

MEASUREMENT OF SUGARS IN FOOD AND FEED PRODUCTS

The Expertise Centre CCC (Eurofins Food & Feed Testing, The Netherlands) is proud to announce the availability of the method for analyses of sugars for product labeling as a validated routine test for food, pet food and feed products according to ISO 17025. The method is based on the Eurofins best practice method and ISO/CD 22184 & IDF/WD 244.

The method is available at CCC as test codes HEC3S (Food) and HEC3T (Feed).

Introduction

Carbohydrates are key components in the diet. Carbohydrates are found in a various food products like bakery products (bread, cookies), beans, pasta's, dairy products (milk, infant formula, yoghurt, dessert), popcorn, potatoes, spaghetti and soft drinks and they are present in a variety of forms. The most common and abundant forms are sugars, fibers, starches, non-starch polysaccharides, dietary fibre and prebiotics. Starchy carbohydrates provide an important source of energy, and fiber is important for digestive health.

The WHO 2015 recommended to limit all free sugar consumption to less than 10% of daily calories. The nutrition labels on food products need to specify the amount of total carbohydrates and sugars present in the product. In food and feed products various mono- and di-saccharides are expected, e.g. glucose, fructose, galactose, lactose, sucrose and maltose.

Regulations

Correct nutrition labeling of total sugars in products is mandatory from EC legislation and other authorities, f.i. FDA. The new EU law on food information to consumers (EU No. 1169/2011), making it compulsory to provide nutrition information, is officially applying as of 2016 (Directive 90/496/EEC concerns nutrition labelling of foodstuffs for the final consumer). According to the Codex Alimentarius Guidelines on Nutrition Labelling (CAC/GL 2 -1985 last rev. 2017) nutritional labelling of food products requires listing of sugars content. 'Sugars' means all monosaccharides and disaccharides present in food, but excludes (acc. EC) polyols, isomaltulose and tagatose.

Claims like Sugar Free, Low or Reduced/Less are also regulated by law (f.i. Codex Alimentarius Nutrition and Health Claims (CAC/GL 23-1997 and EC Regulation 1924/2006).

Method

Currently, no standard protocols (IDF (international dairy federation), ISO, CEN, AOAC, ...) are available for the determination of a complete combination of all relevant mono- and disaccharides in the different dairy matrices in one analysis. Various HPLC based methods only determine glucose, fructose, lactose, sucrose and maltose. ISO/IDF standards are only available for lactose and lactulose, applying either classical chromatography or enzymatic methods. No other sugars are quantified though. Various enzymatic methods are available for individual sugars depending on specificity of enzymes used. This could lead to incorrect values in the presence of saccharides like galactose, lactulose, trehalose, palatinose and allo-lactose.

CCC developed a powerful technique to help you identify and quantify sugars for labeling in your products. The method is an in-house developed method based on the Eurofins best practice method and the ISO/CD 22184 and IDF/WD 244 using high-pH anion-exchange chromatography with pulsed amperometric detection (HPAEC-PAD) being developed by CCC^{1,2}. The method overcomes some of the problems associated with these methods.

Principle

The method consists of an aqueous ethanol extraction of the sugars in the food sample, followed by clarification with Carrez reagents. The clarified filtrate is diluted and then directly introduced in the HPAEC-PAD system for quantification of the sugars.

Applications & Use

The test is validated and applicable for food and feed matrices, covering retail products and labeling requirements. The method reports 6 sugars as well as the sum of the 6 sugars (glucose, fructose, galactose, lactose, sucrose and maltose). The LOQ=0.1% per sugar. TAT=5 days.

Chromatogram and separation

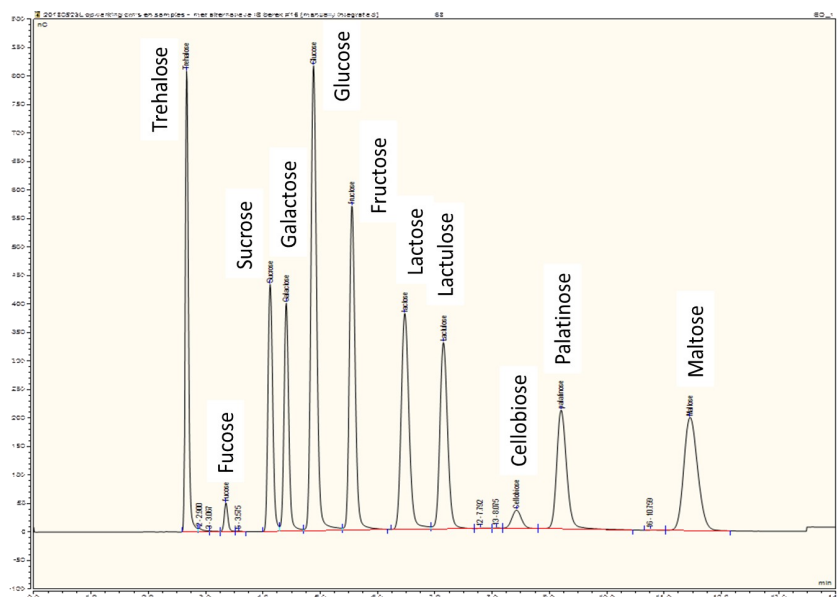


Figure left: High-pH anion-exchange chromatography with pulsed amperometric detection (HPAEC-PAD). A base line separation is achieved for all main food or dairy sugars.

Literature:

1. ISO/CD 22184 Milk and milk products — Determination of the sugar contents — High performance anion exchange chromatographic method (HPAEC-PAD). Technical Committee: ISO/TC 34/SC 5.
2. J AOAC Int. 2017 May 11. The Determination of Sugars in Dairy Products: Development of a New Standard Method for the International Dairy Federation and the International Organization for Standardization by Sanders, Ernste-Nota, Visser, van Soest, Brunt.

Our tests at a glance

Test code	Matrix	Analytical method (HPAEC-PAD)
HEC3S (glc,fru,lac,suc,mal,gal)#	Food	In house method to be accredited
HEC3T (glc,fru,lac,suc,mal,gal)	Feed	In house method to be accredited
HEC3L (Dairy) / HEC3M (Foods)*	All foods incl. dairy	ISO-IDF to be accredited (fru,lac,suc,mal,gal,glc)

Method replaces package PHECB en PHECE incl. tests codes HEC2F and HEC2H. Sum is included in report.

* Method specially designed for complex products, e.g. dairy & infant formula, in process of becoming ISO and IDF standard.

Contact us

Websites: www.carbohydratetesting.com & www.eurofinsfoodtesting.nl/en

