Ref. Ares(2022)1819541 - 11/03/2022

EN

ANNEX I

Methods of analysis used for determining the characteristics of olive oils

	Characteristics of olive oils	**IOC method to be used**
1	Acidity	COI/T.20/Doc. No 34 (*Determination of free fatty acids, cold method*)
2	Peroxide value	COI/T.20/Doc. No 35 (*Determination of peroxide value*)
3	2-glyceryl monopalmitate	COI/T.20/Doc. No 23 (*Determination of the percentage of 2-glyceryl monopalmitate*)
4	K232, K268 or K270, ΔK	COI/T.20/Doc. No 19 (*Spectrophotometric investigation in the ultraviolet*)
5	Organoleptic characteristics	COI/T.20/Doc. No 15 (*Sensory analysis of olive oil – Method for the organoleptic assessment of virgin olive oil*) – except for its points 4.4 and 10.4
6	Fatty acid composition, including trans-isomers	COI/T.20/Doc. No 33 (*Determination of fatty acid methyl esters by gas chromatography*)
7	Fatty acid ethyl esters, waxes	COI/T.20/Doc. No 28 (*Determination of the content of waxes, fatty acid methyl esters and fatty acid ethyl esters by capillary gas chromatography*)
8	Total sterols, sterol composition, erythrodiol, uvaol and aliphatic alcohols	COI/T.20/ Doc. No 26 (*Determination of the sterol composition and content and alcoholic compounds by capillary gas chromatography*)
9	Stigmastadienes	COI/T-20/Doc. No 11 (*Method for determination of stigmastadienes in vegetable oils*)
10	ΔECN42	COI/T.20/Doc. No 20 (*Determination of the difference between actual and theoretical content of triacyglycerols with ECN 42*)

ANNEX II

SAMPLING OF OLIVE OIL DELIVERED IN PACKAGES

This method of sampling is applied to batches of olive oil put up in packages. Different sampling methods apply, depending on whether the package exceeds 5 litres or not.

For the purposes of this Annex, the following definitions apply:

(a) ‘package’ means the container which is in direct contact with the olive oil;
(b) ‘batch’ means a set of packages which are produced, manufactured and packed in circumstances such that the olive oil contained in each package is considered to be homogenous in terms of all analytical characteristics. The individuation of a batch must be done in accordance with Directive 2011/91/EU of the European Parliament and of the Council[1];
(c) ‘increment’ means the quantity of olive oil contained in a package of up to 5 litres or extracted from a package exceeding 5 litres, when packages are selected from a random point of the batch.

1. CONTENT OF PRIMARY SAMPLE

1.1. Primary samples for packages up to 5 litres

A primary sample for packages of up to 5 litres shall be constituted in accordance with Table 1.

Table 1

Primary sample minimum size must comprise the following:

Where the packaging has a capacity of	**The primary sample must comprise the olive oil from**
(a) 750 ml or more	(a) 1 package;
(b) less than 750 ml	(b) the minimum number of packages with a total capacity of at least 750 ml

The content of the primary sample must be homogenised before carrying out the different assessments and analyses.

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[1] Directive 2011/91/EU of the European Parliament and of the Council of 13 December 2011 on indications or marks identifying the lot to which a foodstuff belongs (OJ L 334, 16.12.2011, p. 1).

1.2. Primary samples for packages exceeding 5 litres

A primary sample for packages exceeding 5 litres shall be constituted from the total number of increments extracted from the minimum number of packages set out in Table 2. The packages shall be selected randomly from the batch. Once constituted, the primary sample shall be of sufficient volume to allow for the division in multiple examples.

Table 2

Minimum number of packages to be selected randomly

Number of packages in the batch	**Minimum number of packages to be selected**
Up to 10	1
From … 11 to 150	2
From … 151 to 500	3
From … 501 to 1 500	4
From … 1 501 to 2 500	5
> 2 500 per 1 000 packages	1 extra package

After homogenising the content of each package, the increment is extracted and poured into a common container for homogenisation by stirring, so that it will be best protected from air.

The content of the primary sample must be poured into a series of packages of a minimum capacity of 1 litre, each one of which constitutes a unit of the primary sample. Each package unit must be filled in a way to minimise the air layer on top and then suitably closed and sealed to ensure the product is tamper-proof. These package units must be labelled to ensure correct identification.

2. INCREASING THE NUMBER OF PRIMARY SAMPLES

2.1. The number of primary samples may be increased by each Member State, according to their own necessity (for example organoleptic assessment by a different laboratory from the one that performed the chemical analyses, counter-analysis, etc.).

2.2. The competent authority may increase the number of primary samples according to the following table:

Table 3

Number of primary samples determined by the size of batch

Size of batch (litres)	**Number of primary samples**
Less than 7 500	2
From 7 500 to less than 25 000	3
From 25 000 to less than 75 000	4
From 75 000 to less than 125 000	5
Equal to and more than 125 000	6 + 1 for each 50 000 litres more

2.3. The formation of each primary sample must be carried out in accordance with the procedures referred to in points 1.1 and 1.2.

2.4. When randomly selecting packages for increments, the packages selected for one primary sample must be contiguous to packages selected for another primary sample. It is necessary to take note of the location of each randomly selected package and to identify it unambiguously.

3. ANALYSES AND RESULTS

3.1. Where all the results of the analyses for all primary samples comply with the characteristics of the category of olive oil declared, the whole batch is to be declared compliant.

3.2. When one of the results of the analyses of at least one primary sample does not comply with the characteristics of the declared category of olive oil, the whole sampling batch shall be declared non-compliant.

