
Vegetable fats and oils — Determination of wax content by gas chromatography

*Corps gras d'origine végétale — Détermination de la teneur en cires par
chromatographie en phase gazeuse*



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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.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

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Introduction

Vegetable fats and oils consist predominantly of triacylglycerols, but they also contain small amounts of non-glyceridic substances often called minor components. The composition of these minor constituents (e.g. sterols, steryl esters, triterpene dialcohols, and waxes) provides highly characteristic information about the identity of the oils. Since the physical and chemical steps in the processing of vegetable fats and oils can cause alteration in their composition and content, analysis of these minor components can be conveniently applied to characterize the processing steps through which an oil was obtained.

Waxes are natural compounds occurring in various vegetable oils and can easily crystallize at low temperatures resulting in cloudiness. Wax removal is very often a part of the vegetable oil-refining process (e.g. sunflower, rice bran, corn oil) and its efficiency requires measurement.

This Technical Specification does not cover the analysis of waxes of olive oil.

With the exception of olive oil, there is currently no reliable official method to measure the wax content and composition of vegetable fats and oils. Cold tests give neither qualitative nor quantitative results; methods developed for olive oils are not applicable to seed oils and can cause a lot of problems in the interpretation of results. There is an industrial and commercial need for an International Standard which is applicable to crude, degummed, pre-dewaxed, winterized, and fully refined vegetable fats and oils.

Waxes from different vegetable oils and fats are separated from triacylglycerols and from other non-glyceridic compounds containing double bonds by column chromatography using a mixed column packing consisting of silica gel and silica gel impregnated with AgNO_3 .

The wax fraction is further analysed by capillary gas chromatography. The method also gives information about the total content of waxes and their composition. The information given by the method can be easily used to check oil quality and to track the efficiency of the dewaxing process.

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Vegetable fats and oils — Determination of wax content by gas chromatography

1 Scope

This Technical Specification specifies a gas chromatographic method for determining the wax content of crude, degummed, neutralized, winterized, and fully refined vegetable oils, such as sunflower, soybean, rapeseed, corn, and rice bran oils. It is not applicable to olive oils or olive pomace oils.

Waxes are esters of long chain fatty acids and fatty alcohols (having C_{20} or longer saturated carbon chain).

The wax content is expressed in milligrams per kilogram of oil.

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

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

3.1

wax content

mass fraction of those substances in the sample, which are determined under the conditions specified in this Technical Specification

NOTE The wax content is expressed in milligrams per kilogram of oil.

4 Principle

The waxes are separated by column chromatography using a mixed column packing consisting of silica gel and silica gel impregnated with $AgNO_3$. Determination of the waxes is carried out using capillary gas chromatography (GC), applying an internal standard, previously added to the oil.

5 Reagents and materials

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

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