

Sucrose Malabsorption

Breath Test Interpretation Guidelines

Sucrose, a sugar found in fruits and also known as table sugar, is broken down by the enzyme sucrase into glucose and fructose. Sucrase (also called sucrase-isomaltase, saccharase or invertase) is located in the brush border of the small intestinal mucosa. A deficiency in sucrase leads to sucrose malabsorption and can be genetic or acquired.

People with congenital sucrase-isomaltase deficiency cannot break down the sugars sucrose and maltose or other compounds made from these sugar molecules (carbohydrates). More than 25 mutations within the human sucrase gene are responsible for sucrose malabsorption.

Reduced enzymatic activity and villous atrophy in the small intestine are associated with maldigestive and malabsorptive diarrhea, which can also lead to sucrose malabsorption. The level of sucrase activity in the brush border can be used as a measure of small intestine mucosal health.

Sucrose Malabsorption Leads to:^{1,2}

- Dehydration
- Metabolic acidosis
- Hypercalcemia
- Failure to thrive
- Developmental delay

Regardless of the cause, absent or diminished sucrase activity allows undigested sugars to accumulate in the lumen of the small intestine, resulting in the clinical effects of sucrase-isomaltase deficiency.

Neurovanna Sucrose Diagnostic Criteria

- Methane production ≥ 10 parts per million (ppm) during the test³
- A rise over lowest preceding value in hydrogen production ≥ 20 ppm during the test^{3,4}
- A rise over lowest preceding value in the sum of hydrogen and methane production ≥ 15 ppm during the test⁴

Clinical Considerations

- Falsely elevated findings may result from:
- Improper test preparation
- Residual fiber in the intestine due to delayed transit time
- Residual oropharyngeal (mouth and throat) bacteria
- Exposure to tobacco smoke during collection
- Chewing gum during collection
- Sleeping during collection

Elevated baseline hydrogen levels after strictly following preparation guidelines can occur and may interfere with test interpretations. Based on a complete clinical picture, some healthcare practitioners may consider an elevated hydrogen baseline a positive test.

Quality Control

Neurovanna's quality control exceeds laboratory equipment manufacturer's recommendations with machinery calibrated after every 2 hours or 5th test run. Testing performed on a CLIA waived, QuinTron BreathTracker™ Digital MicroLyzer H+. A parallel measurement of carbon dioxide (CO₂) is obtained with each sample to allow for greater testing precision. All samples are processed using CO₂ correction factor technique that reduces errors and improves interpretation.

1. Sander P, et al. Hum Mutat. 2006 Jan;27(1):119.

2. Cohen SA. Mol Cell Pediatr. 2016;3(1):5. doi:10.1186/s40348-015-0028-0

3. Rezaie A, et al. The American journal of gastroenterology. May 2017;112(5):775-784.

4. QuinTron validated criteria.