Milk and milk products - Determination of the sugar contents - High performance anion exchange chromatography with pulsed amperometric detection method (HPAEC-PAD) (ISO 22184:2021)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 22184:2021 sisaldab Euroopa standardi EN ISO 22184:2021 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 22184:2021 consists of the English text of the European standard EN ISO 22184:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 17.02.2021.	Date of Availability of the European standard is 17.02.2021.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 67.100.01

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 22184

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English Version

Milk and milk products - Determination of the sugar contents - High performance anion exchange chromatography with pulsed amperometric detection method (HPAEC-PAD) (ISO 22184:2021)

Lait et produits laitiers - Détermination de la teneur en sucre - Chromatographie d'échange d'anions haute performance couplée à la détection par ampérométrie pulsée (HPAEC-PAD) (ISO 22184:2021)

Milch und Milcherzeugnisse - Bestimmung des Zuckergehalts - Verfahren der Hochleistungs-Anionenaustausch-Chromatographie mit gepulster amperometrischer Detektion (HPAEC PAD) (ISO 22184:2021)

This European Standard was approved by CEN on 30 October 2020.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 22184:2021 E

European foreword

This document (EN ISO 22184:2021) has been prepared by Technical Committee ISO/TC 34 "Food products" in collaboration with Technical Committee CEN/TC 302 “Milk and milk products - Methods of sampling and analysis” the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2021, and conflicting national standards shall be withdrawn at the latest by August 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 22184:2021 has been approved by CEN as EN ISO 22184:2021 without any modification.

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 302, *Milk and milk products — Methods of sampling and analysis,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement), and the International Dairy Federation (IDF). It is being published jointly by ISO and IDF.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

IDF (the International Dairy Federation) is a non-profit private sector organization representing the interests of various stakeholders in dairying at the global level. IDF members are organized in National Committees, which are national associations composed of representatives of dairy-related national interest groups including dairy farmers, dairy processing industry, dairy suppliers, academics and governments/food control authorities.

ISO and IDF collaborate closely on all matters of standardization relating to methods of analysis and sampling for milk and milk products. Since 2001, ISO and IDF jointly publish their International Standards using the logos and reference numbers of both organizations.

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This document was prepared by the IDF *Standing Committee on Analytical Methods for Composition* and ISO Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*. It is being published jointly by ISO and IDF.

The work was carried out by the IDF/ISO Action Team C22 of the *Standing Committee on Analytical Methods for Composition* under the aegis of its project leader Mr H. Cruijsen (NL).

Milk and milk products — Determination of the sugar contents — High performance anion exchange chromatography with pulsed amperometric detection method (HPAEC-PAD)

1 Scope

This document specifies the quantitative liquid chromatographic determination of specific sugars (galactose, glucose, fructose, sucrose, lactose and maltose) in various milk and milk products, applying arabinose as an internal standard.

The method is applicable to the following dairy matrices: milk, sweetened condensed milk, milk powder, cheese, whey powder, infant formula, milk dessert and yoghurt.

The method does not apply to dairy products containing soy or to the determination of the lactose content in low-lactose milk products at levels below 1 mg/g.

A high performance anion exchange chromatography method in combination with pulsed amperometric detection (HPAEC-PAD) method is applied[5][3][4]. With this method, thirteen different monosaccharides, disaccharides and trisaccharides can be separated: fucose, arabinose, galactose, glucose, fructose, sucrose, lactose, lactulose, maltose, melibiose, trehalose, isomaltulose and maltotriose.

The method is applicable to labelling for the six most important sugars that can be present by nature or by addition in milk and milk products. The method does not apply to sugar contents less than 0,1 %.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

The sugars present in the sample are extracted with an aqueous ethanol buffer solution in order to inhibit potential probiotic activities. The obtained extract is deproteinized with a Carrez clarification. After clarification, the solution is diluted and the sugars present are separated and quantified by HPAEC. HPAE allows carbohydrates separation at high pH. In order to improve sensitivity and stability, post-column sodium hydroxide solution is added to the HPAEC-PAD. GOS (galacto-oligosaccharides) and fructans do not interfere with the analysis of the sugars[5]. Arabinose is applied as an internal standard for the quantification of the sugars.