هيئة التقييس لدول مجلس التعاون لدول الخليج العربية
GCC STANDARDIZATION ORGANIZATION (GSO)

مشروع مواصفة نهائي
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اعداد اللجنة الخليجية رقم **TC05**

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الزيوت النباتية المعدة للطعام – الجزء الثاني
Edible Vegetable Oils – Part II

I.C.S: 67.100

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هذه الوثيقة مشروع لمواصفة قياسية خليجية تم توزيعها لإبداء الرأي والملحوظات بشأنها، لذلك فإنها عرضة للتغيير والتبديل، ولا يجوز الرجوع إليها كمواصفة قياسية خليجية إلا بعد اعتمادها من الهيئة.

تقديم

هيئة التقييس لدول مجلس التعاون لدول الخليج العربية هيئة إقليمية تضم في عضويتها الأجهزة الوطنية للمواصفات والمقاييس في دول الخليج العربية، ومن مهام الهيئة إعداد المواصفات القياسية بواسطة لجان فنية متخصصة.

وقد قامت هيئة التقييس لدول مجلس التعاون لدول الخليج العربية ضمن برنامج عمل اللجنة الفنية رقم (٥) " قطاع مواصفات المنتجات الغذائية والزراعية " بتحديث اللائحة الفنية الخليجية GSO ١٧٥٤-٢" الزيوت النباتية المعدة للطعام – الجزء الثاني"، من قبل دولة قطر، وقد تم إعداد المشروع باللغتين العربية والإنجليزية بعد استعراض المواصفات القياسية العربية والأجنبية والدولية والمؤلفات المرجعية ذات الصلة.

وقد اعتمدت هذه المواصفة كلائحة فنية خليجية في اجتماع مجلس الإدارة رقم ( ) ، الذي عقد بتاريخ / / هـ (/ /) على أن تلغى المواصفة رقم GSO 1754-2: 2013 وتحل محلها.

Edible vegetable oils- Part II

This Gulf standard specification is the second part of the vegetable oil specification prepared for food, and is complementary to the first part prepared by the State of Qatar and bears the number (GSO 1754:2011) and has been adopted as a main reference in the preparation of this part.

This Gulf Standard has cancelled and replaced the following Gulf Standards:

1- **Arachis oil**
2- **Babassu oil**
3- **Coconut oil**
4- **Grape-seed oil**
5- **Rape-seed oil**
6- **Rice bran oil**
7- **Sesame-seed oil**
8- **Sunflower-seed oil**
9- **Sunflower-seed oil (high oleic acid)**
10- **Sunflower-seed oil (mid-oleic acid)**

Edible vegetable oils- Part II

1. Scope and field of application:

This Gulf Standard is concerned with edible vegetable oils mentioned in item (3).

2. Complementary references:

2.1 GSO 9 "Labeling of prepackaged foodstuffs."

2.2 GSO 15 "Methods of sampling edible oils and fats."

2.3 GSO 16 "Physical and chemical methods for testing edible oils and fats."

2.4 GSO 17 "Methods of test for permitted food additives in edible oils and fats- Part 1."

2.5 GSO 19 "Permitted food additives in edible oils and fats."

2.6 GSO 20 "Methods for the determination of contaminating metallic elements in foodstuffs."

2.7 GSO 21 "Hygienic regulations for food plants and their personnel".

2.8 GSO 382, 383 "Maximum limits for pesticides residues in agricultural food products- Parts 1,2".

2.9 GSO 839 "Food packages- Part 1: General requirements".

2.10 GSO 988 "Limits of radioactivity levels permitted in foodstuffs –Part 1".

2.11 GSO CAC 193" General Standard for contaminants and toxics in food stuffs".

2.12 GSO ISO 3960 " Animal And Vegetable Fats And Oils-Determination Of PeroxideValue-Iodometric (Visual) Endpoint Determination ".

2.13 GSO ISO 5508 " Determination of fatty acids in animal and vegetable fats and oils- second part : Analysis by gas- liquid chromatography of methyl esters of fatty acids ".

