EUROPEAN
COMMISSION

Brussels, 19.1.2026
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COMMISSION STAFF WORKING DOCUMENT

Accompanying the document

Proposal for a
COUNCIL DECISION

on the position to be taken on behalf of the European Union in the Council of Members of the International Olive Council as regards the trade standard for olive oil and olive-pomace oil and a new method of analysis to determine the peroxide value in such oils

{COM(2026) 14 final}

DRAFT DECISION No DEC III.X/122-VI/2025

REVISING THE TRADE STANDARD APPLYING TO OLIVE OILS AND OLIVE-POMACE OILS

DECISION DEC-III.X/122-VI/2025

REVISING THE TRADE STANDARD APPLYING TO OLIVE OILS AND OLIVE- POMACE OILS

The Council of Members of the International Olive Council,

Having regard to the International Agreement on Olive Oil and Table Olives, 2015, and in particular Article I thereof "Objectives of the Agreement" concerning standardisation and research, relating to the standardisation of national and international legislation concerning the physico-chemical and organoleptic characteristics of olive oils, olive- pomace oils and table olives in order to avoid any obstacle to trade, and Chapter VI thereof "Standardisation provisions";

Having regard to the recommendation made by the Committee on Chemistry and Standardisation at its 17th meeting, within the framework of the 122nd session of the Council of Members;

Considering the work carried out by chemists concerning the application of methods and studies on olive oils presenting non-standard parameters;

Considering the consensus position of the chemist experts appointed by Members at their meeting on 7 and 8 October 2025, regarding the:

- Inclusion of the footnote on the total sterol limit for certain varieties, on an exceptional basis, until the end of the 2026/27 crop year. The parameters to be studied are: the acidity/total DAG ratio, the ratio free/esterified sterols and the total phenol content. The possible inclusion of the latter will be considered in a decision tree. These parameters will initially be studied for the varieties specified in the note (*Koroneiki*, *Nocellara del Belice* and *Coratina*). Their future application to other varieties in order to consider them as authenticity parameters will be envisaged. A working group has been set up to validate the methods requiring validation and to study the value of these parameters in the said varieties.
- Inclusion of the new method for determining the peroxide value - COI/T.20/Doc No. 38.

Decides

1. To adopt the Trade Standard for Olive Oils and Olive-Pomace Oils COI/T.15/NC No. 3/Rev. 22, attached to this decision, which replaces and repeals the Trade Standard for Olive Oils and Olive-Pomace Oils COI/T.15/NC No. 3/Rev. 21 of June 2025.

2. Members shall, in accordance with their respective legislations, take all relevant measures to apply the adopted standard and communicate these measures to the Executive Secretariat as soon as they are implemented.

3. Non-Member States interested in international trade in olive oils and olive-pomace oils are invited to take the adopted standard into consideration and to adapt their regulations to the provisions of this standard.

Cordoba (Spain), *** 2025

Walid B D Abuabdalla

Chair of the International Olive Council

COI/T.15/NC No 3/Rev. ~~21~~ **22**
~~November 2024~~ **November 2025**

ENGLISH
Original: FRENCH

Trade Standard Applying to Olive Oils and Olive Pomace Oils

International Olive Council

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Trade Standard Applying to Olive Oils and Olive Pomace Oils

01. Scope

This standard applies to olive oils and olive pomace oils that are the object of international trade or of concessional or food aid transactions.

02. Designations and Definitions

2.1. Olive Oils

2.1.1. Virgin olive oils

Virgin olive oils are oils which are obtained from the fruit of the olive tree (*Olea europaea* L.) solely by mechanical or other physical means under conditions, particularly thermal conditions, that do not lead to alterations in the oil, and which have not undergone any treatment other than washing, decantation, centrifugation and filtration. Virgin olive oils shall be classified and designated as follows:

2.1.1.1. Virgin olive oils fit for consumption as they are:

1. Extra virgin olive oil: virgin olive oil which has a free acidity, expressed as oleic acid, of not more than 0.80 grams per 100 grams and the other physico–chemical and organoleptic characteristics of which correspond to those fixed for this category in this standard.

2. Virgin olive oil: virgin olive oil which has a free acidity, expressed as oleic acid, of not more than 2.0 grams per 100 grams and the other physico–chemical and organoleptic characteristics of which correspond to those fixed for this category in this standard.

3. Ordinary virgin olive oil: virgin olive oil which has a free acidity, expressed as oleic acid, of not more than 3.3 grams per 100 grams and the other physico–chemical and organoleptic characteristics of which correspond to those fixed for this category in this standard.[1]

2.1.1.2. Virgin olive oils that must undergo processing prior to consumption:

Lampante virgin olive oil: virgin olive oil which has a free acidity expressed as oleic acid, of more than 3.3 grams per 100 grams and/or the physico–chemical and organoleptic characteristics of which correspond to those fixed for this category in this standard. It is intended for refining or for technical use.

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[1] This product may only be sold direct to the consumer if permitted in the country of retail sale. If not permitted, the designation of this product shall comply with the legal provisions of the country concerned.

2. 1. 2. Refined olive oil

Refined olive oil: olive oil obtained from virgin olive oils by refining methods which do not lead to alterations in the initial glyceridic structure. It has a free acidity, expressed as oleic acid, of not more than 0.30 grams per 100 grams and its other physico–chemical and organoleptic characteristics correspond to those fixed for this category in this standard.[2]

2. 1. 3. Olive oil composed of refined olive oil and virgin olive oils

Olive oil composed of refined olive oil and virgin olive oils: oil consisting of a blend of refined olive oil and virgin olive oils fit for consumption as they are. It has a free acidity, expressed as oleic acid, of not more than 1.00 gram per 100 grams and its other physico–chemical and organoleptic characteristics correspond to those fixed for this category in this standard.

2.2. Olive Pomace Oil

Olive pomace oil[3] is the oil obtained by treating olive pomace with solvents or other physical treatments, to the exclusion of oils obtained by re-esterification processes and of any mixture with oils of other kinds. It is marketed in accordance with the following designations and definitions:

2. 1. Crude olive pomace oil

Crude olive pomace oil: olive pomace oil, the physico–chemical and organoleptic characteristics of which correspond to those fixed for this category in this standard. It is intended for refining for use for human consumption, or it is intended for technical use.

