



**JOINT FAO/WHO FOOD STANDARDS PROGRAMME**

**CODEX COMMITTEE ON FATS AND OILS**

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**Discussion Paper on the Inclusion of Provisions for Walnut Oil, Almond Oil, Hazelnut Oil, Pistachio Oil, Flaxseed Oil and Avocado Oil in the Standard for Named Vegetable Oils (CODEX STAN 210-1999)**

*(Prepared by the electronic working group led by Iran)*

**Background**

1. The 22nd Session of the Codex Committee on Fats and oils (CCFO22) (2011) agreed to establish an electronic working group (EWG) on cold pressed oil led by Iran. The report of the EWG was presented at CCFO 23 (2013)
2. CCFO23 (2013), considered the report of the EWG and noted that 5 out of the 9 types of oils proposed were already present in the Standard for Named Vegetable Oils (CODEX STAN 210-1999). These are peanut oil, sesame oil, sunflower seed oil, maize oil and safflower oil. The committee agreed to reconsider its previous decision and to change the scope of the discussion paper to cover walnut oil, almond oil, hazelnut oil, pistachio oil, flaxseed oil and avocado oil. The Committee also agreed to re-establish the EWG, to revise the discussion paper including a project document, taking into account comments made at the session and based on the Guideline for Application of the Criteria for the establishment of Work Priorities Applicable to Commodities and information as required by the CCFO when proposing the addition of new oils to the Standard for Named Vegetable Oils agreed by CCFO16, for consideration at the next session. The Committee agreed that a circular letter will be issued to obtain the required data and information.
3. According to the decision of CCFO23 (2013), and taking into account the comments made at CCFO24, the EWG revised the discussion paper including a draft project document, for consideration at CCFO25.
4. The following countries participated in the work of the EWG's: Mexico, Greece, Malaysia, Poland, India, Italy, USA, Spain, France, Lebanon, Brazil, Canada, Turkey and the European union. Using the data from countries and information obtained from other sources, Iran prepared a revised discussion paper on walnut oil, almond oil, hazelnut oil, pistachio oil, flaxseed oil and avocado oil for consideration by CCFO25.

**Issues**

Edible oils include walnut oil, almond oil, hazelnut oil, pistachio oil, flaxseed oil and avocado oil are a natural source of vitamin E, an important antioxidant, bioactive compounds, beneficial to general wellbeing. Due to their importance and valuable components in mentioned oils, they are mainly produced by cold pressing and then consumed. All of them also contain the essential fatty acids commonly known as omega 3 and omega 6. These products, which are just cold pressed and filtered, result in oils that are naturally free from trans fatty acids, chemicals such as solvents and full of natural antioxidants. Consumption of more healthy foods like such oils are being raised in different countries. As a result, productions of these kinds of oils have a significant positive growth in recent years.

5. In Iran like many other countries with a long history, nut oils were used for long years. Recently, there are more than 50 active cold pressed oil production units which have been produced the mentioned oils in Iran with focus on tree nut oils. It is also a well known and established industry in European countries as well as India, Pakistan, and South America and many other parts of the world.

**Conclusion**

6. It is recommended that the Committee:
  - a) Considers the issues raised in the discussion paper and agree to initiate new work to review the Named Vegetable Oils to include walnut oil, pistachio oil, almond oil, hazelnut oil, avocado oil, and flaxseed oil (CODEX STAN 210-1999).
  - b) Submit the attached Project Document (Appendix 1) for approval by the Codex Alimentarius Commission.

**DRAFT PROJECT DOCUMENT****INCLUSION OF PROVISIONS FOR WALNUT OIL, ALMOND OIL, HAZELNUT OIL, PISTACHIO OIL, FLAXSEED OIL AND AVOCADO OIL IN THE STANDARD FOR NAMED VEGETABLE OILS (CODEX STAN 210-1999)****1. Purpose and scope of the standard**

The objective of this proposal is to set quality and purity as well as food safety criteria for the edible walnut oil, almond oil, hazelnut oil, pistachio oil, flaxseed oil and avocado oil to facilitate the conditions for their commercialization; and to make a frame work for the establishment of an amendment to the Codex Stan 210:1999 for the Name Vegetable oils.

