

Stable Isotopes for Food Authentication



Key Benefits

- High analytical accuracy of the isotopic ratio, required composition and targeted isotope signature for various pure gases and mixtures
- Increased analyzer calibration efficiency
- Isotopic composition adjusted for each of your products, matching International standardized values

Rely on an expert partner for your isotope ratio measurements

Food safety standards have vastly improved over the years as scientific understanding of food preservation and contamination has advanced. In parallel, significant increases in food and beverage fraud and adulteration have prompted the global scientific community to develop enhanced standardized analytical methods to guard against adulteration, including isotopic analysis.

Whether you are a food manufacturer, university or a quality control laboratory, Air Liquide provides a range of pure gases and mixtures for isotope ratio measurements and equipment calibration according to international regulations which set official methods for isotopic analysis, such as the International Organization of Vine and Wine (OIV) and the Association of Analytical Communities (AOAC).

Air Liquide is the first and only gas supplier to propose a complete standardized offer for stable isotopic analysis worldwide.

With 30+ years of experience in specialty gases production and application, and strong, recognized R&D capabilities, you can trust Air Liquide to ensure product quality, availability and responsiveness.

A product range dedicated to stable isotopic analysis

Air Liquide's offer provides a high purity level and very precise specification of the isotopic ratio of the molecules to ensure accurate analysis and calibration.



Part of the **ALPHAGAZ™** product range, Air Liquide's premium brand of specialty gases for analytical applications, the Isotopes product range for Food Authentication consists of pure gases and calibration mixtures with tuned isotopic signature:

- **ALPHAGAZ™ Isotope:** pure gases (N_2 , CO_2 , O_2 , H_2) with specific isotopic values of the element.
 - δH_2 : from -470 to -170 ‰ VSMOW
 - δCO_2 : from -50 to -3 ‰ VPDB
 - δN_2 : from -13 to 0 ‰ air
- **ALPHAGAZ™ Mix Isotope:** a range of calibration mixtures with different gas and isotopic compositions.

All **ALPHAGAZ™ products** are made to guarantee high accuracy and repeatability of analysis.

Custom isotopically tailored CO_2 , CO , N_2 and H_2 are also available on demand.

Simpler choices

- A straightforward range to meet the most common needs of our customers.
- Low- and high-pressure cylinders available in multiple sizes.
- A selected range of gas handling equipment to ensure high accuracy in use.

Quality you can depend on

- Dedicated expertise to offer accuracy and traceability.
- Delivered with Certificate of Analysis.

Reliable service

- Guaranteed reliable lead time to meet your requirements.
- Ready-to-ship standard products.
- Custom products with specific molecular and isotopic compositions can be designed upon request to satisfy your unique requirements.
- Experts and front office teams to support you from feasibility and quotation, to delivery at your facility.
- Commitment to move the industry forward, by bringing innovations into the labs and implementing new industry standards.

ALPHAGAZ™ Isotope

Pure gases

ALPHAGAZ™ Isotope		Element	Delta value	Uncertainty	Official methods
CO ₂ 2.1	CO ₂	δ ¹³ C (‰ VPDB)	- 25 and - 26	± 0.3	International Organization of Vine and Wine (OIV) OENO 17/2001 and OENO 7/2005
	CO ₂	δ ¹³ C (‰ VPDB)	- 6.4	± 0.3	
	CO ₂	δ ¹³ C (‰ VPDB)	- 11	± 0.3	
CO ₂ 2.4	CO ₂	δ ¹³ C (‰ VPDB)	- 28 and - 29	± 0.3	International Organization of Vine and Wine (OIV) – OENO 343-2010
CO ₂ 2.5	CO ₂	δ ¹³ C (‰ VPDB)	- 29 to -17	± 0.3	CEN (Comite Europeen de Normalisation, Brussels (Belgium) CEN/TC174 N° 108, 1996
O ₂ 2.1	O ₂	δ ¹⁸ O (‰ VSMOW)	- 12 to - 3	± 0.5	CEN (Comite Europeen de Normalisation, Brussels, Belgium) CEN/TC174 N° 109, 1996
H ₂ 2.1	H ₂	δ ² H (‰ VSMOW)	- 80 to - 9	± 0.5	CEN (Comite Europeen de Normalisation, Brussels (Belgium) CEN/TC174 N° 110, 1996
CO ₂ 2.6	CO ₂	δ ¹³ C (‰ VPDB)	- 31 to -22 AND - 20 to - 11	± 0.3	AOAC (Association of Analytical Communities) Methods 978.17, 991.41; 998.12; 981.09; 982.21; 984.23; 992.09; 2004.01

Custom On-Demand Pure Gases and Mixtures

ALPHAGAZ™ Isotope Pure Gases	Element	Delta value Range
CO ₂	δ ¹³ C (‰ VPDB) δ ¹⁸ O (‰ VPDB)	- 44 to + 20 - 24 to + 20
CO	δ ¹³ C (‰ VPDB) δ ¹⁸ O (‰ VSMOW)	- 300 to + 20 - 150 to +10
N ₂	δ ¹⁵ N (‰ Air)	- 10 to + 20
H ₂	δ ² H (‰ VSMOW)	- 400 to + 10

Other pure gases and mixtures are available upon request

Convenient Packaging

- Low and High pressure cylinders
- A wide range of cylinder sizes

All of our cylinders are tracked by barcodes, ensuring an optimized inventory management.

A la carte services

- Local customer service with on-site cylinder management
- Express delivery
- Gas safety training
- Proficiency testing scheme

Check the availability of these services with your local sales representative.

Your local Stable Isotopes contact

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