



## Agenda Item 5

CX/FO 13/23/5

### JOINT FAO/WHO FOOD STANDARDS PROGRAMME CODEX COMMITTEE ON FATS AND OILS

Twenty-third Session

Langkawi, Malaysia, 25 February – 1 March 2013

#### DISCUSSION PAPER ON A PROPOSAL TO AMEND THE CODEX STANDARD FOR NAMED VEGETABLE OILS: SUNFLOWER SEED OILS (CODEX STAN 210-1999)

*Prepared by Argentina*

#### INTRODUCTION

At the 21<sup>st</sup> Session of the Codex Committee on Fats and Oils (CCFO), Argentina requested the revision of the limits of oleic and linoleic acids for the categories of sunflower oil covered in the Codex Stan 210-1999, as well as the existing gaps between these parameters in the different categories, and other quality factors related. The Committee welcomed the proposal of the Delegation of Argentina to prepare a revised document including all relevant scientific data on sunflower oil related to possible new work, for consideration by the next session.

At the 22<sup>nd</sup> Session of the CCFO, Argentina submitted a discussion paper on this matter and, considering that some Members noted that the allotted time to examine the proposal was insufficient, the Committee agreed to establish an electronic working group led by Argentina which would be in charge of revising the discussion paper submitted for Members' consideration and preparing a draft document for consideration at the 23<sup>rd</sup> Session of the Committee, taking into account the Guidelines on the Application of the Criteria for the Establishment of Work Priorities Applicable to Commodities and information required by the Committee when proposing the addition of new oils to the Standard for Named Vegetable Oils.

The reason for proposing new work for the revision of some parameters that define the established categories of sunflower oil is mainly that, after Codex had set these categories, Argentina obtained new scientific information about the fatty acid profile of its sunflower oils. In particular, the findings of the studies concerning the fatty acid profile of sunflower oils from traditional sunflower seeds in Argentina included values that differ substantially from the percentages of oleic/linoleic acids currently set by Codex, as a result of the use of hybrids and the high temperatures in production areas. Moreover, other related quality factors (refractive index, relative density, iodine value, and saponification value) also differ from the international standard and therefore should be adapted.

Considering that Codex develops global standards which should cover the natural variability of products worldwide, we believe that the CCFO is in a position to accept this proposal for new work, since it is within its terms of reference and in line with the Codex Strategic Plan.

#### BACKGROUND

Sunflower oil is the fourth most important oil in the world. Due to its price as compared to other edible oils, and its nutritional quality, the consumption of sunflower oil has increased significantly in the last few years.

According to data published in the 2010 FAO Agribusiness Handbook "Sunflower Crude and Refined Oil", Argentina's share in 11,674,000 tons of sunflower oil produced in 2008/2009 was 1,785,000 tons, which placed the country as the fourth sunflower oil producer. In 2008/2009, Argentina, Ukraine and the Russian Federation accounted for 56% of the world production of sunflower oil and 86% of global exports. In this regard, Argentina was ranked second with 34% of total sunflower exports out of 4,000,000 tons traded at world level.

This information allows to understand the importance that sunflower production has for Argentina, especially if considering that, with the expansion of the agricultural frontier, which started almost two

decades ago, the sunflower production area not only grew but also began to move. As a consequence, changes in the fatty acid profile of sunflower oils from Argentine traditional seeds became evident mainly due to the use of hybrids, high temperatures and the temperature variation in the production areas.

Several studies have shown that high temperatures affect the oleic acid content in traditional varieties, which increases naturally as a result of a decreased oleoyl-CoA-desaturase activity. This enzyme desaturates oleic acid to linoleic acid. When temperature is higher, the enzyme reduces its activity, causing the linoleate-oleate ratio to increase (Garcés, R., Sarmiento, C., and Mancha, M. *Temperature Regulation of Oleate Desaturase in Sunflower (Helianthus Annuus L.) Seeds* in *Planta* 186, no. 3 (1992): 461-465.)

For this reason, in the 2001/2002 crop year, a study began to be conducted which confirmed this trend already noted by observation and analysis.

