



EOLO ADVANCED BREATH TEST ANALYZER

REDEFINING
GASTROINTESTINAL
DIAGNOSTICS

BASED ON μ GC & μ GC/MS TECHNOLOGY

- Carbohydrate Malabsorption
- Small Intestinal Bacterial Overgrowth (SIBO)
- *Helicobacter pylori*



CLINICHROM is a Spain-based startup specialized in Chromatography and Spectrometry solutions for the clinical sector.

We collaborate with:

- Central hospital analytical services
- Private clinical laboratories
- Public and private gastroenterology services

Our mission is to provide innovative and reliable solutions that support healthcare professionals in delivering accurate diagnostics and improving patient outcomes.

Breath Sample Collection Kits

EOLO® Sample Collection Kits are designed for the standardized and reliable collection of breath samples for clinical breath testing.

The kits support testing with different carbohydrate substrates, including lactose, fructose, glucose, lactulose and sorbitol, enabling the diagnosis of carbohydrate intolerances and related gastrointestinal disorders.

Fully compatible with EOLO automated breath analyzers, the kits ensure optimal sample integrity and reproducible results, while enabling high-throughput workflows in routine clinical practice.

Discover our range of EOLO sample collection kits, available and ready for use. Suitable for hospitals, diagnostic laboratories and patient use under medical guidance.



E O L O

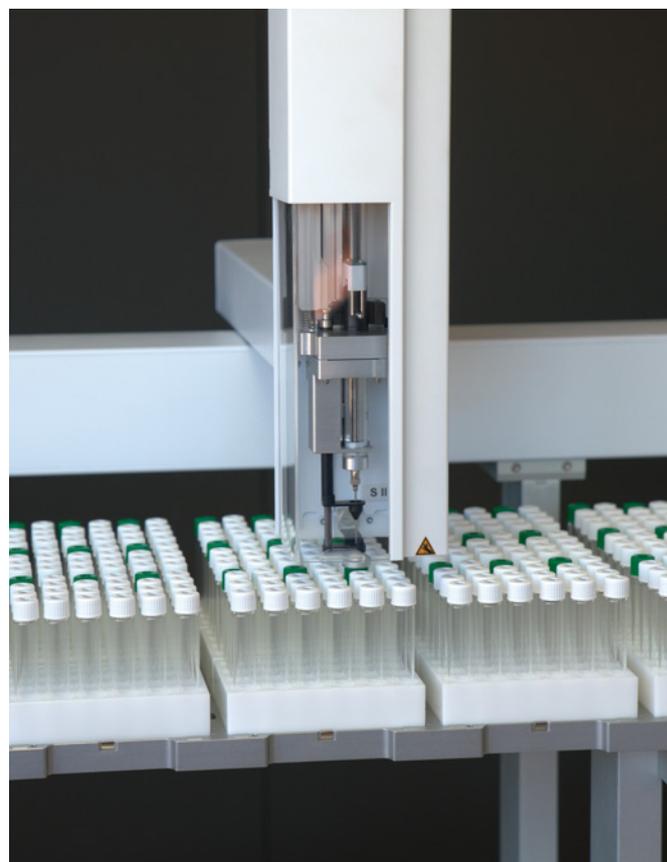
Breath Analyzer

CLINICHROM has developed an instrument that fully automates all analytical pre-treatment steps, sample injection and analysis, processing over **1,440 tubes per day***—equivalent to approximately **180 patients per day**—significantly boosting operational efficiency.

In less than a minute, **E O L O** delivers concentration levels of **hydrogen, methane** and **carbon dioxide** (control analyte), with the option to additionally measure **H₂S**. Results can be printed, exported as CSV files or transmitted directly to a **Laboratory Information Management System (LIMS)**, streamlining data management and supporting faster and more informed clinical decisions.

The system is fully customizable to meet your specific requirements, further optimizing laboratory workflows and productivity.

This approach ensures maximum resource utilization, reduced turnaround times and a significant improvement in both the efficiency and accuracy of analytical results.



**12 mL tubes intended for breath sample collection and storage.*

Why does a patient need a breath test?

Breath tests are used to evaluate how effectively the body digests and absorbs certain sugars. Some individuals have difficulty absorbing carbohydrates such as lactose or fructose. When this occurs, undigested sugars are fermented by gut bacteria, producing gases such as **hydrogen (H₂)**, **methane (CH₄)** and **hydrogen sulphide (H₂S)**, which are then detected in the exhaled breath.

