STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE

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Grade and Labeling Standards for Olive Oil, Refined-Olive Oil and Olive-Pomace Oil

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Unless Subsequently Amended or Terminated

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

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Table of Contents

1.0 SCOPE 1

2.0 OBJECTIVE 1

3.0 PRODUCT DESCRIPTION AND DEFINITIONS 1

4.0 GRADES OF OLIVE OIL, REFINED-OLIVE OIL, AND OLIVE-POMACE OIL 2

5.0 DEFINITIONS OF TERMS 4

6.0 QUALITY AND PURITY PARAMETERS 7

TABLE 1 QUALITY PARAMETERS 8

TABLE 2 PURITY PARAMETERS 9

TABLE 3 FATTY ACID COMPOSITION 10

TABLE 4 STEROL AND TRITERPENE DIALCOHOLS COMPOSITION 10

TABLE 5 TRACE METALS 10

7.0 FOOD ADDITIVES 11

8.0 CONTAMINANTS 11

9.0 METHODS OF ANALYSIS 11

10.0 HYGIENE 13

11.0 PACKAGING 13

12.0 TRACEABILITY 15

1.0 SCOPE

Pursuant to Chapter 29, Part 2, Division 22 of the California Food and Agricultural Code (section 79800 et seq.) these standards apply to California handlers of olives that are processed into olive oils, refined-olive oils and olive-pomace oils in the amount of 5,000 gallons or more during the period beginning July 1 through June 30 of any year and who sell their oils into the commercial channels of trade. Handlers who process and/or market less than 5,000 gallons of olive oil during any year defined above are deemed to be engaged in casual sales of olive oil and are not subject to these standards, but may voluntarily participate in the commission sampling and testing program according to the requirements of SECTION 9 of Appendix A of the Standard.

These standards:

(a) define grades of olive oils, refined-olive oils and olive-pomace oils;
(b) specify purity parameters and quality parameters for these grades;
(c) establishes requirements for labeling and packaging; and
(d) list acceptable methods of analysis.

2.0 OBJECTIVE

The purpose of these standards are to:

(a) ensure the quality of oil produced from olives in California,
(b) enhance the continued growth of olive oil production through greater consumer and trade confidence in the consistent, high quality of California olive oils, and
(c) provide the producers, handlers, buyers and consumers of California oil with reliable and trustworthy information concerning the quality and grade of the product.

3 .0 PRODUCT DESCRIPTION AND DEFINITIONS

3.1 OLIVE OIL

Olive oil is the oil obtained solely from the fruit of the olive tree (*Olea europaea L.*), solely by mechanical or other physical means under conditions, including thermal conditions, that do not lead to alterations in the oil, and which has not undergone any treatment other than washing, crushing, malaxing, decantation, pressing, centrifugation, and filtration and to the exclusion of oils obtained using solvents or re-esterification processes and of any mixture with oils of other kinds.

3.2 REFINED-OLIVE OIL

Refined-olive oil is oil obtained from olive oil by refining methods including but not limited to; degumming, neutralization, bleaching, and/or deodorization that do not lead to alterations in the initial glyceridic structure (basic glycerin-fatty acid structure) and to the exclusion of oils

obtained using solvents or re-esterification processes and of any mixture with oils of other kinds.

3.3 OLIVE-POMACE OIL

Olive-pomace oil is the oil obtained by treating olive pomace (the product remaining after the mechanical extraction of olive oil) with solvents or other physical treatments, to the exclusion of oils obtained by synthetic processes or by re-esterification processes and mixture with oils of other kinds.

3.4 REFINED OLIVE-POMACE OIL

Refined olive-pomace oil is the oil obtained from crude olive-pomace oil by refining methods including but not limited to; degumming, neutralization, bleaching, and/or deodorization that do not lead to alterations in the initial glyceridic structure (basic glycerin-fatty structure) and to the exclusion of oils obtained by synthetic processes or by re-esterification processes any mixture with oils of other kinds.

4.0 GRADES OF OLIVE OIL, REFINED-OLIVE OIL, AND OLIVE-POMACE OIL

4.1 GRADES OF OLIVE OIL

Olive oils are graded based on the criteria outlined in these standards, as appropriate. The hierarchy for grades of olive oil is extra virgin olive oil, virgin olive oil, and crude olive oil.

4.1.1 **Extra Virgin Olive Oil** is olive oil that has a free acidity, expressed as free oleic acid, of not more than 0.5 grams per 100 grams, a median of defects equal to 0, and the other characteristics which correspond to the limits fixed for this grade in these standards. Extra Virgin olive oil is fit for consumption without further processing.

4.1.2 **Virgin Olive Oil** is olive oil that has a free acidity, expressed as free oleic acid, of not more than 1.0 grams per 100 grams, a median of defects equal to or less than 2.5, and the other characteristics which correspond to the limits fixed for this grade in these standards. Virgin olive oil is fit for consumption without further processing.

4.1.3 **Crude Olive Oil** is olive oil that has a free acidity, expressed as free oleic acid, of more than 1.0 grams per 100 grams or a median of defects greater than 2.5 and other characteristics which correspond to those fixed for this grade in these standards. Crude olive oil is not fit for human consumption without further processing and is intended to be used for refining or for technical use. **NOTE: These criteria are not required to be concurrent for crude olive oil, one is sufficient.**

4.2 GRADES OF REFINED-OLIVE OIL

Refined-olive oils are graded based on the criteria outlined in these standards as appropriate. The hierarchy of grades from highest to lowest is refined-olive oil blend and refined-olive oil. Refined-olive oil blend and refined-olive oil fall below the olive oil category but above the olive-pomace category in terms of hierarchy.

4.2.1 **Refined-Olive Oil Blend Composed of refined-olive oil and virgin (or extra virgin) olive oil** is composed of refined-olive oil and olive oil fit for consumption without further processing. It has a free acidity, expressed as free oleic acid, of not more than 0.8 grams per 100 grams, a median of defects equal to or less than 2.5, and its other characteristics correspond to those fixed for this grade in these standards. Refined-olive oil blend shall not be labeled as "olive oil". The addition of alpha-tocopherol is permitted.

4.2.2 **Refined-Olive Oil** is oil obtained from olive oil by refining methods including deodorization that do not lead to alterations in the initial glyceridic structure. Refined-olive oils have a free acidity, expressed as free oleic acid, of not more than 0.3 grams per 100 grams, and other characteristics that correspond to those fixed for this grade in these standards.

4.3 GRADES OF OLIVE-POMACE OIL

Olive-pomace oils are graded below the quality of olive oil and refined-olive oil. Olive-pomace oils are graded based on the minimum criteria outlined in table 1, as appropriate. The hierarchy for grades from highest to lowest is refined olive-pomace oil blend, refined olive-pomace oil, and crude olive-pomace oil. Crude olive-pomace oil must be refined before consumption. Olive-pomace oils shall not be labeled as "olive oil". Olive-pomace oils fall below both olive oil and refined olive oil in terms of hierarchy.

4.3.1 **Refined Olive-Pomace Oil Blend Composed of refined olive-pomace oil and virgin (or extra virgin) olive oils** is the oil composed of a blend of refined olive-pomace oil and olive oils fit for consumption without further processing. It has a free acidity, expressed as oleic acid of not more than 0.8 grams per 100 grams, a median of defects equal to or less than 2.5, and its other characteristics correspond to those fixed for this grade in these standards.

