolerance to high water loads
- Almost 50% smaller instrument than any other currently available
- Significantly reduced consumption of laboratory resources
- Good-For-Go control significantly reduces instrument contact time
- Automated switching between LC and EA inlet systems
- Modern ion**OS** software built for Windows 10

iso CHROM LC

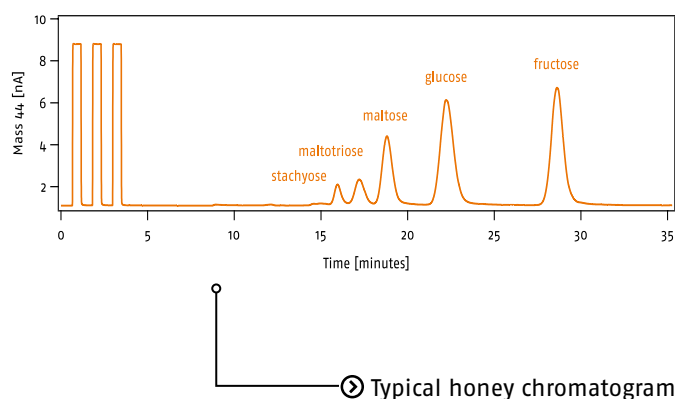
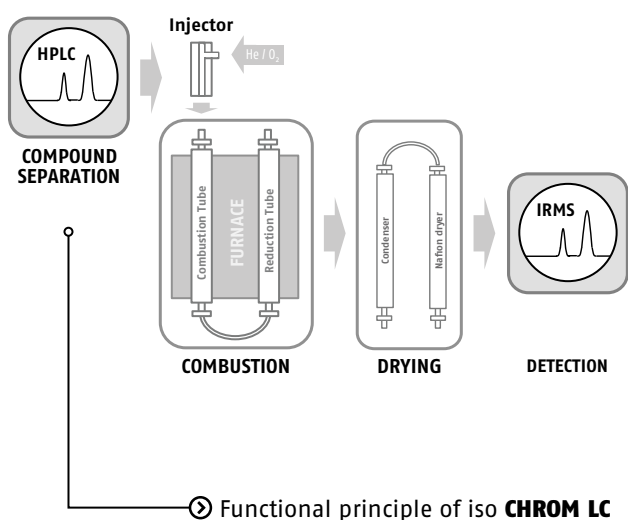
*Detect C₃ honey adulteration
using high-temperature
combustion LC-IRMS*

KEY FEATURES

- High temperature ¹³C LC-IRMS analysis
- Outstanding robustness
- Enhanced maintenance intervals
- Easy to use
- Exceptional precision and accuracy

iso CHROM[®] LC presents a new technique for the detection of C₃ honey adulteration. Unlike existing technologies which use wet chemical oxidation, iso CHROM LC harnesses Elementar's depth of experience in high temperature oxidation chemistry to create

a high performance liquid chromatography interface. This new technique is more robust, easier to use and offers higher analytical precision without any compromise in chromatography, precision or accuracy.



Innovative high temperature combustion method

LC-IRMS has been an established method for C₃ honey adulteration studies for over 10 years. The LC-IRMS technique has utilized wet chemical oxidation at 90 °C which suffers from significant downtime due to maintenance requirements. The high temperature method (925 °C) has substantially less maintenance and is easier to use making it more suitable for contract analysis laboratories.



C₃ HONEY ADULTERATION

Honey adulteration refers to the improvement of a low quality honey by the addition of extraneous sugars. These added sugars have different origins which can be identified by ¹³C isotope analysis. Honeys adulterated with C₃ type sugars can be detected by liquid chromatography (LC) IRMS analysis of the constituent sugars to detect the addition of sweeteners such as beet, rice and tapioca sugars.

Outstanding performance

The iso **CHROM LC** delivers exceptional precision and levels of detection. The instrument produces low and noise-free baselines due to the unique delivery of LC mobile phase into the furnace system whilst the high temperature combustion chemistry ensures the isotopic fractionation-free conversion to CO₂.

