DECISION No. DEC-III.2/111-VI/2020

ADOPTING THE REVISION OF THE ORGANOLEPTIC ASSESSMENT METHOD FOR VIRGIN OLIVE OILS

THE COUNCIL OF MEMBERS OF THE INTERNATIONAL OLIVE COUNCIL

Having regard to the International Agreement on Olive Oil and Table Olives 2015, in particular article 1 “Objectives of the Agreement” as regards standardisation and research concerning the uniformity of national and international legislation, and Chapter VI “Standardisation provisions”;

Having regard Resolution No. RES-5/56-IV/87 of 18 June 1987 adopting method COI/T.20/Doc. no 3 "Organoleptic assessment of virgin olive oil" and standards COI/T.20/Doc. nº 4 "Sensorial analysis: Basic general vocabulary", COI/T.20/Doc. nº 5 "Glass for oil tasting" and COI/T.20/Doc. nº 6 "Guide for setting up a tasting room" and document COI/IGS/Doc. no 8/corr.2; resolution No. RES-2/71-IV/94 of 17 November 1994 provisionally adopting the method "Organoleptic assessment of virgin olive oil" COI/T.20/Doc. No. 15, and the standards COI/T.20/Doc. No. 13 "General methodology for the organoleptic assessment of virgin olive oil", COI/T.20/Doc. No. 14 "Guide for selecting, training and monitoring qualified virgin olive oil tasters" and which confirmed the validity of the standards COI/T.20/Doc. No. 4, COI/T.20/Doc. No. 5 and COI/T.20/Doc. No. 6 of 18 June 1987; Resolution No. RES- 3/75-IV/96 of 20 November 1996 adopting method COI/T.20/Doc. No. 15/rev 1, standards COI/T.20/Doc. No. 13, COI/T.20/Doc. No. 14/rev. 1 and confirming the validity of standards COI/T.20/Doc. No. 4 COI/T.20/Doc. No. 5 and COI/T.20/Doc. No. 6; Decision No. DEC-21/95-V/2007 adopting the revision of method COI/T.20/Doc. No. 15/rev. 2 and standards COI/T.20/Doc. No. 13/rev. 1, COI/T.20/Doc. No. 14/rev. 2, COI/T.20/Doc. No. 4 /rev. 1, COI/T.20/Doc. No. 5/rev. 1 and COI/T.20/Doc. No. 6/rev. 1; Decision of 2010 adopting the revision of method COI/T.20/Doc. No. 15/rev. 3; Decision No. DEC-20/99-V/2011 adopting the revision of method COI/T.20/Doc. No. 15/rev. 4 and standard COI/T.20/Doc. No. 14/rev. 3; Decision- of 2012 adopting the revision of method COI/T.20/Doc. No. 15/rev. 5; Decision No. DEC-18/100-V/2013 adopting method COI/T.20/Doc. No. 15/rev. 6 and revision of standard COI/T.20/Doc. No. 14/rev. 4; Decision No. DEC-6/S.ex.23-V/2015 adopting the revision of method COI/T.20/Doc. No. 15/rev. 7; Decision 14/103-V/2015 adopting the revision of method COI/T.20/Doc. No. 15/rev. 8; Decision DEC-III.15/106-VI/2017 adopting the revision of method COI/T.20/Doc. nº 15/rev. 9, and Decision DEC-III.6/107-VI/2018 adopting the revision of standard COI/T.20/Doc. nº 14/rev. 5 and method COI/T.20/Doc. nº 15/rev. 10.

Whereas the unanimity of the experts on organoleptic assessment designated by Members at their meeting on 19 and 20 September 2019, a proposal was put forward to revise documents COI/T.20/Doc. No. 14/Rev. 5, harmonised with the new version of the *Guide for panel accreditation,* and COI/T.20/Doc. No. 5/Rev. 1, point 2.3 “Rules of use”;

DECIDES

To adopt the revised methods COI/T.20/Doc. No. 14/Rev. 6 and COI/T.20/Doc. No. 5/Rev. 2, which can be found in annex to this Decision, which replace and revoke the methods COI/T.20/Doc. No. 14/Rev. 5, of 21 June 2018 and COI/T.20/Doc. No. 5/Rev. 1, of 16 November 2007.

Tbilisi (Georgia), 1 April 2020

Mr. George Svanidze
Chair of the International Olive Council

INTERNATIONAL
OLIVE
COUNCEL

COI/T.20/Doc. No 14/Rev. 6
2020

ENGLISH
Original : FRENCH

Príncipe de Vergara, 154 – 28002 Madrid – España Tel : +34 915 903 638 Fax : +34 915 631 263 - e-mail : iooc@internationaloliveoil.org - http ://www.internationaloliveoil.org/

SENSORY ANALYSIS OF OLIVE OIL

STANDARD

GUIDE FOR THE SELECTION, TRAINING AND QUALITY CONTROL OF VIRGIN OLIVE OIL TASTERS-QUALIFICATIONS OF TASTERS, PANEL LEADERS AND TRAINERS.

1. PURPOSE

The purpose of this guide is to provide panel leaders with the essential criteria and procedures for selecting, training and monitoring tasters of their sensory analysis panel. This guide also defines some of the requirements and qualifications of tasters, panel leaders and trainers of virgin olive oil tasters they should have.

2. FIELD OF APPLICATION

This guide is a reference tool for the initial training and qualifications of any person or group of people who intend to become tasters of virgin olive oil as well as for the continuous training of skilled tasters. Moreover, this guide is applicable to any person who intends to become a panel leader or a trainer in the sensory analysis of virgin olive oil.

3. SELECTION OF TASTERS

Organoleptic or sensory assessment of a virgin olive oil is the perception and the description of both its qualitative and quantitative flavor characteristics using human senses (smell and taste) and its classification on the basis of those characteristics, as determined by a group of tasters selected, trained and monitored as a panel. Consequently, the measuring instrument in the sensory analysis is the group of tasters. For this reason, the selection and training of sensory assessors (tasters) needs to be conducted with attention and care.

Detailed guidance on the recruitment, selection, training and monitoring of candidates intending to become sensory assessors can be found in ISO 8586 “Sensory analysis — General guidelines for the selection, training and monitoring of selected assessors and expert sensory assessors”. In addition, ISO 5496 “Sensory analysis. Methodology. Initiation and training of assessors in the detection and recognition of odours” and ISO 3972 “Sensory analysis. Methodology. Method of investigating sensitivity of taste” describe several types of method for a preliminary categorization of sensory assessors with regard to their sensitivity to odours and tastes.

Since the above Standards are applicable to assessors involved in any sensory analysis, special procedures for the sensory assessors (tasters) of virgin olive oil have been scientifically studied. On the basis of these studies, the described below procedures (§3.2. and 3.3.) are proposed as a preliminary stage, for the determination of the olfactory discriminatory ability of people who intend to become tasters of virgin olive oil.

It is recommended the application of ISO 3972 in order to be determined the gustatory sensitivity of tasters of virgin olive oil, as well.

3.1. Screening of candidates

Screening shall be carried out by the panel leader who shall personally interview the candidates to become familiar with their personal background and history. The physio-psychological conditions that have to be met are not very rigorous since, theoretically, any normal person should be able to perform this work. Factors such as sex, age, specific habits (smoking), etc. have been superseded nowadays by others such as health, personal interest and time availability for the work in hand.