Elevated gas levels indicate carbohydrate malabsorption or bacterial overgrowth, supporting the diagnosis of gastrointestinal conditions such as **lactose intolerance**, **fructose malabsorption** or **small intestinal bacterial overgrowth (SIBO)**.



Breath testing is commonly used to diagnose:

- **Carbohydrate Intolerance/Malabsorption**
 - Lactose intolerance
 - Fructose malabsorption
 - Sorbitol malabsorption
- **SIBO (H₂, CH₄, H₂S)**

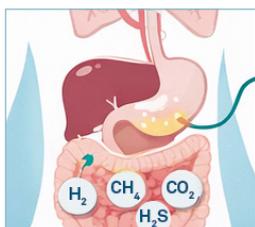
What does the test involve?



1. Preparation

Some preparation is required before the test. This includes discontinuing certain medications and fasting for a specified period.

Before sample collection, the patient must drink a sugar solution as instructed.



2. Digestion

If a person has a sugar intolerance, the sugar is not fully absorbed in the small intestine and passes into the large intestine. There, gut bacteria ferment it, leading to increased production of gases such as **hydrogen**, **methane** and in some cases **hydrogen sulphide**.



3. Sampling

After ingestion of the test solution, breath samples are collected by exhalation into a dedicated collection tube using a straw. Sampling is performed at predefined time intervals over a period of up to three hours, in accordance with the test protocol, to monitor the evolution of the concentration of exhaled gases.



4. Analysis

The laboratory technician scans the 1D/2D barcodes, loads the labeled breath sample tubes into the tray and initiates the analytical sequence. The automated system injects each sample into the μ GC, which quantifies the concentration of the gases of interest.



What about *Helicobacter pylori*?

Helicobacter pylori is a bacterium associated with gastritis, peptic ulcers, and gastric cancer.

- The most accurate method for detecting *H. pylori* is upper endoscopy with biopsy; however, this procedure is highly invasive.
- Blood tests are simple but only indicate past exposure and cannot distinguish active infection.
- The *H. pylori* breath test is the most accurate non-invasive diagnostic method.

The EOLO system is capable of performing the ¹³C Urea Breath Test (¹³C-UBT) for the detection of *Helicobacter pylori*. In this test, the patient ingests a urea solution labeled with ¹³C. If *H. pylori* is present, the bacterium metabolizes the urea, producing labeled ¹³CO₂, which is subsequently detected in the exhaled breath.

The analysis is based on the ¹³C/¹²C isotopic ratio, measured by mass spectrometric detection. This method is non-invasive, fast and highly accurate, eliminating the need for endoscopy.

EOLO — The revolutionary all-in-one analyzer for Carbohydrate Intolerances, SIBO and *H. pylori* (¹³C-UBT)

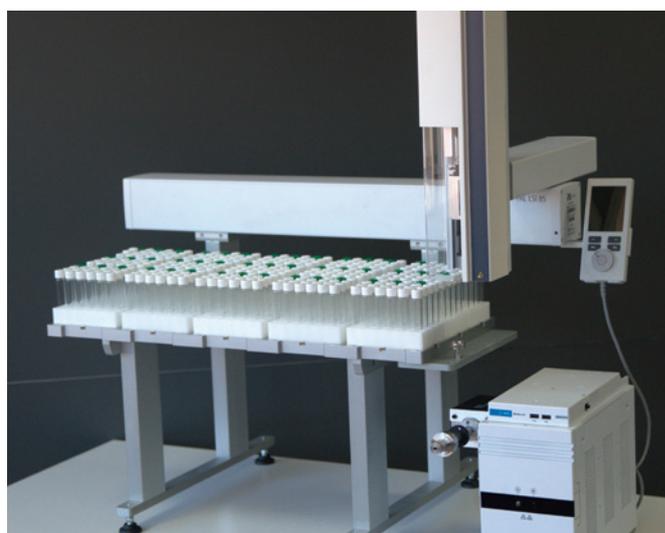
EOLO is a fully **automated solution** for the detection of carbohydrate intolerances, the diagnosis of Small Intestinal Bacterial Overgrowth (SIBO) and **all within a single integrated platform**. This state-of-the-art system streamlines laboratory workflows, from sample injection to result reporting within the Laboratory Information System (LIS).

By leveraging cutting-edge technology, CLINICROM sets new standards in the analysis of food intolerances and digestive disorders, providing clinical laboratories with a powerful and highly efficient diagnostic tool.

For carbohydrate intolerance and SIBO testing, breath samples are collected following ingestion of the corresponding sugar substrate.