4.3.2 **Refined Olive-Pomace Oil** is the oil obtained from crude olive-pomace oil by refining methods that do not lead to alterations in the initial glyceridic structure. It has a free acidity expressed as oleic acid, of not more than 0.3 grams per 100 grams and its other characteristics correspond to those fixed for this grade in these standards.

4.3.3 **Crude Olive-Pomace Oil** is the olive-pomace oil whose characteristics correspond to those fixed in these standards. Olive pomace-oil that falls into this classification shall not be graded above "Crude Olive-Pomace Oil" (this is a limiting rule). It is intended for refining for use for human consumption or for purposes other than food use.

5.0 DEFINITIONS OF TERMS

For the purpose of these standards the following definitions apply.

5.1 **Absorbency in Ultraviolet (UV).** Spectrophotometric test which examines the oil and measures the absorption under ultraviolet light. These absorptions are expressed as K (extinction coefficient) for the specified wavelength. The wave regions examined, 232 nanometers (nm) to calculate K232 and 270 nm to calculate K270 and 264-274 to calculate delta K (ΔK). This test provides information on the quality of the oil, state of preservation, and changes brought through processing.

5.2 **Apparent β-sitosterol.** The sum of the concentrations of β-sitosterol, Δ-5avenasterol, Δ-5,23-stigmastadienol, Δ-5,24-stigmastadienol, clerosterol, and sitostanol.

5.3 **Aroma.** A volatilized chemical compound that is perceived by olfaction.

5.4 **Cold pressed.** Olive oil obtained by pressing crushed olives with a mechanical, hydraulic, or centrifugal press at a temperatures that does not lead to significant thermal alterations.

5.5 **Cold extracted.** Olive oil obtained by separating the oil by any mechanical or other physical means at a temperature that does not lead to significant thermal alterations.

5.6 **Desmethylsterol Composition.** A test used to indicate the origin and purity of the Oil, reported as Total Sterols.

5.7 **Diacylglycerol (DAG).** A glyceride consisting of two fatty acids chains covalently bonded to a glycerol molecule through ester linkages. In mechanically extracted olive oils, DAGs are present in a range of 1% to 3% and they are found as 1,2- and 1,3- isomers.

5.8 **Equivalent Carbon Number 42 (ECN 42).** The determination of the difference between the actual Equivalent Carbon Number triacylglycerol content of the oil molecules determined by High Performance Liquid Chromatography (HPLC) and the theoretical amount of ECN 42 triacylglycerol using fatty acid composition. It is used for the detection of seed oils and verifies authenticity and origin of oils.

5.9 **Erythrodiol and Uvaol.** Two triterpene dialcohol components found in olive oil and olive-pomace oil. The levels present differentiate oils that were physically extracted from oils that were produced by solvent extraction.

5.10 **Estate.** An extensive area of land owned or controlled by one person, family or organization.

5.11 **First extraction.** First mechanical process to separate the oil from the olive paste by centrifugation, decantation, or pressing. This does not include the second mechanical extraction or solvent extraction used to chemically separate the oil remaining in the pomace.

5.12 **Flavor.** The sensory impression of oil, determined mainly by the senses of taste and smell. Refers to the typical flavor of olive oil produced from olives and the degree of positive or negative attributes as listed in sections 5.19-5.25.

5.13 **Free fatty acid content/free acidity.** Expressed as a percentage by weight of grams per 100 grams, as free oleic acid. The free fatty acid is a measure of the quality of the oil, and reflects the care taken in producing the oil and the quality of the in-coming fruit.

5.14 **Handler.** A "Handler" is a person who engages, in this state, in the operation of marketing olive oil that he or she has produced, or purchased or acquired from an olive producer, or that he or she is marketing on behalf of an olive producer, whether as an owner, agent, employee, broker, or otherwise.

5.15 **Induction Time.** A test conducted on olive oil that is an indicator or predictor of the oxidative stability of the oil.

5.16 **Initial glyceridic structure.** The pattern of mono-, di-, and tri-glycerides present in olive oils or crude olive-pomace oils as extracted prior to any refining process.

5.17 **Lot.** A lot is a quantity of oil contained in one or more vessels that is declared by the handler to have uniform characteristics and that is marked in accordance with section 11.3.8 of these standards.

5.18 **Malaxing.** Malaxing is the mechanical mixing of the olive paste after crushing of the olives. Malaxing serves to break down emulsions and cell walls in order to facilitate the extraction of the oil.

5.19 **Median of defects. (Md).** A calculation of the median score of the oils negative flavor and aroma attributes according to the method in section 9.12 or an equivalent method according to section 9.1.

5.20 **Median of defects-Fusty**. A flavor defect attributable to poor storage conditions usually promoting the bacterial growth of the *Clostridium* and *Pseudomonas* genera.

5.21 **Median of defects-Muddy-sediment.** A flavor defect caused by the storage of olives in contact with oil sediment for long periods of time giving the oil a putrid flavor and aroma. The resulting oil has moldy aroma.

5.22 **Median of defects-Musty.** A flavor defect occurring when low temperatures and high humidity promote mold growth, mainly of the *Aspergillus* and *Penicilium* genera.

5.23 **Median of defects-Rancid.** A flavor defect caused by the oxidation of the oil and subsequent formation of aldehydes during the production process or during storage giving the oil an oxidized flavor and aroma.

5.24 **Median of defects-Winey-vinegary.** A flavor defect caused by storage condition of the olives that causes aerobic fermentation by the growth of yeasts that produce ethanol, acetic acid, and ethyl acetate.

5.25 **Median of Fruity (Mf).** A calculation of the median score of the intensity of the positive fruity characteristics of the oil according to the method in section 9.12 or an equivalent method according to section 9.1.

5.26 **Monopalmitate (2-Glyceryl) content determination.** A test used to determine if oil has been re-esterified by synthetic means or by the addition of animal fat.

5.27 **Organoleptic analysis.** An analysis based on flavor and aroma characteristics.

5.28 **Peroxide value.** A measure of the oxidation of oil expressed as milliequivalents of active oxygen per kilogram of oil.

5.29 **Pressing.** An oil extraction method consisting of pressing the malaxed paste utilizing a hydraulic or centrifugal press.

5.30 **Producer.** A "Producer" is any person that produces or causes to be produced olives that are processed into olive oil in the amount of 5,000 gallons or more during the marketing season and that shall upon request of the commission provide proof of commodity sale.

5.31 **Pyropheophytin a.** A degradation product of Chlorophyll a that results from the thermal or age related degradation of the oil.

5.32 **Refining.** A process in which oil undergoes treatment using but not limited to the following, heat (typically stripping steam) or chemicals (typically caustic soda or sodium carbonate) in combination with heat. Soft Column refining, also sometimes known as deodorization, is a type of refining using lower temperatures under vacuum often used to neutralize flavor and aroma.

5.33 **Region.** An area or division, especially part of a country or the world having definable characteristics but not always fixed boundaries.

5.34 **Sterols.** A subgroup of steroids with a hydroxyl group at the 3-position of the A-ring. Sterols comprise one of many minor constituents of oils that are characteristic indicators of impurity.

5.35 **Trans fatty acid.** A group of compounds consisting of all the geometrical isomers of monounsaturated and polyunsaturated fatty acids having one or more non-conjugated carbon-carbon double bond in the trans configuration interrupted by at least one methylene group. As they are not present in olive oil in its natural state their presence indicates if processing such as deodorization or de-coloring has taken place.