**2. Its relevance and timeliness**

The mentioned edible oils are almost the oldest types of edible oil consumed by the human kind. They have been traditionally produced and consumed in Middle Eastern countries, Africa, Europe and South America for years. In recent years consumption of more healthy food being raised due to their essential fatty acid and minor bioactive components content. The most important method for extracion of the mentioned oils is cold pressing. Cold press oils can be considered healthier, since they do not undergo chemical refining treatment and contain some natural beneficial components such as antioxidants, tochopherols, polyphenols as well as phytosterols and unique sensory atributes. .

**3. The main aspects to be covered as follow:**

- a. Edible oil seeds and nuts which are not covered by codex stan 210-1999
- b. Definition of cold pressed oils.
- c. Quality and compositional characteristic.
- d. Contaminants and related food safety issues.
- e. Organoleptic characteristics
- f. Purity criteria
- g. Food additives
- h. Labeling
- i. Analytical methods

**4. An assessment against the criteria for the establishment of work priority**

This proposal is consistent with the following criteria applicable to commodities:

**4.1 General Criterion: Consumer protection from the point of view of health food safety, ensuring fair practices in the food trade and taking into account the identified needs of developing countries.**

a) Consumption of the mentioned vegetable oils has been increasing due to their beneficial components that might be considered as a functional food for consumer protection so the amendment to Codex Stan 210, Providing related information to ensure safety issues might be considered for the production and trade of these oils.

b) Promoting consumer protection and the prevention of fraudulent practices are considered by determining authentic specifications.

c) Providing greater assurance of the quality of the product to meet consumer needs and the minimum requirements for food safety.

d) Arriving at levels of standardization based on the properties of different varieties to meet industrial and consumer needs with exactness and credibility.

**4.1.1 Volume of production and consumption in individual countries and volume and pattern of trade between countries.****Avocado oil:**

According to the International Trade Center (ITC) market brief (2006) the market for avocado oil is expanding. World trade in the product grew on average by 13% and 8% annually in terms of volume and value respectively. For more recent information see the Global Avocado Oil Industry 2016 Market Research Report. However, China and India are the principal producers and suppliers of avocado oil to international markets. In 2005, total world imports of avocado oil reached 371 tons valued at USD 59 million, of which

China and India's exports contributed USD 14 million and USD 9 million, respectively, for quantities exceeding 85 tons each. The United States, Malaysia and Germany are among the major markets for avocado oil. In 2005, the United States accounted for 24% of the total value of avocado oil imports, followed by Malaysia 8% and Germany 7%.

To estimate the present global demand for the product the average growth rate registered by world avocado oil export during the period 2000 – 2005 in terms of volume i.e. 13% is assumed to continue in the near future. Accordingly, taking the 2005 level of international trade (371 tonnes) as a base and applying 13% annual growth rate the current (2007) demand for the product is estimated at 473.73 tonnes. In order to be conservative the market share that could be capture by locally produced avocado oil for industrial use is assumed to be 10% which is 47 tonnes. ((Source: International Trade Center (ITC)).

### Linseed oil

Tables 1 is on the Global Statistic of linseed Oil - Export, import and Consumption Data

**Table 1. Linseed oil data (Qty.in 1000 Tons)**

	2014-15	2013-14	2012-13
Linseed Oil Production	660	618	601
Linseed Oil Import	104	80	93
Linseed Oil Exports	102	84	93

(Source : Oil World 2015)

Linseed Oil Production from [https://www.ag.ndsu.edu/agnic/flax/faoflaxproduction\\_files/oil\\_prod\\_2007.htm](https://www.ag.ndsu.edu/agnic/flax/faoflaxproduction_files/oil_prod_2007.htm) is also shown in Table 2 for different countries during past years (2004- 2007).