ANNEX III

FLOW-CHART FOR VERIFYING WHETHER AN OLIVE OIL SAMPLE IS CONSISTENT WITH THE CATEGORY DECLARED

General table

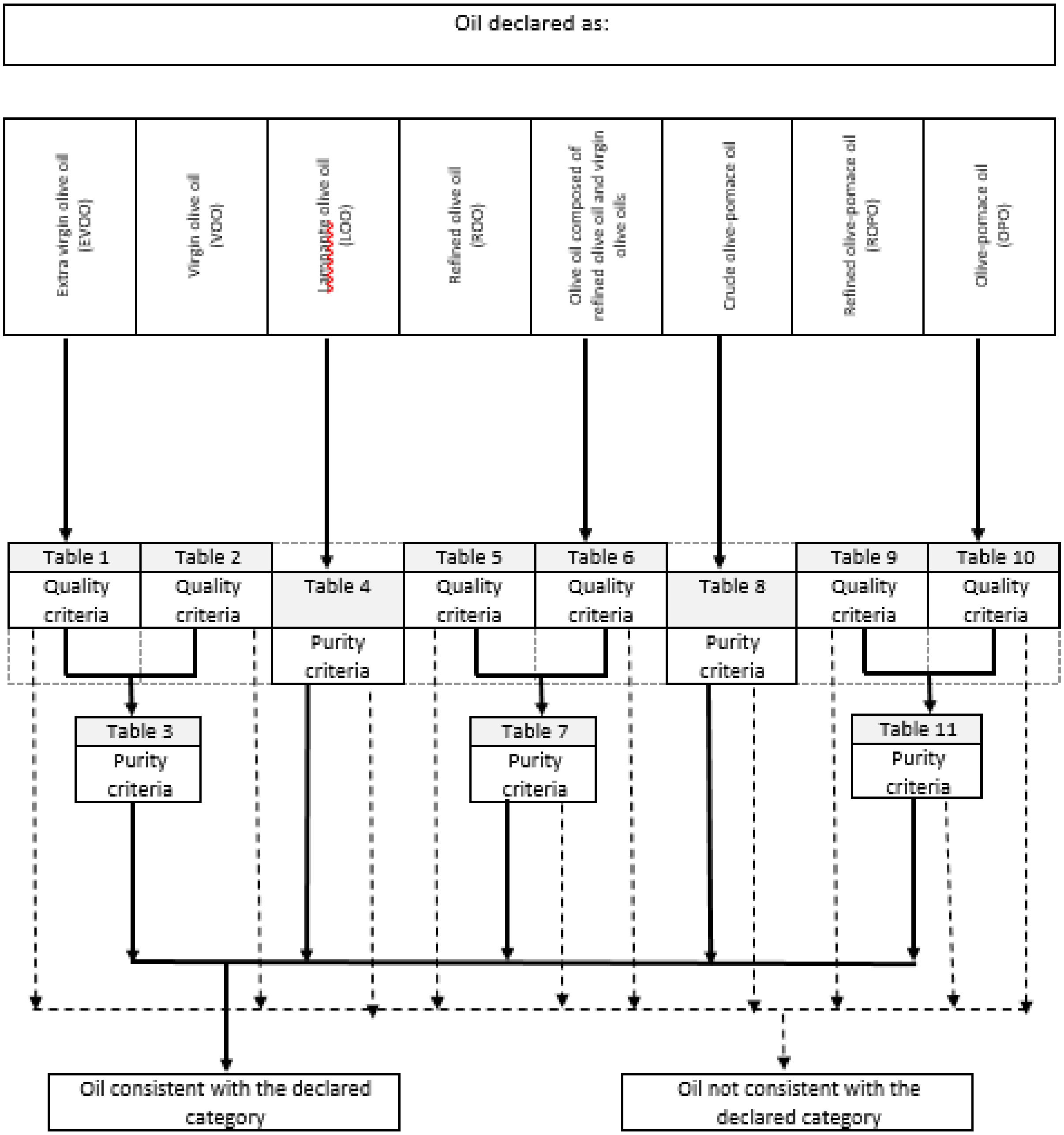
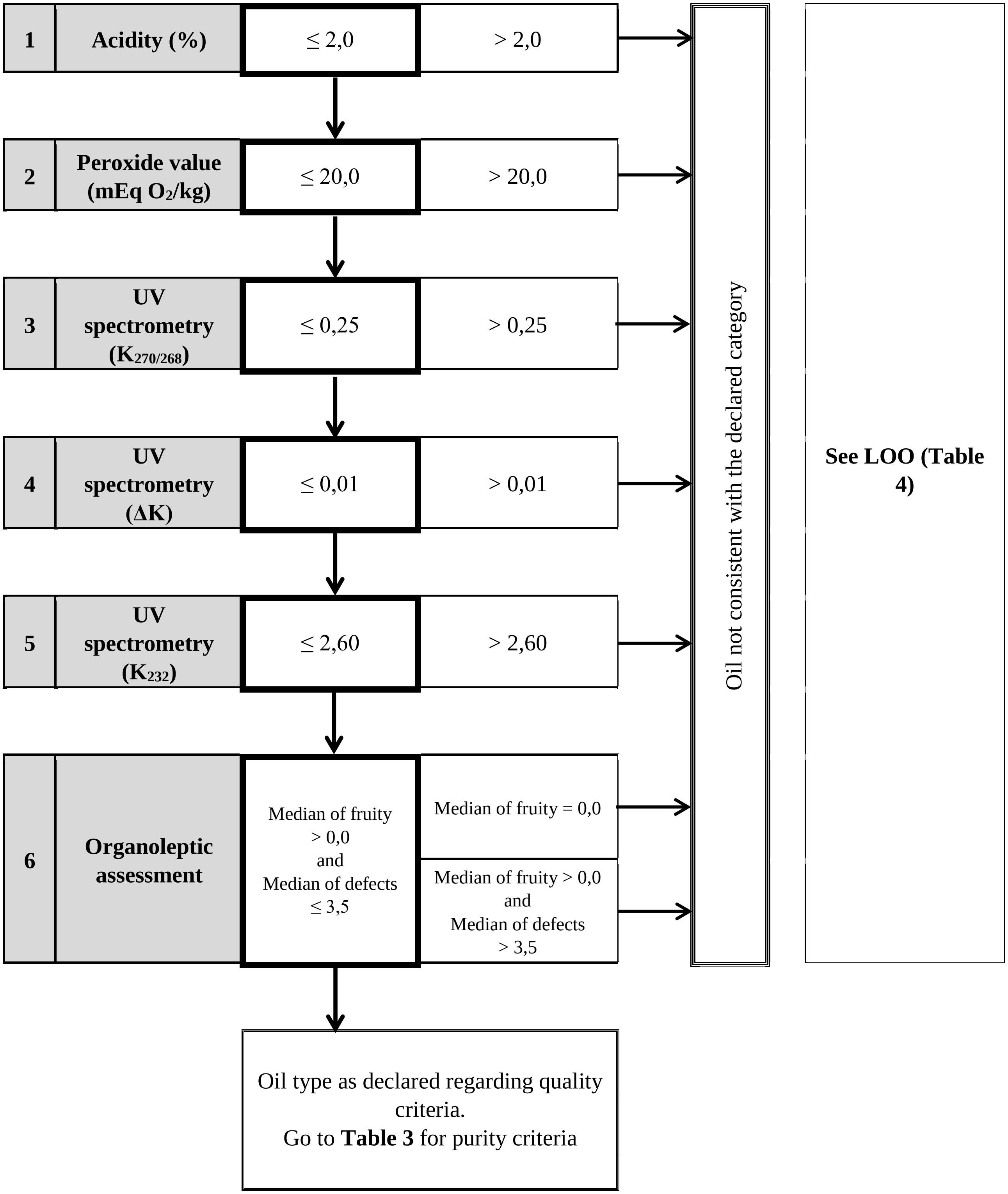


Table 1 — Extra virgin olive oil — Quality criteria

1	**Acidity (%)**	≤ 0,80	> 0,80	Oil not consistent with the declared category	**See VOO (Table 2)**
2	**Peroxide value (mEq O_2/kg)**	≤ 20,0	> 20,0		**See LOO (Table 4)**
3	**UV spectrometry ($K_{270/268}$)**	≤ 0,22	> 0,22		**See VOO (Table 2)**
4	**UV spectrometry (ΔK)**	≤ 0,01	> 0,01		**See LOO (Table 4)**
5	**UV spectrometry (K_{232})**	≤ 2,50	> 2,50		**See VOO (Table 2)**
6	**Organoleptic assessment**	Median of fruity > 0,0 and Median of defects = 0,0	Median of fruity = 0,0		**See LOO (Table 4)**
			Median of fruity > 0,0 and Median of defects > 0,0		**See VOO (Table 2)**
7	**Fatty acid ethyl esters (mg/kg)**	≤ 35	> 35		**See VOO (Table 2)**

Oil type as declared regarding quality criteria.
Go to **Table 3** for purity criteria.