The analytical results of Argentine traditional oil which served as a basis for the preparation of this document can be found in ASAGA R&D paper<sup>1</sup>: ***Composición de ácidos grasos del aceite de girasol obtenido de semillas certificadas sembradas en distintas zonas de la República Argentina – Cosecha 2001-2002 (Fatty Acid Composition of the Sunflower Oil Obtained from Certified Seeds Sown in Different Areas of the Republic of Argentina - 2001/2002 Harvest)*** is also attached to this document. This paper refers to 12 certified varieties of traditional sunflower seeds which are representative samples of 15 different soils of the Argentine territory and whose oil was extracted in laboratories. For each variety, seeds were obtained from three sowings in different plots per district, totaling 441 individual samples.

The 441 samples were analyzed in duplicate through the gas chromatography of their fatty acids, from myristic acid (C14:0) to lignoceric acid (C24:0). The iodine values were calculated on the basis of the acid composition.

The samples were taken from 15 localities in the provinces of Chaco, Santa Fe, Entre Ríos, Córdoba, La Pampa and Buenos Aires. They correspond to hybrid cultivars recommended for each cropping zone and therefore vary according to the location of the trials.

The average results from all localities for oleic acid and linoleic acid content, iodine value and refractive index are as follows:

	Range
Oleic acid (C18:1)	16,1-57,9
Linoleic acid (C18:2)	31,8 – 73,4
Iodine value	104,3 – 140,3
Refractive index	1.4698 – 1.4740

From the study, it was concluded that in Argentina it is possible to obtain sunflower oils from traditional seeds with an oleic acid content of more than 50%, which does not mean that they can be classified as “mid-oleic”. Similarly, it was proved that some mid-oleic oils contain oleic acid levels close to 72%, which does not mean that they are “high oleic”.

This trend was also confirmed by Izquierdo, N.G.; Geroudet, C.; Angeloni, P.; Aguirrezábal, L.A.N. in ***Modelado de la respuesta de la composición acídica del aceite a la temperatura en híbridos comerciales de girasol cultivados en Argentina (Modeling of the Response of the Fatty Acid Composition of Oil to Temperature in Commercial Sunflower Hybrids Grown in Argentina)*** published in 2002/2003 by ASAGA R&D<sup>2</sup> and presented at the Congress of ASAGIR (Argentine Sunflower Association).

Attached to this document is a technical report prepared by the Argentine Oil Industry Chamber, CIARA, which describes the current oil situation in Argentina. According to this document, 16 out of 44 analyzed samples from the NEA (i.e. 36%) present a percentage of oleic fatty acid higher than 39.4%, which is the

<sup>1</sup> ASAGA R&D. *Composición de ácidos grasos del aceite de girasol obtenido de semillas certificadas sembradas en distintas zonas de la República Argentina – Cosecha 2001-2002 (Fatty Acid Composition of the Sunflower Oil Obtained from Certified Seeds Sown in Different Areas of the Republic of Argentina - 2001/2002 Harvest)* in *Revista Aceites y Grasas (Oils & Fats Journal)* No. 52, pp. 430-437.

<sup>2</sup> ASAGA R&D. *Composición de ácidos grasos del aceite de híbridos de girasol cultivados en Argentina - Caracterización y modelado (Fatty Acid Composition of the Oil of Sunflower Hybrids Grown in Argentina - Characterization and Modeling)* in *Revista Aceites y Grasas (Oils & Fats Journal)* No. 59, pp. 338-343.

upper limit currently set by CODEX for sunflower oils from traditional seeds (Table 3). On average, these samples have 45.9% of oleic acid. Based on these results, it is estimated that 19% of the production of sunflower oil in the Northeast (NEA) of Argentina presented higher values of oleic fatty acid to those covered by Codex, this may represent between 10 and 20% of oil exported Argentina, according to the period.

Finally, it is important to point out that IRAM<sup>3</sup> modified its Standard 5529 in 2006 as a consequence of the studies carried out by ASAGA.