**Table 2 - Linseed Oil Production during past years**

Countries	2004		2005		2006		2007	
Afghanistan	4054	F	4047	F	4055	F	4055	F
Argentina	3200	*	7500	*	11700	*	12000	F
Australia	3110	F	3153	F	3120	F	3200	F
Austria					500		300	F
Bangladesh	16538	F	16538	F	16538	F	16538	F
Belarus	601		469		838		600	F
Belgium	110400	*	96300	*	102000	F	105000	F
Brazil	2400	*	3400	*	3600	*	3600	F
Bulgaria	43	F	53	F	58	F	50	F
Canada	20600	*	24400	*	31600	*	20000	F
Chile	458	F	778	F	473	F	475	F
China	124923	*	129923	*	139123	*	150624	*
Costa Rica	84	F	84	F	84	F	84	F
Czech Republic	408	F	836	F	1300	*	700	*
Denmark	3353	F	2750	F	3357	F	3000	F
Egypt	10300	*	13800	*	14000	*	13800	F
Ethiopia	44543	F	35397	F	22293	F	23400	*
Finland	219	F	298	F	219	F	220	F
France	650	F	650	F	450	F	320	F
Germany	95823		78208		62500	*	65000	F
Greece	63	F	76	F	72	F	70	F
Hungary	30	F	30	F	30	F	30	F
India	59000		51000		42000		61000	*
Iran, Islamic Republic of	208	F	224	F	208	F	208	F
Iraq	53	F	53	F	80	F	75	F
Italy	4300	*	4400	*	5800	*	6100	*
Japan	7000		7100		6800	F	6500	F
Kazakhstan	175	F	245	F	175	F	180	F

Kenya	256	F	256	F	256	F	260	F
Korea, Republic of	41	F	81	F	40	F	40	F
Lithuania	245	F	350	F	150	F	150	F
Luxembourg	1094	F	744	F	1100	F	1150	F
Mexico	5000	*	900	*	1500	*	1700	F
Morocco	69	F	370	F	69	F	120	F
Nepal	1603	F	1459	F	1600	F	1600	F
Netherlands	8365	F	7380	F	7805	F	7800	F
New Zealand	498	F	614	F	240	F	250	F
Norway	723	F	814	F	724	F	700	F
Pakistan	1003	F	812	F	897	F	968	F
Poland	1821	F	2391	F	2226	F	2250	F
Portugal	309	F	377	F	309	F	310	F
Romania	493	F	362	F	826	F		
Russian Federation	13800	*	15800	*	279		270	F
Slovakia	90	F	200	*	400	*	410	F
Spain	1400	*	1000	*	900	*	1500	F
Sweden	2650	F	5189	F	4486	F	4500	F
Switzerland	400	*	400	*	400	*	400	*
Tunisia	1532	F	1532	F	1532	F	1540	F
Turkey	131	F	1098	F	34	F	33	F
Ukraine	1714		1711		3496		2272	
United Kingdom	6300	*	2900	*	4200	*	4400	*
United States of America	120202		145150		144900		150000	F
Uruguay	379	F	621	F	390	F	400	F
Uzbekistan	316	F	112	F	316	F	320	F

Blank cell = no

data reported, \* =

Unofficial figure | F = FAO estimate | P = Provisional official data

### Walnut oil

As far as consumption is concerned, based on a review of walnut oil products available on the German market, approximately 90-95% of walnut oil is consumed as an edible product (Figure 1). The remainder will be used in the body care market. Walnut oil will account for less than 0.5% of the edible oil market. The specialty oil sector is quite dynamic and also very competitive as new oils are continuously being introduced (CBI, Ministry of Foreign Affairs, Germany).

