

# Isotopically characterized gases for food authentications



Food authentication

## Pioneering innovation

Gas stable isotope mixtures **enhance reliability of analysis with precise calibration** when it becomes critical to measure  $\delta$  values accurately.

## Isotopic analysis

Food and beverage adulteration is becoming more common and affects a wide range of products.

Food safety standards have vastly improved over the years. However, some recent food scares related to product adulteration have prompted development of enhanced analytical methods to guard against adulteration; isotopic analysis is one of these methods.

# Improve the reliability of your isotopic analysis

Air Liquide offers isotopically characterized gases with **high analytical accuracy, required compositions** and **targeted isotopic signatures**.

A range of **standard pure gases** such as CO<sub>2</sub>, N<sub>2</sub>, H<sub>2</sub> and CO with specific  $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ ,  $\delta^2\text{H}$  and  $\delta^{18}\text{O}$  are **ready to be shipped** and can be **delivered quickly** after receipt of the official order.

Custom products **with customer specific** molecular (from ppm to %) and isotopic composition can be designed upon request.

Air Liquide provides stable isotope ratio reference gases in cylinders with **sizes adapted** to your needs (from 34 L to 4000 L).

## Your benefits

- Stable isotope ratio reference gases with an isotopic composition adjusted for each of your products
- You will rely on Air Liquide reference gases to provide more reliable analysis
- Time saving : more efficient calibration of Isotope ratio instruments

## Standard Pure Gases

Pure Gases		Element	Delta value	Uncertainty
Carbon Dioxide	CO <sub>2</sub>	$\delta^{13}\text{C}$ (‰ VPDB)	-40	± 0.3
	CO <sub>2</sub>	$\delta^{18}\text{O}$ (‰ VPDB)	-24	± 0.5
	CO <sub>2</sub>	$\delta^{13}\text{C}$ (‰ VPDB)	-25	± 0.3
	CO <sub>2</sub>	$\delta^{13}\text{C}$ (‰ VPDB)	-10	± 0.3
Nitrogen	N <sub>2</sub>	$\delta^{15}\text{N}$ (‰ Air)	0	± 0.5
Hydrogen	H <sub>2</sub>	$\delta^2\text{H}$ (‰ VSMOW)	-168	± 10

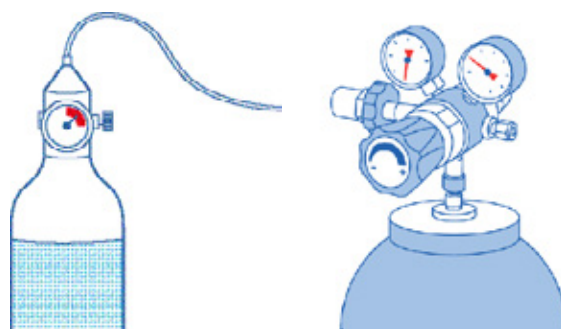
# Custom On-Demand Pure Gases

Pure Gases		Element	Range of Delta Value
Carbon Dioxide	CO <sub>2</sub>	δ <sup>13</sup> C (‰ VPDB)	-50 to +20
	CO <sub>2</sub>	δ <sup>18</sup> O (‰ VPDB)	-30 to +20
Carbon Monoxide	CO	δ <sup>13</sup> C (‰ VPDB)	-300 to +20
	CO	δ <sup>18</sup> O (‰ VSMOW)	-150 to +10
Nitrogen	N <sub>2</sub>	δ <sup>15</sup> N (‰ Air)	-10 to +20
Hydrogen	H <sub>2</sub>	δ <sup>2</sup> H (‰ VSMOW)	-400 to +10

\*Other pure gases and mixtures are available upon request

## Packaging

- A wide range of cylinders size
- High Pressure cylinders
- Low Pressure cylinders
- Pressure Regulators



### Air Liquide Expertise Center

High purity gases, mixtures and related equipment for Research & Analysis

- ✓ Strong expertise
- ✓ Easy to reach
- ✓ Reliable service

[www.airliquide-expertisecenter.com](http://www.airliquide-expertisecenter.com)