Table 2 — Virgin olive oil — Quality criteria



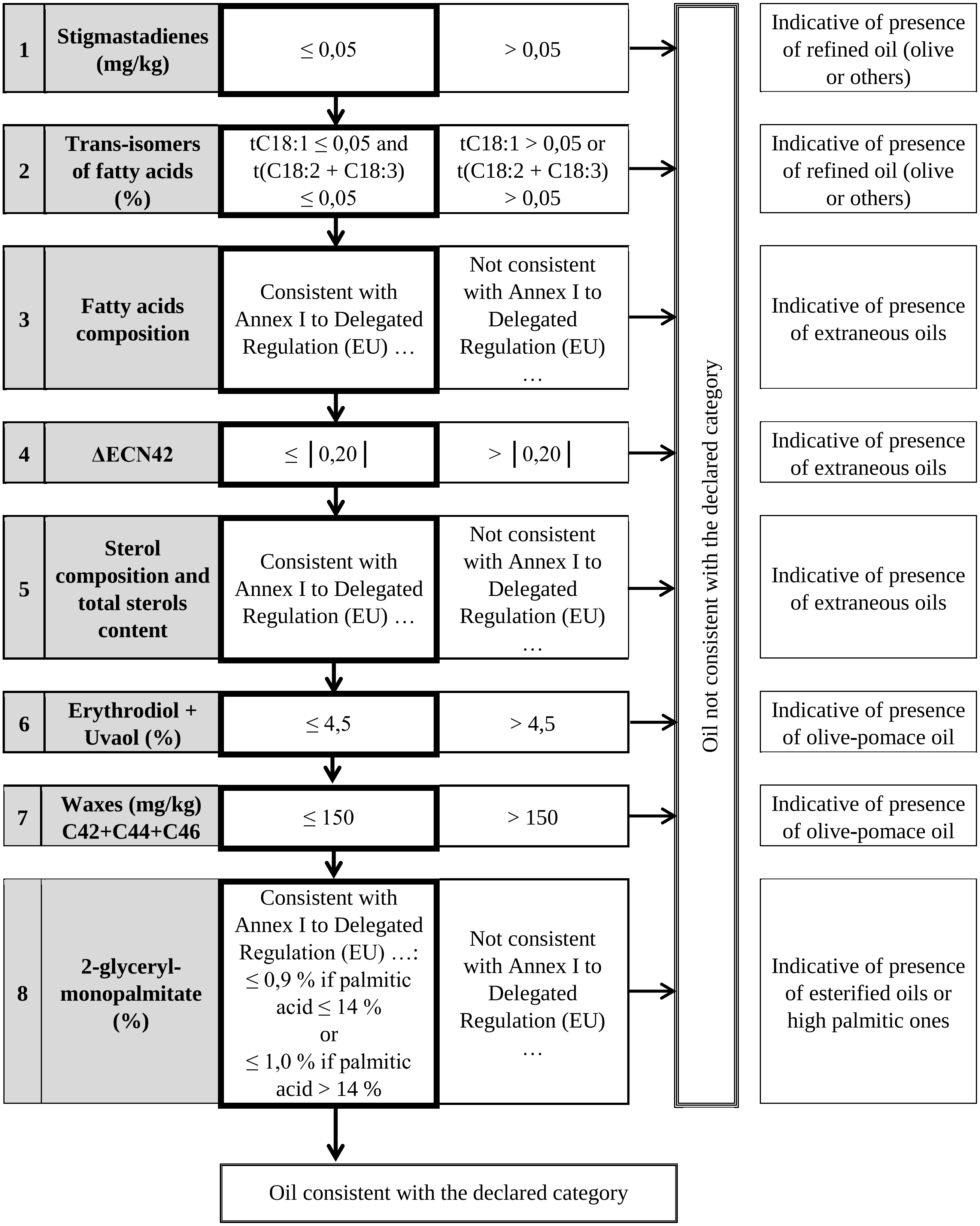
1	**Acidity (%)**	≤ 2,0	> 2,0
2	**Peroxide value (mEq O_2/kg)**	≤ 20,0	> 20,0
3	**UV spectrometry ($K_{270/268}$)**	≤ 0,25	> 0,25
4	**UV spectrometry (ΔK)**	≤ 0,01	> 0,01
5	**UV spectrometry (K_{232})**	≤ 2,60	> 2,60
6	**Organoleptic assessment**	Median of fruity > 0,0 and Median of defects ≤ 3,5	Median of fruity = 0,0 Median of fruity > 0,0 and Median of defects > 3,5

Oil not consistent with the declared category

See LOO (Table 4)

Oil type as declared regarding quality criteria.
Go to **Table 3** for purity criteria