2.14 GSO ISO 5509 " Animal and vegetable fats and oils – Gas chromatography of fatty acids methy esters part 2 : Preparation of Methyl Esters of fatty acids".

2.15 GSO ISO 6883 " Animal And Vegetable Fats And Oils-Determination Of conventional mass per volume ("Liter weight in air ") ".

2.16 GSO ISO 8294 " Animal And Vegetable Fats And Oils-Determination Of copper, iron and nickel content- Graphite furnace atomic absorption method ".

2.17 GSO ISO 9936 " Animal And Vegetable Fats And Oils-Determination Of tocopherol and tocotrienol contents by High – Performance liquid chromatography ".

2.18 GSO ISO 12228 " Animal And Vegetable Fats And Oils-Determination Of individual and total sterols content – G C method".

3. Definitions:

3.1 Edible vegetable oil:

foodstuffs which are composed primarily of glycerides of fatty acids being obtained only from vegetable sources. They may contain small amounts of other lipids such as phosphatides,of unsaponifiable constituents and of free fatty acids naturally present in the fat or oil.

3.1.1 Arachis oil (peanut oil; groundnut oil) is derived from groundnuts (seeds of Arachis hypogaea L.).

3.1.2 Babassu oil is derived from the kernel of the fruit of several varieties of the palm Orbignya spp.

3.1.3 Coconut oil is derived from the kernel of the coconut (Cocos nucifera L.).

3.1.4 Grapeseed oil is derived from the seeds of the grape (Vitis vinifera L.).

3.1.5 Rapeseed oil (turnip rape oil; colza oil; ravison oil; sarson oil: toria oil) is produced from seeds of Brassica napus L., Brassica rapa L., Brassica juncea L. and Brassica tournefortii Gouan species.

3.1.6 Rice bran oil (rice oil) is derived from the bran of rice (Oryza sativa L).

3.1.7 Sesameseed oil (sesame oil; gingelly oil; benne oil; ben oil; till oil; tillie oil) is derived from sesame seeds (seeds of Sesamum indicum L.).

3.1.8 Sunflowerseed oil (sunflower oil) is derived from sunflower seeds (seeds of Helianthus annuus L.).

3.1.9 Sunflowerseed oil - high oleic acid (high oleic acid sunflower oil) is produced from high oleic acid oil-bearing seeds of varieties derived from sunflower seeds (seeds of Helianthus annuus L.).

3.1.10 Sunflowerseed oil - mid oleic acid (mid-oleic acid sunflower oil) is produced from mid-oleic acid oil-bearing sunflower seeds (seeds of Helianthus annuus L.).

3.2 Virgin oils

are obtained, without altering the nature of the oil, by mechanical procedures, e.g. expelling or pressing, and the application of heat only. They may have been purified by washing with water, settling, filtering and centrifuging only.

3.3 Cold pressed oils

are obtained, without altering the oil, by mechanical procedures only, e.g. expelling or pressing, without the application of heat. They may have been purified by washing with water, settling, filtering and centrifuging only.

4 Characteristics :

The following characteristics shall be met in edible vegetable oils in item (3) :

4.1 Edible vegetable oil shall be free from pig fat and free from other animal fats and its derivatives.

4.2 Edible vegetable oil shall be free from other oils and mineral.

4.3 Edible vegetable oil taste and odors shall be normal and characteristics of the oil, and free from foreign odor, taste and rancidity.

4.4 The production shall be carried out according to Gulf Standard mentioned in item (2.7).

4.5 Humidity and volatile substances should be determined at 105°C.

4.6 Oleic acid content in high oleic acid safflower oil shall not less than 75 % oleic acid (as % of Total fatty acids).

4.7 The physical and chemical characteristics for edible vegetable oils shall be according Table No. (1).

4.8 The composition of fatty acids for food-prepared vegetable oils as determined by chromatographic analysis of liquid gas should be from real samples (percentage of total fatty acids) shall be as in Table No. (2).