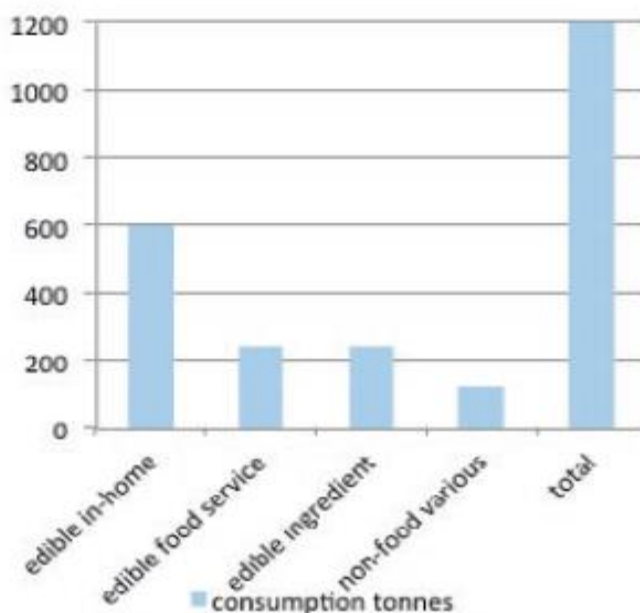


Figure 1. Consumption of walnut oil (tonnes) in Germany 2013

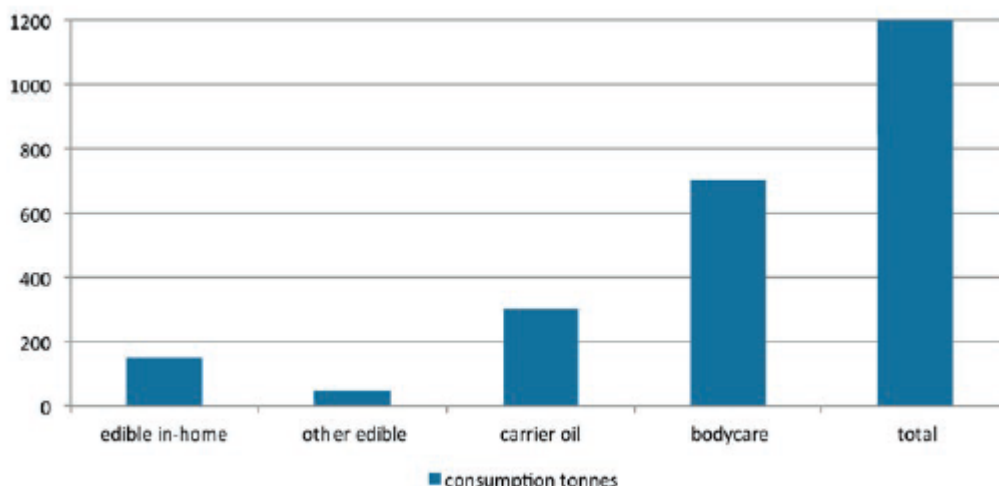
It is estimated that the walnut oil market in Germany is worth approximately S 20 million in retail price equivalent. This equates to approximately 1,200 tonnes. The market is fairly stable.

### **Hazelnut oil**

Turkey is the world's leading hazelnut producer, accounting for approximately 75% of world supply. Generally, about 100,000-150,000 tonnes of annual hazelnut kernel production in Turkey is used as raw material for the production of refined hazelnut oil in the vegetable oil industry almost 50000 to 75000 tonnes of hazelnut oil ([http://www.eurofedlipid.org/meetings/archive/athens/5871/5871\\_0214.pdf](http://www.eurofedlipid.org/meetings/archive/athens/5871/5871_0214.pdf)). More information could be find in Global Hazelnut Oil Market Research Report 2016.

### **Almond oil**

Almond Oil will account for less than 0.5% of vegetable oil market. As far as consumption is concerned, based on a review of almond oil products on the German market, around 15-25% of almond oil is used as a food product. The remainder is used for other purposes (Figure 2) (CBI, Ministry of Foreign Affairs, Germany).



**Figure 2. Consumption of almond oil (tonnes) in Germany in 2013.**

The almond oil market in Germany is worth approximately 20 million dollars across its various uses (between 1,000-1,200 tonnes or between 1.2-1.4 million litres).

### **Pistachio oil**

Iran as a leading country in production of pistachio, has pistachio oil production between 18500- 48000 tonnes (First Iranian Congress on Processing and Packaging of Pistachio, 2007).

#### **4.2 Criteria applicable to general subjects**

##### ***a. Diversification of national legislation and apparent resultant or potential impediments to international trade***

This amendment to codex stan. 210 facilitate global trade for the mentioned edible oils and provide new market and opportunities specially for developing countries to present their own products.

##### ***b. International or regional market potential***

By this amendment to the standard as mentioned potential for both of international and regional markets will be increased

##### ***c. Volume and diversity of production in individual countries and volume and patterns of trade between countries***

It is estimated that the production volume for the mentioned oils is between 2-3% of total vegetable oil production (Data from the U.N. Food and Agriculture Organization's FAOSTAT database 2012).

See 4.1.1 for more information on the global production and trade.

