INTERNATIONAL STANDARD

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Animal and vegetable fats and oils — Gas chromatography of fatty acid methyl esters —

Part 1: Guidelines on modern gas chromatography of fatty acid methyl esters

Corps gras d'origines animale et végétale — Chromatographie en phase gazeuse des esters méthyliques d'acides gras —

Partie 1: Lignes directrices relatives à la chromatographie en phase gazeuse moderne des esters méthyliques d'acides gras

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 34, *Food products*, Subcommittee SC 11, *Animal and vegetable fats and oils*.

This first edition of ISO 12966-1, together with ISO 12966-4, cancels and replaces ISO 5508:1990 and ISO 15304:2002 which have been technically revised.

ISO 12966 consists of the following parts, under the general title *Animal and vegetable fats and oils — Gas chromatography of fatty acid methyl esters*:

— *Part 1: Guidelines on modern gas chromatography of fatty acid methyl esters*

— *Part 2: Preparation of methyl esters of fatty acids*

— *Part 3: Preparation of methyl esters using trimethylsulfonium hydroxide (TMSH)*

— *Part 4: Capillary gas chromatographic method*

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Introduction

This part of ISO 12966 is one of a suite of four International Standards for the preparation and determination of fatty acid methyl esters by gas chromatography in animal and vegetable fats and oils. ISO 12966 (all parts) is applicable to crude, refined, partially hydrogenated or fully hydrogenated fats, oils and fatty acids derived from animal and vegetable sources.

ISO 12966 (all parts) is not suitable for the analysis of dairy, ruminant fats and oils (including milk and milk products or fat coming from milk and milk products), or products supplemented with conjugated linoleic acid (CLA). Furthermore it is not intended to be applied to polymerized and oxidized fats and oils.

This part of ISO 12966 is a guideline to the modern gas chromatography of fatty acid methyl esters, while ISO 12966-2 and ISO 12966-3 cover the preparation of fatty acid methyl esters by different methods. In ISO 12966-4, the conditions for the analysis of fatty acid methyl esters by capillary gas chromatography are given.

This suite of International Standards replaces the following International Standards:

— ISO 5508:1990 is replaced by ISO 12966-1 and ISO 12966-4

— ISO 15304:2002 is replaced by ISO 12966-1 and ISO 12966-4

— ISO 5509:2000 is replaced by ISO 12966-2 and ISO 12966-3

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Animal and vegetable fats and oils — Gas chromatography of fatty acid methyl esters —

Part 1: Guidelines on modern gas chromatography of fatty acid methyl esters

1 Scope

This part of ISO 12966 gives an overview of the gas chromatographic determination of fatty acids, free and bound, in animal and vegetable fats and oils following their conversion to fatty acid methyl esters (FAMEs).

The qualitative and quantitative determination of the composition of fatty acids by gas liquid chromatography (GLC) is a widely used application in lipid analysis. It is used for the characterization of fats and oils, or fatty foodstuffs after the extraction of the oil from the matrix. The bound fatty acids of the triacylglycerols (TAGs) and, depending on the esterification method, the free fatty acids (FFA) and other lipids, are converted to fatty acid methyl esters (FAMEs), which are determined by capillary gas chromatography. Depending on the number of different fatty acids (theoretically more than 50 different fatty acids can be present) capillary columns with a length of 10 m to 100 m are used for a separation.

The GLC of FAMEs is applicable to all natural and synthetic mixtures of tri-, di- and monoacylglycerols, to fatty acid esters, free fatty acids, soaps and other fatty compounds. With this suite of standards, FAMEs from C4 to C26 can be determined, including saturated fatty acid methyl esters, *cis*- and *trans*-monounsaturated fatty acid methyl esters, and *cis*- and *trans*-polyunsaturated fatty acid methyl esters.

For the determination of short chain fatty acids, isopropyl and butyl esters are often used so as to avoid interferences with the solvent peak and in order to reduce differences in detector responses.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12966-2, *Animal and vegetable fats and oils — Gas chromatography of fatty acid methyl esters — Part 2: Preparation of methyl esters of fatty acids*

ISO 12966-3, *Animal and vegetable fats and oils — Gas chromatography of fatty acid methyl esters — Part 3: Preparation of methyl esters using trimethylsulfonium hydroxide (TMSH)*

ISO 12966-4:—[1)], *Animal and vegetable fats and oils — Determination of methyl esters of fatty acids — Part 4: Capillary gas chromatographic method*

3 Principle

Gas liquid chromatography (GLC) is used for the qualitative and quantitative analysis of FAMEs. The FAMEs are prepared in accordance with ISO 12966-2 or ISO 12966-3 and the dissolved FAMEs are then injected into and vaporized within the injector. The separation of FAMEs is achieved on analytical

1) Under preparation. To be published.

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