5.36 **Triglyceride.** A major component of oil comprised of an ester of three fatty acids and glycerol, also known as triacylglycerol.

5.37 **Use by Date.** A date on the container that signifies the end of the period during which the intact package of oil, if stored in accordance with stated storage conditions, will retain any specified qualities for which express or implied claims have been made. Terminology used on packaging shall appear as "Best By" or "Best if Used By".

5.38 **Wax content.** A minor component of olive oil that is found in the skin of the olive fruit.

6.0 QUALITY AND PURITY PARAMETERS

6.1 The quality parameters and limits for grades of olive oil, refined-olive oil, and olive-pomace oil shall be as set out in Table 1.

6.2 The purity parameters of olive oils, refined-olive oils, and olive-pomace oils shall be set out in Tables 2-5.

6.3 The limits established for each parameter take account of the precision values of the respective recommended methods of determination specified in section 9.

TABLE 1

QUALITY PARAMETERS

	OLIVE OIL			**REFINED-OLIVE OIL**		**OLIVE-POMACE OIL**		
Parameter	Extra Virgin olive oil	Virgin olive oil	Crude olive oil[1]	Refined olive oil blend	Refined olive oil	Refined olive pomace oil blend	Refined olive pomace oil	Crude olive pomace oil
Free Fatty Acid Content (%m/m)	≤0.5	≤1.0	>1.0	≤0.8	≤0.3	≤0.8	≤0.3	N/A
Peroxide Value (PV) (meq O_2/kg oil)	≤15.0	≤20.0	>20.0	≤15.0	≤5.0	≤15.0	≤5.0	N/A
Absorbency in ultraviolet K_{232}	≤2.40	≤2.60	>2.60	N/A	N/A	N/A	N/A	N/A
Absorbency in ultraviolet K_{270}	≤0.22	≤0.25	>0.25	≤0.90	≤1.10	≤1.70	≤2.00	N/A
Absorbency in ultraviolet Delta K	≤/0.01/	≤/0.01/	≤/0.01/	≤/0.15/	≤/0.16/	≤/0.18/	≤/0.20/	N/A
Moisture and volatile matter (MOI)(%m/m)	≤0.2	≤0.2	≤0.3	≤0.1	≤0.1	≤0.1	≤0.1	≤1.5
Insoluble impurities (INI) (%m/m)	≤0.1	≤0.1	≤0.2	≤0.1	≤0.1	≤0.1	≤0.1	N/A
Pyropheophytin a (PPPs) (%)	≤17	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2 Diacylglycerols (DAGs) (%)	≥35	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Organoleptic Analysis Median of Defects(MeD)	=0.0	0.0<MeD≤2.5	>2.5	≤2.5	≤2.5	≤2.5	≤2.5	N/A
Organoleptic Analysis Median of Fruity(MeF)	>0.0	>0.0	N/A	>0.0	N/A	>0.0	N/A	N/A

[1] Note: These criteria are not required to be concurrent for crude olive oil, one is sufficient.

TABLE 2

PURITY PARAMETERS

	OLIVE OIL			**REFINED-OLIVE OIL**		**OLIVE-POMACE-OIL**		
Parameter	Extra Virgin olive oil	Virgin olive oil	Crude olive oil	Refined olive oil blend	Refined olive oil	Refined olive pomace oil blend	Refined olive pomace oil	Crude olive pomace oil
Total sterol Content (mg/kg)				≥1000	≥1000	≥1600	≥1800	≥2500
Wax Content (C40+C42+C44+C46)(mg/kg)	≤250	≤250	≤300[1]	≤350	≤350	>350	>350	>350[2]
Trans fatty acid content (C 18:1 T %) (% trans fatty acids)	≤0.05	≤0.05	≤0.10	≤0.20	≤0.20	≤0.40	≤0.40	≤0.20
Trans fatty acid content (C 18:2 T % +C 18:3 T %) (% trans fatty acids)	≤0.05	≤0.05	≤0.10	≤0.30	≤0.30	≤0.35	≤0.35	≤0.10
Maximum difference between the actual and theoretical ENC 42 triacylglycerol content	≤/0.2/	≤/0.2/	≤/0.3/	≤/0.3/	≤/0.3/	≤/0.5/	≤/0.5/	≤/0.6/
Stigmastadienes content (mg/kg)	≤0.10	≤0.10	≤0.50	N/A	N/A	N/A	N/A	N/A
Content of 2-glyceryl monopalmitate (%)				≤1.8	≤1.8			

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

TABLE 3

FATTY ACID COMPOSITION (Expressed as % m/m Methyl Esters)		
Myristic acid	(C 14:0)	≤0.05
Heptadecanoic acid	(C17:0)	≤0.3
Stearic acid	(C 18:0)	0.5-5.0
Arachidic acid	(C20:0)	≤0.6
Behenic acid	(C22:0)	≤0.2[1]
Lignoceric acid	(C24:0)	≤0.2

[1]≤ 0.3 for olive-pomace oils

TABLE 4

STEROL AND TRITERPENE DIALCOHOLS COMPOSITION (Expressed as % of Total Sterols)	
Brassicasterol	≤0.1
Stigmasterol	≤1.9

TABLE 5

TRACE METALS (Expressed as mg/kg)	
Iron (Fe)	≤3.0
Copper (Cu)	≤0.1

7.0 FOOD ADDITIVES

7.1 **Olive oils and crude olive-pomace oil.** Olive oils and crude-olive pomace oils shall not contain food additives.

7.2 **Refined-olive oils, olive-pomace oil and refined olive pomace oil.** Tocopherols may be added to refined-olive oil, olive-pomace oil and refined olive-pomace oil to restore the natural tocopherols lost in the refining process up to a maximum level of 200mg/kg of total alpha-tocopherol in the final product. Use of tocopherols shall be in compliance with the Food and Drug Administration (FDA) 21 C.F.R. Sub Chapter B Part 170, Part 178, and Part 182 (*Food Additives, Indirect Food Additives: Adjuvants, Production Aids, and Sanitizers, and Substances Generally Recognized as Safe (GRAS)*).

7.3 **Processing aids.** Processing aids are allowed to be used during oil extraction to the extent allowed by the Food and Drug Administration (FDA) 21 C.F.R. Sub Chapter B Part 178 (*Indirect Food Additives: Adjuvants, Production Aids, and Sanitizers*).

8.0 CONTAMINANTS

8.1 **Halogenated Solvents.** The maximum permissible content for refined olive-pomace oil of each halogenated solvent is 0.1 mg/kg. The maximum permissible content of all halogenated solvents is 0.2mg/kg.

8.2 **Pesticide Residues.** The products covered by these standards shall comply with the maximum residual level (MRL) limits established by the U.S Environmental Protection Agency (EPA) 40 C.F.R Sub Chapter E Parts 150 to 180 (*Pesticide Programs*).

9.0 METHODS OF ANALYSIS

9.1 **General**
The following methods shall be used to determine the characteristics of the olive oil, refined olive oils, and olive pomace oils. Alternative methods may be used provided they have been recognized as official methods IOC, AOCS, ISO (International Organization for Standardization), or Codex Alimentarius and shown to give equivalent results. At all times the most recently published version of the listed method or their alternatives shall be used.

9.2 **Sampling.** According to the ISO standard 5555:2001 and Appendix A.