##### ***d) Coverage of the main consumer protection and trade issues by existing or proposed general standards***

As mentioned above, the amendment of the Standard for Named Vegetable Oils will improve the information available to consumers, in addition to ensuring fair practices in the trade of these oils.

## 5. Relevance to other codex strategic objectives

### Goal 1 Promoting Sound frameworks

Production and consumption of these oils have been increased recently and this has necessitated the revision of the Codex Standard 210 to include the specification of these oils.

Therefore this work underpins the Codex Strategic plan i.e. “establish new and review existing Codex standards, based on priorities of the CAC” of the Codex Strategic Plan 2014- 2019”.

### Goal 2- Promoting widest and consistent application of scientific principles and risk analysis

**The proposed work will promote the elaboration of Codex commodity standards based on the rigorous scientific analysis of collected data.**

The proposed amendment to CODEX STAN 210 will facilitate fair trade of mentioned oils, as the quality and purity parameters and also food safety regarding these kind of oils are not covered by existing standards regulated by Codex are considered, thus reflecting the existing world variations; also, this will guarantee the purity of oils being produced by press method, allow for their proper classification, and provide proper criteria for the quality control of these products.

### Identification of any requirement for and availability of expert scientific advice

No need for the expert scientific advice has been identified at this stage

### Identification of any need for technical input to the guideline from external bodies that can be planned

N/A

### The Proposed Timeline for Completion of the New Work

Once approved, it is expected tha the work will take at least two sessions of CCFO to complete as indicated below

SESSION	STEP PROCEDURE
CCFO25	Consider the discussion paper and draft project document
CAC40	Approval of project document
CCFO26	Consider the draft amendment
CAC42	Adoption of Amendments at step 5/8

## CODEX STANDARD FOR NAMED VEGETABLE OILS

## CODEX STAN 210

## 2 DESCRIPTION

## 2.1 Product definitions

**Almond oil** is derived from kernel of almond fruit (*Amygdalus communis* L.).

**Avocado oil** is derived from avocado fruit (*Persea americana*).

**Flaxseed (Linseed oil) oil** is derived from the seeds of various cultivated species of (*Linum usitatissimum*)

**Hazelnut oil** is derived from kernel of hazelnut fruit (*Corylus avellana* L.).

**Pistachio oil** is derived from kernel of pistachio fruit (*Pistacia vera* L.).

**Walnut oil** is derived from kernel of walnut fruit (*Juglans regia* L.).

## 3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 GLC ranges of fatty acid composition (expressed as percentages)

**Table 1: Fatty acid composition of vegetable oils as determined by gas liquid chromatograph from authentic samples (expressed as percentage of total fatty acids)**

Fatty acid	Almond oil	Hazelnut oil	Pistachio oil	Walnut oil	Flax/linseed oil	Avocado oil
C6:0	ND	ND	ND	ND	ND	ND
C8:0	ND	ND	ND	ND	ND	ND
C10:0	ND	ND	ND	ND	ND	ND
C12:0	ND	ND	ND	ND	ND	ND
C14:0	ND	0.0-0.1	0.0-0.6	ND	ND	0.0-0.3
C16:0	4.0-13.0	4.0- 9.0	8.0-13.0	6.0-8.0	4.0-13.0	7.0-35.0
C16:1	0.2- 0.6	0.1- 0.3	0.5--1	0.1- 0.2	0.0-0.5	2.0 – 16.8
C17:0	ND	ND	ND	ND	ND	0.0-0.3
C17:1	ND	ND	ND	ND	ND	0.0-0.3
C18:0	2.0-10.0	1.0-4.0	0.5- 2.0	1.0-3.0	2.0-5.0	0.0- 1.5
C18:1	43.0-80.0	66.0-85.0	45.0-70.0	13.0-21.0	10.0-34.0	36.0-80.0
C18:2	15.0-34.0	5.7-25.0	16.0-37.0	54.0-65.0	12.0-18.0	6.0 – 21.2
C18:3	ND	0--0.2	0.1--0.4	13--14	35.0-71.0	0.0-3.0
C20:0	0.1-0.5	0.0-0.3	0.0-0.3	0.0-0.1	0.0-0.2	0.0-0.5
C20:1	0.0-0.3	0.1-0.3	0.0-0.6	0.0-0.2	0.0-0.6	0.0-0.2
C20:2	ND	ND	ND	ND	ND	ND
C22:0	ND	ND	ND	ND	ND	ND
C22:1	ND	ND	ND	ND	0.0-1.0	ND
C22:2	ND	ND	ND	ND	ND	ND
C24:0	ND	ND	ND	ND	ND	0.0-0.1
C24:1	ND	ND	ND	ND	ND	ND
C18:1t	≤0.1	≤0.1	≤0.1	≤0.1	≤ 0.05	ND
C18:2 t + C18:3	≤0.1	≤0.1	≤0.1	≤0.1	≤ 0.05	ND

