

Basics Of Hydrogen/Methane Breath Tests

Hydrogen and methane are produced in the digestive system *primarily* only by the bacterial fermentation of carbohydrates (sugars, starches or vegetable fibers), so if either of these gases appear in the expired air, it is usually a signal that carbohydrates or carbohydrate fragments have been exposed to bacteria, permitting such fermentation to take place². The generation of H₂ and/or CH₄ will result in the reabsorption of some of these gases into the blood stream from the site of their digestion, and they will appear in the expired air.

Bacteria are ordinarily not present in significant numbers in the small intestine, where digestion and absorption of sugars take place. Therefore, when a challenge dose (eg. lactose) is ingested, the level of hydrogen in alveolar air will rise significantly within one to two hours (depending on the intestinal transit time) only if the sugar is not digested and, therefore reaches the colon.

The breath-H₂ test is a simple non-invasive procedure which is readily accepted by patients and staff³, and which has greater reliability and acceptability than the blood test, according to many reports.^{1,4-8} The lower dose of lactose usually does not cause the discomfort and explosive diarrhea frequently seen by malabsorbers who are given the larger dose required for the blood test⁹.

A study¹⁰ with over 300 patients showed that G-I symptoms after a lactose challenge are strongly associated with the amount of H₂ excreted; the relationship between blood glucose change and symptom-severity was less evident.

False-positive breath-tests are rare, and when they occur they are usually caused by improperly doing the test - allowing the subject to smoke, sleep or eat shortly before or during the test¹¹. Bacterial overgrowth (from the colon retrograde into the small intestine) can also produce a false-positive breath-test, but it is usually preceded by an elevated fasting breath-H₂ level and the response is seen soon after the sugar is ingested (within 20-30 minutes).

The incidence of false-negative results with the breath-test is well below that seen with the blood test^{1,4,5}. False-negative results are reported to be from 5-15% of all lactose malabsorbers,¹²⁻¹⁴ due to a variety of causes. Many of the false-negative reports can be avoided by measuring methane in addition to hydrogen¹⁵ because some methanogenic flora convert colonic H₂ to CH₄.

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