Back to the inconsistencies with the Codex Standard, Argentina has noted that there are gaps in the three oil categories and for these two fatty acids, which hinders the classification of oils with values in these undefined zones, as described below:

<i>Fatty acid</i>	<i>Sunflower oil</i>	<i>Sunflower oil (mid oleic acid)</i>	<i>Sunflower oil (high oleic acid)</i>
C18:1 – OLEIC	14.0 – <b><u>39.4</u></b>	<b><u>43.1</u></b> – <b><u>71.8</u></b>	<b><u>75.0</u></b> – 90.7
C18:2 – LINOLEIC	74.0 – <b><u>48.3</u></b>	<b><u>45.3</u></b> – <b><u>18.7</u></b>	<b><u>17.0</u></b> – 2.1

Inconsistencies have also been found in iodine values for these three types of oil, with an overlap between sunflower oil and mid oleic sunflower oil, and a gap between mid oleic sunflower oil and high oleic sunflower oil.

In addition, it has been found that the maximum and minimum levels for refractive index and density are expressed based on different average temperatures, so it is difficult to establish the appropriate correlation and/or continuity between the parameters and therefore to compare them, as, with the same physical and temperature expression, parameters do not necessarily match one another or their respective iodine or saponification values.

<i>Fatty acid</i>	<i>Sunflower oil</i>	<i>Sunflower oil (mid oleic acid)</i>	<i>Sunflower oil (high oleic acid)</i>
IODINE VALUE	141 – <b><u>118</u></b>	<b><u>122</u></b> – <b><u>94</u></b>	<b><u>90</u></b> - 78
RELATIVE DENSITY (at 20°C)	0.923 – <b><u>0.918</u></b> x=20°C	<b><u>0.916</u></b> – <b><u>0.914</u></b> x=20°C	<b><u>0.915</u></b> – <b><u>0.909</u></b> x=25°C
REFRACTIVE INDEX (ND 40°)	1.461 – 1.468	1.467 – 1.471 at 25°C	1.461 – 1.471 at 25°C

## CONCLUSIONS

Argentina occupies an important place in international trade in sunflower oil. An increasing percentage of Argentine sunflower oils from traditional seeds has naturally high values of oleic acid and therefore lower values of linoleic acid, due to the temperatures of production areas and the type of hybrids used. In addition, the existing gaps between the established categories of sunflower oil create uncertainty, since the current Codex Standard does not properly cover these genuine oils.

For these reasons, Argentina requests to revise and amend CODEX STAN 210-1999 in relation to the values for oleic (C18:1) and linoleic (C18:2) fatty acids, in the different categories of sunflower oil, high oleic sunflower oil and mid oleic sunflower oil, in particular in the first two, trying to reduce/eliminate the existing gaps between categories.

For the purpose of consistency in the established parameters, it is also requested to review the refractive index, relative density, iodine value and saponification value of each established category of sunflower oil.

<sup>3</sup> Instituto Argentino de Normalización y Certificación (Argentine standardization body). ISO Member.

- **Table1: Fatty acid composition of vegetable oils as determined by gas liquid chromatography from authentic samples (expressed as percentage of total fatty acids). Current values for the 3 categories of sunflower.**

Fatty acid	Sunflower oil		Mid oleic sunflower oil		High oleic sunflower oil	
	Current value	Proposed value	Current value	Proposed value	Current value	Proposed value
<b>C18:1 - Oleic acid</b>	14.0 - 39.4	Max. 54.9	43.1 – 71.8	55 – 74.9	75 – 90.7	Maintain current value
<b>C18:2 - Linoleic acid</b>	48.3 – 74.0	35.1 – 74.0	18.7 – 45.3	15.1 – 35.0	2.1- 17.0	2.1 – 15.0

The parameters proposed by Argentina relate to the study carried out by ASAGA and the updated version for oils from Northeast Argentina prepared by CIARA.

Also, we have sought to reduce the gaps between categories to avoid uncertainty in trade in sunflower oil.

- Appendix *Other Quality and Composition Factors - Table 2: Chemical and physical characteristics of crude vegetable oils*, as regards the relative density, refraction index, iodine value and saponification value for each sunflower oil category regulated.