4.9 Levels of desmethylsterols in cured vegetable oils as % of total sterols Shall be shown in Table (3).

4.10 Levels of tocopherols and tocotrienols in crude vegetable oils (mg/kg) Shall be shown in Table (4).

4.11 Food additives:

4.11.1 No food additives are permitted to be added to food for raw oils (virgin) or cold press oils.

4.11.2 The materials are permitted to be added for oils and food fats according to the Gulf standard specification mentioned in item (5.2).

4.11.3 The following additives are permitted to be add to edible vegetable oils as mentioned in item (3.1):

Item	Additive	Maximum level	INS No.
4.11.3.1	Flavors :	Natural or synthetic flavors are permitted to add according to Gulf Standard mentioned in item 2.5.	
4.11.3.2	Antioxidants :		
	- Ascorbyl palmitate - Ascorbyl stearate	500 ppm Singly or in combination	304 305
	- Tocophermol, d- alphae- - Tocopherol concentrate,mixed - -Tocopherol, dl-alpha-	300 ppm singly or in compination	307a 307b 307c
	- Propyl gallate	100 ppm	310
	- Tertiary butylated hydroxylquinone (TBHQ)	120 ppm	319
	- Butylated hydroxyanisole (BHA)	175 ppm	320
	- Butylated hydroxytoluene (BHT)	75 ppm	321

	- Any combination of gallates, BHA ,BHT or TBHQ)	not to exceed 200 mg/kg within individual limits	
	- Lecithin	GMP	322 (i)
	- Dilauryl thiodiproprionate	200 mg/kg	389
4.11.3.3	Antioxidant synergists :		
	- Citric acid	**GMP**	330
	- Sodium dihydrogen citrate	**GMP**	331 (i)
	- Trisodium citrate	**GMP**	331(iii)
	- Tripotassium citrate	**GMP**	332 (ii)
	- Tricalcium citrate	**GMP**	333(iii)
	- Isopropyl citrates	100 mg/kg (Singly or in combination)	384
	- Citric and fatty acid esters of glycerol		472c
4.11.3.4	Anti-foaming agents (oils for deep frying) :		
	- Polydimethylsiloxane	10 mg/kg	900a
	-		
	-		

4.12 Quality characteristics for vegetable oils shall be as follows:

Item	Characterisitics	Maximum level
4.12.1	Matter volatile at 105°C	0.2 % m/m
4.12.2	Insoluble impurities	0.05 % m/m
4.12.3	Soap content	0.005 % m/m
4.12.4	Iron (Fe): -Refined oils -Virgin oils	 1.5 mg/kg 5.0 mg/kg
4.12.5	Copper (Cu): -Refined oils -Virgin oils	 0.1 mg/kg 0.4 mg/kg
4.12.6	Acid value -Refined oils -Cold pressed and virgin oils	 0.6 mg KOH/g Oil 4.0 mg KOH/g Oil
4.12.7	Peroxide value: −Refined oils -Cold pressed and virgin oils	 up to 10 milliequivalents of active oxygen/kg oil

		up to 15 milliequivalents of active oxygen/kg oil

4.13 Composition characteristics:

4.13.1 The arachidic and higher fatty acid content of arachis oil should not exceed 48g/kg.

4.13.2 The Reichert values for coconut should be in the rages (6 - 8.5) , and babassu oils should be in the (4.5 - 6.5).

٤.١٣.٣ The Polenske values for coconut should be in the rages (13-18) and babassu oils should be in the ranges (8-10).

٤.١٣.٤ The Baudouin test should be positive for sesame seed oil.

٤.١٣.٥ The gamma oryzanols in crude rice bran oil should be in the range of (0.9-2.1 %) .

4.14 The pesticides residues shall not exceed to what mentioned in Gulf Standard stated in item (2.8).

4.15 The radionuclide limits in the product shall be comply to what mentioned in Gulf Standard stated in Item (2.10) .

4.16 The contaminating metallic elements in the product shall be comply to what mentioned in Gulf Standard stated in Item (2.6) .