During the interview, the panel leader shall explain to the candidates the requirements and the time commitment needed for the task. By interviewing, the panel leader should be able to determine the degree of interest, motivation and time availability of the candidates. The following questionnaire could help as a reference.

QUESTIONNAIRE

Please answer the following questions:	**YES**	**NO**
1. Would you like to be involved in this type of work?		
2. Do you think that sensory analysis can contribute to the improvement of food product quality, both nationally and internationally?		
3. If so, why?[1]		
4. You should be aware of the fact that you will have to taste oils when called upon to do so. Would you be prepared to do this?		
5. Would you mind if your olfactory-gustatory skills were compared to those of your colleagues?		
6. Do you have enough free time? Do you have a degree of independence that allows you to plan your daily work commitments according to your wishes?		
7. If you report to someone at work, would you be excused from your usual duties for at least half an hour, on several occasions and over a successive number of days?[2]		
8. Would you be able to make up for any time lost at work due to your participation in a sensory analysis session?		

The panel leader shall use this information to screen the candidates and shall reject those who show little interest in this kind of work, are not readily available or who are incapable of expressing themselves clearly as sensory analysis requires good verbal communication skills when defining and describing the attributes of a food product.

[1] Describe what could be gained from the sensory analysis of a food product, or specifically, of olive oil.
[2] You should be aware that sensory analysis is a lab work not too much different to other duties in it.

3.2. Determination of the detection threshold of the group of candidates for characteristic attributes

Detection or stimulus threshold is the minimum value of a sensory stimulus which gives rise to the appearance of a sensation and **recognition threshold** is the minimum value of a sensory stimulus which gives rise to the identification of a sensation (ISO 5496 "Sensory Analysis - Methodology - Initiation and Training of Assessors in Detection and Recognition of Odours" and COI / T.20 / Doc. No. 4 “Sensory analysis of olive oil: general basic vocabulary”).
Since a person's degree of sensitivity to different stimuli may offer the best way of determining his ability to distinguish slight variations between stimulies, it is only logical that these perception thresholds have been scientifically and technologically studied. It is therefore a means of choosing the assessors or tasters that show most ability in the sensory assessment of foods.

By the below described procedure **the detection threshold** is determined that is, the minimum concentration of a stimulus that a taster can detect. It is done with paired difference tests for four (4) characteristic attributes found in virgin olive oils, where the tasters are not called to recognize the attribute but only to state whether or not they detect a stimulus.

The determination of the recognition threshold is based on triangular and paired tests, but its practical application requires spending a lot of time. In this case, the tasters not only should detect the appearance of a sensation but also they should recognise the present attribute.

It is considered that the determination of the detection threshold rather than of the recognition threshold is a satisfactory process for a preliminary selection of tasters of virgin olive oil, since in the next stages of their training, they will be trained in identifying and quantifying the different attritutes.

The purpose of the procedure "Determination of the detection threshold" is

- to determine the C10 sample of the series of 12 samples used in the next test "Selection of tasters by the intensity rating method"
- to determine the detection threshold of the panel.
- to reject the tasters (optional) who do not have the discriminatory ability in the perception of low concentrations of characteristic attributes found in virgin olive oils (including the cases of specific anosmia).

Cases of total odour blindness (anosmia) are rare, but specific anosmia, inability to detect specific odours, is not uncommon. For this reason, tasters should be selected using odours similar to those to be tested eventually. For example, if a person has not the ability to detect the attribute rancid in low concentrations, he or she is not suitable to become a taster of virgin olive oil.

3.2.1. Procedure

The panel leader shall carefully choose four oils, each one being representative of characteristics attributes usually found in virgin olive oils (e.g. fusty, winey, rancid and bitter) with the greatest and clearest intensity possibly found or available.

Notes:

a) The 4 attributes for the determination of the detection threshold could be different than those referred in this document. For example, any of the defect (fusty, winey, rancid) can be substituted by another available defect (e.g. musty, frozen olives) and bitter can be substituted by fruity attribute.

b) A reference sample for “bitterness” could be prepared by diluting a solution of caffeic acid or gingerol or quinine in a concentration predetermined and same for all the candidates.

c) It is highly recommended that the initial oil used for each attribute is characterized by robust intensity of the relevant attribute, possibly around 8.0 so that the determined detection threshold of the group for each attribute by the various panels around the world is similar.

The panel leader shall prepare a series of samples for each of the oils in descending concentrations (1/2) by making successive dilutions in a medium (refined oil or paraffin).

The series shall be considered complete when no difference can be detected between two successive samples of the series and the medium. The panel leader shall then choose the seven samples prior to these last two from the prepared series.

Paired difference tests by smelling shall be carried out to determine the detection threshold of each candidate and thus to establish the detection threshold of the group. Each candidate is presented with up to a total of 8 pairs of samples, randomly presented and in successively independent tests (the pairs comprise one of each of the seven samples chosen and a blank medium, plus one pair of blank mediums). After each test, the candidates shall be asked whether the two samples are identical or different. The detection threshold of a candidate is the concentration of that diluted sample which he or she finds to be different from the glass of blank medium, while this is not the case with the next more diluted sample.

Taking into account that each measurement that constitutes the answer of a question corresponds to one some degree in the actual measurement of the assessment of the studied parameter and, on the other, in an internal random error, this determination should be carried out very carefully in order to minimize the random error (e.g. recognition of difference between the glass of the last dilutions and the glass of blank medium by chance, not well understanding of the content of the question by the candidates, sensory fatigue of candidates).

For this reason, it is recommented two glasses of blank medium to be given to each candidate, as well.

In case that the candidate answers that there is difference in the pair of blank mediums given to him or he/she recognizes difference in the pair of a diluted sample and a blank medium while he/she does not recognize difference in the pair of a more concentrated sample and a blank medium, the tests should be repeated in order to reach in the correct determination of the detection threshold of the candidate.

3.2.2. Record and statistical processing of results

Upon completion of the tests, the panel leader shall record the correct answers of the set of candidates for each concentration and shall express them as a percentage.

The leader shall plot the tested concentrations along the x-axis and the percentages of correct answers along the y-axis and then, by interpolation of the curve, shall determine the detection threshold which is the concentration corresponding to 75% correct answers. A practical example of this procedure is given in Figure 1.

This "threshold concentration", which may be different for each of the oils used as the number of dilutions to be made depends on the initial intensity of the attribute of the oil, should be similar for the different groups of candidates to various panels; it is not linked to any habit or preference. Consequently, it is a point of reference common to any normal human group and may be used to homogenise the different panels on the basis of their olfactory-gustatory sensitivity.

The leader can use instead of the fixed critical value 75%, the critical values provided by the ISO 5495 “Sensory analysis-Methodology-Paired comparison test”. These values have been calculated taking into account the number of assessors and the significance level.

