# Faecal Sugar Chromatography

## General information

Diarrhoea is associated with malabsorption of carbohydrates. Conversely, carbohydrate malabsorption can cause diarrhoea. Carbohydrate malabsorption may be non-specific (e.g. post-gastroenteritis enteropathy) or specific (e.g. congenital lactase deficiency). Identification of individual sugars in faecal material can provide diagnostic clues.

This test does not have a role in investigating adult lactose intolerance. Clinicians are advised to try dietary exclusion and see if symptoms improve or test for other causes of frequent diarrhoea such as Crohn's disease, which have specific diagnostic pathways (Bhatnagar, 2007).

**Collection container**: Sterilin blue top pot with scoop (or similar).

**Type and volume of sample**: A marble-sized sample of faecal matter is required (5g).

**Specimen transport/special precautions**: Because fermentation and degradation of sugars continues after collection, specimens must be received in specimen reception either fresh i.e. as soon as possible and at latest within 2h of passing; or freshly frozen (frozen within 2h of passing before sending to MFT).

## Laboratory information

**Method principle**: Sugars are extracted from faecal material using acetone. Individual sugars are separated and identified by Thin Layer Chromatography (TLC). Faecal reducing substances are also screened for using Benedict's Reagent.

**Biological reference range or cut off:** The presence of any sugars in faeces would not normally be expected. Each of the sugars below are reported semi-quantitatively as large amount detected; detected; trace; or negative:

Faecal Glucose
Faecal Galactose
Faecal Fructose
Faecal Sucrose
Faecal Lactose
Faecal Maltose
Faecal Oligosaccharides
and Faecal Reducing Substance

**Turnaround times**: 2 weeks

## Clinical information

**Factors known to significantly affect the results:** Delayed freezing of the sample after collection may result in loss of any sugars due to bacterial metabolism (false negative).

Occasionally it can be difficult to reliably interpret the reducing substance test due to incomplete removal of faecal matter from the extract.

Some drugs cause a false-positive reducing substances test include - salicylate, penicillin, ascorbic acid, nalidixic acid, cephalosporins and probenecid.

**Clinical decision points**: Food leaving the stomach first enters the small bowel. The small bowel has very few bacteria, it is almost sterile but it does have enzymes that are responsible for carbohydrate metabolism that fully convert the complex sugars contained in a normal diet to glucose.

Glucose is fully absorbed from the small bowel in almost all individuals –there is a vanishingly rare Na-Glucose transporter problem that leads to diarrhoea, dehydration and hypoglycaemia in a very, very small number of babies.

In health, carbohydrates are completely digested in the small bowel and none enters the large bowel (the colon) undigested, so there is no abdominal discomfort, flatus or perianal excoriation when consuming a normal diet.

Certain diseases or inherited conditions lead to a shortfall of digestive enzymes in the small bowel. If you lack the correct carbohydrate-digesting enzymes, some unaltered sugar will reach the colon. The colon is richly endowed with a huge number and variety of bacteria that can digest sugars, and in doing so they cause abdominal distension, flatulence and because of liberation of free acids, the stool becomes acidic causing perianal excoriation. This gas is absorbed into the blood stream, transferred into the airspaces of the lung and exhaled in breath.

Hereditary lactose intolerance:
Small amount of glucose and detectable galactose in stool

Post-gastroenteritis diarrhoea:
Generalised carbohydrate pattern in stool

If trace amounts of sugars are detected the pattern should be interpreted together with the presence of continued symptoms and whether the weight gain and growth of the child is impacted. The test can be repeated after 6 weeks and a referral to a paediatrician or paediatric gastroenterologist should be considered for further investigation.

**References:**

Bhatnagar, BMJ 2007, 334, 1331-1332.

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