Agilent 1260 Infinity II LC

The iso **CHROM LC** interfaces seamlessly with the market leading Agilent 1260 Infinity II LC system. The LC system is specially configured for the analysis of honey samples using the iso **CHROM LC** so there is no overhead in method development allowing your instrument to immediately start producing data.



ionOS SOFTWARE CONTROL

ionOS software controls the Agilent 1260 Infinity II LC, iso **CHROM LC** and **isoprime visION** IRMS making sample programming, analysis and data processing quick and easy. Using ionOS Calculated Columns function automatically performs compound-to-compound calculations and flags suspicious results to the user. The on-board maintenance interval counter and warning system ensures that the system is kept in optimal condition.



vario ISOTOPE select

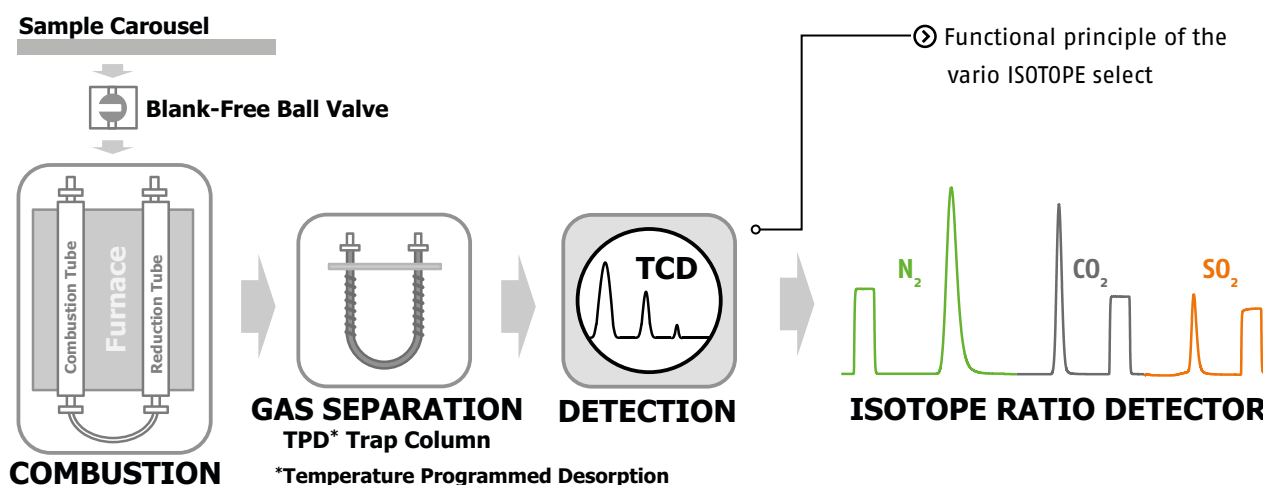
*Detect C₄ honey adulteration
using quick, simple
EA-IRMS analysis*

KEY FEATURES

- Market-leading accuracy and precision due to Temperature Programmable Desorption technology
- Superior ease of use through sophisticated self-diagnosis and tool-free routine maintenance
- Outstanding robustness
- 10 year warranty on furnace and TCD
- Integrated 240 position autosampler as standard
- Patented ball valve for blank-free sample transfer
- Optional upgrade

Adding the optional vario ISOTOPE select EA upgrade allows the conversion of bulk organic material to pure gases for isotope ratio analysis. With a range of unique features for robust analysis and straightforward maintenance, the instrument is the ideal choice for compliance with AOAC 998.12 method for the detection of C₄ honey adulteration.

The vario ISOTOPE select is also ideal for investigating the geographical origin of a honey using multi-elemental isotope analysis. Here, the ¹⁵N, ¹³C & ³⁴S values can be determined quickly from a single sample analysis due to the unique Temperature Programmable Desorption (TPD) technology. This allows laboratories to rapidly screen samples and build a authentic sample database.



Rapid ¹³C honey analysis



The vario ISOTOPE select is ideal for ¹³C analysis of honey. With an autosampler capacity of up to 240 samples the system can perform long unattended runs. Routine maintenance such as ash finger and reduction tube replacement can be performed within minutes and without tools. And with a 10 year warranty on the furnace and TCD, your system will deliver low cost, high throughput analysis for years to come.

C₄ HONEY ADULTERATION

Honey adulteration with C₄ type sugars can be detected using the AOAC 998.12 method which detects adulteration down to 7 % added sugar. This is due to the different photosynthetic pathways between the original nectar producing plants (C₃) and sweeteners such as HFCS and cane sugar (C₄) having different ¹³C signatures. vario ISOTOPE select is the ideal system for performing AOAC998.12 thanks to high throughput and ease of use.

