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GCC STANDARDIZATION ORGANIZATION (GSO)

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Edible olive oil and olive pomace oil

Prepared by:

Gulf technical committee for sector standards of food and agriculture products
This document is a draft Gulf standard circulated for comments, it is therefore, subject to alteration and modification, and may not be referred as a Gulf standard, until approved by the Board of Directors

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FORWARD

GCC Standardization Organization (GSO) is a regional Organization which consists of the National Standards Bodies of GCC member States. One of GSO main functions is to issue Gulf Standards /Technical regulations through specialized technical committees (TCs).

GSO through the technical program of committee TC No.:(5) " Gulf technical committee for standards of food and agriculture products " has updated the GSO Standard No. GSO 1019/2012" Edible olive oil and olive pomace oil" . The Draft Standard has been prepared by (STATE OF QATAR) .

This standard has been approved as a Gulf Technical Regulation by GSO Board of Directors in its meeting No.(), held on h (G) . The approved standard will replace and supersede the GSO standard No. (GSO 1019/2012) .

Edible olive oil and olive pomace oil

1. Scope and field of application:

This Gulf standard is concerned with olive oil and olive pomace oils for human consumption. .

2. Complementary standers:

- 2.1 GSO 9 "Labeling of prepackaged foodstuffs".
- 2.2 GSO 15 "Animal and vegetable fats and oils - Sampling ".
- 2.3 GSO 16 "Physical and chemical methods for testing edible vegetable oils and fats".
- 2.4 GSO 17"Detection of additives in edible oils and fats, and methods for their determination - Part 1".
- 2.5 GSO 20 "Methods for determination of contaminating metallic elements in foodstuffs" .
- 2.6 GSO 21 "Hygienic regulations for food plants and their personnel ".
- 2.7 GSO 168 "Requirements of storage facilities for dry and canned foodstuffs"
- 2.8 GSO 275" Determination of fatty acids in animal and vegetable fats and Oils – Part 2: Analysis of gas liquid – chromatography of methyl esters of fatty acids ".
- 2.9 GSO 382 "Maximum allowable limits of pesticide residues in agricultural and food products – Part 1".
- 2.10 GSO 383 "Maximum allowable limits of pesticide residues in agricultural and food products -Part 2".
- 2.11 GSO 839 "Food packages – Part 1: General requirements ".
- 2.12 GSO 988 "Limits of radioactivity levels permitted in foodstuffs – Part 1".
- 2.13 GSO 1020 "Methods of test for edible olive oil and pomace olive oil".

3. Definitions:

3.1 Olive oil:

Is the oil fit for human consumption obtained from the fruits of the olive tree (*Olea europaea L.*) with the exclusion of any oils obtained by solvents or re-esterification processes, and not blended with other types of oils .

3.2 Virgin olive oils:

Are edible oil obtained from the fruits of the olive tree by only mechanical or other physical means, under conditions, particularly thermal, which do not lead to alterations of the oil, and without being subject to any other treatment except for washing, decanting, centrifuging and filtration, It can be classified into three types :

- 3.2.1 Extra virgin olive oil: shall comply with what is mentioned in item (3.2); its acidity shall not exceed 0.8% as oleic acid.

- 3.2.2 Virgin olive oil: shall comply with what is mentioned in item (3.2); its acidity shall not exceed 2% as oleic acid .
- 3.2.3 Ordinary virgin olive oil: shall comply with what is mentioned in item (3.2); its acidity shall not exceed 3.3% as oleic acid.
- 3.3 Refined olive oil:
Oil obtained from virgin olive oil (the acid content or organoleptic characteristics of which render it unsuitable for human consumption in the natural state) by means of refining methods which do not lead to alterations in its initial glyceridic structure; its acidity content shall not exceed 0.3% as oleic acid.
- 3.4 Olive pomace oil:
Oil obtained by treating olive pomace with solvents or other physical treatments, To the exclusion of oils obtained by re-esterification processes and of any mixture with oils of other kinds.
- 3.5 Refined olive pomace oil:
Oil obtained from fruits olive residues by extraction with solvents, and made edible by means of refining methods which do not lead to alteration in its glyceridic structure; its acidity content shall not exceed 0.3% as oleic acid.
- 3.6 Olive oil mixtures:
Edible oil obtained by mixing virgin olive oil and refined olive oil; fit for human consumption, its acidity content shall not exceed 1% as oleic acid.
- 4. Characteristics:**
- 4.1 identity characteristics (under normal ecological conditions):
- 4.1.1 Fatty acids composition determined with gas chromatography (% of total fatty acids) for olive oils shall be according to Table (1) :

Table (1)
Fatty acids composition as determined by gas chromatography
(% of total fatty acids)