2.2.2. Refined olive pomace oil

Refined olive pomace oil: oil obtained from crude olive pomace oil by refining methods which do not lead to alterations in the initial glyceridic structure. It has a free acidity, expressed as oleic acid, of not more than 0.30 grams per 100 grams and its other physico–chemical and organoleptic characteristics correspond to those fixed for this category in this standard.[2]

2.2.3. Olive pomace oil composed of refined oil and virgin olive oils

Olive pomace oil composed of refined olive pomace oil and virgin olive oils: oil consisting of a blend of refined olive pomace oil and virgin olive oils fit for consumption as they are. It has a free acidity of not more than 1.00 gram per 100 grams and its other physico–chemical and organoleptic characteristics correspond to those fixed for this category in this standard.[4] In no case shall this blend be called "olive oil".

03. Purity Criteria

The identity characteristics comprising the purity criteria shall be applicable to olive oils and olive pomace oils.

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[2] This product may only be sold direct to the consumer if permitted in the country of retail sale.

[3] Olive pomace oil cannot be sold with the designation or definition “olive oil”.

[4] The country of retail sale may require a more specific designation.

The limits established for each criterion include the precision values of the attendant recommended method.

3.1. Fatty acid composition as determined by gas chromatography (% m/m methyl esters):

Myristic acid	≤ 0.03
Palmitic acid	7.00 - 20.00
Palmitoleic acid	0.30 - 3.50
Heptadecanoic acid	≤ 0.40
Heptadecenoic acid	≤ 0.60
Stearic acid	0.50 - 5.00
Oleic acid	55.00 - 85.00
Linoleic acid	2.50 - 21.00
Linolenic acid	≤ 1.00[3]
Arachidic acid	≤ 0.60
Gadoleic acid (eicosenoic)	≤ 0.50
Behenic acid	≤ 0.20[*]
Lignoceric acid	≤ 0.20

3.2. Trans fatty acid content (% trans fatty acids)

	%	
	C18:1 T	C18:2 T
Edible virgin olive oils	< 0.05	< 0.05
Lampante virgin olive oil	< 0.10	< 0.10
Refined olive oil	< 0.20	< 0.30
Olive oil (ROO+VOOs)[1]	< 0.20	< 0.30
Crude olive-pomace oil	< 0.20	< 0.10
Refined olive-pomace oil	< 0.40	< 0.35
Olive pomace oil (ROPO+VOOs)[2]	< 0.40	≤ 0.35

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[3] When an edible virgin olive oil exhibits 1.00<linolenic acid%≤1.40, then this oil is authentic, provided that App. β- sito/Campe content ≥ 24 and all other purity criteria lie within the official limit

[*] Limit raised to < 0.30 for olive pomace oils

[1] Blend of refined olive oil and virgin olive oils

[2] Blend of refined olive pomace oil and virgin olive oils

3.3. Sterol and tripertene dialcohol composition

3.3. 1. Desmethylsterol composition (% total sterols)

Cholesterol	≤ 0.5
Brassicasterol	≤ 0.1[*]
Campesterol	≤ 4.0[**]
Stigmasterol	< campesterol in edible oils
Delta-7-stigmastenol	≤ 0.5[***]
Apparent beta-sitosterol beta-sitosterol + delta-5-avenasterol + delta-5-23- stigmastadienol + clerosterol + sitostanol + delta 5- 24-stigmastadienol	≥ 93.0

3.3.2. Total sterol content (mg/kg)

Virgin olive oils	≥ 1000[****]
Refined olive oil	
Olive oil (ROO+VOOs)	
Crude olive pomace oil	≥ 2500
Refined olive pomace oil	≥ 1800
Olive pomace oil (ROPO+VOOs)	≥ 1600

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[*] Limit raised to < 0.2 for olive pomace oils.

[**] An extra virgin or virgin olive oil that exhibits 4.0< campesterol % ≤4.5 is authentic provided that stigmasterol ≤1.4%, Δ7-stigmastenol ≤0.3% and all other parameters lie within the limits fixed in this standard.

[***] An olive oil or olive-pomace oil that exhibits 0.5< Δ7-stigmastenol % ≤0.8 is authentic provided that:

a) app. β-sitosterol/campesterol≥28, ΔECN42 ≤|0.10| (for extra virgin or virgin olive oil)
b) app. β-sitosterol/campesterol≥28, ΔECN42 ≤|0.15|, stigmastadiene≤0.30 (for lampante virgin olive oil)
c) app. β-sitosterol/campesterol≥28, ΔECN42≤|0.15| (for refined olive oil or olive oil (ROO+VOOs))
d) Stigmasterol ≤1.4%, ΔECN42 ≤|0.40|, in case of crude olive-pomace oil or refined olive-pomace oil or olive pomace oil (ROPO+VOOs).

[****] ~~Pending further scientific studies, for monovarietal extra virgin olive oils produced from either the Koroneiki or Nocellara del Belice varieties, the limit for total sterols content is set at ≥800 mg/kg.~~
By way of exception, for extra virgin olive oils produced exclusively from olives of the Koroneiki, Nocellara del Belice or Coratina varieties—where the definition of additional parameters to establish a decision tree for verifying the authenticity of single-varietal oils is considered a priority—the minimum limit for total sterol content is set at ≥ 800 mg/kg until the end of the 2026/2027 crop year (i.e., 2027 for the Southern Hemisphere), with no possibility of extension.

3.3.3. Erythrodiol and uvaol content (% total sterols)

Edible virgin olive oils	< 4.5
Lampante virgin olive oil	< 4.5[1]
Refined olive oil	< 4.5[2]
Olive oil (ROO + VOOs)	< 4.5
Crude olive pomace oil	> 4.5[3]
Refined olive pomace oil	> 4.5
Olive pomace oil (ROPO+VOOs)	> 4.5

3.4. Wax content (mg/kg)

C42 + C44 + C46 (mg/kg)

Extra virgin olive oil and virgin olive oil	< 150

C40 + C42 + C44 + C46 (mg/kg)

Ordinary virgin olive oil	< 250
Lampante virgin olive oil	< 300[1]
Refined olive oil	<350
Olive oil (ROO+VOOs)	< 350
Crude olive pomace oil	> 350[3]
Refined olive pomace oil	> 350
Olive pomace oil (ROPO+VOOs)	> 350

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[1] When the oil has a wax content between 300 mg/kg and 350 mg/kg it is considered a lampante virgin olive oil if the total aliphatic alcohol content is < 350 mg/kg or the erythrodiol + uvaol content is < 3.5%.

