

GCC Standardisation Organisation (GSO)

**Project: Final
GSO/2008**

Edible Vegetable Oils - Part II

Prepared by:
GCC Technical Standards Committee of
Food & Agricultural Products

**19/11/2007 considering the Notes of the State of Qatar
May 2008**

This document is a project requesting GCC standard specification accreditation. It is distributed for the purpose of inviting notes and views thereof. Accordingly, it is liable to undergo changes and modifications and thus may not be considered as a GCC Standard Specification before the official verification and accreditation of the GSO.

Preamble

The GCC Standardisation Organisation (GSO) is a regional body that consists of the National Standards Bodies of different GCC member states. One of its primary functions is to draft standard specifications for the GCC through specialised technical committees.

The GSO has, through a working programme of the GCC technical committee for the sector of food and agricultural products, referred to hereinafter as TC 5, prepared this specification regarding Edible Vegetable Oils - Part II, which was drafted by the State of Kuwait. The project was drafted after reviewing the relevant Arab, foreign, and international specifications, as well as the related references therein.

The specification was accredited as a GCC Specification (technical regulation) at the GSO Board meeting No (), which convened on Hijri, the equivalent of AD.

For Study Purposes

Edible Vegetable Oil – Part II**Introduction**

This GCC Specification is the second Part of Edible Vegetable Oils and complements the first Part, which was prepared by the State of Qatar under No (GSO 1754:2006). The International standard specification (CODEX-STAN 210/Amended 2003, 2005) was accredited as the primary reference in the preparation of this Part.

This specification is applicable to the following types of vegetable oils:

1. Arachis Hypoqaea
2. Orbignya ssp.
3. Cocos Nucifera L.
4. Vitis Vinifera L.
5. Brassicas Napus L.
6. Sesamum Indicum L.
7. Hlianthus Annuus L.
8. Helianthus Annuus (High Oleic)
9. Helianthus Annuus (Mid Oleic)

For Study Purposes

Edible Vegetable Oil – Part II

1. Scope of Implementation

This GCC specification is applicable specifically to edible vegetable oils as stipulated in paragraph 3.

2. Supplementary References:

2.1 GCC Standard Specification No (GSO 9), “Completed Packed Food Stuffs Cards”.

2.2 GCC Standard Specification No (GSO 15), “Methods of Extracting Oils and Fat Samples”.

2.3 GCC Standard Specification No (GSO 16), “Methods of Chemical and Physical Testing of Edible Vegetable Oils and Fats”.

2.4 GCC Standard Specification No (GSO 17), “Detecting Permitted Additives to Oils and Fat, and Evaluation Methods – Part I”.

2.5 GCC Standard Specification No (GSO 19), “Permitted Additives to Oils and Fats”.

2.6 GCC Standard Specification No (GSO 20), “Evaluating Methods of Contaminant Minerals of Food Stuffs”.

2.7 GCC Standard Specification No (GSO 21), “Health Conditions at Food Factories and its Employees”.

2.8 GSO/ISO 5508:1994, “Estimating amino acids in vegetable and animal oils and fats – Part II: Analysis of the Methyl Stearate of Amino Acids using the Chromatograph Gas Device – Liquid”.

2.9 GCC Standard Specification No (GSO 382,383), “Limits of Permitted Pesticides Residues in Food and Agricultural Products – Parts I & II”.

2.10 GCC Standard Specification No (GSO 839), “Food Containers – Part I: General Provisions”.

2.11 GCC Standard Specification No (GSO 988), “Limits of Permitted Radioactive Agents in Foodstuffs – Part I”.

2.12 GSO/ISO 5509:2002, “Estimating Amino Acids in Vegetable and Animal Oils and Fats- Part I: Preparation of the Methyl Stearate of Amino Acids”.

3. Definitions:

3.1 Edible Vegetable Oil

A food product that is suitable for human consumption that is primarily made up of amino acid glyceride extracted from plants. The oil may comprise small quantities of other lipids such as phosphate derivatives and other components that are anti-saponifiable, as well as other free natural amino acids.

3.1.1 *Arachis Hypoqaea*: the oil extracted from peanut seeds.

3.1.2 *Orbignya Ssp.*: the oil extracted from the kernel of different types of palm trees.

3.1.3 *Cocos Nucifera L.*: the oil extracted from the kernel of the coconut.

3.1.4 *Vitis Vinifera L.*: the oil extracted from grape seeds.

3.1.5 Brassics, *Brassica Napus L.*: the oil extracted from brassics, *brassic napus L.*, *brassica campestris L.*, *brassica juncea L.*, *brassica tournefortii.*

3.1.6 *Sesamum Indicum L.*: the oil extracted from sesame seeds.

3.1.7 *Helianthus Anuus L.*: the oil extracted from sunflowers.