### 3. CHEMICAL AND PHYSICAL CHARACTERISTICS

Chemical and Physical Characteristics are given in Table 2.

**Table 2: Chemical and physical characteristics of crude vegetable oils**

	Almond oil	Hazelnut oil	Pistachio oil	Walnut oil	Flax/linseed oil	Avocado oil
Relative density (x° C/water at 20°C) Apparent density (g/ml)	0.910 - 0.916 25°C/water 25°C	0.908-0.915 25°C/water 25°C	0.919 - 0.20 15,5°C/water 15,5°C	0.923--0.925 25°C/water 25°C	0.925--0.935 20°C/water25°C	0.910--0.920 25°C/water 25°C
Refractive index (ND 40°C)	1.462-1.466	1.456-1.474	1.460-1.466	1.469 - 1.471	1.4720-1.4750	1.465--1.474
Saponification value (mg KOH/g oil)	188 - 200	188-197	189 - 195	189--197	187--197	177--198
Iodine valu	85 - 106	80-100	84 - 115	135--165	170--203	63--95
Unsaponifiable matter (g/kg)	≤20	≤10	≤20	≤25	≤20	≤120

### 4. IDENTITY CHARACTERISTICS

Levels of desmethylsterols in vegetable oils as a percentage of total sterols are given in Table 3.

Levels of tocopherols and tocotrienols in vegetable oils are given in Table 4.

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

	Almond oil	Hazelnut oil	Pistachio oil	Walnut oil	Flax/linseed oil	Avocado oil
Cholesterol	ND	0.0-0.6	ND	ND	ND	0.0-0.5
Brassicasterol	ND	ND	ND	ND	0.0-1.0	ND
Campesterol	2.0-5.0	4.0-7.0	4.0-6.0	4.0-6.0	25.0-31.0	5.0-12.0
Stigmasterol	1.0--2.0	0.0--3.0	0.2--7.0	0.0-1.0	7.0-9.0	1.0-10.0
Beta-sitosterol	72.0--80.0	75.0--96.0	60--84	80--92	45.0-53.0	60.0-90.0
Delta-5-avenasterol	10.0--21.0	1.0--7.0	3.0--8.0	2.0--9.0	8.0-12.0	2.0-10.0
Delta-7-stigmastenol	0.3--3.0	ND	0--3.0	ND	ND	1.0-2.0
Delta-7-avenasterol	0.2--2	≤1	ND	≤1	ND	1.0-2.0
Others	ND	ND	ND	ND	ND	ND
Total sterols (mg/kg)	2500--3500	1200-2200	3500--3800	1300-2150	2300-6900	3500-5500

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

	Almond oil	Hazelnut oil	Pistachio oil	Walnut oil	Flax/linseed oil	Avocado oil
Alpha-tocopherol	20.0-545.0	100-460	10-330	ND -50	4.0-20.0	63.9-116.0
Beta-tocopherol	ND -10.0	ND-12	ND	ND	ND	ND-2.4
Gamma-tocopherol	5-104	18-194	0-370	120--400	100-488	7.3-19.0
Delta-tocopherol	ND -5	ND -10	ND --50	ND --60	7.0-14.0	ND-5.6
Alpha-tocotrienol	ND	ND	ND	ND	ND	ND
Gamma-tocotrienol	ND	ND	ND	ND	ND	ND
Delta-tocotrienol	ND	ND	ND	ND	ND	ND
Total (mg/kg)	100--600	200--600	100--600	309--570	150--540	118.2 (alpha t tocopherol equivalent)