[2] When the oil has an erythrodiol + uvaol content of between 4.5 and 6 %, the erythrodiol content must be < 75 mg/kg.

[3] When the oil has a wax content between 300 mg/kg and 350 mg/kg it is considered a crude olive pomace oil if the total aliphatic alcohol content is > 350 mg/kg and the erythrodiol + uvaol content is > 3.5%.

3.5. Maximum difference between the actual and theoretical ECN 42 triacylglycerol content (%)

Edible virgin olive oils	≤ |0.20|
Lampante virgin olive oil	≤ |0.30|
Refined olive oil	≤ |0.30|
Olive oil (ROO+VOOs)	≤ |0.30|
Crude olive pomace oil	≤ |0.60|
Refined olive pomace oil	≤ |0.50|
Olive pomace oil (ROPO+VOOs)	≤ |0.50|

3.6. Stigmastadiene content (mg/kg)

Extra virgin olive oil and virgin olive oil	< 0.05
Ordinary virgin olive oil	< 0.10
Lampante virgin olive oil	< 0.50

3.7. Content of 2-glyceryl monopalmitate (%)

- Edible virgin olive oils and olive oil (ROO+VOOs):

  C16:0 ≤ 14.00%; 2P ≤ 0.9%
  C16:0 > 14.00%, 2P ≤ 1.0%

- Non-edible virgin olive oils and refined olive oils:

  C16:0 ≤ 14.00%; 2P ≤ 0.9%
  C16:0 > 14.00%, 2P ≤ 1.1%

Olive pomace oil (ROPO+VOOs)	≤ 1.2%
Crude and refined olive pomace oils	≤ 1.4%

3.8. Unsaponifiable matter (g/kg)

Olive oils	< 15
Olive pomace oils	< 3

04. QUALITY CRITERIA

The limits established for each criterion and designation include the precision values of the attendant recommended method

		Extra virgin olive oil	Virgin olive oil	Ordinary virgin olive oil	Lampante virgin olive oil*	Refined olive oil	Olive Oil (ROO+VOOs)	Crude olive pomace oil	Refined olive pomace oil	Olive pomace oil (ROPO+VOOs)
4.1. Organoleptic characteristics	odour and taste					acceptable	good		acceptable	good
	median of defect	Me = 0.0	0.0 < Me < 3.5	3.5 <Me < 6.0**	Me > 6.0					
	median of the fruity attribute	Me > 0.0	Me > 0.0							
	aspect at 20ºC for 24 hours					light yellow	Light yellow to green		Light yellow to brownish yellow	Light yellow to green
	colour					limpid	limpid		limpid	limpid
4.2 Free acidity % m/m expressed in oleic acid		< 0.80	< 2.0	< 3.3	> 3.3	< 0.30	< 1.00	no limit	< 0.30	< 1.00
4.3. Peroxide value in milleq. peroxide oxygen per kg/oil		≤ 20.0	≤ 20.0	≤ 20.0	no limit	≤ 5.0	≤ 15.0	no limit	≤ 5.0	≤ 15.0

* It is not obligatory for the criteria in 4.1, 4.2 and 4.3 to be concurrent; one is sufficient.

** Or when the median of the defect is less than or equal to 3.5 and the median of the fruity attribute is equal to 0.0.

		Extra virgin olive oil	Virgin olive oil	Ordinary virgin olive oil	Lampante virgin olive oil	Refined olive oil	Olive Oil (ROO+VOOs)	Crude olive pomace oil	Refined olive pomace oil	Olive pomace oil (ROPO+VOOs)
4.4. Absorbency in ultra-violet (K1$^{\%}$) 1cm	270 nm (cyclohexane) / 268nm (iso-octane)	< 0.22	< 0.25	< 0.30		< 1.25	< 1.15		< 2.00	< 1.70
	ΔK	< 0.01	< 0.01	< 0.01		< 0.16	< 0.15		< 0.20	< 0.18
	232 nm*	≤ 2.50**	< 2.60**							
4.5. Moisture and volatile matter (% m/m)		< 0.2	< 0.2	< 0.2	< 0.3	< 0.1	< 0.1	< 1.5	< 0.1	< 0.1
4.6. Insoluble impurities in light petroleum % m/m		< 0.10	< 0.10	< 0.10	< 0.20	< 0.05	< 0.05		< 0.05	< 0.05
4.7. Flash point								> 120 °C		
4.8. Trace metals mg/kg	Iron	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0		< 3.0	< 3.0
	Copper	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1
4.9. Fatty acid ethyl esters (FAEEs)		≤ 35 mg/kg								
4.10. Phenols content		See section 11.21								

* This determination is solely for application by commercial partners on an optional basis.

** Commercial partners in the country of retail sale may require compliance with these limits when the oil is made available to the end consumer.

05. FOOD ADDITIVES

5.1. Virgin olive oils and crude olive pomace oil

None permitted.

5.2. Refined olive oil, olive oil (ROO+VOOs), refined olive pomace oil and olive pomace oil (ROPO+VOOs)

Alpha-tocopherol permitted to restore natural tocopherol lost in the refining process.

Maximum level: According to the Good Manufacturing Practices (GMP).

06. CONTAMINANTS

6.1. Heavy metals

The products covered by this standard shall comply with the maximum levels of the General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995).

6.2. Pesticide residues

The products covered by this standard shall comply with those maximum residue limits established by the Codex Alimentarius Commission for these commodities.

07. Hygiene

7.1. It is recommended that the products intended for human consumption covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the General Principles of Food Hygiene (CAC/RP 1- 1969), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

7.2. The products intended for human consumption should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria (CAC/GL 21-1997).

08. PACKING

Olive oils and olive pomace oils intended for international trade shall be packed in containers complying with the General Principles of Food Hygiene recommended by the Codex Alimentarius Commission (CAC/RCP 1 - 1969), and other relevant texts such as Codes of Hygienic Practice and Codes of Practice.