4.17 The contaminants and toxics in the product shall be comply to what mentioned in Gulf Standard stated in Item (2.11) .

5 Packaging, transportation and storage:

The following shall be met during Packaging, transportation and storage:

5.1 Packaging:

The oils shall be packed in healthy containers made from harm less materials and does not affect on its characteristics< the container shall be clean, dry, free from any foreign odor, not previously used, with tight covers and shall be comply with Gulf Standards stated in Item (2.9).

5.2 Transportation:

The transportation shall be carried out by means protect the containers From damage and contamination.

5.3 Storage:

The containers shall be stored at room temperature (25ºC) in good ventilation stores, far from direct sun light and the sources of heat and contamination.

6 . Labeling:

Without prejudice to what mentioned in Gulf Standard stated in item (٢.١) the following shall be Declared on the label:

6.1 Name of the vegetable oil according to the item (3)
6.2 Additives and its added content.
6.3 Expiration date in an un-coded manner (Month- year).

7. Sampling:

Samples shall be taken according with Gulf Standard stated in item (2.2).

8. Methods of examination and test:

The following tests shall be carried out on the representative sample taken according to item (7) to determine its complying with this Standard:

8.1 Detection of Lard mineral and vegetable oils, and the determination of relative density and apparent density, refractive index, saponification value, acid value, iodine value, unseasonable matter, peroxide value, volatile -Matter, insoluble impurities, soap content and Halphen test shall be carried out according to Gulf Standard stated in item (2.3).

8.2 Detection and determination of permissible additives to the oils shall be carried out according to Gulf Standard stated in item (٢.٤).

8.3 Determination of contaminant metallic elements shall be carried out according to Gulf Standard stated in item.(٢.٦)

8.4 Determination of free fatty acids of the oil shall be carried out according to Gulf Standard stated in items (2.13, 2.14).

8.5 Determination Of PeroxideValue of the oil shall be carried out according to Gulf Standard stated in items (2.12).

8.6 Determination Of conventional mass per volume of the oil shall be carried out according to Gulf Standard stated in items (2.15).

8.7 Determination Of copper, iron and nickel content of the oil shall be carried out according to Gulf Standard stated in items (2.16).

8.8 Determination Of tocopherol and tocotrienol contents of the oil shall be carried out according to Gulf Standard stated in items (2.17).

8.9 Determination Of individual and total sterols content of the oil shall be carried out according to Gulf Standard stated in items (2.18).

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Table 1: Physical and chemical characteristics of crude vegetable oils

	Arachis oil	Babassu oil	Coconut oil	Grape-seed oil	Rape-seed oil	Rice bran oil	Sesame-seed oil	Sunflower-seed oil	Sunflower-seed oil (high oleic acid)	Sunflower-seed oil (mid-oleic acid)
Relative density	0.909 – 0.920 at ٢٠˚C	٠,٩١٤ – ٠,٩١٧ at 25^{0}C	0.908 - 0.921 at 40ºC	0.920 - 0.926 at 20ºC	0.910 - 0.920 at 20ºC	0.910 – 0.929	0.915 - 0.924 at 20ºC	0.918 - 0.923 at 20ºC	0.909 - 0.915 at 25oC	0.914 - 0.916 at 20ºC
Refractive index (ND 40ºC)	1.460 – 1.465	١,٤٤٨ - ١,٤٥١	1.448 - 1.450	1.467 - 1.477	1.465 - 1.469	1.460 – 1.473	1.465 - 1.469	1.461 - 1.468	1.467 – ١.٤٧١ at 25oC	1.461 – ١.٤٧١ at 25ºC
Saponification value (mg KOH/g oil)	187 – 196	٢٤٥-256	248-265	188-194	168-181	180 – 199	186-195	188-194	182-194	190-191
Iodine value	77 – 107	10 - 18	6.3-10.6	128-150	94-120	90-115	104-120	118-141	78-90	94-122
Unsaponifiable matter (g/kg)	≤ 10	≤١٢	≤ 15	≤ 20	≤ 20	≤65	≤ 20	≤ 15	≤ 15	≤ 15