The minimum number of correct answers required to conclude that a perceptible difference exists at the signicance level 0.05 are given in the following table:

number of assessors	CRITICAL VALUES at signicance level 0.05		number of assessors	CRITICAL VALUES at signicance level 0.05	
	Correct responses	% correct responses		Correct responses	% correct responses
12	10	83	26	18	69
13	10	77	27	19	70
14	11	79	28	19	68
15	12	80	29	20	69
16	12	75	30	20	67
17	13	76	31	21	68
18	13	72	32	22	69
19	14	74	33	22	67
20	15	75	34	23	68
21	15	71	35	23	66
22	16	73	36	24	67
23	16	70	37	24	65
24	17	71	38	25	66
25	18	72	39	26	67

For values of number of assessors not included in the Table, the minimum number of correct answers is equal to the nearest whole number greater than x

$$x = \frac{n+1}{2} z\sqrt{0.25n}$$

where x= minimum number of correct ansewrs required to conclude that a perceptible difference exists, n=number of assessors and z varies as a fuction of the significance level (z=1.28 for significance level 0.10, z=1.64 for significance level 0.05 and z=3.09 for significance level 0.01).

If the above procedure is repeated for the other three attributes on the basis of their respective thresholds which are also calculated as indicated above, scales with similar intensities for each stimulus will be obtained for all the laboratories, irrespective of the fact that the attributes of the primary oils may be detected at different dilution levels.
This threshold concentration shall be C10 in the series of samples prepared to select tasters by the intensity rating method (section 3.3.).

Example no 1: Determination of the detection threshold of the group for rancid attribute.

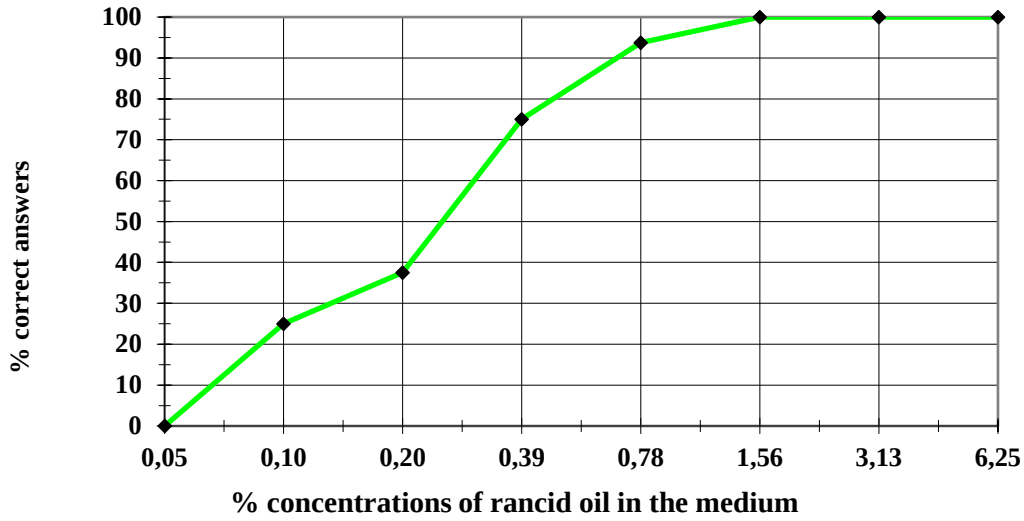

Figure 1. Determination of the detection threshold of the group (threshold is the concentration corresponding to the 75% of the correct answers).

In this example, the detection threshold of the group for the attribute rancid is concentration 0.39.

3.3. Selection of tasters by the intensity rating method

During the selection procedure, there should be two to three times more candidates than those required for the panel, when it is possible, so that the people with the best sensitivity or discriminatory skills can be chosen. It is always advisable to use the same product as the one that is to be subsequently analysed.

When selecting the method, it should not be overlooked that, apart from being effective, the procedure adopted should be as economical as possible in terms of the quantity of oil, the number of samples to be used and the time spent on selection. The effectiveness of a selection procedure lies in the choice of the optimum levels of the following three dependent variables: (a) cost determined by the number of tests, (b) proportion of potentially suitable candidates who by chance have been unfortunately eliminated during screening and (c) proportion of candidates who by chance have passed the selection process, although not suitable.

This selection procedure chosen is as described by F. Gutiérrez Rosales et al. (Selección de catadores mediante el método de clasificación por intensidad, Grasas y Aceites Vol. 35, 1984.).

Products Required

- Liquid paraffin food grade (DAB, PhEur, BP, USP) or an oily medium without any taste or odour (recently and strongly refined olive oil or another similar oil).
- Oils: fusty, winey, rancid or any other defect (e.g. musty, frozen olives) and bitter or fruitiness.

3.3.1. Procedure

Start the selection process in accordance with the methodology described hereafter for each stimulus/attribute:

On the basis of the detection threshold concentration obtained for the group, proceed as follows:

Prepare a series of 12 samples in such a way that the detection threshold concentration holds the 10th place in the series. Naturally, the 11th and 12th concentrations will be more diluted, as a result of which it will be more difficult to detect the presence of the selected attribute in these samples.

Taking the C10 concentration as the basis, the remaining samples are prepared in accordance with the following formula:

C10 x b^n, where "b" is a constant (the dilution factor) equal to 1.5 and "n" is the exponent which varies between 9 and -2.

The dilution factor should not be necessarily the same for all the attributes. The dilution factor 1.5 is very satisfactory for the preparation of the twelve samples of the attributes fusty, rancid, winey or musty, since the diluted samples cause appreciable stimuli to a sensitive person until the dilution 11 or 12. However in case of stimulus bitter, the perception is lost very soon, so that for the preparation of the successive samples of this series it is recommended the use of a fixed concentration difference of 8% and not a fixed dilution factor (COI/IOS/Doc. No 2-June 1983 Programme collaboratif pour la mise au point d'une méthode internationale de determination des characteristiques organoleptiques des huiles d'olive vierges: méthode de selection des dégustateurs).

A general rule for the correct preparation of these samples is that the successive dilutions in each attribute should be done in such a way that in the last two dilutions it is rather difficult to be detected the relevant attribute.

Example no 1: if the detection threshold obtained for rancid oil is 0.39, then C10 = 0.39. Since " b " = 1.5, the series of samples would have the following concentrations:

Sample	1	2	3	4	5	6	7	8	9	10	11	12
Conc.	14.99	10.00	6.66	4.44	2.96	1.97	1.32	0.88	0.58	0.39	0.26	0.17

Example no 2: if the detection threshold obtained for bitter oil is 19%, then C10 = 19. If a fixed concentration difference of 8% is used in this case, the series of samples would have the following concentrations:

Sample	1	2	3	4	5	6	7	8	9	10	11	12
Conc.%	91	83	75	67	59	51	43	35	27	19	11	3

Then, prepare 12 coded tasting glasses (one series per candidate) and pour 15 mL of each prepared concentration into a respective tasting glass.

It is advisable to leave these glasses covered with a watch glass in the tasting room at a temperature of 20–25 ºC for at least an hour before starting the tests so that the samples reach ambient temperature.

The leader shall then arrange the 12 tasting glasses of each series in a row of descending order of concentration.

The next step is to ask each candidate to perform the test on their own, in accordance with the instructions given in §3.3.2.

The tests are limited only to smelling and exclude tasting, in order to avoid the use of large quantities of reference materials and to prevent the sensory fatigue of candidates. If reference materials prepared in the lab are available, especially in case of the attribute bitter, the tests could involve both smelling and tasting.