The containers used may be:

8.1. Tanks, containers, vats, which permit the transportation in bulk of olive oils and olive pomace oils;

8.2. Metal drums, in good condition, hermetically-sealed, which should be internally covered with a suitable varnish;

8.3. Metal tins and cans, lithographed, new, hermetically-sealed, which should be internally covered with a suitable varnish;

8.4. Demi-johns, glass bottles or bottles made of suitable macromolecular material.

09. Container Filling Tolerance

The volume occupied by the contents shall under no circumstances be less than 90% of the capacity of the container, except in the case of tin containers with a capacity of, or less than, 1 L in which the volume occupied shall under no circumstances be less than 80% of the capacity of the container; this capacity is equal to the volume of distilled water at 20oC which the container can hold when full.

10. Labelling

In addition to the appropriate sections of the Codex General Standard for the Labelling of Pre-packaged Foods (CODEX STAN 1-1985) and the guidelines applying to food not intended for direct sale to consumers, the specific provisions providing the following information shall be applied:

10.1. On containers intended for direct sale to consumers

10.1.1. Name of the product

The labelling on each container shall indicate the specific designation of the product contained, complying in every way with the relevant provisions of this standard.

10.1.1.1. Designations of olive oils

- Extra virgin olive oil
- Virgin olive oil
- Ordinary virgin olive oil[5]
- Refined olive oil[11]
- Olive oil (ROO+VOOs)[6]

10.1.1.2. Designations of olive pomace oils

- Refined olive pomace oil[1]
- Olive pomace oil (ROPO + VOOs)[2]

10.1.2. Net contents

The net contents shall be declared by volume in the metric system ("Système International" units).

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[5] This product may only be sold direct to the consumer if permitted in the country of retail sale.

[6] The country of retail sale may require a more specific designation.

10.1.3. Name and address

The name and address of the manufacturer, packer, distributor, importer, exporter or seller shall be declared.

10.1.4. Country of origin

The name of the country of origin shall be declared. When the product undergoes substantial processing in a second country, the country in which such processing is carried out shall be considered as the country of origin for labelling purposes.

10.1.5. Geographical indications and designations of origin

10.1.5.1. Geographical indications

The labels of virgin olive oils may state their geographical indication (country, region or locality) when they have been empowered to do so by their country of origin and when such virgin olive oils have been produced, packed and originate exclusively in the country, region or locality mentioned.

10.1.5.2. Designations of origin

The labels of extra virgin olive oils may indicate their designation of origin (country, region or locality) when they have been awarded such a designation, in accordance with the terms provided under the regulations of their country of origin and when such extra virgin olive oil has been produced, packed and originates exclusively in the country, region or locality mentioned.

10.1.6. Lot identification

Each container shall be embossed or otherwise permanently marked in code or in clear to identify the producing factory and the lot.

10.1.7. Date marking and storage conditions

10.1.7.1. Date of minimum durability

In the case of pre-packaged products intended for the end consumer, the date of minimum durability (preceded by the words "best before end") shall be declared by the month and year in uncoded numerical sequence. The month may be indicated by letters in those countries where such use will not confuse the consumer; if the shelf life of the product is valid to December, the expression "end (stated year)" may be used as an alternative.

10.1.7.2. Storage instructions

Any special conditions for storage shall be declared on the label if the validity of the date of minimum durability depends thereon.

10.2. On forwarding packs of oils intended for human consumption

In addition to the details noted under section 10.1., the following inscription shall appear:

- Number and type of containers held in pack.

10.3. On containers allowing the transportation in bulk of olive oils and olive pomace oils

The labelling on each container shall include:

10.3.1.1. Name of the product

The name shall indicate the specific designation of the product contained, complying in every way with the provisions of this standard.

10.3.1.2. Net contents

The net contents shall be declared by weight or volume in the metric system ("Système International" units).

10.3.1.3. Name and address

The name and address of the manufacturer, distributor or exporter shall be declared.

10.3.1.4. Country of origin

The name of the exporting country shall be declared.

11. METHODS OF ANALYSIS AND SAMPLING

The methods of analysis and sampling given below are international referee methods. The latest version of these methods should be used.

The methods of analysis and sampling given below are international referee methods. The latest version of these methods should be used.

11.1 Sampling

According to ISO 5555, "Animal and vegetable fats and oils - Sampling".

11.2 Preparation of the test sample

According to ISO 661, "Animal and vegetable fats and oils - Preparation of the test sample".

11.3 Determination of the fatty acid composition and trans fatty acid content

According to COI/T.20/Doc. No 33/Rev.1, “Determination of fatty acid methyl esters by gas-chromatography”

11.4 Determination of the sterol composition and content and alcoholic compounds

According to COI/T.20/Doc. No 26/Rev. 5, “Determination of the composition and content of sterols, triterpenic dialcohols and aliphatic alcohols by capillary column gas chromatography”.

11.5 Determination of the difference between the actual and theoretical ECN 42 triacylglycerol content

According to COI/T.20/Doc. No 20/Rev. 4, "Determination of the difference between actual and theoretical content of triacylglycerols with ECN 42", or AOCS 5b- 89.

11.6 Determination of the stigmastadiene content

According to COI/T.20/Doc. No 11/Rev.4, "Determination of stigmastadienes in vegetable oils", or COI/T.20/Doc. no. 16/Rev.2, "Determination of sterenes in refined vegetable oils", or ISO 15788-1 or AOCS Cd 26-96.

11.7 Determination of the content of 2-glyceryl monopalmitate

According to COI/T.20/Doc. No 23/Rev.1, "Determination of the percentage of 2-glyceryl monopalmitate" or to ISO 12872.

11.8 Determination of the unsaponifiable matter

According to ISO 3596, “Determination of the unsaponifiable matter – Method using diethyl ether extraction”, or AOCS Ca 6b-53 or ISO 18609

The results should be expressed in g/unsaponifiable matter per kg/oil.

11.9 Determination of the organoleptic characteristics

According to COI/T.20/Doc. No. 15/Rev.11, "Organoleptic assessment of virgin olive oil".

11.10 Determination of the free acidity

According to COI/T.20/Doc. No. 34/Rev.1, “Determination of free fatty acids, cold method ”.

11.11 Determination of the peroxide value

According to **COI/T.20/Doc. No. 38**, COI/T.20/Doc. No 35/Rev.1, “Determination of the peroxide value”, ISO 3960, or AOCS Cd 8b-90.

