

Breath Hydrogen and Methane Testing

GastroCH₄ECK™ & Gastro+™ Gastrolyzer®

coVita | Bedfont Scientific Ltd recommends protocols for breath hydrogen (H₂) and methane (CH₄) testing in line with current testing practice in Europe and America^{1,2}.

The correct use of the GastroCH₄ECK™ & Gastro+™ Gastrolyzer® is at all times the sole responsibility of the user.

Normally the human small intestine contains fewer bacteria than the colon. Structural or functional disorders of the gastrointestinal tract can lead to bacterial overgrowth in the small intestine, with colonic bacteria proliferating in the ileum and jejunum. Small intestinal bacterial overgrowth (SIBO), as it is known, is characterized by steatorrhea and diarrhoea, together with vitamin deficiencies and carbohydrate malabsorption. The syndrome is difficult to diagnose with accuracy using blood tests³.

The basis for breath testing in these circumstances is that bacteria in the intestine can break down carbohydrates to produce hydrogen and methane. The sole source of these gases in alveolar air is bacterial fermentation of carbohydrate in the gut, so estimation of hydrogen and methane in breath samples can be used to study the passage of carbohydrates through the gut and the presence of pathogenic bacteria in the gastro-intestinal lumen³.

Breath H₂ and CH₄ can be used as a non-invasive, safe alternative to procedures such as biopsy in order to evaluate bloating, diarrhoea, constipation and malabsorption. In the 1970's and 2006 research found that approximately 35% of healthy adult subjects are CH₄ producers⁴. Other research also found that, in 34% of patients with lactose intolerance who showed a negative H₂ breath test, in fact showed an increase of CH₄ percentage of greater than 100%⁵.

Breath testing to aid in the diagnosis of small intestinal bacterial overgrowth (SIBO) may also provide a framework for the understanding of irritable bowel syndrome (IBS)^{3,6,7}. Recent work has demonstrated that among IBS subjects, methane production in the lactulose breath test is associated with constipation. Methane also appears to slow down the passage of food through the intestinal tract⁸.

Suggested Testing Protocol

Patient must not eat or consume alcohol for 12 hours prior to the test, with only water to drink and avoid slowly digesting foods such as beans the day before the test.

Where more than one opinion is available this has been used and referenced, other opinions may be available, a baseline breath test must be taken before any substrate is administered:

Test	Dosage	Test Frequency (minutes)	Samples
Lactose ³	25g of Lactose in 200ml of water	60, 120, 180	3
Lactose ⁹	25g of Lactose in 250ml of water	15, 30, 60, 90, 120	5
Lactulose ³	10g of Lactulose in 200ml of water	20, 40, 60, 80, 100, 120, 140, 160, 180	9
Fructose ³	25g of Fructose in 250ml of water	60, 120, 180	3
Fructose ⁹	25g of Fructose in 250ml of water	15, 30, 60, 90, 120	5
Sorbitol ⁹	12.5g of Sorbitol in 250ml of water	15, 30, 60, 90, 120	5
Xylitol ⁹	25g of Xylitol in 250ml of water	15, 30, 60, 90, 120	5

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Interpretation

Comprehensive H₂ interpretation of readings, interferences, symptoms and indications are explained in 'Hydrogen Breath Tests' by Professor Maximilian Ledochowski, which is supplied with both the GastroCH₄ECK™ & Gastro+™ Gastrolyzer®.

Guideline interpretation is shown below, again where more than one opinion is available this has been used and referenced, other opinions may be available:

Test	Positive Interpretation
Lactose ^{3,9}	H ₂ ≥20ppm CH ₄ ≥12ppm compared to basal sample
Lactulose ¹⁰	H ₂ & CH ₄ >20ppm compared to basal sample within 90 minutes of lactulose ingestion
Lactulose ³ SIBO*	a) Early increase of at least 20ppm for the sum of the two gases b) Increase ≥20ppm corresponding to the appearance of lactulose in the colon
Lactulose ³ IITT**	Fast ≥20ppm peak is detected at 60 minutes Normal ≥20ppm peak is detected at 80 minutes Slow ≥20ppm peak is detected 100 minutes or later
Fructose ³	H ₂ ≥20ppm CH ₄ ≥12ppm compared to basal sample
Sorbitol ⁹	H ₂ ≥20ppm compared to basal sample
Xylitol ⁹	H ₂ ≥20ppm compared to basal sample

*SIBO = Small Intestinal Bacterial Overgrowth

**IITT = Impaired Intestinal Transit Time

The information contained within this document is for reference purposes only and is accurate at the point of publishing, but may be changed at any time.

References

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