3.3.2. Instructions for candidates

The 12 tasting glasses lined up in front of the candidates contain dilutions of one attribute (fusty/muddy sediment or rancid or winey or any other defect or bitter or fruity). The distinguishing factor between the contents of the tasting glasses is their intensity. The glass with the greatest intensity is on the far left-hand side (tasting glass no.1) and the rest of the glasses are placed in descending order of intensity towards the right. The last tasting glass on the right (tasting glass no.12) may have such a weak intensity that it is impossible to detect.

Proceed as follows: Become familiar with the odour of each of the tasting glasses in the series. To do so, begin smelling from the right-hand side (tasting glass no. 12) and try to retain the intensity of all the odours, without becoming overtired.

When you feel that you have got used to the scale of concentrations of the odour, leave the room.

Meanwhile, the leader shall remove one of the tasting glasses from the series and shall place it on a level with the last one on the right-hand side (tasting glass no. 12), moving all the others together in order to fill in the space of the removed tasting glass. Then return to the room and carry out the test, which includes the following:

The tasting glass withdrawn from the series has to be put back in its exact position. In order to do so, smell it and compare it with the others as often as needed, bearing in mind that if it is to be placed back in its correct position, its intensity should be stronger than the sample on its immediate right and weaker than that on its left. This test is repeated with three other glasses of the same series.

Each candidate shall be issued a form, in order to make the test and the collection of the replies easier.

SELECTION OF CANDIDATES
Sheet for the candidate

Attribute:.....

Test no.:.....

The glass taken out belongs to position no.:.....

Date:.....

Name:.....

3.3.3. Record of results

The panel leader shall record the data for each of the candidates in the following way to facilitate their arrangement:

Name of candidate	Attribute studied	Number of order given (K')	Exact no. of order (K)	Grading $(K'-K)^2$

3.3.4. Statistical scoring procedure

In this particular selection procedure, the tasting glasses that have to be placed back in their exact position shall be the same for all the candidates. According to the statistical calculations done for this purpose, the exact positions of each attribute shall correspond to the following positions in the order of their respective series.

Attribute	1	2	3	4
Glass no.	(10,5,7,2)	(11,3,8,6)	(7,4,10,2)	(6,3,11,9)

The number corresponding to the position of the glasses in the order of the series may not vary since the statistical calculations for this test have been done taking into account the probability of the glasses being randomly placed back in their exact position.

In order to make it extremely difficult for any information to be passed on from one candidate to another, the panel leader shall ensure that:

1) **THERE IS NO POSSIBLE MEANS OF CONTACT BETWEEN THE CANDIDATES. DIFFERENT CODES SHALL BE USED FOR EACH CANDIDATE.**

2) **THERE IS NO WAY IN WHICH THE CANDIDATES CAN FIND OUT THE POSITION OF THE GLASSES WHICH HAVE BEEN WITHDRAWN.**

3) EVEN THOUGH ALL THE CANDIDATES SHALL BE PRESENTED WITH THE SAME GLASSES INDICATED EARLIER ON, THE ORDER IN WHICH THEY ARE HANDED OVER TO EACH CANDIDATE SHALL VARY.

Each candidate shall then be given a score, depending on their performance, in the following manner:

Let e^i_1 , e^i_2, ... e^i_{12} be the 12 glasses with the 12 corresponding concentrations of attribute "i" (i may be any one of the 4 attributes) arranged in descending order of intensity.

Let e^i_K be one of the glasses removed and K' the position assigned by the candidate when placed back in the series. Therefore, the values of K and K' are whole numbers between 1 and 12 inclusive, corresponding to the real place number of the glass chosen and that assigned by the candidate respectively.

Let T (maximum permitted deviation) be a value set beforehand, which in this case is equal to 3, so that if $|K' - K| > T$, the candidate is automatically rejected. The panel leader should encourage the candidate to proceed reasonably, that is to say without losing any sensitivity through olfactory or gustatory fatigue.

If, on the contrary, $|K' - K| \leq T$, theoretically the candidate is accepted and may go on with the test since he or she is able to place the tasting glass back in its exact position or in a position very close to this.

In this case, the score awarded to a candidate who has assessed one concentration, for instance in the fusty series (Fy), shall be equal to the square of the difference between the exact number of the glass (K) in the order of the series and the position in which the candidate has placed back it (K'). That is to say:

$$P^{(Fy)}_h = (K' - K)^2$$

where P is the partial score of a candidate in the h number of test (h takes the values 1, 2, 3, 4) for the attribute fusty (Fy).

As this procedure will be carried out by each candidate for 4 concentrations of the series of each of the 4 attributes, the partial score of a candidate for one attribute (e.g. Fy) would be:

$$Z^{Fy} = P^{Fy}_1 + P^{Fy}_2 + P^{Fy}_3 + P^{Fy}_4$$

Examples are provided below to facilitate understanding of this procedure.

Example no. 1: Let us assume that the answers given by candidate A for the four tasting glasses removed from the series for attribute (i) are as follows:

Exact position of the glass in the series (K)	Position in which it was placed back by the candidate (K')	Deviation from the exact position (K' - K)
7	7	7 - 7 = 0
4	5	4 - 5 = -1
10	6	10 - 6 = 4(*)
2	4	2 - 4 = -2

(*) This candidate is rejected because he or she has obtained a score of $|K' - K| > 3$ in the third test for the attribute i.

Example no. 2: Let us assume that a candidate rearranges the four tasting glasses for an attribute as follows:

Exact position of the glass in the series (K)	Position in which it was placed back by the candidate (K')	Deviation from the exact position (K' - K)
7	7	7 - 7 = 0
4	4	4 - 4 = 0
10	7	10 - 7 = 3
2	3	2 - 3 = -1

This candidate is not rejected, having obtained a score of:

$$Z^i = 0^2 + 0^2 + 3^2 + (-1)^2 = 10$$

The candidate's final score, confirming their acceptance or rejection for selection as a taster, depending on the responses to the four attributes under consideration, is as follows:

Attribute	Score	Final score
Fusty	$Z^{Fy} = P^{Fy}_1 + P^{Fy}_2 + P^{Fy}_3 + P^{Fy}_4$	$Z=Z^{Fy}+Z^{W}+Z^{Rd}+Z^{Bt}$
Winey	$Z^{W} = P^{W}_1 + P^{W}_2 + P^{W}_3 + P^{W}_4$	
Rancid	$Z^{Rd} = P^{Rd}_1 + P^{Rd}_2 + P^{Rd}_3 + P^{Rd}_4$	
Bitter	$Z^{Bt} = P^{Bt}_1 + P^{Bt}_2 + P^{Bt}_3 + P^{Bt}_4$	

It is now a question of determining up to what maximum value for Z the candidate can be considered to have good levels of perception, olfactory and gustatory retention and mental capacity to give the correct answer for the four stimuli considered. Obviously, Z always has a non-negative value and Z = 0 means that the candidate has recognised and correctly quantified the total of the 16 intensities presented (four for each attribute). Values of Z other than zero indicate that the candidates have recognised the scale areas from which the selected intensities have been picked, but within these areas they have been unable to place back the tasting glass in its exact position because their ability to discriminate the scale of intensity presented to them for one or more of the stimuli is not satisfactory.