For *H. pylori* detection, the patient ingests a ¹³C-labeled urea solution or tablet prior to breath sample collection.

Operation is simple and fully automated: the laboratory technician loads the collected breath sample tubes onto the tray and initiates the analytical sequence. EOLO automatically reads the autosampler barcodes, transfers the samples, and delivers analytical results in under one minute per sample. The system simultaneously quantifies hydrogen, methane, carbon dioxide (control analyte) and hydrogen sulphide (H₂S) determining the ¹³C/¹²C isotopic ratio when the Urea Breath Test method is enabled.



Robotic autosampler. Custom sample trays.

EOLO Advantages



Fully Automated Workflow

EOLO minimizes manual intervention and optimizes processing time. One of its key advantages is its ease of use: the laboratory technician only needs to scan the barcode when loading the tubes into the tray and initiate the analytical sequence.

System calibration and verification procedures are fully automated through the software, with no hardware modifications required. An integrated barcode reader can be used to enable a fully automated and traceable workflow.



Capacity and Performance Flexibility

The system is highly configurable, with tray capacities ranging from 360 to 936 breath sampling tubes and analysis times of less than one minute per sample. This enables the processing of up to 180 patients per day, based on eight samples per patient and a dual-analyzer system configuration.

For the ¹³C Urea Breath Test (*H. pylori*), throughput is significantly higher, as the test protocol requires only two breath samples per patient instead of eight. This allows the processing of a substantially greater number of patients per day compared to carbohydrate intolerance or SIBO testing. This versatility and speed optimize laboratory workflows, significantly increasing productivity while ensuring fast, reliable and accurate results.

By incorporating **hydrogen sulphide (H₂S) analysis**, EOLO enables the detection of alternative fermentation pathways that are not captured by breath analyzers limited to hydrogen and methane.

This capability is particularly relevant in low-hydrogen producers, in whom hydrogen is rapidly consumed by sulphate-reducing bacteria and converted into H₂S, potentially leading to false-negative results when H₂S is not measured.

The inclusion of H₂S measurement significantly improves diagnostic sensitivity in the assessment of carbohydrate malabsorption and small intestinal bacterial overgrowth (SIBO).

By providing a more complete characterization of intestinal gas production, **EOLO supports more accurate clinical interpretation and reduces diagnostic uncertainty.**

Designed to support healthcare professionals in clinical decision-making, EOLO delivers high-throughput, robust and high-resolution results, enabling a precise and comprehensive diagnosis of gastrointestinal disorders.



μGC
Channel 1: H₂
Channel 2: CO₂, CH₄, (H₂S)



Mass Selective Detector (Agilent)
¹³C/¹²C Isotopic Relation (*H. pylori*)
H₂S at ppb levels



High Reproducibility and Analytical Precision

EOLO delivers reliable results for accurate clinical diagnosis, achieving one of the lowest relative standard deviations (RSD) on the market.

The system demonstrates RSD < 2.5% for H₂, CH₄, CO₂ and H₂S, ensuring excellent analytical precision.

Linearity is maintained across the entire calibration range, with a correlation coefficient (R²) > 0.999, providing consistent, reproducible and highly reliable results.



Commercial Options Tailored to Your Needs

- **Flexible financing plans.**
Choose between leasing or rent-to-own models to best suit your budget and workflow.
- **Sampling kits and breath tubes.**
Complete accessories available for streamlined operation.
- **Per-test pricing models.**

**Certain options may not be available in all countries. Availability is subject to local regulations and applicable commercial policies.*

EOLO Platform Features: Ultra Fast GC/MSD Analysis: 1min/sample

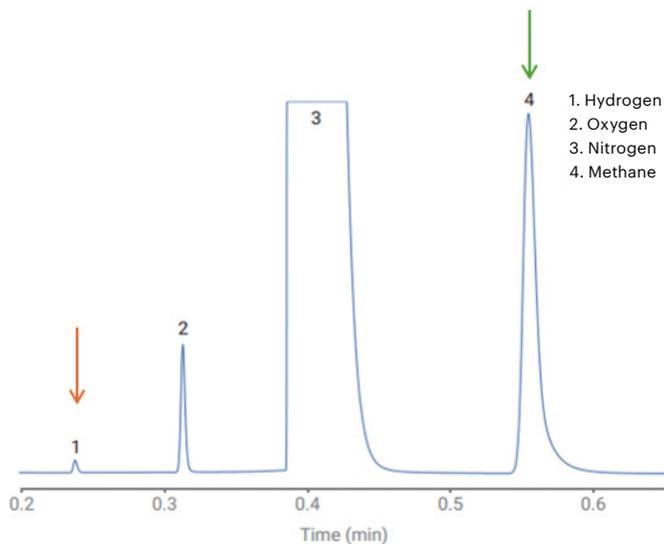


Figure 1: Chromatogram of hydrogen, oxygen, nitrogen and methane on the 10 m Molesieve column.

