

**Animal and vegetable fats and oils -  
Determination of individual and total  
sterols contents - Gas chromatographic  
method**

Animal and vegetable fats and oils - Determination  
of individual and total sterols contents - Gas  
chromatographic method

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 12228:2003 sisaldab Euroopa standardi EN ISO 12228:1999 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 14.08.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 12228:2003 consists of the English text of the European standard EN ISO 12228:1999.</p> <p>This document is endorsed on 14.08.2003 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>This standard specifies a method for the gas chromatographic determination of the content and composition of sterols in animal and vegetable fats and oils</p>	<p><b>Scope:</b></p> <p>This standard specifies a method for the gas chromatographic determination of the content and composition of sterols in animal and vegetable fats and oils</p>
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**ICS** 67.200.10

**Võtmesõnad:** agricultural products, animal fats, animal oils, chemical analysis and testin, chemical analysis and testing, content, definition, definitions, determination of content, fats, food products, gas chromatography, oils, sterols, vegetable fats, vegetable oils

**English version**

**Animal and vegetable fats and oils**

Determination of individual and total sterols contents –  
Gas chromatographic method  
(ISO 12228 : 1999)

Corps gras d'origines animale et  
végétale – Détermination de la teneur  
en stérols individuels et totaux –  
Méthode par chromatographie en  
phase gazeuse (ISO 12228 : 1999)

Tierische und pflanzliche Fette und  
Öle – Bestimmung der individuellen  
und der Gesamtsterine – Gas-  
chromatographisches Verfahren  
(ISO 12228 : 1999)

This European Standard was approved by CEN on 1999-01-17.

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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

## Foreword

International Standard

ISO 12228 : 1999 Animal and vegetable fats and oils – Determination of individual and total sterols contents – Gas chromatographic method,

which was prepared by ISO/TC 34 'Agricultural food products' of the International Organization for Standardization, has been adopted by 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, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by September 1999 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

## Endorsement notice

The text of the International Standard ISO 12228 : 1999 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to International Standards are listed in Annex ZA (normative).

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## 1 Scope

This International Standard specifies a method for the gas chromatographic determination of the contents and compositions of sterols in animal and vegetable fats and oils.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 661:1989, *Animal and vegetable fats and oils — Preparation of test samples*.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*.

## 3 Definitions

For the purposes of this International Standard, the following definitions apply.

### 3.1

#### **composition of sterols**

composition of individual sterols in the sample, beginning with cholesterol and ending with  $\Delta^7$ -avenasterol (see table 1) under the conditions specified in this International Standard

NOTE The composition is expressed as peak area, in percent, and normalized to 100 %.

### 3.2

#### **total sterol content**

mass of the sum of all individual sterols, as determined in accordance with the method specified in this International Standard, beginning with cholesterol and ending with  $\Delta^7$ -avenasterol (see table 1), divided by the mass of the test portion

NOTE The content is expressed in milligrams per 100 g.

## 4 Principle

A test portion is saponified by boiling under reflux with an ethanolic potassium hydroxide solution. The unsaponifiable matter is isolated by solid-phase extraction on an aluminium oxide column. The aluminium oxide column is used to retain the fatty acid anions; sterols pass through the column. The sterol fraction from the unsaponifiable matter is separated by thin-layer chromatography. The qualitative and quantitative compositions of the sterol fraction are determined by gas chromatography using betulin as an internal standard.