Fatty acid	Virgin olive oils	Olive oil- Refined olive oil	Olive pomace oil- refined olive pomace oil
Myristic acid (C14:0)	0.0-0.05	0.0-0.05	0.0-0.05
Palmitoleic acid(C 16:0)	7.5-20.0	7.5-20.0	7.5-20.0
Palmitoleic acid(C 16:1)	0.3-3.5	0.3-3.5	0.3-3.5
Heptadecanoic acid(C 17:0)	0.0-0.3	0.0-0.3	0.0-0.3
Heptadecanoic acid(C 17:1)	0.0-0.3	0.0-0.3	0.0-0.3
Stearic acid (C 18:0)	0.5-5.0	0.5-5.0	0.5-5.0
Oleic acid (C 18:1)	55.0-83.0	55.0-83.0	55.0-83.0
Linoleic acid (C 18:2)	3.5-21.0	3.5-21.0	3.5-21.0
Gadolic acid (C 20:0)	0.0-0.6	0.0-0.6	0.0-0.6
Arachidic acid (C 20:1)	0.0-0.4	0.0-0.4	0.0-0.4
Behenic acid (C 22:0)	0.0-0.2	0.0-0.2	0.0-0.3
Lignoceric acid (C 24:0)	0.0-0.2	0.0-0.2	0.0-0.2
Trans fatty acids:			
Oleic acid (C 18:1) T	0.0-0.05	0.0-0 .20	0.0-0 .40
Linoleic acid (C 18:2) T + Linolenic acid (C 18:3) T	0.0-0.05	0.0-0 .30	0.0-0 .35

4.1.2 Chemical and physical characteristics:

The chemical and physical characteristics for olive oil shall be according to Table (2):

Table (2)
Chemical and physical characteristics for olive oil

Item	Type of oil characteristics	Virgin olive oils	Refined olive oil	Refined olive pomace oil	Olive oil
4.1.2.1	Relative density (20°C /water at 20°C)	0.910-0.916	0.910-0.916	0.910-0.916	0.910-0.916
4.1.2.2	refractive index (at20°C)	1.4677-1.4705	1.4677-1.4705	1.4680-1.4707	1.4680-1.4707
4.1.2.3	Saponification value (mg KOH/g oil)	184-196	184-196	182-193	184-196
4.1.2.4	Iodine value (wijs method)	75-94	75-94	75-94	75-94
4.1.2.5	Unsaponifiable matter	15g/kg	15g/kg	30/kg	15g/kg

4.1.2.6 Sterols and triterpene dialcohol composition:

a. Desmethylsterol composition (% of total sterols):

- Cholesterol ≤ 0.5
- Brassicasterol ≤ 0.2 for olive pomace oil
 ≤ 0.1 for other grades
- Campesterol ≤ 4.0
- Stigmassterol $<$ campesterol
- Delta -7- Stigmastanol ≤ 0.5
- Beta – Sitosterol + delta -5 -
Avenasterol+delta -5- 23 Stigmastadienol+ Clerosterol+ Sitostanol+
Delta-5-24- Stigmastadienol} ≥ 93.0

b. Minimum value for total sterols:

- Virgin olive oil 1000 mg /kg
- Refined olive oil 1000 mg/kg
- Olive oil 1000 mg/kg
- Refined olive-pomace oil 1800 mg /kg
- Olive -pomace oil 1600 mg /kg

- c. Maximum erythrodiol and uvaol content (% total sterol):
- Virgin olive oil ≤ 4.5
 - Refined olive oil ≤ 4.5
 - Olive oil ≤ 4.5
- 4.1.2.7 Saturated fatty acids at the 2-position in the triglyceride (sum of palmitic and stearic acids) (maximum level):
- Virgin olive oil 1.5%
 - Refined olive oil 1.8%
 - Olive oil 1.8%
 - Refined olive-pomace oil 2.2%
 - Olive -pomace oil 2.2%.
- 4.1.2.8 Maximum difference between the actual and theoretical ECN 42 triglyceride content shall not exceed:
- Virgin olive oils 0.2
 - Refined olive oil 0.3
 - Olive oil 0.3
 - Olive -pomace oil 0.5
- 4.1.2.9 Stigmastadine content in virgin olive oil shall not exceed 0.15 mg /kg.
- 4.2 Quality characteristics:
- 4.2.1 Color, odor and taste:-
- 4.2.1.1 Virgin olive oils: See item 2.3.

Kind of oil	Odor	Taste	Color
Virgin olive oil	Acceptable	Acceptable	Light yellow
Olive oil	Good	Good	Light, yellow to green
Refined Olive oil	Acceptable	Acceptable	Light, yellow to brownish
Olive-pomace oil	Acceptable	Acceptable	Light, yellow to green

- 4.2.1.2 The appearance of these oils after store for 24 hours less than 20°C shall be limpid and free from opacity.