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

9.4 **Determination of the fatty acid composition**. Preparation of methyl esters in accordance with AOCS Ce 2-66 or ISO 5509 or COI/T.20/Doc.24. Methyl esters of fatty acids shall be analyzed by gas chromatography in accordance with ISO 5508 or AOCS Ch 2-91.

9.5 **Determination of the trans fatty acid content.** According to AOCS Ch 2a-94 (Rev. 2002) or ISO 15304 or COI/T.20/Doc.17.Rev.1.

9.6 **Determination of the sterol composition and total sterol content.** Sterol composition and total sterol content shall be determined in accordance with ISO 12228 or COI/T.20/Doc.10.Rev.1 or AOCS Ch 6-91.

9.7 **Determination of the content of erythrodiol + uvaol.** Erythrodiol + uvaol content shall be determined in accordance with IUPAC no. 2.431; capillary columns are recommended or IOC/T.20/Doc. 30.

9.8 **Determination of wax content.** According to COI /T.20/Doc.18.Rev.2 or AOCS Ch 8-02 (Rev.2007).

9.9 **Determination of the stigmastadienes content.** Stigmastadienes shall be determined in accordance with AOCS Cd 26-96 or COI /T.20/Doc.11.Rev.2.

9.10 **Determination of the content of 2-glyceryl monopalmitate.** According to COI /T.20/Doc.23.

9.11 **Determination of the difference between the actual and theoretical ECN 42 triglyceride content.** The difference between the actual and theoretical ECN 42 triglyceride content shall be determined in accordance with AOCS Ce 5b-89 or COI /T.20/Doc.20.Rev.3.

9.12 **Determination of organoleptic characteristics.** Organoleptic characteristics shall be determined in accordance with COI/T.20/Doc. 15.Rev.2.

9.13 **Determination of free fatty acid content.** Free fatty acid content shall be determined in accordance with ISO 660 or AOCS Ca 5a-40.

9.14 **Determination of the peroxide value.** Peroxide value shall be determined in accordance with AOCS Cd 8b-90 or ISO 3960.

9.15 **Determination of absorbency in ultraviolet.** Absorbency in ultraviolet shall be determined in accordance with ISO 3656 or AOCS Ch 5-91 or COI/T.20/Doc.19.Rev.2.

9.16 **Determination of moisture and volatile matter.** Moisture and volatile matter shall be determined in accordance with ISO 662 or AOCS Ca 2c-25.

9.17 **Determination of insoluble impurities in light petroleum.** Insoluble impurities shall be determined in accordance with ISO 663 or AOCS Ca 3a-46.

9.18 **Determination of trace metals.** Determination of copper and iron by direct graphite furnace atomic absorption spectrometry shall be in accordance with ISO 8294.13

9.19 **Determination of alpha-tocopherol.** Tocopherols and tocotrienols contents, using high-performance liquid chromatography, shall be determined in accordance with ISO 9936.

9.20 **Determination of pyropheophytins.** The degradation products of chlorophylls a and a' (pheophytins a, a' and pyropheophytins) shall be determined in accordance with ISO 29841.

9.21 **Determination of 1,2-Diacylglycerol content.** Relative amounts of 1,2- and 1,3-diacylglycerols shall be determined in accordance with ISO 29822.

9.22 **Determination of Induction Time.** Oxidative Stability Index in accordance with AOCS Cd 12b-92.

10.0 HYGIENE

10.1 Products covered by these standards shall be prepared and handled in accordance with the Food and Drug Administration (FDA) 21 C.F.R. Sub Chapter B and E Parts 110 and 589 (*Current Good Manufacturing Practices in Manufacturing, Packaging, or Holding of human food*).

11.0 PACKAGING

11.1 **General.** Olive oils, refined-olive oils, and olive-pomace oils intended for trade should be packaged in containers complying with the *General Principles of Food Hygiene* by the Codex Alimentarius Commission (CAC/RCP 1) and shall comply with the Food and Drug Administration (FDA) 21 C.F.R. Sub Chapter B and E Parts 110 and 589 (*Current Good Manufacturing Practices in Manufacturing, Packaging, or Holding of human food*).

11.2 **Packaging materials.** Only packaging materials fit for the intended use, selected to minimize the deterioration of oil quality, and selected to ensure continued compliance with the grade of the oil of the shall be used.

11.3 **Labeling**

11.3.1 **General.** In addition to the requirements set out herein handlers of olive oils, refined-olive oils and olive-pomace oils shall comply with the Food and Drug Administration (FDA) 21 C.F.R Sub Chapter A, B, D, E, F, G Part 101 (*Food Labeling*).

11.3.2 **Product name.** The labeling on each container shall indicate the specific grade of the product as specified and determined by these standards in section 4. The designations shall be prominent and clearly legible in the principal display panel of the label. The following are the only grade designations permitted:

(a) Extra Virgin Olive Oil
(b) Virgin Olive Oil
(c) Crude Olive Oil*
(d) Refined-Olive Oil Blend composed of refined-olive oil and virgin (or extra virgin) olive oils
(e) Refined-Olive Oil
(f) Refined Olive Pomace-Oil Blend composed of refined olive-pomace oil and virgin (or extra virgin) olive oils
(g) Refined Olive Pomace-Oil*
(h) Crude Olive Pomace-Oil*

*Note: Grades for trade only, not fit for consumption without further processing.

11.3.3 **Prohibited Terminology**. Indications shown on the labeling shall not mislead the purchaser as to the characteristics of the oil contained therein by attributing to it characteristics that it does not possess. Examples of designations prohibited but not limited to; "Pure", "Pure Olive Oil", "Lite", "Lite Olive Oil", "Light", "Light Olive Oil", "Extra Light", "Extra Light Olive Oil" "Extra Lite" or "Extra Lite Olive Oil", "Super Virgin" shall not be used.

11.3.4 **Provenance.**

(a) If any olive oil is produced, processed, sold, offered for sale, given away or possessed in California, that indicates on its label "California Olive Oil" or uses words of similar import that indicates that California is the source of the oil, 100 percent of that oil shall be derived from olives grown in California.

(b) If reference is made to a specific region in California, then at least 85% of the oil must be from olives grown in that region.

(c) If reference is made to a specific estate within California, then 100% of the oil must be from olives grown on that estate and the estate must be owned or controlled by that producer.

11.3.5 **Varietal Names.** If olive varietal names are used on the label, then varietals comprising 85% of the oil by weight must be listed in their order of dominance.

11.3.6 **Harvest Date.** If reference is made to a harvest date, then 100% of the olives used to make the oil must have been harvested during that time period. Because the California harvest typically runs from August through March, the dating year refers to the earlier calendar year; for example the August 2014 - March 2015 harvest is deemed to be the 2014 harvest. When oils from multiple years are combined and the year of harvest is indicated the label must indicate each of the harvest years contained therein. If both the month(s) and year(s) of harvest are indicated then all periods must be listed and 100% of the oil must be from that (those) period(s). (*Amended February 16, 2015*)

11.3.8[1] **Lot identification.** Each container shall be permanently marked to identify the producing factory and the lot in accordance with the relevant US and California codes. Every lot must include a date of manufacture; in either closed or open format.

11.3.9 **Use by Date.** Declaration of a Use by Date is mandatory. It must be supported by technical evidence. The Use By shall be displayed as "Best if Used By" or "Best By". The label shall include storage conditions necessary to ensure the validity of that date.