3.1.8 *Helianthus Anuus*: the oil extracted from sunflowers with high oleic acid concentration.

3.1.9 *Helianthus Anuus*: the oil extracted from sunflowers with medium oleic acid concentration.

3.2 Virgin Oil:

Oil extracted without altering its natural components using mechanical methods such as centrifugation, pressure or heat. The oil may only be filtered by washing with water and precipitation, by filtration and by central centrifugation.

3.3 Oil made using cold-squeeze method:

Oil extracted without altering its natural components using mechanical methods such as squeezing without exposure to heat. The oil may only be filtered by washing with water and precipitation, by filtration and by central centrifugation.

4. Specifications:

Edible vegetable oils, as stipulated in paragraph 3, must adhere to the following specifications:

4.1 Must be completely free of pork products or derivatives, or the fat of any other animal;

4.2 Must be free of any other vegetable oils or minerals;

4.3 Must have the distinctive aroma, taste and smell of oil; as well as being free of any unfamiliar aromas, smells or sourness;

4.4 Must be produced according to the GSO specifications stipulated in subparagraph 2.7;

4.5 Must be extracted from clean and intact seeds or grains; seeds must not be rotten or contain any residue or contaminants;

4.6 Must not contain any residue or turbidity;

4.7 The edible vegetable oils stipulated in paragraph 3 must possess the physical and chemical features as stipulated in Table 1 that is attached to the supplement thereof.

4.8 Additives:

4.8.1 No additives are permitted in virgin oils or oils extracted through the cold squeeze method.

4.8.2 The following additives are permitted in Edible Vegetable Oils as described in subparagraph 1.3:

	Additive	Maximum Limit	International Symbol
4.8.2.1	Flavourings	Natural and artificial flavourings are permitted as per the GCC standard specification stipulated in subparagraph 5.2	

4.8.2.2	Antioxidants 1. Ascorbyl palmitate 2. Ascorbyl Stearate 3. Mixed Tocopherols Concentrate 4. Alpha Tocopherol 5. Synthetic gamma-tocopherol 6. Synthetic delta-tocopherol 7. Propyl Gallate 8. TBHQ 9. BHA 10. BHT 11. BHT, BHA, or TBHQ (any combination of gallates, BHA and BHT and/or TBHQ) 12. Dilauryl Thiodipropionate	500 mg/Kg (Unilateral or Collective) According to good production According to good production According to good production According to good production 100 mg/kg 120 mg/kg 175 mg/kg 75 mg/kg 200 mg/kg – noting not to excessively use the above limits for each type separately. 200 mg/kg	E 304 E 305 E 306 E 307 E 308 E 309 E310 E 319 E 320 E 321 E 389
4.8.2.3	Antioxidant Synergists 1. Citric Acid 2. Sodium Citrates 3. Isopropyl Citrate 4. Monoglyceride Citrate	According to good production According to good production 100 mg/kg Unilateral or collective	E 330 E 331 E 384
4.8.2.4	Anti-foaming Agents (oils for deep frying) Polydimethylsiloxane	10 mg/kg	E 900 (a)

4.9 The structure of amino acids in Edible Vegetable Oils (percentage of collective amino acids) must conform to the percentages stipulated in Table 2, attached to the supplement.

4.10 The quality specifications of Edible Vegetable Oils must be as follows:

	Specification	Maximum Limit
4.10.1	Volatile Agents at 105 °C	0.2% Mass/Mass
4.10.2	Insolvent Residues	0.05% Mass/Mass
4.10.3	Soap Contents	0.005% Mass/Mass
4.10.4	(Fe) Refined Oils Virgin Oils	1.5 mg/kg 0.4 mg/kg
4.10.5	(Cu) Refined Oils Virgin Oils	0.1 mg/kg 0.4 mg/kg
4.10.6	Acid Value: Refined Oils Virgin oil, Cold Press Oil	0.6 mg Potassium Hydroxide/Oil volume 15 ml of active oxygen/oil Kg
4.10.7	Peroxide value: Refined Oils	10 ml of active oxygen/oil Kg 15 ml of active oxygen/oil Kg

	Virgin oil, Cold press oil	
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4.11 Synthetic Specifications

4.11.1 The Archardic contents and the level of other amino acids must not exceed 48 gm/litre in *Arachis Hypoqaea*.

4.11.2 The Rechert Value of *Cocos Nucifera* L. oil must be between 6-8.5, and for *Orbignya* ssp. Oil between 4.5-6.5.

4.11.3 The Poleske Value of *Cocos Nucifera* L. oil must be between 13-18, and for *Orbignya* ssp. 8-10.

4.11.4 The ethrodoyl content of grape seed oil must exceed 2% of total Astrol.

4.11.5 The Bodwin Test of sesame seeds must yield positive results.

4.11.6 The Crismer Value of Boric Acid in *Brassicas Napus* L. oil must be low; between 67-70.

4.12 Pesticide residues must not exceed the permitted limits for GCC standard specifications as stipulated in subparagraph 2.9.