Therefore, a critical value (Zc) has to be determined in such a way that if the candidates randomly place back all the glasses inside the areas they had recognised beforehand, the probability “a” (which can be set beforehand) of a final Z score being less than Zc, is very low. In other words, it must be ensured that using this procedure, the probability of selecting a taster for the panel who does not demonstrate sufficient sensory discriminatory skill for the intensities of the stimuli used in the selection process is less than a.

When the value for “a” is set (in our case at 0.05), Zc is obtained from the probability distribution of the Z variable, which in turn depends on the probability distributions of the P variable (K').

Following the relevant statistical calculations, the value for Zc comes to **34**. The justification of the value 34 for Zc is described in the publication "Selección de catadores mediante el

método de clasificación por intensidad" (F. Gutiérrez Rosales, J. M. Alba Risco y R. Gutiérrez González-Quijano. Grasas y Aceites, Vol. 35, 1984. 310-314.)

When the Z score for all the candidates has been obtained, any candidate whose score is higher than 34 shall be eliminated.

Example no. 3: Let us assume that the scores for candidates A and B are as follows:

Attribute	Candidate A	Candidate B
Fusty (Fy)	$Z^{Fy} = 10$	$Z^{Fy} = 12$
Winey (W)	$Z^{W} = 10$	$Z^{W} = 11$
Rancid (Rd)	$Z^{Rd} = 10$	$Z^{Rd} = 15$
Bitter (Bt)	$Z^{Bt} = 4$	$Z^{Bt} = 0$
	Z=34	**Z=38**

Given that the two candidates considered have respective Z values of 34 and 38, candidate A will be accepted whereas candidate B will be rejected.

Once those of the candidates with scores higher than 34 have been removed from the pool of candidates, the others should be sorted according to their Z values in descending order and the number of candidates which are required to complete the panel with the lowest Z scores should be selected for the sensory panel.

4. INITIAL TRAINING OF TASTERS

The principal aims of the training stage are:

a) to familiarise the tasters with the multiple olfactory-gustatory-tactile variations found in virgin olive oils;

b) to familiarise the tasters with the specific sensory methodology;

c) to improve individual skills in recognising, identifying and quantifying the sensory attributes; and

d) to improve sensitivity and retention in regards to the various attributes considered, in order to obtain precise and consistent assessments.

The practical utility of training period is considered very important and even essential if repeatable, reproducible sensory data are to be obtained.

For this reason, the training phase should be carried out with meticulous care and attention.

4.1. Duration of training

The training stage normally entails a number of sessions, depending on the possibilities open to the panel and the evaluation of the results, during which, after individually analysing the oils, the tasters discuss the difficulties they have encountered with the panel leader and comment on the attributes and their intensities so that uniformity is achieved.

The training should be adequate and sufficient to reach the goals but also the limits, defined for a trained panel. The effective number of training hours needed depends on various aspects (e.g. prior experience of tasters in olive oil, experience of tasters in sensory analysis, the frequency of training and therefore will vary from panel to panel. A training duration of approximatively 40 hours is recommended so that a taster can be considered competent to participate in a panel and to give reliable results according to the sensory method, especially in the case of a newly formed panel. In the case of including a new taster to a panel, the panel leader should determine when the new panel member is competent to apply the sensory analysis method (see §7.1.).

4.2. Performance of training

The training should be carried out in accordance with a program well designed for the needs of the trainees. The program of training should involve the most important procedures for the training of the tasters and should consist of a theoretical and a practical component. A theoretical background of tasters on the sensory analysis and generally on olive oil is a valuable tool for the correct application of the sensory method.

The theoretical component of training should cover the following topics of sensory tasting of olive oil:

- Categories of virgin olive oil
- Quality criteria of virgin olive oil: chemical (optional) and organoleptic criteria.
- Sensory analysis and its importance.
- Chemical senses-Sense of smell and taste.
- Organization and operation of a sensory lab.
- Method for the organoleptic assessment of virgin olive oil: Historical evolution of method (optional), the panel of tasters as a measuring tool, classification of the samples in terms of sensory evaluation, critical points for the correct application of the method.
- Specific vocabulary for virgin olive oil-organoleptic defects and their origin.
- Factors affecting the quality of virgin olive oil
- Possible errors in sensory evaluation and their control and rectification.
- Basic knowledge on olive cultivation, olive harvesting and production of olive oil in oil mills.
- National olive varieties (where it is applicable) and the main international olive varieties.

Note 1. The theoretical component suggested above is intended for the training of a whole panel. In the case of adding a new taster to an already established panel, the theoretical component will depend on the previous training of the new taster. In either case, it must be made certain that each individual taster, experienced or new, has undertaken theoretical training which includes all the topics listed above.

The practical component of training should involve at least:

- Practice in recognizing by smell and taste the characteristic negative attributes of olive oil and their intensities with the aid of reference materials and an oily medium for dilutions (e.g. refined oil).
- Practice in recognising by smell and taste the characteristic positive attributes of olive oil and their intensities with the aid of reference materials.
- Practice in using the profile sheet of the method for the recognition of negative and positive attributes and measuring the intensity of virgin olive oil samples.
- Practice in using the profile sheet for the classification of the various categories of virgin olive oil samples.
- Practice in tasting and becoming familiar with the national olive varieties, if it is possible and necessary.
- Assessment of trainees using the profile sheet for the classification of virgin olive oil samples.

Note 2. If the tasters have to bring their nose close up to the edge of the tasting glass, or inside it, to perceive the attribute they must mark the section of the straight line corresponding to the intensity of perception of 3.5 or less. This intensity will also serve as a reference for the intensity perceived via the retronasal pathway, which may be even higher for certain attributes. In such cases, the tasters will score above 3.5. This is designed to homogenise the application of the scale by the tasters and should be done solely for those attributes permitting classification.

During training, it is very important to monitor the performance of each taster and the panel as a whole (in the case of panel training) that is, their trueness and precision. It is advisable to use (except of the descriptive test of the method) various objective tests to check the discriminative ability of the tasters. Examples of such objective tests used in sensory analysis are triangular, paired-comparison and duo-trio tests. In addition, the results of each session should be compared with those of the previous ones, in order to assess the improvement of the participants' performance in the course of the training.

At the end of training the trainees should be able to give reliable results regarding:

- the identification of various sensory attributes of virgin olive oil (name and intensity)
- the classification of random samples of various categories of virgin olive oil.

4.3. Use of reference or characterized materials in training

The use of reference materials in the training is absolutely necessary so that the tasters can compare their judgment to the "assigned values" of tasted samples and thus improve their individual skills in recognising, identifying and quantifying the sensory attributes.
These materials can be samples from proficiency tests (It is very important that the report of the proficiency test indicates clearly the type and the intensity of fruity and the defect which should be indicated to the taster at the training in order to prevent misperception and to have better homogenisation among panels); in the absence of the mentioned samples, pre-tested (characterised) samples can be used. Since many samples are tasted during each session of training (of one or more days), the trainer is responsible for the reliability of the tasted samples. If characterised samples are used, it is recommended that their results have been obtained by accredited or and IOC recognized sensory panels.

The provision of reference materials will be made through the trainers or directly from another reliable source e.g. the IOC.