11.3.10 **First Cold Pressing/ Cold Extraction.** The indication "First Cold Pressing" Cold pressing", Cold extraction", "Cold Crushed", or similar language may be used only for "Extra Virgin Olive Oil "or "Virgin Olive Oil" extracted by mechanical means that do not lead to significant thermal alterations in the oil.

[1] Section 11.3.7 was not implemented

12.0 TRACEABILITY

12.1 All containers of oil shall be clearly labeled as to their contents and be identified by a lot number. The lot number shall provide the ability for the handler to identify the following:

12.1.1 The location including the address, county and assessor's parcel number(s) of the land where the olives were grown.

12.1.2 The pesticide records for that location.

12.1.3 The name of any harvesting company used in harvesting the olives

12.1.4 The name of the transportation company that transported the olives

12.1.5 Total quantity by weight of olives delivered to the mill for processing.

12.1.6 Applicable processing and quality records.

12.1.7 Total quantity of oil by weight or volume produced from the tonnage as stated in section 12.1.5.

12.1.8 Final lot numbers identified on the goods that were sold.

12.2 Product traceability documents and identification records shall be maintained and available for review. All records shall be maintained for a minimum of 3 years.

12.3 All traceability, documentation, verification, and validations shall be in accordance with 21 C.F.R Part 120 (*Hazard Analysis and Critical Control Point (HACCP) Systems*).

12.4 In the event that purity testing results are in the ranges footnoted in tables 2 and 4, the handler shall provide the documents identified in section 12.1 to the commission for review.

Exhibit "B"

Appendix "A"

SAMPLING, TESTING AND GRADING METHODOLOGY FOR OLIVE OIL, REFINED-OLIVE OIL AND OLIVE-POMACE OIL

Effective September 30, 2020 Through June 30, 2021
Unless Subsequently Amended or Terminated

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

Appendix A: Sampling, Testing and Grading Methodology for Olive Oil, Refined-Olive Oil and Olive-Pomace Oil

Table of Contents

PREFACE 1

1 GENERAL 1

2 DEFINITIONS 2

3 SAMPLING BY COMMISSION 3

4 SAMPLING BY HANDLERS 4

5 SAMPLING PROTOCOLS 5

6 REPORTING 6

7 GRADING 6

8 RIGHT TO REVIEW AND RETEST 6

9 OOCC VOLUNTARY MEMBERSHIP AND STANDARD PARTICIPATION 7

PREFACE

The goal of the Olive Oil Commission of California is to further the objectives of the Standards by requiring mandatory testing and grading of olive oil produced in California under the jurisdiction of the Commission using laboratories accredited by AOCS, IOC and/or ISO in the methods prescribed by the Standard.

Notwithstanding anything in this section, handlers of olive oil covered by the Standard shall comply with testing, reporting and grading and submission of results as delineated in this Appendix.

1 GENERAL

1.1 Applicability. This appendix shall apply to all oil under the jurisdiction of the California Department of Food and Agriculture (CDFA) Olive Oil Commission of California (the Commission), Chapter 29 of Part 2, Division 22 of the California Food and Agricultural Code.

1.2 Method of Sampling. According to International Standards Organization (ISO) 5555:2001-International Standard, Animal and Vegetable Fats and Oils-Sampling as applicable. At all times. the most recently published version of the method must be used.

1.3 Controlling rule. Where differences exist between this appendix and ISO 5555-2001, this appendix shall be controlling.

1.4 Requirement of Sampling. All lots of olive oil shall be sampled, tested and graded.

1.5 Frequency of Sampling. Annually, all lots in handler's inventory, including current and past harvest lots, are subject to these testing protocols and shall be sampled and tested under the rules as outlined below. Oil need not be sampled and retested if all the following apply:

(a) The oil was previously tested under this Appendix
(b) The oil is packed as a finished good for resale
(c) The oil is identified by a lot number on the container, and
(d) The oil container carries a "Best By", "Use By", or "Best Before" date.

1.6 Lots sold prior to Commission sampling. In cases where the whole of a lot of oil is sold prior to sampling by the Commission, the lot must be sampled and tested by the handler. Retention samples taken according to the procedures described herein must be retained by the handler in quantities listed in section 3.4 and 4.3 of this Appendix.

2 DEFINITIONS

2.1 **Bulk Sample**. Per ISO 5555-2001, Section 2.4 "quantity of fat [oil] obtained by combining the various increments from a lot in amounts proportional to the quantities they represent"

2.2 Good Manufacturing Practices (GMPs). Established guidelines to help ensure production of safe, quality food. These must be followed when pulling samples.

2.3 **Increment**. Per ISO 5555:2001 Section 2.3 "a quantity of fat [oil] taken at one time from one place in a lot".

2.4 **ISO 5555 Oil Sampling Standard.** Standard used in creating the OOCC detailed sampling protocol. All sampling details below are based on the guidelines of the ISO Standard using the most current published version.

2.5 **Laboratory sample**. Per ISO 5555: 2001 Section 2.5 "quantity of fat [oil] obtained from the bulk sample after suitable homogenization and reduction in size which is representative of the lot and intended for laboratory examination".

2.6 **Lot.** A lot is a quantity of oil contained in one or more vessels that is declared by the handler to have uniform characteristics and that is marked in accordance with section 11.3.8 of the Standard. The maximum lot size is 200,000 gallons.

2.7 **Nitrogen Capping**. Act of purging container's/vessel's headspace of oxygen with nitrogen or another inert gas, and then applying an air-tight cap.

2.8 **Tanks with top opening**. Refers to storage tanks of oil that have easy access to the tops to pull samples. Samples are pulled through the top of the tank.

2.9 **Tanks with sample port**. Oil storage tanks that do not have access through the top to pull a sample. Samples are pulled from sample port.

2.10 **Retention Samples**. Containers of oil in quantities described in sections 3.4 and 4.3, saved by the producer and the OOCC sampling party, of samples submitted to labs for testing. Retention samples shall be identified by lot code and each container shall be a minimum 250ml in volume.

2.11 **Sampling Guidance Document**. A document which outlines the recommended sampling process and procedures including sampling from multiple Drums/Totes/Tanks of less than 1,510 gallons per container.

2.12 **Small Storage Vessel**. A drum, tote, or tank of less than 1,510 gallons.

2.13 **Standard**. Means the California Department of Food and Agriculture Grade and Labeling Standards for Olive Oil, Refined-Olive Oil and Olive-Pomace Oil pursuant to Chapter 29, Part 2 of Division 22 of the Food and Agricultural Code.

2.14 **Thief.** Tool made of food-grade stainless steel which provides the ability to accurately sample oil from a specified depth.

2.15 **Fiscal Year**. Means July 1 of any year through June 30 of the following year.

3 SAMPLING BY COMMISSION

3.1 **Sampling of Lots**. Five lots will be sampled at random from each handler subject to the jurisdiction of the Commission under the direction of the CDFA or by a CDFA and Commission approved independent third party (sampling party). Samples will be taken following the procedures and sampling plan in accordance with section 5.0 below.

3.2 **Sample Timing.** The date of the sampling as well as which lots are to be sampled will be determined by the sampling party. All sample collection must be completed by February 1 of the fiscal year. All results must be reported to the Commission administrator by March 1 of the fiscal year.

3.3 **Bulk samples per lot.** A single bulk sample is required per lot.