Table 3 — Extra virgin olive oil and virgin olive oil — Purity criteria

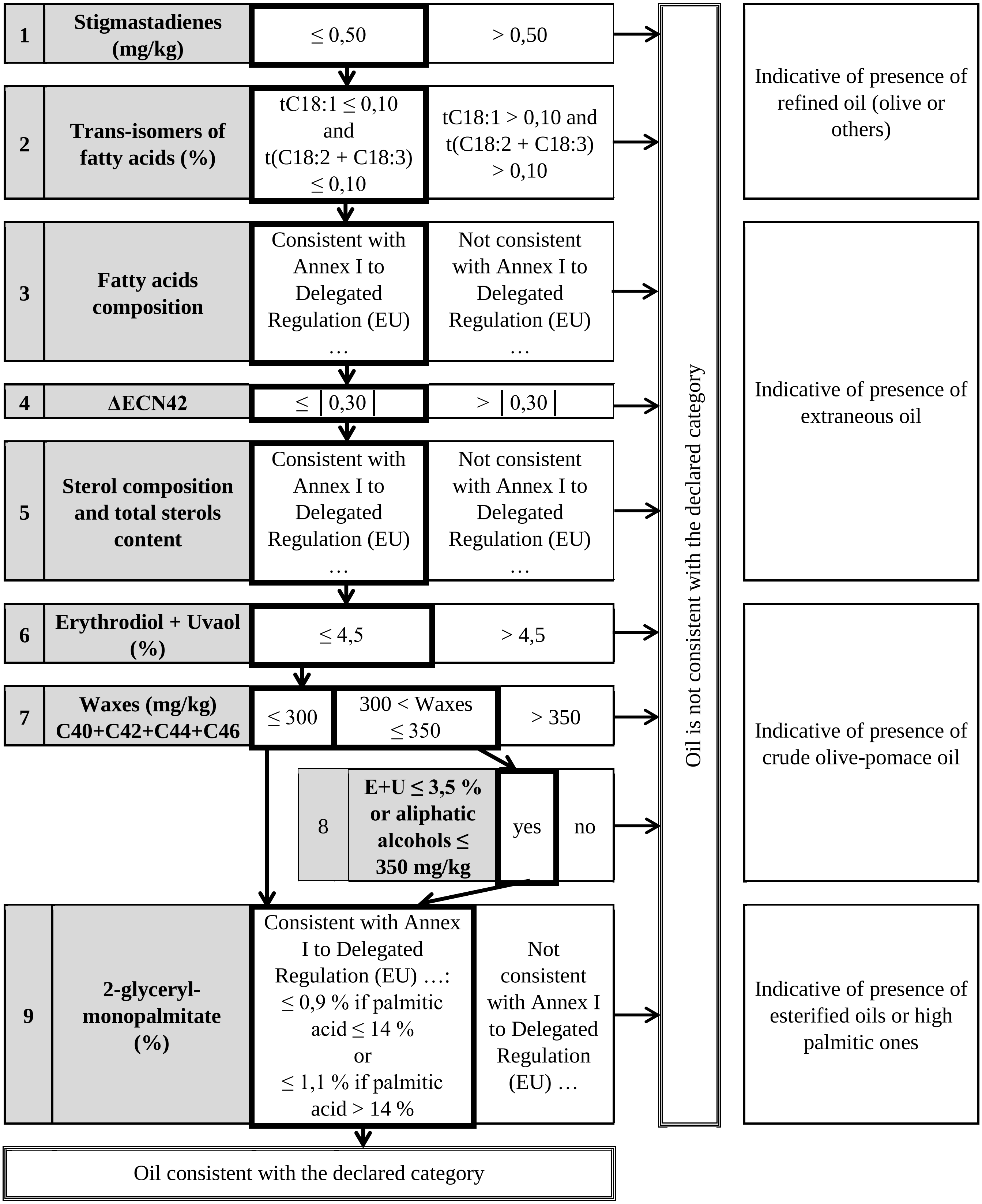


1	**Stigmastadienes (mg/kg)**	≤ 0,05	> 0,05	Indicative of presence of refined oil (olive or others)
2	**Trans-isomers of fatty acids (%)**	tC18:1 ≤ 0,05 and t(C18:2 + C18:3) ≤ 0,05	tC18:1 > 0,05 or t(C18:2 + C18:3) > 0,05	Indicative of presence of refined oil (olive or others)
3	**Fatty acids composition**	Consistent with Annex I to Delegated Regulation (EU) …	Not consistent with Annex I to Delegated Regulation (EU) …	Indicative of presence of extraneous oils
4	**ΔECN42**	≤ |0,20|	> |0,20|	Indicative of presence of extraneous oils
5	**Sterol composition and total sterols content**	Consistent with Annex I to Delegated Regulation (EU) …	Not consistent with Annex I to Delegated Regulation (EU) …	Indicative of presence of extraneous oils
6	**Erythrodiol + Uvaol (%)**	≤ 4,5	> 4,5	Indicative of presence of olive-pomace oil
7	**Waxes (mg/kg) C42+C44+C46**	≤ 150	> 150	Indicative of presence of olive-pomace oil
8	**2-glyceryl-monopalmitate (%)**	Consistent with Annex I to Delegated Regulation (EU) …: ≤ 0,9 % if palmitic acid ≤ 14 % or ≤ 1,0 % if palmitic acid > 14 %	Not consistent with Annex I to Delegated Regulation (EU) …	Indicative of presence of esterified oils or high palmitic ones

Oil not consistent with the declared category

Oil consistent with the declared category

Table 4 — Lampante olive oil — Purity criteria



1	**Stigmastadienes (mg/kg)**	≤ 0,50	> 0,50	Indicative of presence of refined oil (olive or others)
2	**Trans-isomers of fatty acids (%)**	tC18:1 ≤ 0,10 and t(C18:2 + C18:3) ≤ 0,10	tC18:1 > 0,10 and t(C18:2 + C18:3) > 0,10	
3	**Fatty acids composition**	Consistent with Annex I to Delegated Regulation (EU) …	Not consistent with Annex I to Delegated Regulation (EU) …	Indicative of presence of extraneous oil
4	**ΔECN42**	≤ │0,30│	> │0,30│	
5	**Sterol composition and total sterols content**	Consistent with Annex I to Delegated Regulation (EU) …	Not consistent with Annex I to Delegated Regulation (EU) …	
6	**Erythrodiol + Uvaol (%)**	≤ 4,5	> 4,5	Indicative of presence of crude olive-pomace oil
7	**Waxes (mg/kg) C40+C42+C44+C46**	≤ 300 300 < Waxes ≤ 350	> 350	
8	**E+U ≤ 3,5 % or aliphatic alcohols ≤ 350 mg/kg**	yes	no	
9	**2-glyceryl-monopalmitate (%)**	Consistent with Annex I to Delegated Regulation (EU) …: ≤ 0,9 % if palmitic acid ≤ 14 % or ≤ 1,1 % if palmitic acid > 14 %	Not consistent with Annex I to Delegated Regulation (EU) …	Indicative of presence of esterified oils or high palmitic ones

