

MEASUREMENT OF FREE & TOTAL CARBOHYDRATES IN INSTANT COFFEE ACCORDING TO ISO 11292 AND AOAC 995.13

The Expertise Centre CCC Analyses (Eurofins Food & Feed Testing, The Netherlands) is proud to announce the availability of a routine test according to ISO 17025 for the analysis of carbohydrates for instant or soluble coffee products. The test is based on ISO 11292 and AOAC 995.13 and can be requested with the test codes HEC6G, HEC6H and PHECF. On request, as special test, authenticity check can be offered.

Introduction

Coffee is one of the most popular drinks in the world. Carbohydrates belong to major constituents of coffee and function as:

- ◆ aroma binders
- ◆ foam stabilizers
- ◆ viscosifiers
- ◆ formation of sediments of the extract.

Carbohydrates may also be added for:

- ◆ (sweet) taste
- ◆ as flavor enhancers
- ◆ or structurizers



Measurement may be required for product labeling. Carbohydrate composition is also a good tracer for authenticity assessment.

Regulations and Adulteration

Soluble coffee represents a sizable fraction of international trade. (Inter-) National regulations on the ingredients acceptable in soluble coffee and on their declaration are in force¹. Various methods only determine free sugars like glucose, fructose, lactose, sucrose and maltose. This could lead to incorrect values in the presence of coffee carbohydrates and free sugars like arabinose and xylose.

The ISO and AOAC methods were developed to ensure the 100% purity and quality of instant or soluble coffee to detect false declarations and counterfeit products [AFCASOLE²⁻³]. Pure soluble coffee is made exclusively from pure roasted coffee, while adulterated products may contain other components. Sugars are very good tracers for the authenticity of instant or soluble coffee. With a total glucose and xylose exceeding the specification limits the products are considered as adulterated⁴⁻⁵.

Method

The International Standards specify a method for the determination of free and total carbohydrate contents (except total fructose, which is degraded) in soluble (instant) coffee using high-performance anion exchange chromatography (HPAEC). In particular, it determines the content of various individual monosaccharides, sucrose and mannitol.

Principle

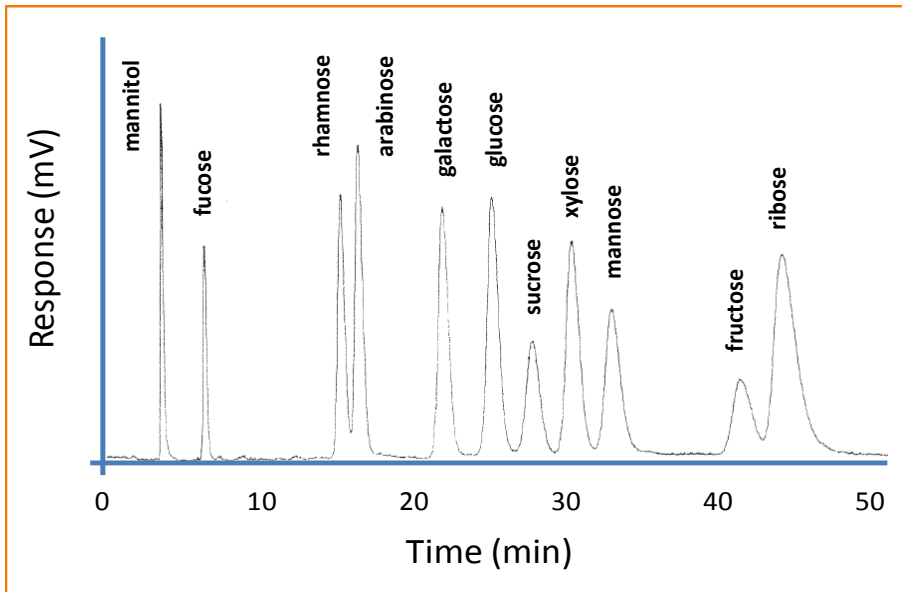
The method consists of an aqueous extraction of the free carbohydrates and hydrolysis of the carbohydrates in the coffee sample. The quantification of the free carbohydrates as well as after hydrolysis is done by using HPAEC-PAD. Free carbohydrate content is expressed as the individual monosaccharides (arabinose, fructose, galactose, glucose, mannose), sucrose and mannitol contents. Total carbohydrate content is expressed as the individual monosaccharides (arabinose, galactose, glucose, mannose, xylose, ribose, fucose, rhamnose) and mannitol.

Applications & Use

The tests are applicable for pure, mixed and adulterated soluble coffee, but can be used also for other food and feed matrices, such as roasted chicory extracts, when additional information is needed on the specific sugars.

1. Commission Directive 2001/54/EC repealing 79/1066/EEC laying down methods of analysis for testing coffee extracts and chicory extracts
2. ISO 24114:2011, Instant coffee — Criteria for authenticity
3. AFCASOLE (Association of European producers of soluble coffee) statement on the authenticity of soluble coffees of 1995; as confirmed by the ECF (European Coffee Federation, legal successor of AFCASOLE) in 2007
4. Girard et al., Carbohydrate specification limits for the authenticity assessment of soluble (instant) coffee: Statistical approach. J.AOAC Int. 2006, 89, pp. 999-1003
5. NEN-ISO 24114 Instant coffee - Criteria for authenticity (2011)

Chromatogram and separation



Figure

High-performance anion-exchange chromatography with pulsed amperometric detection (HPAEC-PAD).

A base line separation is achieved for coffee sugars.

Our tests at a glance

Test code	Matrix	Analytical method (HPAEC-PAD)
HEC6H	Soluble coffee	Free carbohydrates
HEC6G	Soluble coffee	Total carbohydrates
PHECF	Soluble coffee	Free and total carbohydrates
On request	Soluble coffee	Authenticity check (ISO 24114 Instant coffee - Criteria for authenticity)

ISO 11292 and AOAC 995.13 methods consist of two separate measurements. Methods are adopted on national levels like DIN 10780:2003, IS 16031: 2012, PROY-NMX-F-000-SCFI-2016:2016 and BS 5752-15:1997.

Contact us

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

Email: carbohydrates@eurofins.com