4.4. Statistical evaluation of the taster's results

The purpose of the training is to provide the tasters with confidence in their judgment. To achieve this, special attention should be given to the evaluation of the results of each taster and of the panel as a whole (in the case of panel training) to check their reliability and to monitor their performance.

All the results of the participants should be statistically evaluated during the training sessions and copies of the results should be readily available to the tasters so they can study their weaknesses and take corrective measures to improve their performance. In this way, the taster also can realise the objectivity of the sensory analysis method.

When discriminatory trials are used, the exact replies of the participants are calculated and compared to the critical values given by statistical tables specific for each type of trial. The standard achieved in the training after a set number of sessions is assessed in terms of the percentage increase in the exact replies.

When the profile sheet of the method (descriptive test using a scale) is used, the recommended procedures for the statistical evaluation of the results are similar to those required for the control of the performance of the skilled tasters, that is:

- Estimation of the precision and trueness of each taster
- Estimation of the precision and trueness of the panel as a whole (in the case of panel training).

The determination of the above is made in accordance with those referred in the ANNEX I "INTERNAL QUALITY CONTROL GUIDE FOR SENSORY LABORATORIES" of the COI/T.28/Doc. No 1.

Since in each training session (of one or more days) characterized or reference samples are tested, it is recommended that trueness be estimated by the mean z-score, as well, according to the formulas of table 1a.

Table 1a. Estimators of taster's trueness during a training session for n samples

Estimation of trueness
Field of application: taster
Mean z-score taster ($\overline{z-score_t}$) $\overline{z-score_t} = \frac{\sum\left(\frac{x_{it}-TMe_i}{s_i}\right)}{n}$ Where: ❖ $\overline{z-score_t}$ is the mean z-score of the taster t, for a specific attribute (predominant defect, fruity attribute or classified attribute). ❖ x_{it} is the intensity given by the taster t to a specific attribute (predominant defect, fruity attribute or classified attribute) in the assessment of sample i. ❖ TMe_i, is the value of reference or characterized sample i for a specific attribute (predominant defect, fruity attribute or classified attribute). ❖ s_i is the standard deviation of all values of the laboratories participating in the certification process of the material i, for a specific attribute (predominant defect, fruity attribute or classified attribute) or the standard deviation of the method (0,7) in case of characterized samples. ❖ n is the number of analysed reference or characterized samples i during a training session Criteria of acceptance: Warning limits: $\overline{z-score_t}$ = ±2.0 and action limits: $\overline{z-score_t}$ = ±3.0 If this index falls outside the action limits, the training of taster should be continued.

Table 1b. Estimators of panel's trueness during a training session for n samples

Estimation of trueness
Field of application: panel
Mean z-score panel ($\overline{z-score_p}$) $\overline{z-score_p} = \frac{\sum\left(\frac{Me_{ip}-TMe_i}{s_i}\right)}{n}$ Where: ❖ $\overline{z-score_p}$ is the mean z-score of the panel p, for a specific attribute (predominant defect, fruity attribute or classified attribute) ❖ Me_{ip} is the median of the panel p for a specific attribute (predominant defect, fruity attribute or classified attribute), in the assessment of sample i. ❖ TMe_i is the value of reference or characterized sample i for a specific attribute (predominant defect, fruity attribute or classified attribute). ❖ s_i is the standard deviations of all values of the laboratories participating in the certification process of the material i, for a specific attribute (predominant defect, fruity attribute or classified attribute), or the standard deviation of the method (0,7) in case of characterized samples. ❖ n is the number of analysed reference or characterized samples i during a training session Criteria of acceptance : Warning limits: $\overline{z-score_p}$ = ±2.0 and action limits: $\overline{z-score_p}$ =±3.0 If this index falls outside the action limits, the training of panel should be continued.

The above indexes are very useful in the comparison of the results of each session with those of previous ones. The trainer can calculate either one index of each taster or of the panel for a classified attribute (fruity for EVOO and the defect for other categories) or one for the defects and another for the fruity attribute separately.

In addition, the index mean value of CVR% of n samples tasted during a training session is very effective in the assessment of homogeneity of the panel. This index, as the above, can be used for the comparison of the panel's results of the training sessions and is determined according to the formulas in table 2.

Table 2. Estimators of panel's homogeneity during a training session

Estimation of homogeneity
Field of application: panel

Mean CVR% panel ($\overline{CVR\%_p}$)

$$\overline{CVR\%_p} = \frac{\sum\left(\frac{s_i * 100}{Me_i}\right)}{n}$$

Where:

- $\overline{CVR\%_p}$ is the mean CVR% of the panel p, for a specific attribute (predominant defect, fruity attribute or classified attribute).
- Me_i is the median of the panel p for a specific attribute (predominant defect, fruity attribute or classified attribute) in the assessment of sample i,
- s_i is the robust standard deviation of the median for a specific attribute (predominant defect, fruity attribute or classified attribute), in the assessment of sample i
- n is the number of analysed samples i during a training session

Criteria of acceptance:

$\overline{CVR\%_p} \leqslant 20$

If this index falls outside the above limit, the training of panel should be continued.

As for the control of trueness, the trainer can calculate either one index of each taster or of the panel for a classified attribute (fruity for EVOO and defect for other categories) or one for the defects and another for the fruity attribute separately.

In order to facilitate the work of the trainer, table 3 below presents a summary of recommended techniques for the control of the performance of tasters in training sessions, including all the requirements for their proper application.

Table 3. Recommended statistical evaluation of the results during a training session.

Determined indexes	Criteria	Samples	Calculation
Field of application: taster			
1. Precision Number (PN_t)	≤2.0	one random sample in duplicate	formulae in table 1 of ANNEX I of COI/T.28/Doc. No 1
2. Deviation Number (DN_t)			formulae in table 3a of ANNEX I of COI/T.28/Doc. No 1
3. z-score$_t$	Warning limits:±2.0 and action limis: ±3.0	One reference sample	formulae in table 3b of ANNEX I of COI/T.28/Doc. No 1
4. mean z-score$_t$		All reference samples of the session	formulae in table 1a of current document
Field of application: panel			

1. Normalized error (En)	≤1.0	one random sample in duplicate	formulae in table 6a of ANNEX I of COI/T.28/Doc. No 1
2. z-score$_p$	Warning limits:±2.0 and action limits:±3.0	One reference sample	formulae in table 7b of ANNEX I of COI/T.28/Doc. No 1
3. mean z-score$_p$		All reference samples of the session	formulae in table 1b of current document
4. mean CVR%	≤20	All samples of the session	formulae in table 2 of current document

All the above indexes are calculated either for the classified attribute (fruity for EVOO and defect for other categories) or one for the predominant defect and another for the fruity attribute separately.

There are many techniques for the statistical processing of the results. It depends on the trainer to select the techniques that ensures continuous control of candidate tasters and the panel throughout the duration of education and to determine the completion of the training applying specific and measurable criteria.

Proposed criteria for successful training attendance are:

- ➡ In the last two sessions, each taster and the whole group have achieved acceptable values for the indexes selected for their evaluation.
- ➡ In the final examination, the tasters should classify correctly random samples given to them for tasting (This criterion serves only as a recommendation)**.**

The sensory laboratory should keep the corresponding fully documented records for the training of each taster and the panel, according to the selected procedure by the trainer.