Table 1: Fatty acid composition of vegetable oils (expressed as percentage of total fatty acids)

Fatty acid	Arachis oil	Babassu oil	Coconut oil	Grape-seed oil	Rape-seed oil	Rice bran oil	Sesame-seed oil	Sunflower-seed oil	Sunflower-seed oil (high oleic acid)	Sunflower-seed oil (mid-oleic acid)
C 6:0	ND	ND	ND -0.7	ND	ND	ND	ND	ND	ND	ND
C 8:0	ND	2.6-7.3	4.6-10.0	ND	ND	ND	ND	ND	ND	ND
C 10:0	ND	1.2-7.6	5.0-8.0	ND	ND	ND	ND	ND	ND	ND
C 12:0	ND-0.1	40.0-55.0	45.1-53.2	ND	ND	ND -0.2	ND	ND-0.1	ND	ND
C 14:0	ND-0.1	11.0-27.0	16.8-21.0	0.3-ND	ND -0.2	ND -1.0	ND-0.1	ND-0.2	ND-0.1	ND-1
C 16:0	5.0-14.0	5.2-11.0	7.5-10.2	5.5-11.0	1.5-6.0	14-23	7.9-12.0	5.0-7.6	2.6-5.0	4.0-5.5
C 16:1	0.2-ND	ND	ND	ND -1.2	ND -3.0	ND-0.5	ND-0.2	ND-0.3	ND-0.1	ND-0.05
C 17:0	ND-0.1	ND	ND	ND -0.2	ND -0.1	ND	ND-0.2	ND-0.2	ND-0.1	ND-0.05
C 17:1	ND0.1	ND	ND	ND -0.1	ND -0.1	ND	ND-0.1	ND-0.1	ND-0.1	ND-0.06
C 18:0	1.0-4.5	1.8-7.4	2.0-4.0	3.0-6.5	0.5-3.1O	0.9-4.0	4.5-6.7	2.7-6.5	2.9-6.2	2.1-5.0
C 18:1	35.0-80	9.0-20.0	5.0-10.0	12.0-28.0	8.0-60.0	38-48	34.4-45.5	14.0-39.4	75-90.7	43.1-71.8
C 18:2	4.0-43.0	1.4-6.6	1.0-2.5	58.0-78.0	11.0-23.0	21-72	36.9-47.9	48.3-74.0	2.1-17	18.7-45.3
C 18:3	ND-0.5	ND	ND- 0.2	ND -1.0	5.0-13.0	0.1-2.9	0.2-1.0	ND-0.3	ND-0.3	ND-0.5
C 20:0	0.7-2.0	ND	ND -0.2	ND -1.0	ND -3.0	ND-0.9	0.3-0.7	0.1-0.5	0.2-0.5	0.2-0.4
C 20:1	0.7-3.2	ND	ND -0.2	ND -0.3	3.0-15.0	ND-0.8	ND-0.3	ND-0.3	0.1-0.5	0.2-0.3
C 20:2	ND	ND	ND	ND	ND -1.0	ND	ND	ND	ND	ND
C 22:0	1.5-4.5	ND	ND	ND -0.5	ND -2.0	ND-1.0	NN-1.1	0.3-1.5	0.5-1.6	0.6-1.1
C 22:1	ND -0.6	ND	ND	ND -0.3	>2.0-60.0	ND	ND	ND-0.3	ND-0.3	ND
C 22:2	ND	ND	ND	ND	ND -2.0	ND	ND	ND-0.3	ND	ND-0.09
C 24:0	0.5-2.5	ND	ND	ND -0.4	ND -2.0	ND-0.9	ND-0.3	ND-0.5	ND-0.5	0.3-0.4
C 24:1	ND -0.3	ND	ND	ND	ND -3.0	ND	ND	ND	ND	ND

