
**Animal and vegetable fats and oils —
Determination of cadmium content
by direct graphite furnace atomic
absorption spectrometry**

*Corps gras d'origines animale et végétale — Détermination de la
teneur en cadmium par spectrométrie d'absorption atomique à four
graphite*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 11, *Animal and vegetable fats and oils*.

This second edition cancels and replaces the first edition (ISO 15774:2000), which has been technically revised to exclude its applicability for fat coming from milk and milk products.

ISO 15774:2017

<https://standards.iteh.ai/catalog/standards/iso/653cdc4b-ee0c-4c93-98bf-61cc102e0367/iso-15774-2017>

Animal and vegetable fats and oils — Determination of cadmium content by direct graphite furnace atomic absorption spectrometry

1 Scope

This document describes a method for the determination of trace amounts (micrograms per kilogram) of cadmium in all types of crude or refined edible oils and fats.

Milk and milk products (or fat coming from milk and milk products) are excluded from the scope of this document.

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.

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

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

The oil or fat is incinerated and atomized in a suitable graphite tube furnace with a platform connected to an atomic absorption spectrometer, previously calibrated using standard solutions of an organo-compound of cadmium. The metal content is determined from the observed absorption at a wavelength of 228,8 nm. Palladium is added as a matrix modifier in order to prevent loss of cadmium during the thermal pretreatment.

5 Reagents

Use only reagents of recognized analytical grade, unless otherwise specified.

5.1 Water, of grade 1 according to ISO 3696.

5.2 Cyclohexane.

5.3 Hydrochloric acid.

5.4 Palladium chloride.

5.5 Matrix modifier, 0,1 % (mass/volume) palladium solution.

Dissolve 0,167 g of palladium chloride (5.4) in 50 ml water (5.1) in a 100 ml volumetric flask (6.4), adding 1 ml hydrochloric acid (5.3) and making up to volume with water.

5.6 Vegetable oil, refined.

Any liquid edible oil is suitable. It shall be stored in a metal-free polyethylene bottle. The cadmium content of the oil shall not be greater than 0,2 µg/kg.

5.7 Organometallic cadmium standard, e.g. Conostan, 5 000 mg/kg¹⁾.

5.8 Standard stock solution, of concentration 10 mg/kg cadmium, prepared by diluting 200 mg of the organometallic standard (5.7) with 100 g of vegetable oil (5.6).

5.9 Standard working solutions

Prepare daily working solutions containing 2,5 µg/kg, 5,0 µg/kg and 10,0 µg/kg of cadmium by diluting 25 mg, 50 mg and 100 mg, respectively, of the stock solution (5.8) with 100 g of vegetable oil (5.6).

5.10 Argon, of 99,99 % minimum purity.

6 Apparatus

6.1 Polyethylene or polypropylene bottles, of capacities 20 ml and 50 ml, metal free, with caps.

The bottles are made metal free in the following way. Clean the bottles thoroughly with warm nitric acid (2 mol/l). Rinse with distilled water and dry the bottles in a dust-free drying oven at about 80 °C.

6.2 Micropipettor, to deliver 10 µl and 20 µl.

6.3 Pipettor tips.

6.4 Volumetric flask, of capacity 100 ml.

6.5 Electric oven, capable of being maintained at 60 °C ± 2 °C.

6.6 Atomic absorption spectrometer, equipped with “peak area” mode and “autocalibrate” mode, together with an appropriate electrode-less discharge lamp (or hollow cathode lamp) and deuterium background corrector (or Zeeman atomic absorption spectrometer).

6.7 Graphite furnace atomizer, placed in the atomic absorption spectrometer (6.6), equipped with a control unit for temperature programming.

6.8 Graphite tube, uncoated.

6.9 Platform, pyrolytic.

1) Conostan, available from Continental Oil Company, Ponca City, Oklahoma, USA, is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product. Equivalent products may be used if it can be shown that they lead to the same results.