5. QUALITY CONTROL OF TASTERS (or CONTOL OF TASTERS PERFORMANCE)

Once members of a panel, tasters should be evaluated on a continuing basis. The quality control of tasters should be performed according to ANNEX I of the COI/T.28/Doc. No 1.

In order to facilitate the work of the panel leader, the two tables below (tables 4 and 5) summarize the proposed control procedures of tasters' performance, including all the requirements for their proper application.

Whether these control procedures are applied or not is optional and serves only as a recommendation in accordance to the note of ANNEX I of COI/T.28/Doc. No 1: "*This document is a complete quality control guide for sensory laboratories undertaking the analysis of virgin olive oils. It includes a broad range of procedures. As some of them are time-*

consuming, it is not compulsory to apply all of them; the panel leader can select the most appropriate procedures that will ensure the competence of tasters and the panel and will prove that results are reliable."

Table 4. Recommended control procedures of taster's performance by duplicate analysis.

Method of duplicate analysis Frequency: every 11 tests or every tasting day Required samples: one random sample Quality control charts: Trend charts			
		Application	Calculation
Determined indexes	1. Precision Number (PN_t) for a specific attribute (predominant defect, fruity attribute or classified attribute)	Recommended	formulae in table 1 of ANNEX I of COI/T.28/Doc. No 1
	2. Deviation Number (DN_t) for a specific attribute (predominant defect, fruity attribute or classified attribute)	Recommended	table 4 and formulae in table 3a of ANNEX I of COI/T.28/Doc. No 1

The cumulative indexes, precision number and deviation number are calculated when the number of the tested different duplicate samples is between 6 and 10.

The indexes of table 4 are calculated either for the classified attribute (fruity for EVOO and defect for other categories) or one for the predominant defect and another for the fruity attribute separately.

Table 5. Recommended control procedures of taster's performance by analysis of reference or characterised materials.

Method of reference or characterised materials analysis Frequency: once per month (depending on the availability of reference materials) or according to the participation of the laboratory in interlaboratory tests. Required samples: one reference or characterized sample for all indexes except for the control of taster competence index (SCOREct), which requires three reference samples Quality control charts: Trend charts or $\bar{x}$ charts or no charts for SCOREct			
		Application	Calculation
Determined indexes	3. Deviation Number (DN_t) for a specific attribute (predominant defect, fruity attribute or classified attribute)	Recommended (once per month, trend charts)	table 4 and formulae in table 3a of ANNEX I of COI/T.28/Doc. No 1
	4. z-score$_t$ for a specific attribute (predominant defect, fruity attribute or classified attribute)	Recommended (at least once per 3 month, $\bar{x}$ chart)	formulae in table 3b of ANNEX I of COI/T.28/Doc. No 1
	5. SCOREct	Recommended (at least once per year for each taster, no charts)	table 5 of ANNEX I of COI/T.28/Doc. No 1

The above indexes 3 and 4 are calculated either for the classified attribute (fruity for EVOO and defect for other categories) or one for the predominant defect and another for the fruity attribute separately.

The sensory laboratory should keep the corresponding fully documented records for each taster of the panel, according to the selected procedure by the panel leader.

6. RETRAINING OF TASTERS

Retraining a taster is required in the following cases:

- An individual taster's results during the quality control are outside the specified limits in tables 1 and 3 ANNEX I of COI/T.28/Doc. No 1.

  If the non-compliance of the taster is achieved in only one session, at first the taster repeats the test and their performance is checked again. If the new results do not meet the criteria of acceptance, then the taster should be retrained. But, if a cumulative index calculated by the sensory lab is out-of-limits, it means that the taster is being wrong in several sessions, so, he/she should be retrained.

- ❖ The taster has not participated in the sessions of the panel for more than six months. In this case, the performance of the taster is controlled on the basis of the acceptance criteria and only if these are not met, retraining of the taster should be performed.

In either case, the taster does not participate in the panel sessions, until their results demonstrate that they have regained their sensory competence again.

7. QUALIFICATIONS

7.1. Qualifications of tasters

Since the tasters of a panel are the measuring instrument in sensory analysis, strict requirements of qualifications are required so that a taster can be a member of a panel and produce reliable results.

7.1.1. Requirements for incorporating a new taster into a panel

Everything that has been discussed above, a taster can become member of a panel, if they fulfill the following requirements of qualifications.

- **a.** They have been interviewed by the panel leader and have completed the relative questionnaire.
- **b.** Their detection threshold in the characteristic attributes has been determined.
- **c.** They have successfully passed the tests “Selection of tasters by the intensity rating method”
- **d.** They have attended training courses and have been judged competent for the application of sensory method.

In case that any of the above requirments b or c are not met, the taster must have the necessary documentation that they can reliably apply the organoleptic method.

7.1.2. Requirements of taster qualifications

It is obvious that a new taster who fulfills all the requirements to become a panel member cannot maintain their competence if they do not participate systematically in the panel sessions and they are not controlled on a continuous basis in accordance with the provisions of paragraph 5.

Consequently, a person is considered a fully qualified taster, if they fulfill the following requirements:

- ➡ They meet all the requirements for their inclusion in a panel (7.1.1.)
- ➡ They participate in the panel sessions on a regular basis.
- ➡ Their performance is controlled and their competence is proven on a regular basis, according to the procedures of the panel in which they are members.

7.2. Qualifications of panel leaders

Sensory analysis must be carried out under the supervision of a qualified and experienced panel leader possessing relevant qualifications.

Paragraph 8.1 of the document COI/T.20/Doc. No 15 “method for the organoleptic assessment of virgin olive oil” describes in detail the duties of panel leaders.

Normally, a person should possess at least 2 years’ relevant sensory analysis work experience (e.g. taster of a panel) before being considered as a panel leader. In addition, they should have knowledge of

- ❖ the types of oils they will encounter during the course of their work
- ❖ statistical analysis
- ❖ Microsoft Office software

Special training is needed for panel leaders (besides taster training), which should include at least:

a) Selection of test procedures, experimental design and analysis;

b) Reception and storage of the samples before and after being tested;

c) Preparation, coding and presentation of the samples to the tasters;

d) Organisation and performance of the tests;

e) Data input and processing;

f) Preparation of reports;

g) Maintenance of records;

h) Maintenance of all necessary supplies and services;

i) Sensory assessor screening, selection, training and monitoring procedures;

j) Importance of the assessor's health and safety;

k) Human resources management (useful for the motivation of the panel members);

l) Training in quality management system and ISO-17025.

Moreover, a panel leader should participate in calibration sessions for panel leaders organized by the IOC or its members or in national or international competitions of extra virgin olive oil in order to gain experience in the sensory characteristics of olive oils worldwide.

7.3. Qualifications of trainers

Special attention should be given to the persons conducting the training.

The panel leader of a sensory group is responsible for organizing, planning and supervising the training of tasters, so that tasters are properly trained for the task assigned to them. A trainer can be the panel leader or another external trainer. In the case that the training concerns the development of a new panel, an external trainer should be used.