4.13 Radioactive levels in the product must conform to the levels for GCC standard specifications stipulated in subparagraph 11.2.

4.14 The percentage of mineral contaminants in edible vegetable oils must not exceed the following:

Element	Maximum Limit
Lead	0.1 mg/kg
Arsenic	0.1 mg/kg

5. Packing, Transport & Storage:

The following must be accounted for upon packing, transporting and storing edible vegetable oils:

5.1 Packaging:

Oils must be packaged in strong and appropriate containers made of materials that are health-friendly and do not have any effect on the product specifications. Containers must be clean, dry, free of any alien odours, unused, with a sealed lid, and compatible with the GCC standard specification stipulated in subparagraph 10.2.

5.2 Transport:

When transporting oils, vehicles must be used that protect the containers from any contamination or damage.

5.3 Storage:

Oil containers must be stored at room temperature (25 °C) in well-aired facilities away from direct sunlight and away from any source of contamination or heat.

6. Instructions:

In accordance with the GCC standard specifications stipulated in subparagraph 2.1, the instructions on the container must include the following information:

- 6.1** Name of the oil as stated in paragraph 3;
- 6.2** Additives and percentages therein;
- 6.3** Clearly state the expiry date (month-year).

7. Sample Selection:

All samples must be selected according to the GCC standard specification set out in subparagraph 2.2.

8. Test Methods:

The following tests must be applied to the selected samples as per paragraph 7, so as to determine conformity with the following specifications:

- 8.1** Detect pork fat, mineral and vegetable oils, rottenness, estimate the relative density, refractive index, saponifiability value, acid value, iodine value, unsaponifiable matter, oxidisation value, percentage of volatile matters, percentage of insolvent residue, soap content, Halphen test according to the GCC standard specification set out in subparagraph 2.3.
- 8.2** Permitted additives in oils are detected and estimated according to the GCC standard specification set out in subparagraph 2.4.
- 8.3** Estimating contaminating matter is conducted according to the GCC standard specification set out in subparagraph 2.6.
- 8.4** Estimating the number of amino acids in oils is conducted according to the GCC standard specification set out in subparagraphs 2.8 and 2.12.

Appendix

For Study Purposes

Table 1
Chemical and Physical Features of Edible Vegetable Oils

	Arachis Hypoqaea	Orbignya ssp.	Cocos Nucifera L.	Vitis Vinifera L.	Brassics	Sesamum Indicum L.	Helianthus Annuus	Helianthus Annuus (high oleic)	Helianthus Annuus (mid oleic)
Relative Density	0.912- 0.920 at 20 °C	0.914- 0.917 at 25 °C	0.908- 0.921 at 40 °C	0.920- 0.926 at 20 °C	0.910- 0.920 at 20 °C	0.915- 0.924 at 20 °C	0.918- 0.923 at 25 °C	0.909- 0.915 at 25 °C	0.914- 0.916 at 20 °C
Refractive Index at 40°C	1.460- 1.465	1.448- 1/451	1.448- 1.450	1.465- 1.469	1.467- 1.477	1.465- 1.469	1.461- 1.468	1.467- 1.471 at 25 C	1.461- 1.471 at 25 C
Saponification value (mgm Potassium Hydroxide/gm Oil	187-196	245-256	248- 265	188- 194	168- 181	186-195	188-194	182-194	190-191
Iodine Value	86-107	10-18	6.3-10.6	128- 150	94-120	104-120	118-141	78-90	94-122
Unsaponifiable matter	10 ≤	12 ≤	15≤	≤15	20≤	20≤	15≤	12≤	10≤

For Study

Table (2)