Oil is not consistent with the declared category

Oil consistent with the declared category

Table 5 — Refined olive oil — Quality criteria

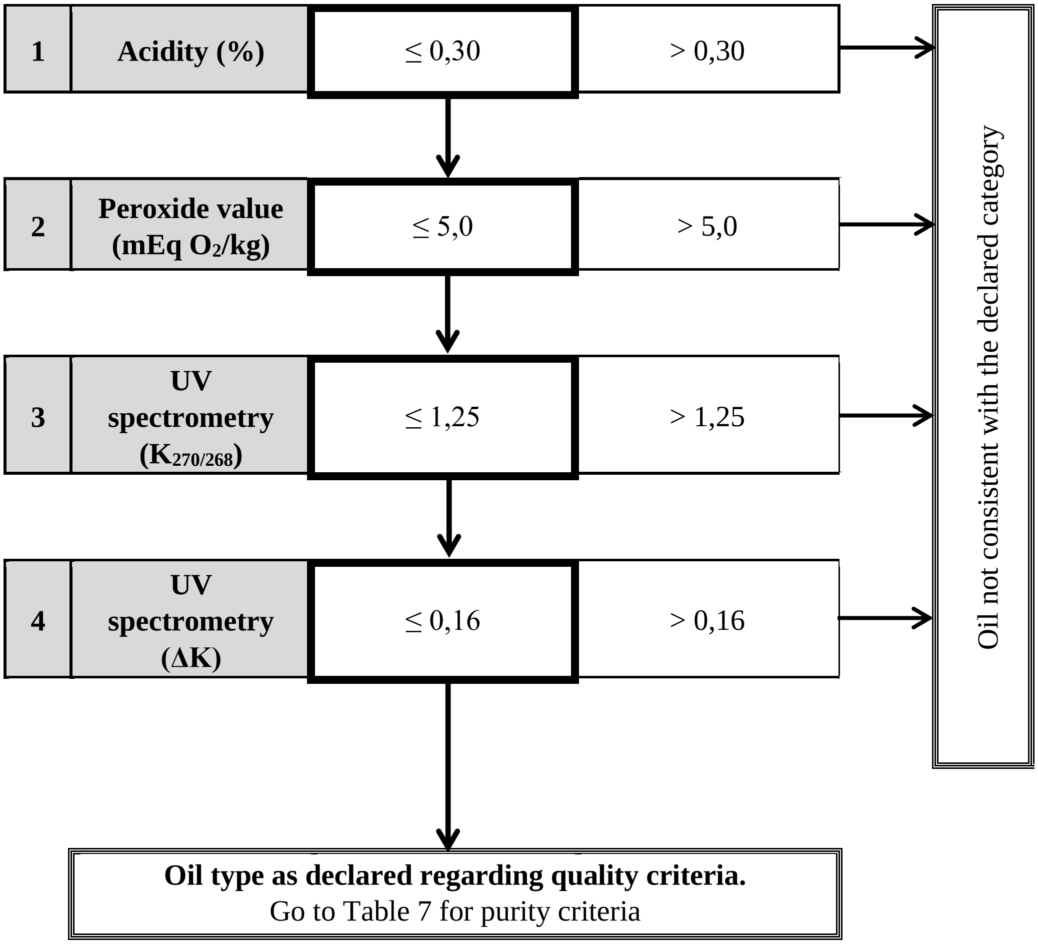
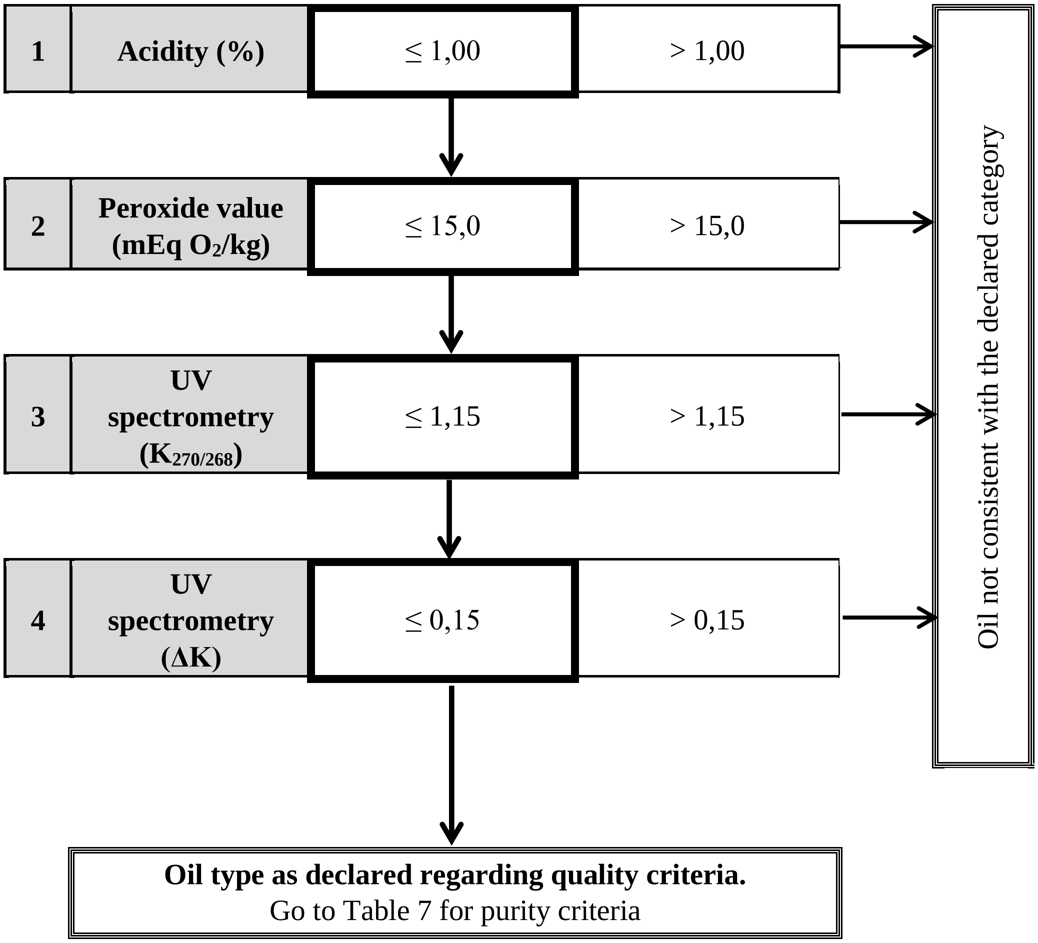


Table 6 — Olive oil (composed of refined olive oil and virgin olive oils) — Quality criteria



1	**Acidity (%)**	≤ 1,00	> 1,00
2	**Peroxide value (mEq O_2/kg)**	≤ 15,0	> 15,0
3	**UV spectrometry ($K_{270/268}$)**	≤ 1,15	> 1,15
4	**UV spectrometry (ΔK)**	≤ 0,15	> 0,15

Oil not consistent with the declared category

Oil type as declared regarding quality criteria.
Go to Table 7 for purity criteria

Table 7 — Refined olive oil and olive oil composed of refined olive oil and virgin olive oils — Purity criteria

1	**Trans-isomers of fatty acids (%)**	tC18:1 ≤ 0,20 and t(C18:2 + C18:3) ≤ 0,30	tC18:1 > 0,20 or t(C18:2 + C18:3) > 0,30	Oil not consistent with the declared category	
2	**Fatty acids composition**	Consistent with Annex I to Delegated Regulation (EU) …	Not consistent with Annex I to Delegated Regulation (EU) …		Indicative of presence of extraneous oil
3	**Δ ECN42**	≤ |0,30|	> |0,30|		
4	**Sterol composition and total sterols content**	Consistent with Annex I to Delegated Regulation (EU) …	Not consistent with Annex I to Delegated Regulation (EU) …		
5	**Erythrodiol + Uvaol (%)**	≤ 4,5 or ***for ROO:*** ***if E+U > 4,5 and < 6,0 and E ≤ 75 mg/kg***	> 4,5 or ***for ROO:*** ***if E+U > 4,5 and < 6,0 and E > 75 mg/kg*** ***or*** ***E+U > 6,0***		Indicative of presence of olive-pomace oil
6	**Waxes mg/kg C40+C42+C44+C46**	≤ 350	> 350		
7	**2-glyceryl-monopalmitate ≤ 0,9 % if palmitic acid ≤ 14 % or 2-glyceryl-monopalmitate ≤ 1,1 % (for ROO) or ≤ 1,0 (for OO) if palmitic acid > 14 %**	yes	no		Indicative of presence of esterified oils or high palmitic ones

