

Cereals, cereals-based products and animal feeding stuffs — Determination of crude fat and total fat content by the Randall extraction method

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National foreword

This British Standard is the UK implementation of EN ISO 11085:2010. It is identical to ISO 11085:2008. It supersedes BS ISO 11085:2008 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AW/4, Cereals and pulses.

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

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30 June 2010	This corrigendum renumbers BS ISO 11085:2008 as BS EN 11085:2010

English Version

**Cereals, cereals-based products and animal feeding stuffs -
Determination of crude fat and total fat content by the Randall
extraction method (ISO 11085:2008)**

Céréales, produits céréaliers et aliments des animaux -
Détermination de la teneur en matières grasses brutes et
en matières grasses totales par la méthode d'extraction de
Randall (ISO 11085:2008)

Getreide, Getreideerzeugnisse und Futtermittel -
Bestimmung des Rohfettgehalts und des
Gesamtfettgehalts mit dem Extraktionsverfahren nach
Randall (ISO 11085:2008)

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Foreword

The text of ISO 11085:2008 has been prepared by Technical Committee ISO/TC 34 “Food products” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11085:2010 by Technical Committee CEN/TC 338 “Cereal and cereal products” 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of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

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Endorsement notice

The text of ISO 11085:2008 has been approved by CEN as a EN ISO 11085:2010 without any modification.

Contents

Page

1	Scope	1
2	Normative references	1
3	Terms and definitions.....	1
4	Principle.....	2
5	Reagents	2
6	Apparatus	2
7	Sampling.....	3
8	Procedure	3
8.1	Preparation of the test sample	3
8.2	Test portion	3
8.3	Preliminary extraction	3
8.4	Hydrolysis.....	4
8.5	Extraction	5
9	Calculation and expression of results.....	5
9.1	Determination with preliminary extraction.....	5
9.2	Determination without preliminary extraction	6
10	Precision	6
10.1	Interlaboratory test	6
10.2	Repeatability.....	6
10.3	Reproducibility	6
10.4	Critical difference.....	6
10.5	Measurement uncertainty	7
11	Test report	8
Annex A	(informative) Results of an interlaboratory test.....	9
Annex B	(informative) Comparison of fat contents for the samples used in the interlaboratory test	14
Bibliography		16

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1 Scope

This International Standard specifies procedures for the determination of the fat content of cereals, cereal-based products, and animal feeding stuffs. These procedures are not applicable to oilseeds and oleaginous fruits.

The choice of procedure to be used depends on the nature and composition of the material analysed and the reason for carrying out the analysis.

Procedure A is a method for the determination of directly extractable crude fats, applicable to all materials, except those included within the scope of procedure B.

Procedure B is a method for the determination of total fats, applicable to all materials from which the oils and fats cannot be completely extracted without prior hydrolysis.

NOTE Most cereals, as well as feeds of animal origin, yeasts, potato protein, compound feeds with milk products, glens and products subjected to processes such as extrusion, flaking and heating, yield significantly higher total fat contents when tested by procedure B than by procedure A. See Annex B.

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 3696, *Water for analytical laboratory use — Specification and test methods*

3 Terms and definitions

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

3.1

crude fat content

mass fraction of substances extracted from the sample by procedure A specified in this International Standard

NOTE The crude fat content is expressed as a percentage mass fraction.

3.2

total fat content

mass fraction of substances extracted from the sample by procedure B specified in this International Standard

NOTE The total fat content is expressed as a percentage mass fraction.

4 Principle

Fat is extracted using light petroleum as a solvent and the Randall modification of the Soxhlet method. The test portion is submerged in boiling solvent prior to rinsing in cold solvent, reducing the time needed for extraction. The solvent dissolves fats, oils, pigments and other soluble substances. After extraction, the solvent is evaporated and recovered by condensation. The resulting fat residue is determined gravimetrically after drying.

For total fat determination, the sample is treated under heating with hydrochloric acid. Hydrolysis makes chemically or mechanically bound fats accessible to solvent extraction. The mixture is cooled and filtered. The residue is washed and dried and submitted to the above extraction procedure.

For total fat determinations of samples with a "high" fat content (i.e. at least 100 g/kg), a preliminary extraction is performed before applying procedure B.

5 Reagents

Use only reagents of recognized analytical grade.

5.1 Water, complying with the requirements of at least grade 3 of ISO 3696.

5.2 Light petroleum (petroleum ether), consisting mainly of hydrocarbons with six carbon atoms, boiling range 30 °C to 60 °C. The bromine value shall be less than 1. The evaporation residue shall be less than 20 mg/l.

5.3 Glass beads, of diameter 5 mm to 6 mm or **silicon carbide chips**.

5.4 Hydrochloric acid, $c(\text{HCl}) = 3 \text{ mol/l}$.

5.5 Filtration aid, e.g. diatomaceous earth¹⁾, boiled for 30 min in hydrochloric acid, $c(\text{HCl}) = 6 \text{ mol/l}$, washed with water (5.1) until acid-free, then dried at 130 °C.

5.6 Acetone.

5.7 Cotton wool, defatted.

6 Apparatus

Usual laboratory apparatus and, in particular, the following.

6.1 Solvent extraction system, consisting of a 2-stage Randall extraction process unit enabling solvent recovery, fitted with fluoroelastomer²⁾ or polytetrafluoroethylene seals compatible with petroleum ether.

6.2 Hydrolysis apparatus I, multiple position unit enabling boiling with acid, compatible with the solvent extraction system (6.1), used for hydrolysis according to 8.4.1.

6.3 Hydrolysis apparatus II, consisting of either a beaker of capacity 400 ml and, as a cover, a watch glass of appropriate diameter, or a conical flask of capacity 300 ml with a reflux condenser, used for hydrolysis according to 8.4.2.

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