**Amino Acids Structure of Edible Vegetable Oils
(Overall Amino Acid Percentage)**

Amino Acids	Arachis Hypoqaea	Orbignya ssp.	Cocos Nucifera L.	Vitis Vinifera L.	Brassics	Sesamum Indicum L.	Helianthus Annuus	Helianthus Annuus (high oleic)	Helianthus Annuus (mid oleic)
C 6:0	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
C 10:0	ND	1.2-7.6	5.0-8.0	ND	ND	ND	ND	ND	ND
C 12:0	0.1-ND	40.0-55.0	45.1-53.2	ND	ND	ND	ND	ND	ND
C 14:0	0.1-ND	11.0-27.0	16.8-21.0	0.3-ND	0.2-ND	0.1-ND	0.2-ND	0.1-ND	1-ND
C 16:0	8.0-14.0	5.2-11.0	16.8-21.0	0.3-ND	0.2-ND	0.1-ND	0.2-ND	0.1-ND	4.0-5.5
C 16:1	0.2-ND	ND	ND	1.2-ND	3.0-ND	0.1-0.2	0.3-ND	0.1-ND	0.05-ND
C 17:0	0.1-ND	ND	ND	0.2-ND	0.1-ND	0.2-ND	0.2-ND	0.1-ND	0.05-ND
C 17:1	0.1-ND	ND	ND	0.1-ND	0.1-ND	0.1-ND	0.1-ND	0.1-ND	0.06-ND
C 18:0	1.0-4.5	1.8-7.4	2.0-4.0	3.0-6.5	0.5-3.1	4.8-6.7	2.7-6.5	2.9-6.2	2.1-5.0
C 18:1	35.0-69	9.0-20.0	5.0-10.0	12.0-28.0	8.0-60.0	35.9-43.0	14.0-39.4	75-90.7	43.1-71.8
C 18:2	12.0-43.0	1.4-6.6	1.0-2.5	58.0-78.0	11.0-23.0	39.1-47.9	48.3-74.0	2/1-17	18.7-45.3
C 18:3	0.3-ND	ND	0.2-ND	1.0-ND	5.0-13.0	0.3-0.5	0.3-ND	0.3-ND	0.5-ND
C 20:0	1.0-2.0	ND	0.2-ND	1.0-ND	3.0-ND	0.3-0.7	0.1-0.5	0.2-0.5	0.2-0.4
C 20:1	0.7-1.7	ND	0.2-ND	0.3-ND	3.0-15.0	0.3-ND	0.3-ND	0.1-0.5	0.2-0.3
C 20:2	ND	ND	ND	ND	1.0-ND	ND	ND	ND	ND
C 22:0	1.5-4.5	ND	ND	0.5-ND	2.0-ND	1.1-ND	0.3-1.5	0.5-1.6	0.6-1.1
C 22:1	0.3-ND	ND	ND	0.3-ND	2.0-60.0	ND	0.3-ND	0.3-ND	ND
C 22:2	ND	ND	ND	ND	2.0-ND	ND	0.3-ND	ND	0.09-ND
C 24:0	0.5-2.5	ND	ND	0.4-ND	2.0-ND	0.3-ND	0.5-ND	0.5-ND	0.3-0.4
C 24:1	0.3-ND	ND	ND	ND	3.0-ND	ND	ND	ND	ND

Note: C = Carbon

ND= cannot be measured and is set at $\leq 0.05\%$

Table (3)
Tocopherol and Tocotrienol levels in Edible Vegetable Oil Samples

	Arachis Hypoqaea	Orbignya ssp.	Cocos Nucifera L.	Vitis Vinifera L.	Sesamum Indicum L.	Helianthus Annuus	Helianthus Annuus (high oleic)	Helianthus Annuus (mid oleic)
Alpha-tocopherol	49-373	ND	17-ND	16-38	3.3-ND	403-935	400-1090	488-668
Beta-tocopherol	41-ND	ND	11-ND	89-ND	ND	45-ND	10-35	19-52
Gama-tocopherol	88-389	ND	14-ND	73-ND	521-983	34-ND	3-30	2.3-19.0
Delta-tocopherol	22-ND	ND	ND	4-ND	4-21	7.0-ND	17-ND	1.6-ND
Alpha-tocotrienol	ND	25-46	44-ND	18-107	ND	ND	ND	ND
Gama-tocotrienol	ND	32-80	1-ND	115-205	20-ND	ND	ND	ND
Delta-tocotrienol	ND	9-10	ND	3.2-ND	ND	ND	ND	ND
Total (Mlg/Kg)	170-1300	60-130	50-ND	240-410	330-1010	440-1520	450-1120	509-741

Note:

ND= cannot be measured and is set at $\leq 0.05\%$

Technical Definitions

Arachis Hypogaea: the oil extracted from peanut seeds.

Orbignya Ssp.: the oil extracted from the kernel of different types of palm trees.

Cocos Nucifera L.: the oil extracted from the kernel of the coconut.

Vitis Vinifera L.: the oil extracted from grape seeds.

Brassics, Brassica Napus L.: the oil extracted from brassics, brassica napus L., brassica campestris L., brassica juncea L., brassica tournefortii.

Sesamum Indicum L.: the oil extracted from sesame seeds.

Helianthus Annuus L.: the oil extracted from sunflowers.

Helianthus Annuus: the oil extracted from sunflowers with high oleic acid concentration.

Helianthus Annuus: the oil extracted from sunflowers with medium oleic acid concentration.

For Study Purposes

References

CODEX Standard for Named Vegetable Oils
CODEX-STAN 210 (Amended 2003, 2005)

For Study Purposes