Oil is consistent with the declared category

Table 8 — Crude olive-pomace-oil — Purity criteria

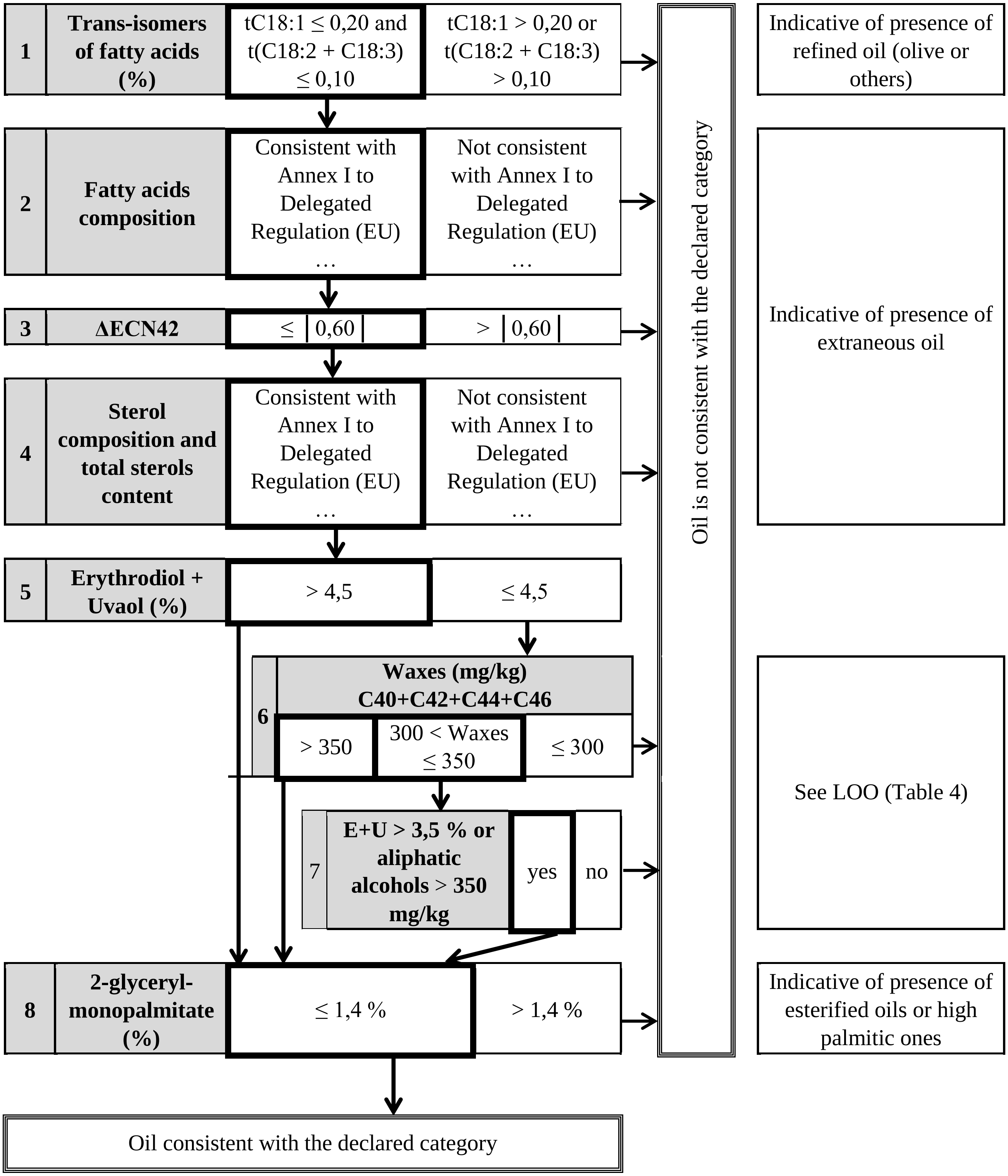


Table 9 — Refined olive-pomace-oil — Quality criteria

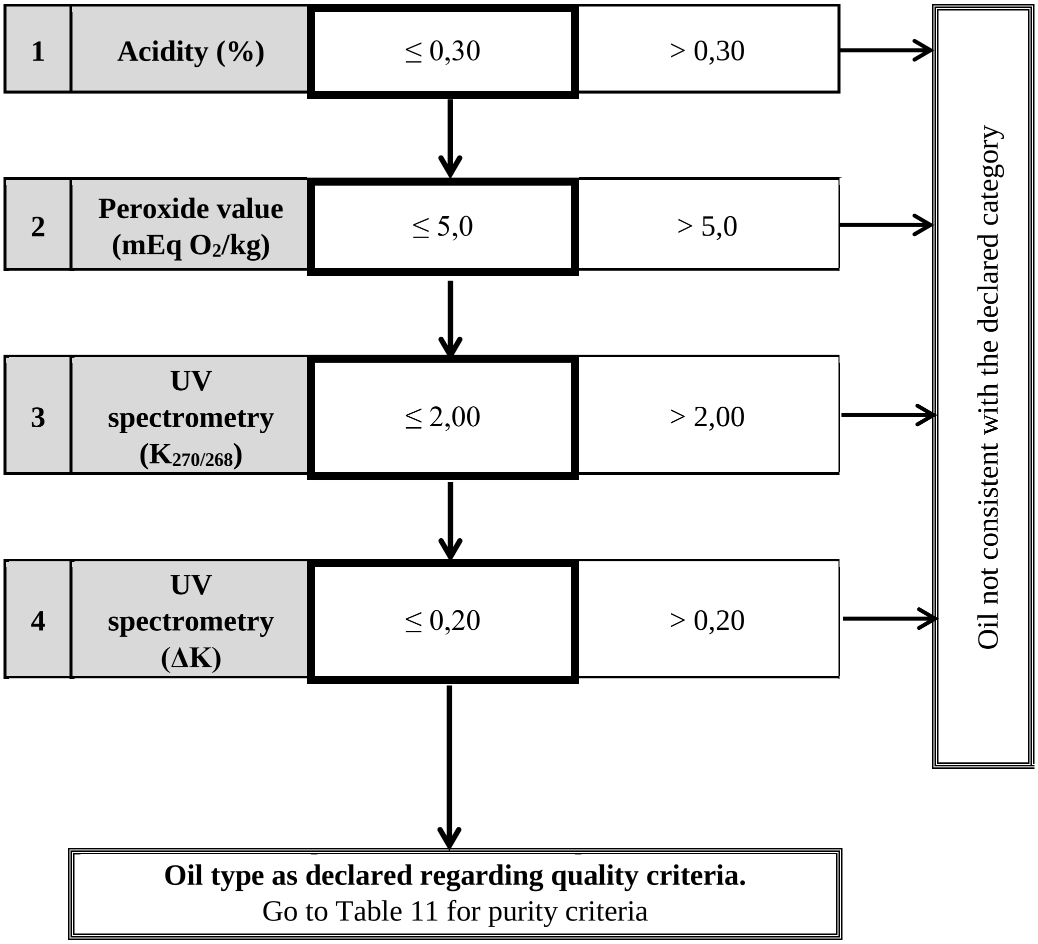
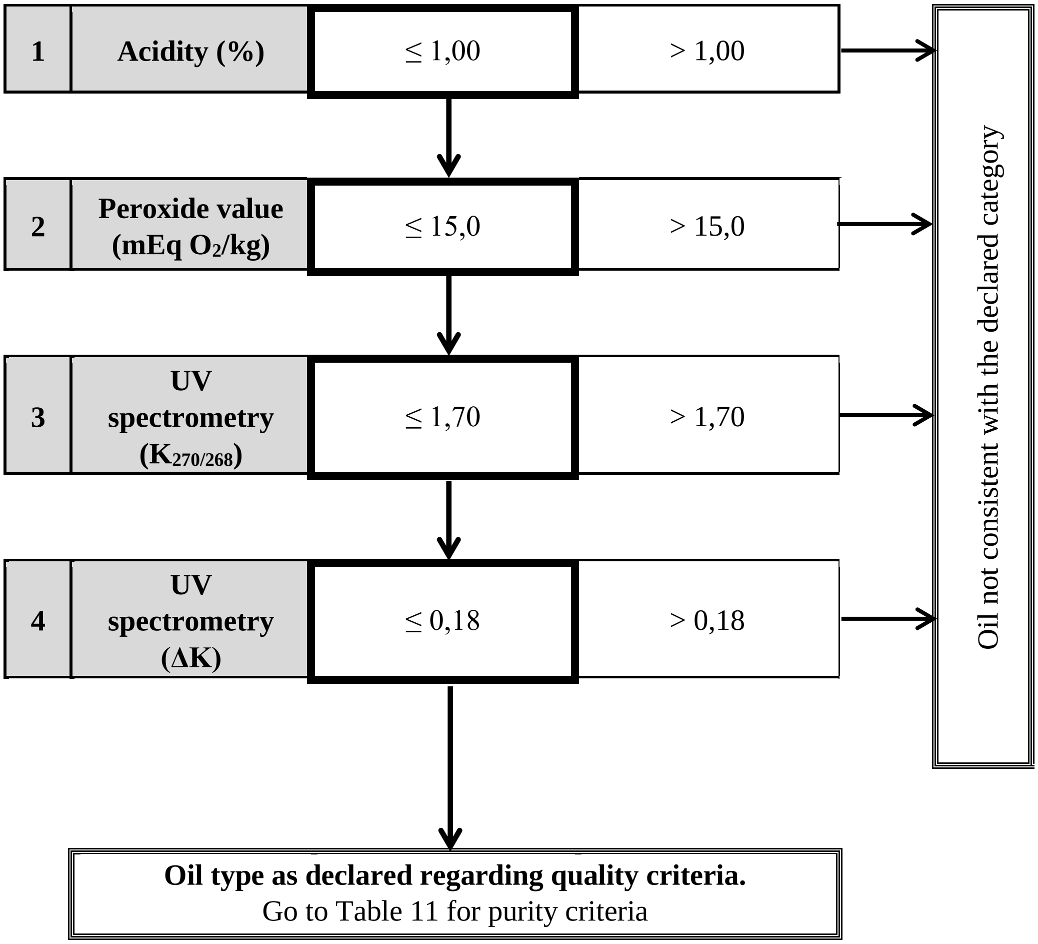