3.4 **Quantity and volume of laboratory sample containers per lot.** A minimum of five laboratory samples in containers of 250ml or larger are required per lot for testing and retention samples.

3.5 **Sampling technique.** The sampling technique shall be in accordance with Section 5 of ISO 5555:2001 as appropriate.

3.6 **Sampling Methods.** Methods of sampling shall be applicable to the container in which the oil is stored in accordance with Section 6 ISO 5555:2001 as appropriate**.**

3.7 **Sample handling.** Samples shall be packed and handled in accordance with ISO 5555:2001as appropriate

3.8 **Sample Information**. Samples shall contain the information identified in Section 7.2 items e, f, h, j, k, l, m, and n of ISO 5555:2001 as appropriate.

3.9 **Tamper Proof Boxes.** All laboratory samples shall have a tamper evident seal placed on the box and marked by the sampling party.

3.10 **Designated Labs.** The sampling party shall send to an accredited edible oil analytical laboratory designated by the Commission three laboratory samples for each lot sampled in accordance with this section for analysis and grading based on the quality parameters in Table 1 of the Standard, Induction Time (Oxidative Stability Index in Accordance with AOCS Cd 12b-092) and for the analysis of the purity parameters as described in the following paragraph.

3.11 **Samples Tested for Purity.** The Commission shall direct the sampling party to randomly select from the samples of lots taken by the sampling party from handlers a number, fixed annually, of

samples to be tested for the purity parameters in tables 2-5 of the Standard at an analytical laboratory designated by the Commission.

3.12 **Retention Samples.** The sampling party shall retain two containers of the laboratory sample, designated as retention samples, for the purpose of replacement of a lost sample, or retesting. The laboratory samples shall be retained until the end of the fiscal year. Additional laboratory samples may be taken by sampling party and retained by the handler.

3.13 **Test Results.** The Commission administrator shall distribute to each handler the results only of the tests from his or her lots by March 15 of the fiscal year. The name of the handler shall be confidential. The results shall be reported the Commission referencing only lot numbers. The results shall include the information listed in section 6 of this Appendix.

3.14 **Payment for Commission Samples.** The Commission shall pay the cost of sampling, shipping testing, grading and reporting of the samples under this section.

4 SAMPLING BY HANDLERS

4.1 **Samples required.** All handlers subject to the jurisdiction of the Commission shall be required to annually sample, test and grade all lots of olive oil in inventory, regardless of harvest year, for the quality parameters listed in Table 1 of the Standard except as described in section 1.5. Sampling and testing must be done by a certified laboratory chosen by the handler, including the handler's own laboratory if certified, following an official testing method described in the Standard. The handler is required to assign a distinct number to each lot.

4.2 **Sampling protocol**. Samples will be taken following the procedures and sampling plan in accordance with section 5 below.

4.3 **Retention Samples.** The handler shall retain a minimum of two containers of oil from each lot sampled for the purpose of retesting. These retention samples shall be a minimum of 250ml and be retained until the end of the fiscal year in which the oil was produced.

4.4 **Payment for handler samples.** The handler shall pay the cost of sampling, quality testing and retention of samples required under this section and section 5 below.

4.5 **Reporting of Handler Test Results.** The results of the quality tests and grades assigned under this section shall be sent to the Commission administrator, and shall include the name of the handler. The results of sampling shall be reported to the commissioners using only the lot number and without the name of the producer or handler.

4.6 **Reporting deadline.** The results of the sampling testing and grading must be reported to the Commission no later than March 1 of the fiscal year of production and must include all information required by section 6 of this Appendix and values for all parameters listed in Table 1 "Quality Parameters" of the Standard.

4.7 **Extension of reporting deadline for handlers.** Handlers may apply to the Commission for a 30-day extension of the reporting deadline for lots of oil processed after February 1 of the fiscal year. Application for extension must be received by March 1.

4.8 **Partial waiver of testing requirement.** For any lot of oil of 350 gallons or less, a handler may receive a waiver from all testing except for Free Fatty Acid, UV and Organoleptic Analysis per Table 1 of the Standard. Such a waiver must be requested in writing and presented to the Commission or its representative. Nothing in this subsection shall relieve the requesting handler from the requirement to correctly grade and label every lot of oil according to the Standard.

5 SAMPLING PROTOCOLS

5.1 **Materials.** All materials used must be food grade and approved materials to minimize contamination or risk to the product (i.e., stainless steel, PET, etc.)

5.2 **Compliance with Good Manufacturing Practices and Cal OSHA Regulations.** All equipment cleaning and sampling protocols shall comply with GMPs and Cal OSHA regulations.

5.3 **Tank samples from tanks with top access**. Large tank samples shall be drawn through the top opening and consist of one part from the top 10% of the tank, three parts from the middle 30% of the tank and one part from the bottom 10% of the tank. Blend all samples in equal portions to create one final sample. All sample labels must include Date Sampled, Lot Number and Varietal(s).

5.4 **Tank samples from tanks with sample port but no top access.** Samples will be drawn from the sample port after purging the sample port of approximately 200ml of oil. Fill labeled bottles straight from the sample port. All sample labels must include Date Sampled, Lot Number and Varietal(s).

5.5 **Sampling from Small Vessels.** These are vessels of 1,510 gallons of less and only require one sample from the middle of the container. If multiple vessels comprise one lot, reference the **Sampling Guidance Document** for proper sample quantities by number of containers per lot. All sample labels must include Date Sampled, Lot Number and Varietal(s).

5.6 **Sampling for Multiple Containers**. For lots of oils that have multiple containers per lot, multiple samples shall be pulled and combined in equal portions for the final lot sample. Reference **Sample Guidance Document** for the number of samples to pull from each lot by container size. All sample labels must include Date Sampled, Lot Number and Varietal(s).

5.7 **Finished samples**. All finished samples shall be bottled in new dark glass of 250ml. It is recommended by the Commission that all samples be capped in nitrogen after filling.

5.8 **Sample Storage**. Samples need to be kept as cool as is practical during storage and transport prior to testing.

6 REPORTING

6.1 **Sample and lot reporting.** The designated sampling party or the handler shall send to the Commission or its representative the following information:

(a) The identifying number of each lot sampled.
(b) The volume or weight of each lot.
(c) The date and time each lot was sampled.
(d) The percentage of all varieties in each sample to the extent known.
(e) A complete copy of the laboratory report or reports.
(f) The grade assigned to each sample.

7 GRADING

7.1 Based on the results of the testing each lot will be assigned a grade subject to review by the Commission or its representative.

7.2 Lots that fail chemical purity testing are not eligible to be graded and shall not be sold as olive oil, refined-olive oil or olive-pomace oil provided however, that traceability documentation as described in section 12 of the Standard, after review and acceptance by the Commission will negate failure to comply with the limits of Tables 2, 3, 4 and 5 of the Standard.

8 RIGHT TO REVIEW AND RETEST

8.1 Any handler is entitled to a retest of any or all lots of oil tested by the Commission; provided however that the retesting is at the sole expense of the handler. Retesting is only required for parameters that did not meet the limits set in the Standard.

8.2 The handler must notify the Commission of his or her desire to have a Commission retest within 10 days of receipt of test results. Retesting by the Commission must be completed within 21 days of the date of notification to the Commission.

8.3 All Commission retests must be done using retention samples or a new sample drawn from the same lot by the sampling party at the handler's expense using a laboratory as agreed upon by the Commission and handler.