11.12 Determination of the absorbency in ultra-violet

According to COI/T.20/Doc. No. 19/Rev.5, "Spectrophotometric investigation in the ultraviolet", or ISO 3656 or AOCS Ch 5- 91.

11.13 Determination of the moisture and volatile matter

According to ISO 662, "Determination of the moisture and volatile matter".

11.14 Determination of the insoluble impurities in light petroleum

According to ISO 663, "Determination of the insoluble impurities".

11.15 Determination of the flash point

According to the FOSFA International method.

11.16 Detection of trace metals

According to ISO 8294, "Determination of copper, iron and nickel by direct graphite furnace atomic absorption spectrometry".

11.17 Determination of the alpha-tocopherol

According to ISO 9936, “Determination of tocopherols and tocotrienols contents – Method using high-performance liquid chromatography”.

11.18 Determination of traces of heavy metals

- Determination of lead: according to ISO 12193 or AOCS Ca 18c-91 or AOAC 994.02.
- Determination of arsenic: according to AOAC 952.13 or AOAC 942.17 or AOAC 985.16.

11.19 Determination of the content of waxes and alkyl esters

According to COI/T.20/Doc. No. 28/Rev.4, “Determination of the content of waxes, fatty acid methyl esters and fatty acid ethyl esters by capillary gas chromatography“.

11.20 Determination of phenolic compounds

According to COI/T.20/Doc. No. 29/Rev.2, “Document to declare the use of IOC methods for phenolic compounds determination”

11.21 Determination of the coherence of TAG composition with the fatty acid composition: Screening method (not legal in nature and cannot downgrade an oil)

According to COI/T.20/Doc. No. 25/Rev.2, “Method for the evaluation of the coherence of TAG composition with the fatty acid composition”.

11.22 Determination of the methanol and ethanol content in virgin olive oils.

According to COI/T.20/Doc. No. 36, “Method of determination of ethanol and methanol content on virgin olive oils”.

11.23 Determination of the Triacylglycerols and Di-acylglycerols

According to COI/T.20/Doc. No. 32, “Method of determination of composition of triacylglycerols and composition and content of di-acylglycerols by capillary gas chromatography, in vegetable oils”.

DRAFT DECISION DEC-III.X/122-VI/2025

ADOPTING THE METHOD OF ANALYSIS FOR THE DETERMINATION OF PEROXIDE VALUE

DECISION NO DEC-III.X/122-VI/2025

ADOPTING THE METHOD OF ANALYSIS FOR THE DETERMINATION OF PEROXIDE VALUE

THE COUNCIL OF MEMBERS OF THE INTERNATIONAL OLIVE COUNCIL,

Having regard to the International Agreement on Olive Oil and Table Olives, 2015, and in particular its Article 1 "Objectives of the Agreement" concerning standardisation and research, relating to the standardisation of national and international legislation, in particular as regards physico-chemical and organoleptic analysis to improve knowledge of the compositional and quality characteristics of olive products, and its Chapter VI "Standardisation provisions";

Having regard to the recommendation made by the Committee on Chemistry and Standardisation at its 17th meeting, within the framework of the 122nd Session of the Council of Members;

Considering the work carried out by the chemists;

Considering the unanimous position of the chemist experts appointed by the Members at their meeting on 7 and 8 October 2025 and the recommendation for the use of isooctane as a solvent,

Decides

To adopt the ‘Method of analysis for the determination of peroxide value’ - COI/T.20/Doc. No. 38.

Cordoba (Spain), *** 2025
Walid B D Abuabdalla

Chair of the International Olive Council

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METHOD OF ANALYSIS

DETERMINATION OF PEROXIDE VALUE

1. SCOPE AND FIELD OF APPLICATION

This Standard describes a method for the determination of the peroxide value of animal and vegetable oils and fats with titrimetric or potentiometric endpoint detection.

2. DEFINITION

The peroxide value is the quantity of those substances in the sample, expressed in terms of milliequivalents of active oxygen per kilogram, which oxidize potassium iodide under the operating conditions described.

3. PRINCIPLE

Treatment of the test portion, in solution in isooctane and glacial acetic acid, by a solution of potassium iodide. Titration of the liberated iodine with standardized sodium thiosulfate solution. The endpoint of the titration is determined iodometrically (visually) or electrochemically.

4. REAGENTS

Use only reagents of recognized analytical grade, unless otherwise specified. All reagents shall be free of dissolved oxygen.

4.1. Water, demineralized, boiled and cooled down.

4.2. Glacial acetic acid, mass fraction of 100 %; degassed in an ultrasonic bath under vacuum or by purging with a current of pure and dry inert gas (carbon dioxide or nitrogen).

4.3. Isooctane, degassed in an ultrasonic bath under vacuum or by purging with a current of pure and dry inert gas (carbon dioxide or nitrogen).

4.4. Glacial acetic acid/isooctane solution, prepared by mixing 60 ml of glacial acetic acid (4.2) and 40 ml of isooctane (4.3) (volume fraction of glacial acetic acid: ϕ = 60 ml/100 ml, and volume fraction of isooctane: ϕ = 40 ml/100 ml).

The mixture is degassed in an ultrasonic bath under vacuum or by purging with a current of pure and dry inert gas (carbon dioxide or nitrogen).

4.5. Potassium iodide, free from iodine and iodates.

4.6. Saturated potassium iodide solution, mass concentration ρ(KI) = 175 g/100 ml.

Dissolve approximately 14 g of potassium iodide (4.5) in approximately 8 g of freshly boiled water at room temperature. Make sure the solution remains saturated (undissolved crystals). Store in the dark and prepare freshly every day. Test the solution as follows: add two drops of starch solution (4.9) to 0,5 ml of the potassium iodide in 30 ml of the glacial acetic acid/isooctane solution (4.4). If a blue colour is formed and if more than one drop of sodium thiosulfate standard solution (4.7) is needed to remove it, discard the potassium iodide solution.

4.7. 0,1 N sodium thiosulfate standard solution, c(Na2S2O3) = 0,1 mol/l.

Use only freshly boiled water for the preparation of this solution, possibly purged with nitrogen. This solution can be used for one month and is stored in an amber-stained bottle (5.10).

4.8. 0,01 N sodium thiosulfate standard solution, c(Na2S2O3) = 0,01 mol/l.