Table 10 — Olive-pomace oil — Quality criteria

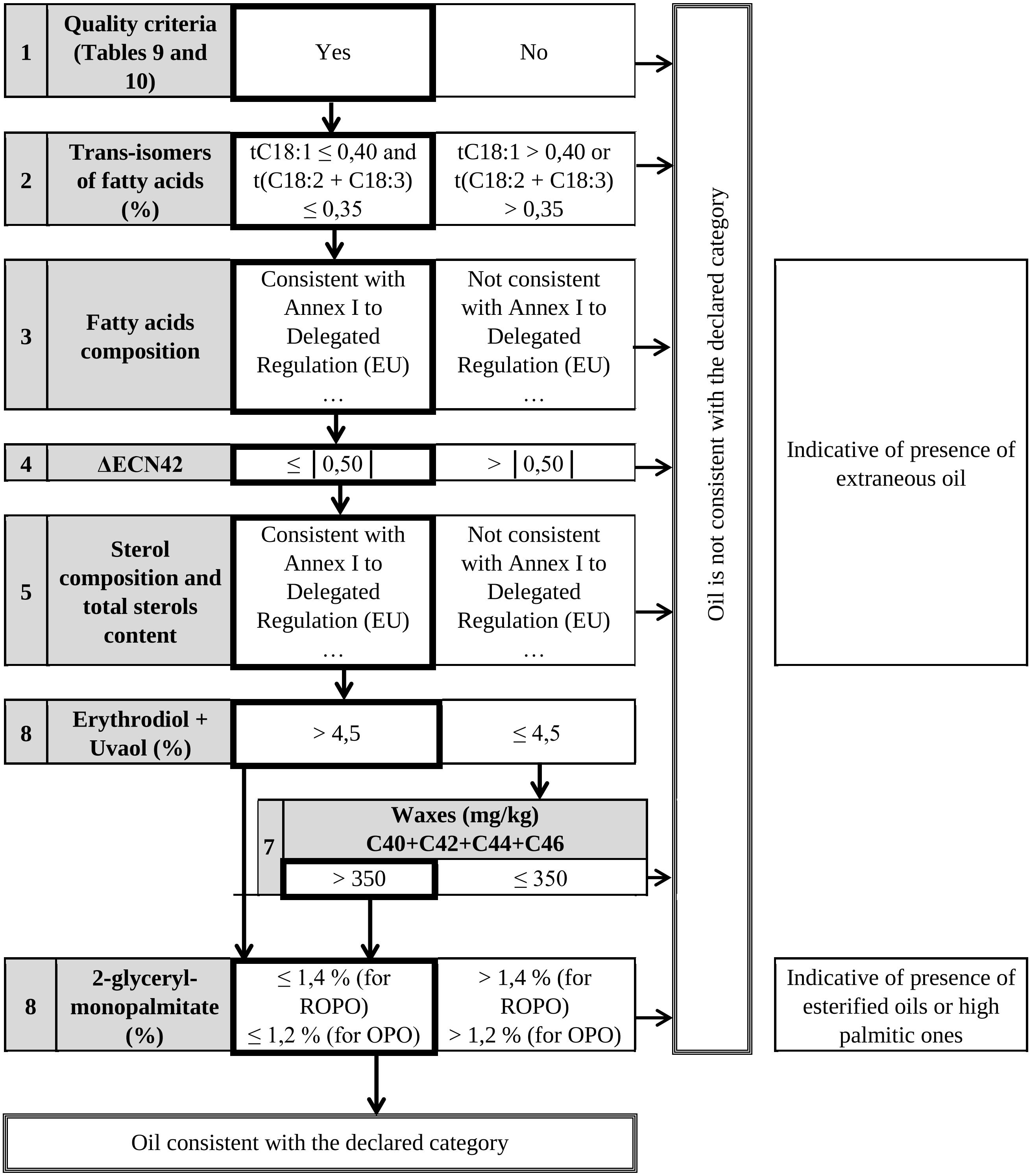


1	**Acidity (%)**	≤ 1,00	> 1,00
2	**Peroxide value (mEq O_2/kg)**	≤ 15,0	> 15,0
3	**UV spectrometry ($K_{270/268}$)**	≤ 1,70	> 1,70
4	**UV spectrometry (ΔK)**	≤ 0,18	> 0,18

Oil not consistent with the declared category

Oil type as declared regarding quality criteria.
Go to Table 11 for purity criteria