Chemical and physical characteristics	Sunflower oil		Mid oleic sunflower oil		High oleic sunflower oil	
	Current value	Proposed value	Current value	Proposed value	Current value	Proposed value
<b>Relative density (x°C/water at 20°)</b>	0.918 – 0.923	0.9151 – 0.9193	0.914 – 0.916	0.9124 – 0.9150	0.909 – 0.915	0.909 – 0.9123
	X= 20°C	x=20°C**	x= 20°C	x= 20°C**	x= 20°C	X= 20°C
<b>Refractive index (ND 40°)</b>	1.461 – 1.468	1.4706 – 1.4740	1.461 – 1.471	1.4684 – 1.4705	1.467 – 1.471	1.467 – 1.4683
		at 25°C	at 25°C	at 25°C	at 25°C	at 25°C
<b>Saponification value (mg KOH/g of oil)</b>	188 – 194	188 – 192	190 – 191	188 – 192	182 – 194	188 – 192
<b>Iodine value</b>	118 – 141	110 – 140	94 – 122	91.1 – 109.9	78 – 90	78 – 91.0

\* **Saponification value.** We propose to maintain a range of 188-192 for all sunflower oil categories, considering that this index is heavily dependent on C18 fatty acids and the variation in the content of each of them does not imply a major change in the index, since such variation is of approximately 0.014.

\*\* **We suggest to standardize the temperature of oil in relation to water at 20°C, which is how Argentina has calculated it, to facilitate the comparison between the categories of sunflower oil.**

In order to ensure a regional and/or international trade that is fair, dynamic and transparent, it is essential that Codex consider amending the parameters related to the content of oleic and linoleic fatty acids, with a view to providing them with a continuing framework that takes into account the characteristics resulting from other production areas, to guarantee that all genuine sunflower oils are included in the Standard and that all associated quality factors are adjusted accordingly.

**PROPOSAL FOR NEW WORK TO AMEND THE CODEX STANDARD FOR NAMED  
VEGETABLE OILS (CODEX STAN 210-1999): ESSENTIAL COMPOSITION AND QUALITY  
FACTORS OF SUNFLOWER OIL, MID OLEIC SUNFLOWER OIL AND HIGH OLEIC  
SUNFLOWER OIL**

This draft document has been prepared according to the *Procedural Manual of the Codex Alimentarius Commission*, 19th edition (2010), Section II, Procedure for the Elaboration of Codex Standards and Related Texts, *part 2. Critical Review, Proposals to Undertake New Work or to Revise a Standard (page 25 of the Spanish version)*.

**1. Purpose and scope of the standard**

The proposed work is intended to amending the Codex Standard for Named Vegetable Oils (CODEX STAN 210-1999) in relation to sunflower oil, mid oleic sunflower oil and high oleic sunflower oil, so as to adapt composition parameters - particularly, the limits for oleic acid (C18:1) and linoleic acid (C18:2) - to represent the actual world variability of these oils, and consequently to modify the quality factors relative to the refraction index, relative density, iodine value and saponification value for each category.

Additionally, the gaps between the fatty acid ranges of each of these oils will be examined, specifically for: the OLEIC (C18:1) and LINOLEIC (C18:2) fatty acids in Table 1 (CODEX STAN 210/1999) and in particular between Sunflowerseed Oil and Sunflowerseed oil (mid-oleic acid).; it is proposed that new work would focus on removing those gaps so there is no break in continuity of the ranges between these oils.

**2. Relevance and timeliness:**

Oils derived from sunflower seeds are some of the most consumed oil products worldwide for decades, both for its taste and for its beneficial nutritional qualities, and its functionality in the food industry.

In order to ensure a regional and / or international fair trade, is of fundamental importance that the Codex consider amending the parameters related to the content of oleic and linoleic fatty acids in order to classify them continuously, supporting the concept of genuineness, quality factors and associated consistency resulting from the point of view of stoichiometric calculation.