As an example, pipette (5.4) 100 ml of the 0,1 N sodium thiosulfate standard solution (4.7) into a volumetric flask of capacity 1 000 ml (5.8) (1/10 dilution). Make up to the mark with water (4.1) (volumes can be adapted regarding number of samples to be quantified, hence use other volumetric flask (5.8)). After homogenization, transfer the obtained 0,01 N sodium thiosulfate standard solution to an amber-stained bottle (5.10).

Prepare the 0,01 N sodium thiosulfate standard solution freshly from the 0,1 N sodium thiosulfate standard solution just before use or determine the titre daily. As experience shows, the stability is limited and depends upon the pH value and the content of free carbon dioxide. Use only freshly boiled water (4.1) for the dilution, possibly purged with nitrogen.

The following procedure is recommended to determine the titre of the 0,01 N sodium thiosulfate standard solution (factor determination):

Weigh, to the nearest 0,001 g, 0,27 g to 0,33 g potassium iodate (4.10) into a volumetric flask [250 ml (5.8) or 500 ml (5.8)] and make up to the mark with water (4.1).

Pipette (5.4) 5 ml or 10 ml of this potassium iodate solution into a 250 ml Erlenmeyer flask (5.9). Add 60 ml freshly boiled water (4.1), 5 ml of HCl (4.11) and 0,5 ml of the saturated potassium iodide solution (4.6).

Titrate this solution with the 0,01 N sodium thiosulfate standard solution to determine the exact molarity of the 0,01 N sodium thiosulfate standard solution.

Calculate the factor, F of the 0,01 N sodium thiosulfate solution using the following formula:

$$F = \frac{m_{KIO_3} \cdot V_1 \cdot 6 \cdot 1000 \cdot w_{KIO_3}}{M_{KIO_3} \cdot V_2 \cdot V_3 \cdot c_{thio} \cdot 100} \qquad (1)$$

Where:

6 is the equivalent mass for the titre (1 mol $KIO_3 \Leftrightarrow 3$ mol I_2);

V_1 is the volume of the potassium iodate solution, used for the titre determination (5 ml or 10 ml);

V_2 is the total volume of potassium iodate solution, in millilitres (250 ml or 500 ml);

V_3 is the volume of 0,01 N thiosulfate solution used for the determination, in millilitres;

m_{KIO3} is the mass of potassium iodate, in grams; w_{KIO3} is the purity of potassium iodate, in g/100 g;

M_{KIO3} is the molecular mass of potassium iodate (214 g/mol);

C_{thio} is the concentration of the sodium thiosulfate standard solution, in moles per litre (0,01 mol/l).

4.9. Starch solution, mass concentration ρ = 1 g/100 ml (10 g/l) aqueous dispersion. Mix 0,5 g of starch and a small amount of cold water. Add this mixture, while stirring, to 50 ml of boiling water, boil it for a few seconds and cool immediately.

The solution shall be freshly prepared every day.

It is recommended to use potato starch for iodometry as this starch gives a darker blue colour. Equivalent reagents may also be used.

4.10. Potassium iodate (KIO_3) volumetric standard, secondary reference material, traceable to the National Institute of Standards and Technology (NIST), Gaithersburg, MD, USA.

4.11. Hydrochloric acid, c(HCl) = 4 mol/l.

5. APPARATUS

All the equipment used shall be free from reducing or oxidizing substances.

NOTE Do not grease ground surfaces

5.1 Erlenmeyer flask, of 250 ml capacity, with ground neck and ground glass stopper.

5.2 Burette, of 5 ml, 10 ml or 25 ml capacity, graduated in at least 0,05 ml, preferably with automatic zero adjustment (pellet titrators).

5.3 Manual or automatic dosing unit, of 20 ml capacity (other volume can be accepted), with a resolution of at least 10 µl and an accuracy of ±0,15 % (e.g. a piston burette).

5.4 Pipettes, of 0,5 ml, 1 ml, 10 ml, 20 mL and 100 ml capacity, or others in order to implement an 1/10 dilution (or automatic pipettes).

5.5 Measuring cylinders, of 50 ml and 100 ml capacity.

5.6 Analytical balance, readable to 0,000 1 g.

5.7 Magnetic stirrer, with magnetic stirring rod and heating plate.

5.8 Volumetric flask, of 1 000 ml, 500 ml, 250 ml, 200 ml and 100 ml capacity (depending on the prepared volume).

5.9 Erlenmeyer or Beaker, of capacity 250 ml, and of tall form.

5.10 Amber-stained bottles, of capacity 1 000 ml. (or others depending on the prepared volume, 100 ml, 200 ml, 250 ml, 500 ml…)

5.11 Automatic titrator with processor, dosing device, stirrer and electrodes.

If other apparatus is used, the procedure shall be optimized for the relevant apparatus. The apparatus shall be able to perform a dynamic titration (fast at the beginning, slow near the endpoint). This is necessary to minimize the titration time whilst achieving a slow titration near the endpoint.

5.12 Combined platinum electrode.

5.13 Microwave oven

A microwave oven may be used to melt solid samples in an easy and quick manner. Careful and proper use of a microwave oven will not lead to any increase in the peroxide value. The suitable conditions shall be tested in advance.

6. SAMPLE PREPARATION

Take care that the sample is taken and stored away from the light (daylight or artificial light), kept cold and contained in completely filled glass containers, hermetically sealed with ground-glass or cork stoppers.

Homogenize the test sample, preferably without heating and without aeration. Avoid direct solar radiation. Heat solid test samples carefully to 10 °C above their melting point, using a microwave oven (5.13). Test samples with visible impurities shall be filtered.

Take the test portion for the determination of peroxide value first, before taking test portions for any other test, and determine the peroxide value immediately.

7. PROCEDURE

Purge the carefully cleaned Erlenmeyer flask (5.1) for iodometric determination or the beaker (5.9) for potentiometric determination with nitrogen or carbon dioxide. Weigh the following into the flask, to the nearest 0,1 mg:

a) 5,0 g ± 0,1 g of test sample for expected peroxide values from >1 to 30;

b) 10,0 g ± 0,1 g of test sample for expected peroxide values from 0 to 1.

The peroxide value of the fat/oil can be over 30 meq active oxygen per kilogram. In this case, the user should choose a smaller test portion mass.