NOTE : C = Carbon

ND - non detectable, defined as ≤ 0.05%

Table 3: Levels of desmethylsterols in crude vegetable oils from authentic samples as a percentage of total sterols

	Arachis oil	Babassu oil	Coconut oil	Grape-seed oil	Rice bran oil	Sesame-seed oil	Sunflower-seed oil	Sunflower-seed oil (high oleic acid)	Sunflower-seed oil (mid-oleic acid)
Cholesterol	ND-3.8	1.2-1.7	ND-3.0	ND-0.5	ND-0.5	0.1-05	ND-0.7	ND-0.5	0.1-0.2
Brassicasterol	ND-0.2	ND-0.3	ND-0.3	ND-0.2	ND-0.3	0.1-0.2	ND-0.2	ND-0.3	ND-0.1
Campesterol	12.0-19.8	17.7-18.7	6.0-11.2	7.5-14.0	11.0-35.0	10.1-20.0	6.5-13.0	5.0-13.0	9.1-9.6
Stigmasterol	5.4-13.2	8.7-9.2	11.4-15.6	7.5-12.0	6.0-40.0	3.4-12.0	6.0-13.0	4.5-13.0	9.0-9.3
Beta-sitosterol	47.4-69.0	48.2-53.9	32.6-50.7	64.0-70.0	25.0-67.0	57.7-61.9	50-70	42.0-70	56-58
Delta-5-avenasterol	5.0-18.8	16.9-20.4	20.0-40.7	1.0-3.5	ND-9.9	6.2-7.8	ND-6.9	1.5-6.9	4.8-5.3
Delta-7-stigmastenol	ND-5.1	ND	ND-3.0	0.5-3.5	ND-14.1	0.5-7.6	6.5-24.0	6.5-24.0	7.7-7.9
Delta-7-avenasterol	ND-5.5	0.4-1.0	ND-3.0	0.5-1.5	ND-4.4	1.2-5.6	3.0-7.5	ND-9.0	4.3-4.4
Others	ND-1.4	ND	ND-3.6	ND-5.1	7.5-12.8	0.7-9.2	ND-5.3	3.5-9.5	5.4-5.8
Total sterols (mg/kg)	900-2900	500-800	400-1200	2000-7000	10500-31000	4500-19000	2400-5000	1700-5200	

NOTE : ND - Non-detectable, defined as ≤ 0.05%

Table 4: Levels of tocopherols and tocotrienols in crude vegetable oils from authentic samples (mg/kg)

	Arachis oil	Babassu oil	Coconut oil	Grape-seed oil	Rice bran oil	Sesame-seed oil	Sunflower-seed oil	Sunflower-seed oil (high oleic acid)	Sunflower-seed oil (mid-oleic acid)
Alpha-tocopherol	49-373	ND	ND-17	16-38	49-583	ND-3.3	403-935	400-1090	488-668
Beta-tocopherol	ND-41	ND	ND-11	ND89	ND-47	ND	ND-45	10-35	19-52
Gamma-tocopherol	88-389	ND	ND-14	ND-73	ND-212	521-983	ND-34	3-30	2.3-19.0
Delta-tocopherol	ND-22	ND	ND	ND-4	ND-31	4-21	ND-7.0	ND-17	ND-1.6
Alpha-tocotrienol	ND	25-46	ND-44	18-107	ND-627	ND	ND	ND	ND
Gamma-tocotrienol	ND	32-80	ND-1	115-205	142-790	ND-20	ND	ND	ND
Delta-tocotrienol	ND	9-10	ND	ND-3.2	ND-59	ND	ND	ND	ND
Total (mg/kg)	170-1300	60-130	ND-50	240-410	191-2349	330-1010	440-1520	450-1120	509-741

NOTE: ND - Non-detectable.

REVENCES

CODEX STANDARD FOR NAMED VEGETABLE OILS
CODEX-STAN 210 (Amendments 2019)