Animal and vegetable fats and oils - Determination of ultraviolet absorbance expressed as specific UV extinction (ISO 3656:2011)

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 3656:2011 sisaldab Euroopa standardi EN ISO 3656:2011 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 3656:2011 consists of the English text of the European standard EN ISO 3656:2011.
Standard on kinnitatud Eesti Standardikeskuse 28.02.2011 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 28.02.2011 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 01.02.2011.	Date of Availability of the European standard text 01.02.2011.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 67.200.10

absorptance, agricultural products, animal fats, animal oils, determination, fats, food products, oils, testing, tests, ultraviolet radiation, vegetable fats, vegetable oils

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 3656

February 2011

ICS 67.200.10

Supersedes EN ISO 3656:2002

English Version

Animal and vegetable fats and oils - Determination of ultraviolet absorbance expressed as specific UV extinction (ISO 3656:2011)

Corps gras d'origines animale et végétale - Détermination de l'absorbance dans l'ultraviolet, exprimée sous la forme d'extinction spécifique en lumière ultraviolette (ISO 3656:2011)

Tierische und pflanzliche Fette und Öle - Bestimmung der Ultraviolett-Absorption, ausgedrückt als spezifische UV-Extinktion (ISO 3656:2011)

This European Standard was approved by CEN on 22 January 2011.

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.

CEN members are the national standards bodies of 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

This document (EN ISO 3656:2011) has been prepared by Technical Committee ISO/TC 34 "Food products" in collaboration with 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 August 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

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

This document supersedes EN ISO 3656:2002.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 3656:2011 has been approved by CEN as a EN ISO 3656:2011 without any modification.

Introduction

This International Standard describes a method for the determination of the absorbance of light in the ultraviolet (UV) spectrum by fats and oils. Changes in absorption in the UV region are used as quality, purity, and authenticity criteria for fats and oils. Refining causes the formation of conjugated dienes and trienes and increased values of K_{232} and K_{268}, which then indicate the presence of refined oils. The oxidation of linoleic and linolenic acids results in the formation of hydroperoxides in which the double bonds become conjugated. Furthermore, the formation of either carbon-carbon bonds or carbon-oxygen bonds (α,β-unsaturated carbonyl compounds) as secondary autoxidation products are observed. These compounds all lead to an increase of the absorption in the region between 225 nm and 325 nm.

The third edition of this International Standard allowed the determination of the UV absorbance at 232 nm and 268 nm using three different solvents (isooctane, cyclohexane or *n*-hexane). However, it is known that the solvents themselves have an effect on the UV absorbance between 260 nm and 276 nm in vegetable oils. Recent investigations have shown that the measurement of K_{268} and K_{270} for the same oil in isooctane or in cyclohexane give significantly different results. In isooctane, the maxima appear at 267 nm to 268 nm whereas in cyclohexane, the maxima appear at 268 nm to 269 nm. In the IOC standards for the determination of the ultraviolet absorbance of (virgin) olive oils, the specified wavelengths are 232 nm and 270 nm.

Taking into account the above, the fourth edition of this International Standard specifies measurement at 268 nm when isooctane is used and measurement at 270 nm when cyclohexane is used. Moreover, the variation of the specific extinction, ΔK, for olive oils has been introduced. Precision data from a new collaborative trial have also been taken into consideration for this revision.

Animal and vegetable fats and oils — Determination of ultraviolet absorbance expressed as specific UV extinction

1 Scope

This International Standard specifies a method for the determination of the absorbance at ultraviolet wavelengths of animal and vegetable fats and oils.

2 Normative references

The following referenced documents are indispensable for the application 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 661, *Animal and vegetable fats and oils — Preparation of test sample*

3 Terms and definitions

NOTE The usual policy of ISO/TC 34/SC 11 of using symbols specified in International Standard 80000[5] is not followed in this International Standard. The symbols are those used, for example, in Commission Regulation (EEC) No 2568/91[6].

For the purposes of this document, the following terms and definitions apply.

3.1
specific extinction ($K_{232} - K_{268} - K_{270}$)
absorbance of 1 g sample, dissolved in 100 ml isooctane or cyclohexane, measured in a 10 mm cell at the specific wavelengths 232 nm, 268 nm, and 270 nm

4 Principle

A sample is dissolved in isooctane or cyclohexane and the absorbance is measured spectrophotometrically in a specified ultraviolet wavelength range. The specific absorbance at 232 nm and 268 nm in isooctane or 232 nm and 270 nm in cyclohexane for a concentration of 1 g per 100 ml in a 10 mm cell is calculated.

5 Reagents

WARNING — Attention is drawn to the regulations which specify the handling of hazardous substances. Technical, organizational and personal safety measures shall be followed.

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and distilled or demineralized water or water of equivalent purity.

5.1 Solvent: isooctane (2,2,4-trimethylpentane) for the measurement at 232 nm and 268 nm or **cyclohexane** for the measurement at 232 nm and 270 nm, having an absorbance less than 0,12 at 232 nm and less than 0,05 at 250 nm against water, measured in a 10 mm cell.