It is advisable to rinse the Erlenmeyer flask or the beaker with the glacial acetic acid/isooctane solution (4.4) prior to use to ensure that the flask does not contain any oxidizing or reducing substances.

Then, to determine the peroxide value, use procedure 7.1 for iodometric determination (visually) or use procedure 7.2 for potentiometric determination.

7.1 IODOMETRIC DETERMINATION OF PEROXIDE VALUE

7.1.2 Dissolve the test sample in 50 ml of the glacial acetic acid/isooctane solution by gentle swirling.
In the case of fats with high melting points (hard fats and animal fats), carefully add to the melted fat 20 ml of isooctane (4.3) by gentle swirling, and then immediately add 30 ml of glacial acetic acid (4.2). Also warm the test sample gently, where necessary.

7.1.3 Add 0,5 ml of the saturated potassium iodide solution (4.6). Close the Erlenmeyer flask
(5.1) and mix with a magnetic stirrer (5.7) without creating a large vortex, or manually without aeration for exactly 60 s (use a timer accurate to ±1 s).

7.1.4 Open the Erlenmeyer flask (5.1), immediately add 100 ml of demineralized water, rinse the ground glass stopper and swirl.

7.1.5 Immediately titrate the liberated iodine with the 0,01 N sodium thiosulfate standard solution (4.8) from yellow orange to pale yellow and, after addition of 0,5 ml of starch solution (4.9), from violet to colourless. Stop the titration as soon as the solution is colourless for 30 s.

> NOTE 1 The phase being titrated is the lower one. There is a delay of 15 s to 30 s in the change of colour with the 0,01 N sodium thiosulfate standard solution (4.8).
>
> NOTE 2 In the case of peroxide values below 1, the starch solution can be added at the beginning of the titration.
>
> NOTE 3 The determination may cause an emulsion when water is adding. To avoid this emulsion, a moderate circular agitation (always in the same direction) is recommended during the titration.

7.1.6 In a parallel blank test, not more than 0,1 ml of the 0,01 N thiosulfate solution shall be used. If the blank test is higher, then replace the saturated potassium iodide solution as it could be unsuitable.

7.2 POTENTIOMETRIC DETERMINATION OF PEROXIDE VALUE

7.2.2 Dissolve the test portion in 50 ml of the glacial acetic acid/isooctane solution (4.4) by gentle swirling.

7.2.3 Add the magnetic stirring rod (5.7) and 0,5 ml of the saturated potassium iodide solution (4.6), stir the test portion on the stirrer of the automatic titrator (5.11) for exactly 60 s (use a timer accurate to ±1 s) at a medium speed to avoid spraying.

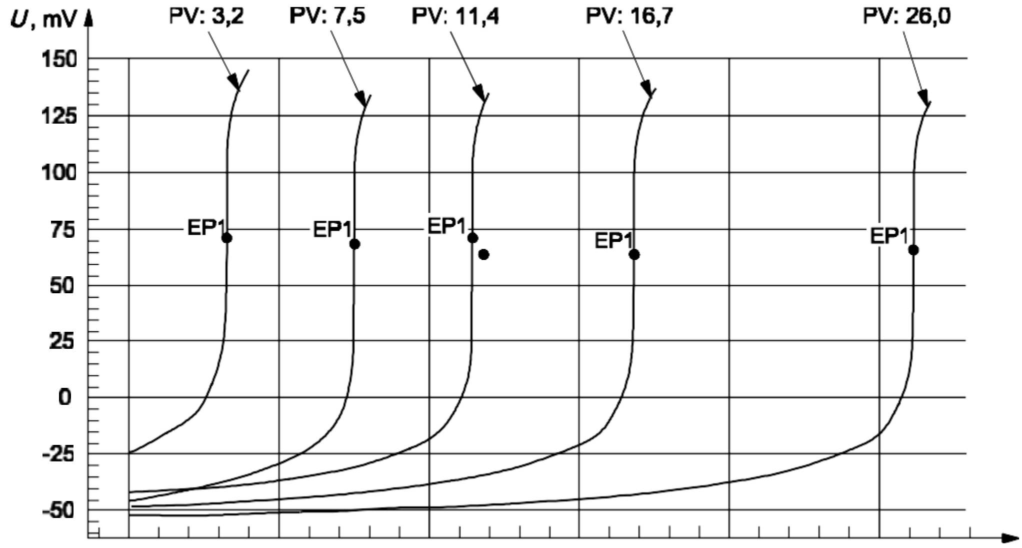
7.2.4 Immediately add 30 ml to 100 ml of water (4.1). The amount depends on the apparatus used.

NOTE The greater amount of water is necessary due to phase inversion and depends upon the apparatus used. The phase being titrated is the lower one. With higher amounts of water, the potentiometric difference between the starting and end-point of the titration is bigger (~100 mV). This results in a titration curve with a sharp turning point.

7.2.5 Immerse the combined platinum electrode (5.12) into the test sample and start the titration with the 0,01 N sodium thiosulfate standard solution (4.8) while stirring at high speed.

7.2.6 In a parallel blank test, not more than 0,1 ml of the 0,01 N thiosulfate solution shall be used.

7.2.7 Most titration equipment evaluates the equivalent point automatically; otherwise determine the end point graphically using the point of inflection method.



Key

EP1 titration end- point PV peroxide value

U potential difference

V volume

Figure 1 — Potentiometric titration curves of five samples with different peroxide values

8. CALCULATION AND EXPRESSION OF RESULTS

The peroxide value (PV), expressed in milliequivalents of active oxygen per kilogram, is given by the formula (2):

$$\frac{(V - V_0) \cdot c_{\text{thio}} \cdot F \cdot 1\,000}{m} \qquad (2)$$

Where

V	is the volume of sodium thiosulfate solution used for the determination, in millilitres;
V0	is the volume of the sodium thiosulfate standard solution used for the blank test, in millilitres;
Cthio	is the concentration of the sodium thiosulfate solution, in moles per liter;
m	is the mass of the test portion, in grams;
F	is the factor of the 0,01 N sodium thiosulfate solution, determined according to 4.8.

The result of the determination shall be reported to one decimal place.

