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BSI Standards Publication

Fat and oil derivatives – Fatty Acid Methyl Esters (FAME) – Determination of ester and linolenic acid methyl ester contents

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National foreword

This British Standard is the UK implementation of EN 14103:2020. It supersedes BS EN 14103:2011, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AW/307, Oilseeds, animal and vegetable fats and oils and their by-products.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Amendments/corrigenda issued since publication

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English Version

Fat and oil derivatives - Fatty Acid Methyl Esters (FAME) - Determination of ester and linolenic acid methyl ester contents

Produits dérivés des corps gras - Esters méthyliques
d'acides gras (EMAG) - Détermination de la teneur en
ester et en ester méthylique de l'acide linoléique

Erzeugnisse aus pflanzlichen und tierischen Fetten und
Ölen - Fettsäure-Methylester (FAME) - Bestimmung
des Ester-Gehaltes und des Gehaltes an Linolensäure-
Methylester

This European Standard was approved by CEN on 18 November 2019.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 14103:2020) has been prepared by Technical Committee CEN/TC 307 "Oilseeds, vegetable and animal fats and oils and their by-products — Methods of sampling and analysis", the secretariat of which is held by AFNOR.

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 July 2020, and conflicting national standards shall be withdrawn at the latest by July 2020.

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.

This document supersedes EN 14103:2011.

In comparison with the previous edition, the following technical modifications have been made:

- a) note on natural nonadecanoic acid methyl ester added in the scope;
- b) new procedure to check nonadecanoic acid methyl ester purity, with new GC conditions, and reduction of the minimum GC purity (99,5 to 99,0 % (*m/m*));
- c) calculation of results revised by incorporation of theoretical flame ionization detector correction factor (TCF), this gives a better accuracy of the calculated contents in case of presence of methyl esters with short chains;
- d) new inter-laboratories study (ILS) conducted and precision adopted;
- e) new sample chromatograms recorded and added;
- f) calculation of the pattern of fatty acid methyl esters incorporated as informative Annex C;
- g) modification of the way of integration in 8.4 by taking all the peaks into consideration whereas in the previous edition all the peaks identified as fatty acid methyl esters were taken into consideration;
- h) increase of the FAME sample test portion in 8.3 to 250 mg whereas in the previous edition the sample test portion was 100 mg;
- i) document revised editorially.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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.

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1 Scope

The purpose of this document is to describe a procedure for the determination of the ester content in fatty acid methyl esters (FAME) intended for incorporation into diesel oil. It also allows determining the linolenic acid methyl ester content. It allows verifying that the ester content of FAME is greater than 90 % (*m/m*) and that the linolenic acid methyl ester content is between 1 % (*m/m*) and 15 % (*m/m*).

The precision was established using FAMES with an ester content of 95 % (*m/m*) and 100 % (*m/m*) only, thus covering the range of the limit value. The method is also suitable outside of this range; however, precision for lower concentrations is subject to further work.

This method is suitable for FAME which contains methyl esters between C6 and C24.

NOTE 1 For the purposes of this document, the term "% (*m/m*)" is used to represent the mass fractions.

This method was elaborated for FAME samples from usual raw material. For FAME sample from unidentified raw material, a solution of the test sample is prepared without any internal standard addition, in order to verify the absence of natural nonadecanoic acid methyl ester or other unknown substances co-eluting with the IS.

NOTE 2 The calculation method of the pattern of fatty acid methyl esters is given in Annex C.

WARNING — The use of this method may involve hazardous equipment, materials and operations. This method does not purport to address to all of the safety problems associated with its use, but it is the responsibility of the user to search and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2 Normative references

There are no normative references in this document.

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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Principle

Determination of the mass percentage of total methyl esters of fatty acids and the mass percentage of linolenic acid methyl ester present in the sample, by gas chromatography according to a procedure using internal calibration (nonadecanoic acid methyl ester).