Complete software control

The EA-IRMS system is fully automated with no manual control or optimization required. Sample programming is done quickly through a single software and automated diagnostic functions makes fault-finding simple and effective. Detailed maintenance counters ensure that pro-active intervention maximizes instrument up-time.



DETECTION OF GEOGRAPHIC ORIGIN

Reduced He consumption

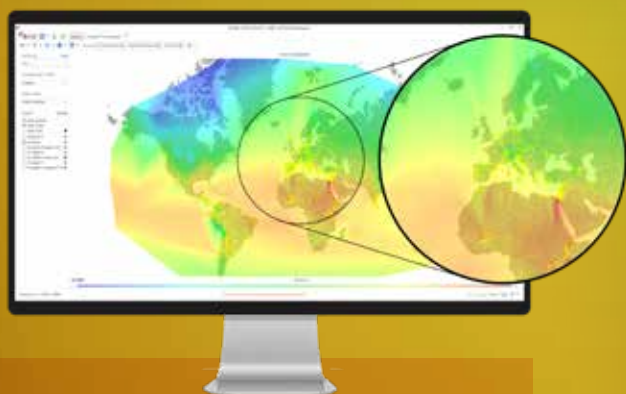
For the preservation of finite laboratory resources such as helium the instrument utilizes digital mass flow controllers which enables sleep/wake-up functions to be implemented to further reduce the cost per analysis of the system.

The highest throughput

Routine maintenance tasks are performed using only your fingers minimizing downtime and fully automated system diagnostics ensures the instrument keeps running at its highest capacity for longer.

Many honeys command a premium price due to their geographic origin. BiovisiON Honey is the ideal tool to detect fraudulently declared origins by exploiting the concept of a unique isotopic fingerprint which is a result of the location that the honey was produced. The vario ISOTOPE select is able to analyze multiple isotopes in a single analysis making it possible to compare unknown samples against genuine honeys using the included ArDB software.

Make your database work for you with ArDB



Centralize



Integration with
Elementar Instruments



Collaborate



Data Security & Trust



Statistics



Visualize

BiovisION Honey includes an ArDB cloud license which has been designed for flexible integration into your laboratory workflow, allowing seamless transfer of sample information and results between the database and your instruments. Bringing together sample results for numerous analytical techniques – IRMS, ICP-MS, TMS, etc. – it eliminates transcription errors, duplication and inconsistent data handling, offering:

- Hassle-free construction and maintenance of centralized sample databases
- Easy handling of sample meta data, such as names, dates, coordinates, types, etc.
- Straightforward creation of sample run lists for use by instrument control software
- Automatic recording of calibrated analytical results for each sample
- Full audit trail for any changes made to database

Once a database is constructed and analytical results are published, ArDB provides an array of sophisticated analytical tools for interrogating and visualizing the data, helping you confirm a honey's true geographic origin.

IDEAL SOLUTION FOR

- Contract analysis laboratories
- Public health laboratories
- Honey importers / exporters
- Industrial honey producers

POSSIBLE ANALYSES

- C₃ sugar adulteration of honey (LC-IRMS)
- C₄ sugar adulteration of honey (AOAC 998.12)
- Confirmation of geographic point of origin



Extreme durability

Outstanding robustness and longevity thanks to state-of-the-art technology. 10 year warranty on furnace.



Ease of use

Easy, labor-saving instrument operation and sample preparation. Simplified maintenance.



Low cost of ownership

Sleep/wake up functions and complete automation increases return on investment.



High data quality

Outstanding precision and accuracy through high performance combustion, no isotope fractionation.

Elementar – your partner for excellent elemental analysis

Elementar is the world leader in high performance analysis of organic and inorganic elements. Continuous innovation, creative solutions and comprehensive support form the foundation of the Elementar brand, ensuring our products continue to advance science across agriculture, chemical, environmental, energy, materials and forensics markets in more than 80 countries.

Elementar Analysensysteme GmbH

Elementar-Straße 1 • 63505 Langenselbold (Germany)

Phone: +49 (0) 6184 9393-0 | info@elementar.com | www.elementar.com