PRECISION VALUES OF THE METHOD
(data from ISO 3960 and ISO 27107 standards)

1. RESULTS OF THE INTERLABORATORY TEST FOR IODOMETRIC DETERMINATION (ISO 3960)

An international collaborative test involving 23 laboratories in nine countries was carried out on the following samples.

A:	Refined sunflower/rape-seed oil (1:1)
B:	Olive oil (mixture of refined and virgin olive oil)
C:	Extra virgin olive oil
D:	Extra virgin olive oil
E:	Rape-seed oil, aged
F:	Lampante olive oil
G:	Tallow
H:	Lard
I:	Palm oil
J:	Palm stearin
K:	Coconut oil

The test was organized by the Deutsches Institut für Normung (DIN) in 2004/2005. The results obtained were subjected to statistical analysis in accordance with ISO 5725 1 and ISO 5725 2 to give the precision data shown in the tables 1 and 2.

Table 1 : Peroxide values on oils that are liquid at room temperature

	Sample					
	A	B	C	D	E	F
Number of laboratories participating	23	23	21	23	23	23
Number of laboratories after eliminating outliers	21	21	18	22	23	22
Number of test results from remaining laboratories	42	42	36	44	46	44
Mean value, meq/kg	1,63	3,21	8,34	12,04	19,02	26,92
Repeatability standard deviation, s_r, meq/kg	0,10	0,08	0,25	0,26	0,36	0,33
Repeatability relative standard deviation, %	6,0	2,6	3,0	2,2	1,9	1,2
Repeatability limit, r (= 2,8 s_r), meq/kg	0,27	0,23	0,69	0,73	1,01	0,92
Reproducibility standard deviation, s_R, meq/kg	0,22	0,46	0,80	1,07	1,71	3,06
Reproducibility relative standard deviation, %	13,3	14,2	9,6	8,9	9,0	11,4
Reproducibility limit, R (= 2,8 s_R), meq/kg	0,61	1,28	2,25	3,00	4,78	8,57

Table 2 : Peroxide values on oils that are solid at room temperature

	Sample					
	G	H	I	J	K (5 g)	K (10 g)
Number of laboratories participating	16	16	16	16	16	16
Number of laboratories after eliminating outliers	15	15	14	12	13	11
Number of test results from remaining laboratories	30	30	28	24	26	22
Mean value, meq/kg	1,60	3,67	2,99	4,77	0,55	0,71
Repeatability standard deviation, s_r, meq/kg	0,07	0,09	0,08	0,17	0,06	0,04
Repeatability relative standard deviation, %	4,6	2,3	2,7	3,66	11,4	6,0
Repeatability limit, r (= 2,8 s_r), meq/kg	0,20	0,24	0,22	0,49	0,17	0,12
Reproducibility standard deviation, s_R, meq/kg	0,45	0,48	0,44	0,27	0,19	0,25
Reproducibility relative standard deviation, %	28,0	13,0	14,7	5,6	34,7	34,8
Reproducibility limit, R (= 2,8 s_R), meq/kg	1,25	1,33	1,23	0,75	0,53	0,69

2. RESULTS OF THE INTERLABORATORY TEST FOR POTENTIOMETRIC DETERMINATION (ISO 27107)

An international collaborative test involving 12 laboratories from five countries (Canada, France, Germany, Iran and Poland) was carried out on the samples listed in the tables 3 and 4.

The test was organized by the Deutsches Institut für Normung (DIN) in 2006 and the results obtained were subjected to statistical analysis in accordance with ISO 5725-1 and ISO 5725-2 to give the precision data shown in the tables 3 and 4.

Table 3 : Peroxide values on oils that are liquid at room temperature

Sample	Refined oil (A)	Refined sunflower seed oil (B)	Olive oil (D)	Extra virgin olive oil (F)	Extra virgin olive oil (G)	Vegetable oil mixture (I)
No. laboratories participating	12	12	12	12	12	11
No. laboratories after eliminating outliers	12	12	12	11	11	11
No. test results from remaining laboratories	24	24	24	22	22	22
Mean value, meq/kg	0,61	1,27	4,02	13,70	13,13	17,92
Repeatability standard deviation, s_r, meq/kg	0,03	0,06	0,14	0,16	0,25	0,36
Coefficient of variation of repeatability, CV(*r*), %	5,5	4,4	3,6	1,2	1,9	2,0
Repeatability limit, r (= 2,8s_r), meq/kg	0,09	0,16	0,41	0,45	0,71	1,01
Reproducibility standard deviation, s_R, meq/kg	0,11	0,18	0,45	0,82	1,03	1,90
Coefficient of variation of reproducibility, CV(*R*), %	17,8	14,1	11,3	6,0	7,8	10,6
Reproducibility limit, R (= 2,8s_R), meq/kg	0,30	0,50	1,27	2,30	2,87	5,32

Table 4 : Peroxide values on oils that are solid at room temperature

Sample	Lard (C)	Raw palm oil (E)	Palm stearin (H)
No. laboratories participating	12	12	11
No. laboratories after eliminating outliers	12	10	9
No. test results from remaining laboratories	24	20	18
Mean value, meq/kg	1,54	7,52	27,31
Repeatability standard deviation, s_r, meq/kg	0,07	0,15	0,44
Coefficient of variation of repeatability, CV(r), %	4,8	2,0	1,6
Repeatability limit, r (= 2,8s_r), meq/kg	0,21	0,41	1,23
Reproducibility standard deviation, s_R, meq/kg	0,31	0,42	1,78
Coefficient of variation of reproducibility, CV(R), %	20,1	5,6	6,5
Reproducibility limit, R (= 2,8s_R), meq/kg	0,87	1,17	5,00

3. REFERENCES

ISO 5725-1:1994 Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions

ISO 5725-2:1994 Accuracy (trueness and precision) of measurement methods and results – Part 2: Basic method for the determination of the repeatability and reproducibility of a standard measurement method

ISO 5725-5:1998 Accuracy (trueness and precision) of measurement methods and results – Part 5: Alternative methods for the determination of the precision of a standard measurement method

ISO 5725-6:1994 Accuracy (trueness and precision) of measurement methods and results – Part 6: Use in practice of accuracy values

ISO 3960:2017 Animal and vegetable fats and oils — Determination of peroxide value — Iodometric (visual) endpoint determination

ISO 27107:2008 Animal and vegetable fats and oils — Determination of peroxide value — Potentiometric end-point determination