Table 11 — Refined olive-pomace oil and olive-pomace oil — Purity criteria



1	**Quality criteria (Tables 9 and 10)**	Yes	No
2	**Trans-isomers of fatty acids (%)**	tC18:1 ≤ 0,40 and t(C18:2 + C18:3) ≤ 0,35	tC18:1 > 0,40 or t(C18:2 + C18:3) > 0,35
3	**Fatty acids composition**	Consistent with Annex I to Delegated Regulation (EU) …	Not consistent with Annex I to Delegated Regulation (EU) …
4	**ΔECN42**	≤ ∣0,50∣	> ∣0,50∣
5	**Sterol composition and total sterols content**	Consistent with Annex I to Delegated Regulation (EU) …	Not consistent with Annex I to Delegated Regulation (EU) …
8	**Erythrodiol + Uvaol (%)**	> 4,5	≤ 4,5
7	**Waxes (mg/kg) C40+C42+C44+C46**	> 350	≤ 350
8	**2-glyceryl-monopalmitate (%)**	≤ 1,4 % (for ROPO) ≤ 1,2 % (for OPO)	> 1,4 % (for ROPO) > 1,2 % (for OPO)

Oil is not consistent with the declared category

Indicative of presence of extraneous oil

Indicative of presence of esterified oils or high palmitic ones

Oil consistent with the declared category

ANNEX IV

Method for measuring the oil content in olive cake and residues

1. MATERIALS

1.1. Apparatus

- suitable extraction apparatus fitted with a 200 to 250 ml round-bottomed flask,
- electrically heated bath (e.g., sand bath, water bath) or hotplate,
- analytical balance,
- oven regulated to a maximum of 80 °C,
- electrically heated oven fitted with a thermostatic device regulated to 103 ± 2 °C and one that can be swept with a stream of air or operated at reduced pressure,
- mechanical mill, easy to clean, and one that allows the olive residues to be ground without a rise in their temperature or any appreciable alteration in their content of moisture, volatile matter or substances extractable with hexane,
- extraction thimble and cotton wool or filter paper from which substances extractable with hexane have already been removed,
- desiccator,
- sieve with 1 mm diameter apertures,
- small particles of previously dried pumice stone.

1.2. Reagent

Normal hexane, technical grade, which must leave a residue of less than 0,002 g per 100 ml, on complete evaporation.

2. PROCEDURE

2.1. Preparation of the test sample

If necessary, use the mechanical mill, which has previously been properly cleaned, to grind the laboratory sample in order to reduce it to particles that can pass completely through the sieve.

Use about one twentieth of the sample to complete the process of cleaning the mill, discard the ground material, grind the remainder and collect, mix carefully and analyse without delay.

2.2. Test portion

As soon as the grinding operation has been completed, weigh out about 10 g of the sample to the nearest 0,01 g for testing.

2.3. Preparation of the extraction thimble

Place the test portion in the thimble and plug with cotton wool. If a filter paper is used, envelope the test portion in it.

2.4. Preliminary drying

If the olive residues are very moist (i.e., moisture and volatile matter content more than 10 %), carry out preliminary drying by placing the loaded thimble (or filter paper) in the oven heated for an appropriate time at not more than 80 °C in order to reduce the moisture and volatile matter content to less than 10 %.

2.5. Preparation of the round-bottomed flask

Weigh to the nearest 1 mg the flask containing one or two particles of pumice stone, previously dried in the stove at 103 ± 2 °C and then cooled in a desiccator for not less than one hour.

2.6. Initial extraction

Into the extraction apparatus insert the thimble (or filter paper) containing the test portion. Pour into the flask the requisite quantity of hexane. Fit the flask to the extraction apparatus and place the whole on the electrically heated bath. Adjust the rate of heating in such a way that the reflux rate is not less than three drops per second (moderate, not violent boiling). After four hours extraction, allow to cool. Remove the thimble from the extraction apparatus and place it in a stream of air in order to drive off most of the impregnating solvent.

2.7. Second extraction

Tip the contents of the thimble into the micro-grinder and grind as finely as possible. Return the ground mixture to the thimble without loss and place it back in the extraction apparatus.

Continue the extraction for a further two hours using the same round-bottomed flask containing the initial extract.

The resultant solution in the extraction flask must be clear. If not, filter it through a filter paper and wash the original flask and the filter paper several times with hexane. Collect the filtrate and the washing solvent in a second round-bottomed flask which has been dried and tared to the nearest 1 mg.

2.8. Removal of solvent and weighing of extract

Remove the greater part of the solvent by distillation on an electrically heated bath. Remove the last traces of solvent by heating the flask in the oven at 103 ± 2 °C for 20 minutes. Assist the elimination process either by blowing in air, or preferably an inert gas, at intervals or by using reduced pressure.

Leave the flask in a desiccator to cool for at least one hour and weigh to the nearest 1 mg.

Heat again for 10 minutes under the same conditions, cool in a desiccator and reweigh.

The difference between the two weightings shall not exceed 10 mg. If it does, heat again for periods of 10 minutes followed by cooling and weighing until the weight difference is 10 mg or less. Note the last weight of the flask.

Carry out duplicate determinations on the test sample.

3. EXPRESSION OF RESULTS

3.1. Method of calculation and formula

(a) The extract expressed as a percentage by mass of the product as received is equal to:

$$S = m_1 \times \frac{100}{m_0}$$

where:

S = is the percentage by mass of extract of the product as received,

m0 = is the mass, in grams, of the test portion,

m1 = is the mass, in grams, of the extract after drying.

Take as the result the arithmetic mean of the duplicate determinations, providing the repeatability conditions are satisfied.

Express the result to the first decimal place.

(b) The extract is expressed on a dry matter basis by using the formula:

$$S \times \frac{100}{100 - U} = \text{oil percentage of extract on a dry basis}$$

where:

S = is the percentage of extract by means of the product as received (see point (a)),

U = is its moisture and volatile matter content.

3.2. Repeatability

The difference between the duplicate determinations carried out simultaneously or in rapid succession by the same analyst shall not exceed 0,2 g of hexane extract per 100 g of sample.

If this condition is not satisfied, repeat the analysis on two other test portions. If, in this case too, the difference exceeds 0,2 g, take as the result the arithmetic mean of the four determinations.

ANNEX V

Form for reporting results of conformity checks referred to in Article 2(3) in conformity with Commission Delegated Regulation (EU) 2017/1183

				Labelling						**Chemical parameters**			**Organoleptic characteristics(4)**			**Final conclusion**	
Sample	**Category**	**Country of origin**	**Place of inspection(1)**	**Legal name**	**Place of origin**	**Storage conditions**	**Erroneous information**	**Legibility**	**C/NC(3)**	**Parameters out of limit** **Y/N**	**If so, please indicate which one(s)(2)**	**C/NC(3)**	**Median defect**	**Fruity Median**	**C/NC(3)**	**Required action**	**Sanction**

(1) Internal market (mill, bottlers, retail stage), export, import.

(2) Each characteristic of olive oil set out in Annex I to Delegated Regulation (EU) …/… [*reference to the DA to be adopted]* shall have a code.

(3) Conform/not conform.

(4) Required only for virgin olive oils within the meaning of Part VIII, point 1, of Annex VII to Regulation (EU) No 1308/2013