

Sucrose, Urine

Analyte: Sucrose

Specimen Type: Urine

Optimum Volume: 0.1 mL

2-8°C

-20°C

-70°C

6 days

1 month

2.8 years

Reporting units: umol/L

Method: Enzymic

Biological or Clinical Significance:

Sucrose ($C_{12}H_{22}O_{11}$) is a disaccharide of glucose and fructose with an α -1,2-glycosidic linkage. It is the most common food sweetener and the most important sugar in plants. In mammals, sucrose is readily digested in the stomach into glucose and fructose, which are rapidly absorbed into the bloodstream in the small intestine.

Some epidemiological evidence suggests that diets high in refined sugars may be associated with an increased risk of colorectal cancer, breast cancer, pancreatic cancer and endometrial cancer. However, several studies have failed to show an association between different cancer sites and sugar intake. The inconsistency in the reported findings of epidemiological studies directed at hypothesized relations between sugars and cancer may be due to ambiguity of dietary assessment methods employed in these studies.

One of the possible ways to enable more accurate findings to be gathered is to introduce a biomarker for sugars intake. One possibility is sucrose in urine, because early work showed that small amounts of sucrose cross the small intestine unchanged and are excreted in the urine. Under normal conditions, glucose is not therefore expected to be found in urine samples. However, some of the second cleavage product, fructose, was detected in urine following an oral administration of sucrose.

The mechanism by which sucrose and fructose occurs in the urine is not well understood. Except in the case of endogenous sucrosuria, sucrose appearing in the urine is usually of dietary origin. In physiologic conditions, very small amounts of sucrose may escape enzymatic hydrolysis by sucrase in the small intestine and enters the general circulation. The increased amount in urine has been attributed to either altered intestinal disaccharidase activity or more often to gastric damage.

Principle of Test Method:

The sucrose assay developed in-house at nexelis is an automated assay using a modified version of the glucose hexokinase assay.

References:

1. Tasevska, N., Runswick, A., McTaggart, A., & Bingham, S. (2005). Urinary Sucrose and Fructose as Biomarkers for Sugar Consumption. *Cancer Epidemiology, Biomarkers and Prevention*, 14(5), 1287 - 1294.