However, the results of a handler retest shall be accepted as a substitute for the first Commission retest, provided that the sampling and testing by the handler is performed in accordance with all the requirements of Section 4 "Sampling by Handlers" and is reported to the Commission in a timely manner.

8.4 The results of the first Commission retest, if the same as the original test, shall be final. If however the first Commission retest results in the assignment of a different grade, a second Commission retest will be required using a laboratory selected by the Commission but paid for by the handler. The result of the second Commission retest will be final.

9 OOCC VOLUNTARY MEMBERSHIP AND STANDARD PARTICIPATION

9.1 Any California handler of olive oil not covered by the OOCC standard may participate voluntarily provided that all of the following conditions are met:

- **(a)** The handler voluntarily participates in the commission program or is member of an OOCC approved organization that requires testing and certification of their members' olive oils for the following quality parameters; FFA, UV and Organoleptic Analysis.
- **(b)** The handler agrees to participate in the OOCC testing and sampling program described in Appendix A of the Standard and agrees to label oil only in accordance with the Standard and the Appendix.
- **(c)** The handler agrees to pay an annual fee calculated by taking the current assessment rate multiplied by the quantity of olive oil produced.
- **(d)** The handler agrees that all oil produced by the handler will be assigned a lot number and graded according to the requirements of the Standard including those that are in addition to those listed in (a) above and /or beyond those of the approve d organization.
- **(e)** The program applies only to 100% California olive oils.
- **(f)** The handler agrees in a written contract to conditions (a) – (e) above.

9.2 Any handler meeting the above conditions may use the OOCC logo and approved language provided however that the same conditions for use by compulsory handlers will apply.

Exhibit "C"

OOCC
Tank Sampling Guidance Document

1.0 Definitions and Materials

1.1 **FDA Good Manufacturing Practices (GMPs):** Established guidelines to help ensure production of safe, quality food.

1.2 **ISO 5555:** Standard followed in creation of this guidance document for ease of sampling various container types. Includes Table which outlines the sampling requirements from multiple Drums/Totes/small tanks less than 1510 gallons per container.

1.3 **Materials:** All materials used must be approved materials to minimize contamination or risk to the product (i.e.; stainless steel, PET, etc.).

1.4 **Thief (Left Picture):** Tool made of food-grade stainless steel which allows us the ability to accurately sample oil from a specified depth.

1.5 **Coliwasa (Right Picture):** Semi-reusable hand held "thief-like" device made of a tube with a rod in the middle and two stoppers on either side of the tube.

1.6 **Twine or Chain:** made of material approved to minimize contamination tied to Thief to lower into containers or tanks. Disposable preferred so minimize cross contamination of oils.

1.7 **Nitrogen Capping:** Act of purging container's/vessel's headspace of oxygen with nitrogen or another inert gas, and then applying an air-tight cap.

1.8 **Cleaning:** All re-usable materials shall be cleaned with soap and water followed by sufficiently dried so as to not contaminate any samples. Clean all sample materials with dish soap, hot water and a dish sponge.

1.9 **Gloves:** shall be worn at all times while handling food contact surfaces and sampling materials.

2.0 Sampling From Tanks with Access to Top

2.1 First prepare the appropriate number of bags for quantity of oil needed. Using food grade materials lower the thief down the top of the tank to collect samples at each phase of the tank. Final oil samples need to be comprised of 1-part Top 10% of the tank, 3- parts Middle of the tank, and 1-part Bottom 10% of the tank.

2.2 Securely tie one end of the twin/chain to the thief. Measure out enough twine to reach the bottom 10% of the tank. Make a knot half way on up the twine; this will reach the middle of the tank. Cut the twine and tie the end to the handle on the bucket.

2.3 Carefully lower the thief into the tank holding onto the twine. Lower the thief to the bottom 10% of the tank. Carefully jig the thief about three times by pulling up on the twine and then letting the slack fall back out. This helps exchange the oil in the thief with the oil at the particular level being sampled. Carefully pull the thief back up.

2.4 While pulling the thief up, gently pinch the twine to squeeze out the excess oil. Empty the Sample into a sample container for further blending required.

2.5 Repeat steps above for the middle and bottom of tank samples.

2.6 Once all samples are pulled close the lid to the top of the tank. Clean all materials according to section above. The twine, gloves, and bags shall not be reused for any samples.

2.7 Blend samples together by measure out 200mL of the "Top" oil, 600mL of the "Middle" oil and 200mL of the "Bottom" oil.

2.8 All sample labels must include Date sampled, Lot Number, and Varietal.

3.0 Sampling From Tanks without Access to Top

3.1 Open Sample port and purge 200mL of oil from port to get to fresh oil. Dispose of the 200mL pulled.

3.2 Place sample bottles at port and fill up desired quantity of sample bottles.

3.3 Samples from individual small tanks do not need blending if it is one lot per tank. If there are multiple containers per lot mix equal parts of each lot into one sample from each tank.

3.4 Reference **Sample Conversion Table** at the end of this document for the number of samples to pull from each lot by container size.

3.5 All sample labels must include Date sampled, Lot Number, and Varietal(s).

4.0 Sampling from Small Vessels

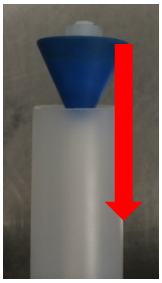
4.1 With gloves on, open the bung on the drum or vessel.

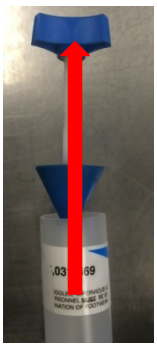
4.2 If the container opening is large enough, use the thief with twine or a chain to obtain sample as seen in section above for **tanks with access to top**.

4.3 If container opening does not fit the thief, use the following materials:

4.3.1 With the bottom end all the way submerged, push down on the handle so that the bottom stopper comes unplugged from the tube, allowing oil to enter the tube.

4.3.2 Once filled pull up on the handle to close the bottom stopper. Pull the small vessel sampler out of the drum and empty sampled oil into a sample bottle. Repeat until the appropriate volume of oil is sampled.





4.4 Repeat with clean and dry tools until enough bottles are made.

4.5 Samples from individual small vessels do not need blending if it is one lot per vessel. If there are multiple containers per lot mix equal parts of each lot into one sample from each vessel.

4.6 Reference **Sample Conversion Table** at the end of this document for the number of samples to pull from each lot by container size.

4.7 All sample labels must include Date sampled, Lot Number, and Varietal(s).

Guidance Document Recommendations for number of packages to be sampled

ISO 5555:2003 Table 3 page 11 Conversion from KG to Gal.

Tanks greater than 1,510 gallons

Size of Tank	Volume of Tanks (gal)	Number of Bulk Samples for each Tank
≥151,017 gallons up to 200,000 gallons	1	2
> 1,439 gallons to 151,017 gallons	1	1

Drums/Totes/small tanks less than 1,510 gallons per container

Size of Package	Number of Packages in the Lot	Number of Packages to be sampled
≥5.8 gallons up to 1,314 gallons	1 to 5	all
	6 to 50	6
	51 to 75	8
	76 to 100	10
	101 to 250	15
	251 to 500	20
	501 to 1,000	25
	> 1,000	30
≥1.4 gallons and < 5.8 gallons	1 to 20	all
	21 to 200	20
	201 to 800	25
	801 to 1,600	35
	1,601 to 3,200	45
	3,201 to 8,000	60
	8,001 to 16,000	72
	16,001 to 24,000	84
	24,001 to 32,000	96
	> 32,000	108
<1.4 gallons	1 to 20	all
	21 to 1,500	20
	1,501 to 5,000	25
	5,001 to 15,000	35
	15,001 to 35,000	45
	35,001 to 60,000	60
	60,001 to 90,000	72
	90,001 to 130,000	84
	130,001 to 170,000	96
	>170,000	108

Olive Oil Density: 0.000912 kg/mL

Conversion 3785.41mL/1gal

Gallons=(Xkg / 0.000912kg/mL)/3785.41mL/gal

Exhibit "D"

Olive Oil Commission of California

Use By Technical Evidence Guidance Document

Why require use by?