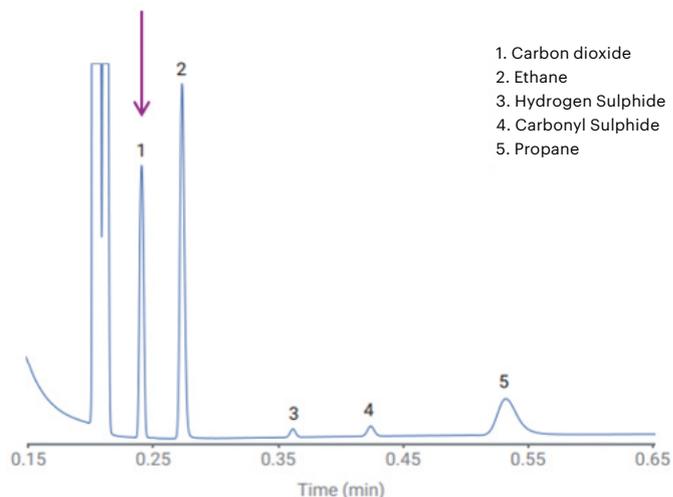


Figure 2: Chromatogram of carbon dioxide, ethane, hydrogen sulphide, carbonyl sulphide and propane on the 10 m polymeric column.

EOLO

Breath Analyzer

Specifications

- Tray capacity of up to 936 tubes
- 1-minute per tube analysis time (dual configuration)
- Optional multilevel automatic calibration
- Self-verification using control samples and He blanks
- Ultra-fast μ GC/MSD (all-in-one platform)
- Automatic result generation with LIS integration
- Intuitive, user-friendly software

- **Analytical Performance EOLO:**

H_2 : 5 ppm - 200 ppm CO_2 : 1% - 7%
 CH_4 : 5 ppm - 50 ppm H_2S : 10ppb - 50 ppm

- ***H.pylori* (^{13}C -UBT):**

DOB range: -5% to +100%

Limit of Detection (LOD):

$^{13}CO_2/^{12}CO_2$ (DOB): 0.1%

$^{13}CO_2$: < 0.1 ppm

Technical Specifications EOLO

Reported compounds (EOLO model-dependent)	H ₂ , CH ₄ , CO ₂ EOLO-160	H ₂ , CH ₄ , CO ₂ EOLO-200	H ₂ , CH ₄ , H ₂ S, CO ₂ <i>H.pylori</i> (¹³ CO ₂ / ¹² CO ₂) EOLO-CHP	<i>H.pylori</i> (¹³ CO ₂ / ¹² CO ₂) EOLO-HP
Number of analytical channels	2	2	2	2
Analysis time	1 min. (extended version) or 2 min. (standard)		< 2 minute	1 minute
Tray tube capacity (more options available)	432 tubes (54 patients)	936 tubes (117 patients)	936 tubes (117 patients)	936 tubes (468 patients)
Power	90-240 Vac - 50/60 Hz			
Gas	Argon and Helium at 550 ± 10kPa (80 ± 1.5 psi)			Helium
Operating temperature and humidity	0-50 °C and 5-95%			
Supported tubes and caps	CLINICHROM 12 ml inert breath sampling tubes			

Tubes and Sampling Kits

	CC0058WNCNE	Tubes IVDR 12 ml white cap, without coating
	CC0058GNCNE	Tubes IVDR 12 ml green cap, without coating
	CC0058WCNE	Tubes IVDR 12 ml white cap, coated
	CC0058GCNE	Tubes IVDR 12 ml green cap, coated
	CCSIBOEKIT / CSIBOEKITE	Sampling Kit SIBO (w/H ₂ S) - (8 inert tubes/ 12 inert tubes)
	CCLACTOSEKIT	Sampling Kit IVDR for LACTOSE (8 tubes)
	CCFRUCTOSEKIT	Sampling Kit IVDR for FRUCTOSE (8 tubes)
	CCHpyloriKIT	Sampling Kit IVDR for <i>H. pylori</i> (4 tubes)



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