The external trainers must be appropriately trained having at least the following qualifications:

a. Recognized trainers by the International Olive Council in virgin olive oil sensory tasting or proven experience in the application of the sensory method of virgin olive oil as a panel leader for at least five (5) years or as a taster for at least ten (10) years.

b. Experience in the application of ISO 17025 on the sensory method of virgin olive oil.

c. Have organized and conducted training courses on sensory evaluation of virgin olive oil (official method) for the development of a panel or for panel leaders, proving this with respective documentation.

Requirement c does not apply to persons who are used as external trainers for the first time. In addition, the above requirements are not applicable to panel leaders performing training to the members of their panel.

Bibliography:

1. ISO 8586 “Sensory analysis — General guidelines for the selection, training and monitoring of selected assessors and expert sensory assessors”.
2. ISO 5496 "Sensory Analysis - Methodology - Initiation and Training of Assessors in Detection and Recognition of Odors"
3. ISO 3972 Sensory analysis. Methodology. Method of investigating sensitivity of taste.
4. COI / T.20 / Doc. No. 4 “Sensory analysis of olive oil: general basic vocabulary”
5. ISO 5495 “Sensory analysis-Methodology-Paired comparison test”
6. American Society for Testing and Materials (A.S.T.M.), Special Technical Publication no 440 (1968), p. 53 “Correlation of Subjective-Objective Methods in the Study of Odors and Taste”.
7. Selección de catadores mediante el método de clasificación por intensidad, F. Gutiérrez Rosales, J. M. Alba Risco y R. Gutiérrez González-Quijano. Grasas y Aceites, Vol. 35 (1984), 310-314.
8. COI/IOS/Doc. No 2-June 1983 “Programme collaboratif pour la mise au point d’une méthode internationale de determination des characteristiques organoleptiques des huiles d’olive vierges: méthode de selection des dégustateurs”.
9. COI/T.28/Doc. No 1 “Guidelines for the accomplishment of requirements of standard iso 17025 of sensory testing laboratories with particular reference to virgin olive oil”

INTERNATIONAL

OLIVE

COUNCIL

COI/T.20/Doc. No 5/Rev. 2
November 2019

ENGLISH
Original: SPANISH

Príncipe de Vergara, 154 – 28002 Madrid – Spain Tel.: +34 915 903 638 Fax: +34 915 631 263 - e-mail: iooc@internationaloliveoil.org - http://www.internationaloliveoil.org/

SENSORY ANALYSIS OF OLIVE OIL

STANDARD

GLASS FOR OIL TASTING

1. PURPOSE

The purpose of this standard is to describe the characteristics of the glass intended for use in the organoleptic analysis of edible oils (odour, taste, flavour).

In addition, it describes the adapted heating unit needed to reach and maintain the right temperature for this analysis.

2. DESCRIPTION OF THE GLASS

The drawing in Figure 1 attempts to establish the optimum characteristics desirable in a piece of apparatus of this kind, which can be specified as follows:

a) Maximum steadiness, to prevent the glass from tilting and the oil from being spilled.

b) A base which easily fits the indentations of the heating unit so that the bottom of the glass is evenly heated.

c) A narrow mouth which helps to concentrate the odours and facilitates their identification.

d) Made of dark-coloured glass to prevent the taster from perceiving the colour of the oil, thus eliminating any prejudices and impeding the possible formation of biases or tendencies that might affect the objectiveness of the determination.

2.1. Dimensions

The glass is sketched in Figure 1, and has the following dimensions:

Total capacity.....	130 ml ± 10 ml
Total height.....	60 mm ± 1 mm
Diameter of mouth	50 mm ± 1 mm
Diameter of glass at its widest.....	70 mm ± 1 mm
Base diameter.....	35 mm ± 1 mm
Thickness of glass on sides.....	1.5 mm ± 0.2 mm
Thickness of glass base	5 mm ± 1 mm

Each glass shall be equipped with a watch-glass, the diameter of which shall be 10 mm larger than the mouth of the glass. This watch-glass shall be used as a cover to prevent the loss of aroma and the entry of dust.

2.2. Manufacturing characteristics

The glass shall be made of resistant glass; it shall be dark-coloured so that the colour of its contents cannot be discerned, and it shall be free from scratches or bubbles.

The rim shall be even, smooth and flanged.

The glass shall be annealed so that it stands the temperature changes it has to undergo in the tests.

2.3. Instructions for use

The glasses shall be cleaned using unperfumed soap or detergent and shall then be rinsed repeatedly until the cleaning agent has been totally eliminated. The final rinse shall be with drinking water, after which the glasses shall be left to drain and then dried in an odour-free environment.

Neither concentrated acids nor chromic acid mixtures shall be used.

The glasses shall be stored in a cabinet, protecting them from contamination from any extraneous odours.

Before use, each glass shall be smelled to ensure that no extraneous odour is present. When the test is being prepared care shall be taken to record the code of each glass and the oil it contains. Only the person in charge of the test will know to which code the oil corresponds.

3. DEVICE FOR HEATING SAMPLES

The samples shall be organoleptically examined at a set temperature which, in the case of edible oils, shall be 28 ± 2 ºC. For this purpose, a heating device (see Figure 2) shall be installed in each booth within the taster's reach. It comprises an aluminium block immersed in a thermostatically-controlled water bath so as to keep a uniform temperature. This block has a series of indentations into which fit the bottoms of the glasses. The temperature difference between the heating device and the oil contained in the glasses inserted in the indentations of the various blocks shall not be more than ± 2 ºC.

Fig. 1

TASTING GLASS

(dimensions in millimetres)

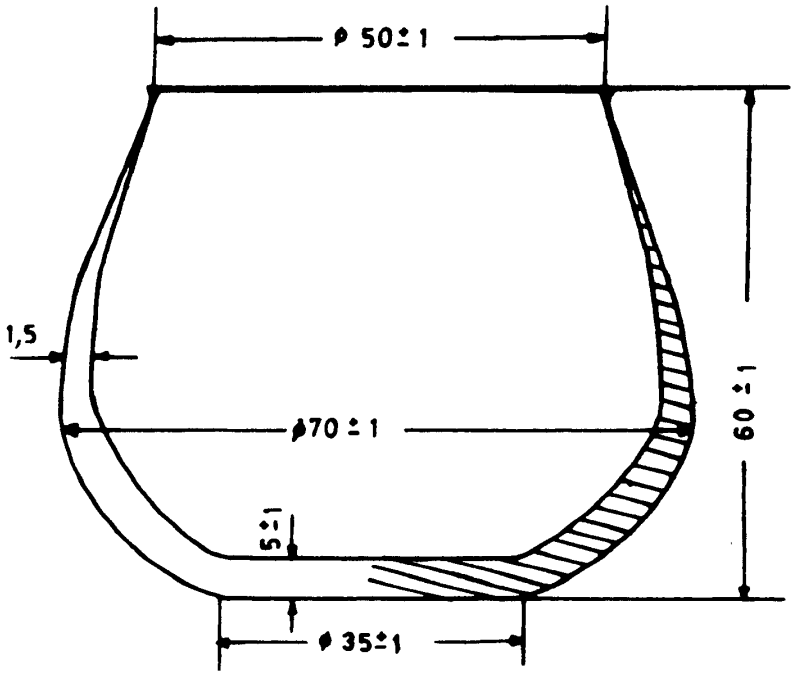

Fig. 2

EXAMPLE OF DEVICE FOR HEATING SAMPLES

(dimensions in millimetres)