To be compliant with FDA recommendations issued over the last 3 years, the Olive Oil Commission decided to mandate use by dating on olive oils for transparency and clarity to consumers. The FDA has recommended industry groups take this approach as they are not able to mandate use by dates for all product, currently only for baby food and juice. This initiative originated with the food waste reduction by consumers.

Why require technical evidence?

There is substantial research done across the world on olive oil shelf life stability to correlate and determine what are the key parameters of degradation to test and qualify when an oil has gone from Extra Virgin to Virgin or Crude. Coupling this research with internal testing is vital for a business to validate their own use by. The focus of the evaluation being- the oil must meet the Extra Virgin Grade as stated in the Quality Parameters as stated in Table 1 of the OOCC Grades and Labeling Standard. Some examples for technical evidence are:

- Best By Calculator or prediction models *Guidance*
- Assessing the key quality parameters with review of other research *Below*
- Use By Trial *Below*

What does the Commission Expect of Handlers?

The intention of the recommendations below is to ensure handlers have on file reports validating their use by dates printed on bottles. For some bottlers and handlers, it would be cost prohibitive to conduct a full trial and testing. An alternative recommendation to trial set-up is to have a report on file annually to evaluate the olive oil quality chemistry and relate to the various shelf life prediction models available. If using this method, this report is recommended to be done annually, to update the new harvest chemistry results evaluation.

***Examples of Technical Evidence:* Technical Evidence Report Summary**

Assessing Key Quality Parameters Report

The recommended topics to cover in your report would be:

- Controlling Measures
  - Detail section about how you control the product quality of the oil in your possession. Below outline some recommended topics to cover here in how you control your quality, to include in your report as a summary- proving the steps you are taking to ensure longevity of the oil.
  - What storage conditions do you use, i.e.:
    - temperature controlled at what temperature range?
    - Use stainless steel vessels only?
    - Nitrogen flush/blanket the oil regularly to maintain quality?
    - Bottle as needed vs. bottling all right after harvest?
    - Filter or not filter the oil to improve sediment integrity?
    - Rack oil prior to final storage and/or bottling?

- Data Analysis
  - Summary of harvest chemistry and sensory of each lot of oil including but not limited to- FFA, PV, UV's, PPP, and DAG, induction time, total phenol, sensory. Testing results should be no later than 1-month post-harvest of the oil for best results.
  - Using one of the models reviewed by the *UC Davis Olive Center* in the **Shelf Life of Olive Oil and Useful Methods for its Prediction** use your data to show the potential trend of degradation and what shelf life the model suggests the oil will last under optimal conditions
- Conclusion
  - Summary based on the facts of your controlling storage to maintain oil quality, along with the results of your oil based on the prediction models what shelf life your oil will maintain.
  - Include here any findings you found in the data that you can do to improve on the next year's harvest to improve your quality.

Use by Trial Set Up

A shelf life trial is recommended to be conducted every few years on your product to evaluate the oil quality over time with the use by date you provide is enough to maintain the quality of the oil as labeled.

A use by/ shelf life trial for olive oil is not the same as most other foods. Instead of looking for bacterial or fungal growth and other food safety concerns, an olive oil use by trial is set up to evaluate strictly the quality of the oil and degradation of the oil grade to the next level. This is to maintain if the oil is labeled as extra virgin the oil remains extra virgin to the stated use by date on the label.

- Considerations for use by trials:
  - Done under ideal storage conditions as it is difficult to predict how the stores will manage the product and could become costly in testing.
  - Once a container is opened and tested it should not be-reclosed and re-used at a later month testing. i.e. multiple containers will need to be needed to conduct trial
  - Always plan for a test or two post your use by date to test past date quality and what happens to the oil.
  - As close as possible use containers and oil that were manufactured in the way that you manufacture to sell. Example- don't hand fill bottles and cap, if you have a line that fills the bottles, pull the bottles off your line at a production date.

- Setting up a trial and Conducting:
  - Decide on which oil (s) and container (s) you want to test. Save at minimum 2 bottles per each testing frequency
  - It is recommended to test every other month or 1x quarterly for the extend of the use by of the product + 2 additional after the use by date. If your product has 24 months shelf life you should test up to 28 months (at quarterly would be 9 testing times, at every other month would be 13).

- Decide on which chemical and sensory parameters to test and a lab to send samples to. It is important to keep the lab consistent on the testing for the extent of the trial. *See OOCC recommended labs on the OOCC website*
  - The chemical parameters at a minimum that should be included: FFA, PV, UV's, Total Phenol, Induction Time, PPP, DAG, Sensory.
  - Phenol and Induction time are not required OOCC Quality Standard testing, however highly recommended in evaluating a use by date for your oil.
- Collect the samples to be stored and tested. Store the samples in a controlled location.
- At your set frequency of testing, pull 1 bottle at minimum to test. Send the samples out to testing and obtain results. *It is recommended to do a blend of 2-3 bottles for each but could be cost prohibitive.*
- At each testing frequency record the data and evaluate the trend of each parameter- showing how the parameters tested are changing over time.
- Upon time that your samples fail the OOCC Standard for the grade the oil is labeled, test 2 additional frequencies later at minimum to evaluate how the oil degrades or if there was a anomaly issue sample.
- OOCC Quality Standard Table 1: http://www.oliveoilcommission.org/wp-content/uploads/2018/11/Summary-Tables-of-California-Olive-Oil-Standards-2018-19-1.pdf

- Conclusion
  - After the extent of the use by a final report with findings shall be concluded evaluating the data. The data will clearly show if the oil still meets the OOCC Quality standard at commencement of the trial.
  - Evaluation of the data should include recommendations to take on modifications to extend or reduce the use by date, better storage conditions, or changing the container for improved results.

Technical Resources for investigating your Use by date

USDA FSIS- Food Product Dating ; retrieved from https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/food-labeling/food-product-dating/food-product-dating

FDA- Confused by Date Labels on Packaged Foods? Retrieved from https://www.fda.gov/consumers/consumer-updates/confused-date-labels-packaged-foods

Wang, S. (2014). Packaging Influences on Olive Oil Quality. Retrieved from https://olivecenter.ucdavis.edu/media/files/PackagingInfluencesonOliveOilQuality.pdf

Ayton, J. (2012) The Effect of Storage Conditions on Extra Virgin Olive Oil Quality. Retrieved from https://1.oliveoiltimes.com/library/Olive-Oil-Storage-Conditions.pdf

Wang, S. (2017) Shelf Life of Olive Oil and Useful Methods for its Prediction. Retrieved from http://www.oliveoilcommission.org/wp-content/uploads/2018/03/16-17-OOCC-Lit-Review-Shelf-Life.pdf