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BSI Standards Publication

**Fat and oil derivatives — Fatty Acid Methyl Esters (FAME) — Determination of free and total glycerol and mono-, di-, triglyceride contents**

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## National foreword

This British Standard is the UK implementation of EN 14105:2024. It supersedes BS EN 14105:2020, which is withdrawn.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 committee manager.

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## EUROPÄISCHE NORM

October 2024

ICS 67.200.10

Supersedes EN 14105:2020

English Version

## Fat and oil derivatives - Fatty Acid Methyl Esters (FAME) - Determination of free and total glycerol and mono-, di-, triglyceride contents

Produits dérivés des corps gras - Esters méthyliques  
d'acides gras (EMAG) - Détermination de la teneur en  
glycérols libre et total et en mono-, di- et triglycérides

Erzeugnisse aus pflanzlichen und tierischen Fetten und  
Ölen - Fettsäure-Methylester (FAME) - Bestimmung  
des Gehaltes an freiem und Gesamtglycerin und Mono-,  
Di- und Triglyceriden

This European Standard was approved by CEN on 12 August 2024.

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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EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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## European foreword

This document (EN 14105:2024) 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 April 2025, and conflicting national standards shall be withdrawn at the latest by April 2025.

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 14105:2020.

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

— the weighing accuracy is specified.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, Türkiye and the United Kingdom.

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## 1 Scope

This document specifies a method to determine the free glycerol and residual mono-, di- and triglyceride contents in fatty acid methyl esters (FAME). The total glycerol content is then calculated from the obtained results.

Under the conditions described, the quantification limits are 0,001 % (*m/m*) for free glycerol, 0,10 % (*m/m*) for all glycerides (mono-, di- and tri-). This method is suitable for FAME prepared from rapeseed, sunflower, soybean, palm, animal oils and fats and mixture of them. It is not suitable for FAME produced from or containing coconut and palm kernel oils derivatives because of overlapping of different glyceride peaks.

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

NOTE 2 Under the common EN 14105 GC conditions, squalene can coelute with alpha glycerol monostearate. If the presence of squalene is suspected, EN 17057 can be used to discriminate between squalene and glycerol monostearate.

**WARNING** — The use of this document can involve hazardous materials, operations and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of users of this document to take appropriate measures to ensure the safety and health of personnel prior to application of the standard, and fulfil statutory and regulatory requirements for this purpose.

## 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.

EN ISO 5555, *Animal and vegetable fats and oils — Sampling (ISO 5555)*

EN ISO 3170, *Petroleum liquids — Manual sampling (ISO 3170)*

## 3 Terms and definitions

No terms and definitions are listed in this document.

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

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

## 4 Principle

The glycerol and the mono- and diglycerides are transformed into more volatile and stable silyl derivatives in presence of pyridine and of N-methyl-N-trimethylsilyltrifluoroacetamide (MSTFA).

The sample after silylation is analysed by gas chromatography on a short capillary column with thin film thickness, with an on-column injector or equivalent device, and flame ionization detection.

After a calibration procedure, the quantification of glycerol is carried out in presence of the internal standard 1,2,4-butanetriol.

Mono-, di- and triglycerides are directly evaluated in presence of an internal standard for each glyceride category: