

COMMISSION IMPLEMENTING REGULATION (EU) 2016/1227**of 27 July 2016****amending Regulation (EEC) No 2568/91 on the characteristics of olive oil and olive-residue oil and on the relevant methods of analysis**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007 ⁽¹⁾, and in particular point (d) of the first paragraph and the second paragraph of Article 91 thereof,

Whereas:

- (1) Commission Regulation (EEC) No 2568/91 ⁽²⁾ defines the chemical and organoleptic characteristics of olive and olive-pomace oil and lays down methods of assessing those characteristics. Those methods are regularly updated on the basis of the opinion of chemical experts and in line with the work carried out within the International Olive Council (IOC).
- (2) In order to ensure the implementation at Union level of the most recent international standards established by the IOC, the method for the determination of free acidity and the method related to the organoleptic assessment of virgin olive oils set out in Regulation (EEC) No 2568/91 should be updated.
- (3) Regulation (EEC) No 2568/91 should therefore be amended accordingly.
- (4) The measures provided for in this Regulation are in accordance with the opinion of the Committee for the Common Organisation of the Agricultural Markets,

HAS ADOPTED THIS REGULATION:

Article 1

Regulation (EEC) No 2568/91 is amended as follows:

- (1) Annex II is replaced by the text set out in Annex I to this Regulation;
- (2) Annex XII is amended in accordance with Annex II to this Regulation.

Article 2

This Regulation shall enter into force on the seventh day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 27 July 2016.

For the Commission
The President
Jean-Claude JUNCKER

⁽¹⁾ OJ L 347, 20.12.2013, p. 671.

⁽²⁾ Commission Regulation (EEC) No 2568/91 of 11 July 1991 on the characteristics of olive oil and olive-residue oil and on the relevant methods of analysis (OJ L 248, 5.9.1991, p. 1).

ANNEX I

ANNEX II

DETERMINATION OF FREE FATTY ACIDS, COLD METHOD

1. SCOPE AND FIELD OF APPLICATION

This method describes the determination of free fatty acids in olive oils and olive pomace oils. The content of free fatty acids is expressed as acidity calculated as the percentage of oleic acid.

2. PRINCIPLE

A sample is dissolved in a mixture of solvents and the free fatty acids present titrated using a potassium hydroxide or sodium hydroxide solution.

3. REAGENTS

All the reagents should be of recognized analytical quality and the water used either distilled or of equivalent purity.

3.1 Diethyl ether; 95 % ethanol (v/v), mixture of equal parts by volume.

Neutralize precisely at the moment of use with the potassium hydroxide solution (3.2), with the addition of 0,3 ml of the phenolphthalein solution (3.3) per 100 ml of mixture.

Note 1: Diethyl ether is highly inflammable and may form explosive peroxides. Special care should be taken in its use.

Note 2: If it is not possible to use diethyl ether, a mixture of solvents containing ethanol and toluene may be used. If necessary, ethanol may be replaced by propanol-2.

3.2 Potassium hydroxide or sodium hydroxide, titrated ethanolic or aqueous solution, $c(\text{KOH})$ [or $c(\text{NaOH})$] about 0,1 mol/l or, if necessary, $c(\text{KOH})$ [or $c(\text{NaOH})$] about 0,5 mol/l. Commercial solutions are available.

The exact concentration of potassium hydroxide solution (or sodium hydroxide solution) must be known and checked prior to use. Use a solution prepared at least five days before use and decanted into a brown glass bottle with a rubber stopper. The solution should be colourless or straw coloured.

If phase separation is observed when using aqueous solution of potassium hydroxide (or sodium hydroxide), replace the aqueous solution by an ethanolic solution.

Note 3: A stable colourless solution of potassium hydroxide (or sodium hydroxide) may be prepared as follows. Bring to the boil 1 000 ml of ethanol or water with 8 g of potassium hydroxide (or sodium hydroxide) and 0,5 g of aluminium shavings and continue boiling under reflux for one hour. Distil immediately. Dissolve in the distillate the required quantity of potassium hydroxide (or sodium hydroxide). Leave for several days and decant the clear supernatant liquid from the precipitate of potassium carbonate (or sodium carbonate).

The solution may also be prepared without distillation as follows: to 1 000 ml of ethanol (or water) add 4 ml of aluminium butylate and leave the mixture for several days. Decant the supernatant liquid and dissolve the required quantity of potassium hydroxide (or sodium hydroxide). The solution is ready for use.

3.3 Phenolphthalein, 10 g/l solution in 95 to 96 % ethanol (v/v) or alkali blue 6B or thymolphthalein, 20 g/l solution in 95 to 96 % ethanol (v/v). In the case of strongly coloured oils, alkali blue or thymolphthalein shall be used.

4. APPARATUS

Usual laboratory equipment including:

- 4.1 Analytical balance;
- 4.2 250 ml conical flask;
- 4.3 10 ml burette class A, graduated in 0,05 ml, or equivalent automatic burette.

5. PROCEDURE

5.1 Preparation of the test sample

When the sample is cloudy, it should be filtered.

5.2 Test portion

Take a sample depending on the presumed acidity in accordance with the following table:

Expected acidity (oleic acidity g/100 g)	Mass of sample (g)	Weighing accuracy (g)
0 to 2	10	0,02
> 2 to 7,5	2,5	0,01
> 7,5	0,5	0,001

Weigh the sample in the conical flask (4.2).

5.3 Determination

Dissolve the sample (5.2) in 50 to 100 ml of the previously neutralized mixture of diethyl ether and ethanol (3.1).

Titrate while stirring with the 0,1 mol/l solution of potassium hydroxide (or sodium hydroxide) (3.2) (see Note 4) until the indicator changes (the colour of the coloured indicator persists for at least 10 seconds).

Note 4: If the quantity of 0,1 mol/l potassium hydroxide (or sodium hydroxide) solution required exceeds 10 ml, use the 0,5 mol/l solution or change the sample mass according to the expected free acidity and the proposed table.

Note 5: If the solution becomes cloudy during titration, add enough of the solvents (3.1) to give a clear solution.

Carry out a second determination only if the first result is higher than the specified limit for the category of the oil.

6. EXPRESSION OF RESULTS

Acidity as a percentage of oleic acid by weight is equal to:

$$V \times c \times \frac{M}{1\,000} \times \frac{100}{m} = \frac{V \times c \times M}{10 \times m}$$

where:

V = the volume of titrated potassium hydroxide solution (or sodium hydroxide) used, in millilitres;

c = the exact concentration in moles per litre of the titrated solution of potassium hydroxide (or sodium hydroxide) used;

M = 282 g/mol, the molar mass in grams per mole of oleic acid;

m = the mass of the sample, in grams.

Oleic acidity is reported as follows:

- (a) to two decimal places for values from 0 up to and including 1;
 - (b) to one decimal place for values from 1 up to and including 100.'
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ANNEX II

Annex XII to Regulation (EEC) No 2568/91 is amended as follows:

(1) point 3.3 is replaced by the following:

3.3. Optional terminology for labelling purposes

Upon request, the panel leader may certify that the oils which have been assessed comply with the definitions and ranges corresponding solely to the following terms according to the intensity and perception of the attributes.

Positive attributes (fruity, bitter and pungent): According to the intensity of perception:

- *Robust*, when the median of the attribute is more than 6;
- *Medium*, when the median of the attribute is between 3 and 6;
- *Delicate*, when the median of the attribute is less than 3.

Fruitiness Set of olfactory sensations characteristic of the oil which depends on the variety of olive and comes from sound, fresh olives in which neither green nor ripe fruitiness predominates. It is perceived directly and/or through the back of the nose.

Green fruitiness Set of olfactory sensations characteristic of the oil which is reminiscent of green fruit, depends on the variety of olive and comes from green, sound, fresh olives. It is perceived directly and/or through the back of the nose.

Ripe fruitiness Set of olfactory sensations characteristic of the oil which is reminiscent of ripe fruit, depends on the variety of olive and comes from sound, fresh olives. It is perceived directly and/or through the back of the nose.

Well balanced Oil which does not display a lack of balance, by which is meant the olfactory- gustatory and tactile sensation where the median of the bitter attribute and the median of the pungent attribute are not more than 2 points above the median of the fruitiness.

Mild oil Oil for which the median of the bitter and pungent attributes is 2 or less.

List of terms according to the intensity of perception:

Terms subject to production of an organoleptic test certificate	Median of the attribute
Fruitiness	—
Ripe fruitiness	—
Green fruitiness	—
Delicate fruitiness	Less than 3
Medium fruitiness	Between 3 and 6
Robust fruitiness	More than 6
Delicate ripe fruitiness	Less than 3
Medium ripe fruitiness	Between 3 and 6

Terms subject to production of an organoleptic test certificate	Median of the attribute
Robust ripe fruitiness	More than 6
Delicate green fruitiness	Less than 3
Medium green fruitiness	Between 3 and 6
Robust green fruitiness	More than 6
Delicate bitterness	Less than 3
Medium bitterness	Between 3 and 6
Robust bitterness	More than 6
Delicate pungency	Less than 3
Medium pungency	Between 3 and 6
Robust pungency	More than 6
Well balanced oil	The median of the bitter attribute and the median of the pungent attribute are not more than 2 points above the median of the fruitiness
Mild oil	The median of the bitter attribute and the median of the pungent attribute are not more than 2'