- 4.2.1.3 The organoleptic characteristic (odor and taste) of virgin olive oils shall be as follows :

	Average defect	Median of the fruity attribute
Extra virgin olive oil	0	
Refined olive oil	Between 0 and 2.5	> 0
Ordinary virgin olive oil	Between 2.5 and 6.0*	> 0

* Or when the median of the defect is less than or equal to 2.5 and the n=median of the fruity attribute is equal to 0.

- 4.2.2 Peroxide value (maximum level) shall be in the following ranges:

Kind of oil	Peroxide value (mill equivalent of active oxygen / kg oil)
Virgin olive oils	≤ 20
Refined olive oil	≤ 5
Olive oil	≤ 15
Refined olive- pomace oil	≤ 5
Olive pomace oil	≤ 15

- 4.2.3 Specific extinction in ultra-violet:

- 4.2.3.1 Absorbency in ultra-violet K 270:

Kind of oil	Absorbency in ultra-violet at 270 nm	Delta K
Extra virgin olive oil	≤ 0.22	≤ 0.01
Virgin olive oils	≤ 0.25	≤ 0.01
Ordinary virgin olive oil	≤ 0.30(*)	≤ 0.01
Refined olive oil	≤ 1.10	≤ 0.16
Olive oil	≤ 0.90	≤ 0.15
Refined olive- pomace oil	≤ 2.00	≤ 0.20
Olive- pomace oil	≤ 1.70	≤ 0.18

* After passing the sample through activated alumina, absorbency at 270 nm shall be equal to or less than 0.11.

- 4.2.3.2 Ultraviolet absorbance at 232 nm for extra virgin olive oil shall be ≤ 2.50⁴ and for virgin olive oil ≤ 2.60⁴.

* The country of retail sale may require compliance with these limits when the oil is made available to the end consumer.

4.2.4 The limits of wax content shall be as follows (mg/kg):

Virgin olive oils	≤ 250
Refined olive oil	≤ 350
Olive oil	≤ 350
Refined olive- pomace oil	> 350
Olive- pomace oil	> 350

4.2.5 Halogenated solvents content shall not exceed (mg/kg):

- Content of each halogenated solvent 0.1
- Content of sum of all halogenated solvents 0.2

Maximum level of Benzo(α) pyrene of all kinds of oils should not exceed 2µg/kg oil weight.

4.3 Additives:

No additives are permitted for any kind of olive oil, except the addition of alpha-tocopherol (d-alpha tocopherol (307a), mixed tocopherol concentrate (INS 307b), dl-alpha tocopherol (INS 307c) to virgin olive oil, to refined olive -pomace oil and to olive- pomace oil so as to restore the natural tocopherol which is lost during the refining process; and whose content in the final product shall not exceed 200 mg/kg.

4.4 Quality characteristics:

Kind of oil	% Moisture and volatile matters (max)	% of insoluble impurities(max)	Unsaponifiable matter: g/Kg
Virgin olive oils	0.2	0.1	15
Refined olive oil	0.1	0.05	15
Olive oil	0.1	0.05	15
Refined olive oil olive	0.1	0.05	
Olive pomace oil	0.1	0.05	30

4.5 Contaminant heavy metals content in all kinds of olive oil shall not exceed (mg/kg):

- Iron 3.0
- Copper 0.1

4.6 Hygienic requirements:

4.6.1 The production shall be carried out according to the hygienic requirements mentioned in item (2.6).

4.6.2 Radioactivity levels in the product shall not exceed the levels mentioned in the Gulf standards stated in item (2.12).

4.6.3 Pesticides residues shall not exceed the levels mentioned in the Gulf standards stated in items (2.9) and (2.10).

5. Sampling:

Samples shall be taken according to the Gulf standard mentioned in item (2.2).

6. Methods of analysis:

Physical and chemical tests shall be carried out on the representative sample taken according to item (5), according to the Gulf standard mentioned in items (2.3) and (2.13). The detection and determination of permitted additives to the oil shall be carried out according to the Gulf standard mentioned in item (2.4). The determination of contaminating heavy metallic elements shall be carried out according to the Gulf standard mentioned in item (2.5); and the determination of fatty acid shall be carried out according to the Gulf standard mentioned in item (2.8).

7. Packaging:

Containers used in packaging of the product shall comply with the Gulf standard mentioned in item (2.11).

8. Storage:

Containers shall be stored in well ventilated stores far away from direct sunlight and sources of heat as well as contamination; the stores shall meet the requirements laid down in the Gulf standard mentioned in item (2.7).

9. Labeling:

Without prejudice to what has been mentioned in the Gulf standard in item (2.1), the following shall be declared on each container:

- 9.1 The type of oil as mentioned in the definition.
- 9.2 The explanation 'Natural' can be mentioned for extra virgin olive oil, virgin olive oil and ordinary virgin olive oil.
- 9.3 Pure or 100% pure can be used on the label for olive oil.
- 9.4 Free acidity for oil expressed as % (m/m) as oleic acid or grades shall be d