ORGANOLEPTIC ASSESSMENT OF VIRGIN OLIVE OIL

Mercedes Fernández Albaladejo
Olive Chemistry & Standardisation Unit
INTERNATIONAL OLIVE COUNCIL (IOC)

Workshop
“Sensory analysis for better quality of virgin olive oil”
Milan (Italy), 2 October 2015
The International Olive Council (IOC) has its headquarters in Madrid since it was first set up in 1959.

The current Members of the Council are Albania, Algeria, Argentina, Egypt, the European Union (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom), Iran, Iraq, Israel, Jordan, Lebanon, Libya, Montenegro, Morocco, Syria, Tunisia, Turkey and Uruguay.

IOC Members produce around 98% of the world’s olive oil and 92% of its table olives.

**What are the main objectives of the IOC?**

These are clearly defined in the International Agreement on Olive Oil and Table Olives, which is negotiated under the umbrella of the United Nations Conference on Trade and Development. The current Agreement was negotiated in Geneva in April 2005.
UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

INTERNATIONAL AGREEMENT ON OLIVE OIL AND TABLE OLIVES, 2005

UNITED NATIONS
THE INTERNATIONAL OLIVE COUNCIL

ITS OBJECTIVES
Aims:

- Foster international cooperation for the integrated, sustainable development of world olive growing
- Further action to improve product quality and interaction between olive growing and the environment with a view to environmental protection and conservation
- Establish international standards enabling:
  - Product quality control
  - Fair international trading
  - Protection of consumer rights
  - Prevention of fraudulent practices
- Promote expansion of international trade and encourage promotion of olive products
Standards for olive oils and table olives

- Updating of trade standards for olive oils, olive pomace oils and table olives
- Harmonisation of domestic or EU regulations and international standards (particularly Codex Alimentarius standards)

Standards for olive oils and table olives

TRADE STANDARD APPLYING TO OLIVE OILS
AND OLIVE-POMACE OILS

INTERNATIONAL
OLIVE
COUNCIL

COI/T.15/NC no. 3/Rev. 2
24 November 2012
ENGLISH
Original: FRENCH

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

CODEX STANDARD FOR OLIVE OILS AND OLIVE POMACE OILS

CODEX STAN 33
Virgin olive oil

(Olive juice)

**Extra (1) Virgin (2) Ordinary Virgin (3) Lampante Virgin (4)**

(1), (2) and (3) are marketable and fit for human consumption according to the IOC standard but category (3) does not exist in the EU.

(1), (2) and (3) exist in the CODEX STANDARD.

(4) Not fit for human consumption.
Quality criteria for virgin olive oils

- Organoleptic assessment: smell and taste
- Peroxide value
- Free acidity
- Absorbance in ultraviolet
- Ethyl esters
Limits for quality and purity parameters are fixed (and/or updated) on the basis of years of scientific research by researchers from a range of countries and after evaluation of all the data obtained.
• Quality/purity parameters and limits for olive oils are proposed by researchers and chemists involved in official testing, after reaching general agreement.

• Any changes must be carefully checked to preclude fraud.

• Proposals are adopted by consensus of the IOC Council of Members.
Requisite for fixing analytical limits:

- Relevant method MUST BE scientifically validated and based on a solid hypothesis and testing
METHOD FOR THE ORGANOLEPTIC ASSESSMENT OF VIRGIN OLIVE OIL

COI/T.20/Doc. No 15/Rev. 7 - 2015
Definition:
Sensory analysis as applied in the IOC method = perception and description of certain flavour characteristics of Virgin Olive Oil using the human senses and classification of the oil according to those characteristics.

Method: COI/T.20/Doc. No. 15:
- Uses a group of selected, trained, qualified tasters as a panel
- Only applicable for the classification of virgin olive oils according to the perceived intensity of the predominant defect and the presence/absence of the fruity attribute
Olives oil tasting panels

Panels must comply with the following IOC standards

COI/T.20/Doc. No 15/Rev.7
Organoleptic assessment of virgin olive oil

COI/T.20/Doc. No 14/Rev.4
Guide for the selection, training and monitoring of skilled virgin olive oil tasters

COI/T.20/Doc. No 4/Rev.1
Sensory analysis: general basic vocabulary

COI/T.20/Doc. No 5/Rev.1
Glass for oil tasting

COI/T.20/Doc. No 6/Rev.1
Guide for the installation of a test room
GUIDELINES FOR THE ACCREDITATION OF LABORATORIES UNDERTAKING THE SENSORY ANALYSIS OF VIRGIN OLIVE OIL

Date of adoption: November 2007, 95th session of the Council of Members

Aim:

. Provide national accreditation bodies with a tool to ensure uniform training of technical auditors and inspectors responsible for assessing sensory olive oil testing laboratories applying for accreditation

. Assist tasting panels wishing to work towards quality assurance
The organoleptic assessment (OA) method is divided into six parts:

• A first general part providing the specific vocabulary for virgin olive oil and optional labelling terminology

• A second part specifying all the equipment and conditions necessary for a tasting session

• A third part explaining the duties and conduct required of the panel leader and tasters
- A fourth part specifying the techniques for tasting virgin olive oil
- A fifth part explaining how to analyse the resultant data
- A sixth part explaining how to classify virgin olive oil according to the data analysis results

These parts are not necessarily dealt with in the order listed here.
1. **PURPOSE**

   The purpose of this international method is to determine the procedure for assessing the organoleptic characteristics of virgin olive oil and to establish the method for its classification on the basis of those characteristics.