(2) point 9.1.1 is replaced by the following:

'9.1.1. The tasters shall pick up the glass, keeping it covered with the watch-glass, and shall bend it gently; they shall then rotate the glass fully in this position so as to wet the inside as much as possible. Once this stage is completed, they shall remove the watch-glass and smell the sample, taking slow deep breaths to evaluate the oil. Smelling should not exceed 30 seconds. If no conclusion has been reached during this time, they shall take a short rest before trying again.

When the olfactory test has been performed, the tasters shall then evaluate the buccal sensations (overall retronasal olfactory, gustatory and tactile sensations). To do so, they shall take a small sip of approximately 3 ml of oil. It is very important to distribute the oil throughout the whole of the mouth cavity, from the front part of the mouth and tongue along the sides to the back part and to the palate support and throat, since it is a known fact that the perception of tastes and tactile sensations varies in intensity depending on the area of the tongue, palate and throat.

It should be stressed that it is essential for a sufficient amount of the oil to be spread very slowly over the back of the tongue towards the palate support and throat while the taster concentrates on the order in which the bitter and pungent stimuli appear. If this is not done, both of these stimuli may escape notice in some oils or else the bitter stimulus may be obscured by the pungent stimulus.

Taking short, successive breaths, drawing in air through the mouth, enables the taster not only to spread the sample extensively over the whole of the mouth but also to perceive the volatile aromatic compounds via the back of the nose by forcing the use of this channel.

NB: When the tasters do not perceive fruitiness in a sample and the intensity of the classifying negative attribute is 3,5 or less the panel leader may decide to arrange for the tasters to analyse the sample again at ambient temperature (COI/T.20/Doc. No 6/Rev. 1, September 2007, section 3 — General specifications for installation of a test room) while specifying the context and concept of ambient temperature. When the sample reaches room temperature, the tasters should re-assess it to check solely whether fruitiness is perceived. If it is, they should mark the intensity on the scale.

The tactile sensation of pungency should be taken into consideration. For this purpose it is advisable to ingest the oil.'

(3) point 9.4 is replaced by the following:

‘9.4. Classification of the oil

The oil is graded as follows in line with the median of the defects and the median for the fruity attribute. The median of the defects is defined as the median of the defect perceived with the greatest intensity. The median of the defects and the median of the fruity attribute are expressed to one decimal place.

The oil is graded by comparing the median value of the defects and the median of the fruity attribute with the reference ranges given below. The error of the method has been taken into account when establishing the limits of these ranges, which are therefore considered to be absolute. The software packages allow the grading to be displayed as a table of statistics or a graph.

- (a) Extra virgin olive oil: the median of the defects is 0 and the median of the fruity attribute is above 0;
- (b) Virgin olive oil: the median of the defects is above 0 but not more than 3,5 and the median of the fruity attribute is above 0;
- (c) Lampante virgin olive oil: the median of the defects is above 3,5 or the median of the defects is less than or equal to 3,5 and the fruity median is equal to 0.

Note 1: When the median of the bitter and/or pungent attribute is more than 5,0, the panel leader shall state so on the test certificate.

For assessments intended to monitor compliance, one test shall be carried out. In the case of counter assessments, the analysis must be carried out in duplicate in different tasting sessions. The results of the duplicate analysis must be statistically homogenous. (See point 9.5). If not, the sample must be reanalysed twice again. The final value of the median of the classification attributes will be calculated using the average of both medians.’

(4) the following point 9.5 is added:

‘9.5 Criteria for the acceptance and rejection of duplicates

The normalised error, defined below, shall be used to determine whether the two results of a duplicate analysis are homogenous or statistically acceptable:

$$E_n = \frac{|Me_1 - Me_2|}{\sqrt{U_1^2 + U_2^2}}$$

Where Me_1 and Me_2 are the medians of the two duplicates (respectively first and second analysis) and U_1 and U_2 are the expanded uncertainties obtained for the two values, calculated as follows as specified in Appendix:

$$U_1 = c \times s^* \text{ and } s^* = \frac{(CV_r \times Me_1)}{100}$$

For the expanded uncertainty, $c = 1,96$; hence:

$$U_1 = 0,0196 \times CV_r \times Me_1$$

where CV_r is the robust coefficient of variation.

For it to be stated that the two values obtained are not statistically different, E_n must be equal to or less than 1,0.’