2. **FIELD OF APPLICATION**

   The method described is only applicable to virgin olive oils and to the classification of such oils according to the intensity of the defects perceived and of the fruitiness, as determined by a group of tasters selected, trained and monitored as a panel.

   It also provides indications for optional labelling.

3. **GENERAL BASIC VOCABULARY FOR SENSORY ANALYSIS**

   Refer to the standard COI/T.20/Doc. no. 4 "Sensory Analysis: General Basic Vocabulary".

4. **SPECIFIC VOCABULARY FOR VIRGIN OLIVE OIL**
Optional labelling provisions in the OA method

Optional labelling terminology

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

Positive attributes (fruity, bitter and pungent):

According to the intensity of perception:

- Intense, when the median of the fruitiness is more than 6;
- Medium, when the median of the fruitiness is between 3 and 6;
- Light, when the median of the fruitiness is less than 3.

Fruity: 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.

Greenly fruity: 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.

Ripely fruity: 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, green or ripe. 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 and/or pungent attributes is two points higher than the median of the fruitiness.

Mild oil: Oil for which the median of the bitter and pungent attributes is 2 or less.
5. **GLASS FOR OIL TASTING**
   Refer to the standard COI/T.20/Doc. no. 5, "Glass for Oil Tasting".

6. **TEST ROOM**
   Refer to the standard COI/T.20/Doc. no. 6, "Guide for the Installation of a Test Room".

7. **ACCESSORIES**

8. **PANEL LEADER AND TASTERS**
   8.1. Panel leader
   8.1.1 Deputy panel head
   8.2. Tasters
9. TEST CONDITIONS

9.4. Tasters: general rules of conduct

10.1. Tasting technique

10.3. Use of the data by the panel leaders

Annex 1

METHOD FOR CALCULATING THE MEDIAN AND THE CONFIDENCE INTERVALS

10.4. Classification of the oil
Method for the organoleptic assessment of virgin olive oil

Purpose
Absence of defects + fruitiness
Defective, median intensity
< 3.5 + fruitiness
Defective, median intensity
between 3.5 and 6
or defect < 3.5 + no fruitiness
Defective, median intensity > 6

Classification of virgin olive oils
Extra virgin olive oil
Virgin olive oil
Ordinary virgin olive oil
Lampante virgin olive oil
The purpose of the method is to classify virgin olive oils on the basis of their sensory attributes to ensure compliance with the definitions given in the INTERNATIONAL AGREEMENT ON OLIVE OIL AND TABLE OLIVES, 2005, which grades virgin olive oils according to their organoleptic characteristics and specific physico-chemical parameters.
The definitions stipulated in the Agreement have been adopted and incorporated into:

- **CODEX ALIMENTARIUS** international standards;

- International legislation on olive oils and olive pomace oils, for instance EU regulations.

They have also been adopted in the domestic standards of producer countries like the USA and Australia.
The method features numerous guarantee mechanisms to prevent potential errors due to the nature of the tasting panel, namely:
• Use of a group of at least 8 selected and trained tasters (panel) who are qualified to perform testing according to international standards
• Qualification according to international standards EA-4/09 G:2003 and ISO/IEC 17025:2005
• Use of the median as opposed to the mean for determining attribute intensity. Means that at least 50% of the tasters has to perceive an attribute in order for it to be taken into account
• Minimum homogeneity required in taster responses (CV≤20 %). In practical terms, means that in a panel of 8 tasters, the attribute must have been perceived by 75%
• Monitoring of taster performance according to ISO/IEC 17025:2005

• Inclusion of the error of the method in the limit between categories that can be packed for consumption. Means that measurement error is always applied to the advantage of packers

• Decision-making in official testing based on three different assessments by three different panels. The last two tests must be performed in duplicate in different tasting sessions. Duplicates must be valid according to statistical criteria

• Provisional approval of proposals to taste virgin olive oil cold if fruitiness is not perceived when the oil is heated and to show a physical mark for 3.5 on the scale which separates oils that can/cannot be packed for consumption
Figure 1

PROFILE SHEET FOR VIRGIN OLIVE OIL

INTENSITY OF PERCEPTION OF DEFECTS

<table>
<thead>
<tr>
<th>Defect Description</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusty/muddy sediment (*)</td>
<td></td>
</tr>
<tr>
<td>Musty/humid/earthy (*)</td>
<td></td>
</tr>
<tr>
<td>Winy/vinegary acid/sour (*)</td>
<td></td>
</tr>
<tr>
<td>Frostbitten olives (wet wood)</td>
<td></td>
</tr>
<tr>
<td>Rancid</td>
<td></td>
</tr>
<tr>
<td>Other negative attributes:</td>
<td></td>
</tr>
</tbody>
</table>

**Descriptor:**
- Metallic
- Hay
- Grubby
- Rough
- Brine
- Heated or burnt
- Vegetable water
- Esparto
- Cucumber
- Greasy

(*) Delete as appropriate

INTENSITY OF PERCEPTION OF POSITIVE ATTRIBUTES

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruity</td>
<td></td>
</tr>
<tr>
<td>Bitter</td>
<td></td>
</tr>
<tr>
<td>Pungent</td>
<td></td>
</tr>
</tbody>
</table>

**Name of taster:**

**Taster code:**

**Sample code:**

**Date:**

**Comments:**

**Signature:**