**3. Main aspects to be covered:**

- The revision of the parameters of oleic and linoleic acids in sunflower oil, mid oleic sunflower oil and high oleic sunflower oil included in section *Essential Composition and Quality Factors - Table 1: Fatty acid composition of vegetable oils as determined by gas liquid chromatography from authentic samples* (expressed as percentage of total fatty acids) (see Section 3.1 of the Standard), and

- Appendix *Other Quality and Composition Factors - Table 2: Chemical and physical characteristics of crude vegetable oils*, as regards the relative density, refraction index, iodine value and saponification value for each sunflower oil category regulated.

**4. Assessment against the Criteria for the establishment of work priorities:**

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

*a) 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.*

The composition limits set in the Codex Standard have been mainly established to ensure fair practices in the food trade. However, non-representative limits may also act as technical barriers to trade in genuine sunflower oils, particularly sunflower oil from traditional seeds, if these exceed the limits for agroclimatic reasons or other causes related to the hybrids used. These limits are not safety-related.

*b) Volume of production and consumption in individual countries and volume and pattern of trade between countries.*

Sunflower oil is the fourth most important oil in the world. Due to its price as compared to other edible oils, its consumption has increased significantly in the last few years.

According to data published in the 2010 FAO Agribusiness Handbook "Sunflower Crude and Refined Oil", Argentina's share in 11,674,000 tons of sunflower oil produced in 2008/2009 was 1,785,000 tons, which placed the country as the fourth sunflower oil producer, following Ukraine, the Russian Federation and the European Union.

In 2008/2009, Argentina, Ukraine and the Russian Federation accounted for 56% of the world production of sunflower oil and 86% of global exports. In this regard, Argentina was ranked second with 34% of total sunflower exports out of 4,000,000 tons traded at world level.

*c) Diversification of national legislations and apparent resultant or potential impediments to International trade.*

This Codex Standard may be used by Member States as a reference for the establishment of their own national legislation.

The WTO Agreement on Technical Barriers to Trade states that, whenever a Member adopts a technical regulation in accordance with relevant international standards, it shall be presumed not to create an unnecessary obstacle to international trade (Article 2.5.) There is sound scientific evidence of the world variation in the oleic/linoleic acid levels and related indexes as a consequence of high temperatures in production areas.

In 2006, the Instituto Argentino de Normalización y Certificación (IRAM), the Argentine standardization body which represents Argentina before ISO, revised the sunflower standard based on the results of the ASAGA study attached.

Finally, it should be stressed that the legislation on sunflower oil in the Argentine Food Code is under revision to adapt it to the productive reality, since the Codex Standard no longer allows to reflect the fatty acid profile of sunflower oils from Argentine traditional seeds.

The proposed amendment to the Codex Standard for Named Vegetable Oils (CODEX STAN 210) will help provide a harmonized international approach to the said quality and composition factors and will facilitate world trade in different types of sunflower oil.

The resolution of the various inconsistencies found for sunflower oils defined in Codex Stan 210, both for the lack of continuity between parameters of oleic (C18:1) and linoleic (C18:2) fatty acids and for the lack of stoichiometric correlation of some of their chemical and physical characteristics, will avoid difficulties in and barriers to trade.

*d) International or regional market potential.*

The consumption of edible vegetable oils has risen significantly in the last few years, and this trend is expected to continue and increase in the future.

In 2010, the world production of the 17 main oils and fats was 164.8 million tons, showing a 1.2% increase in relation to the 2009 production. According to Oilworld, those most produced included palm oil, soybean oil, sunflower oil and rapeseed oil with a market share of 31%, 22%, 13% and 8%, respectively.

According to USDA data, the total consumption of oils will remain stable but the consumption of sunflower oil will increase 6.5% (about 250,000 tons more) mainly intended for the agri-food sector.

In the 2011 crop year, the global production of sunflower oil reached 13 million tons; Ukraine, the Russian Federation, the EU-27 and Argentina were the first four producers. The production of the northeastern region of Argentina accounted for 19% of the Argentine total production of sunflower oil.

In the same period, the world imports of sunflower oil totaled about 5.2 million tons mainly concentrated in India, the EU, Turkey, Algeria, Egypt and South Africa. The largest export volumes belonged to Ukraine, Argentina and the Russian Federation.

Currently, it is estimated that 19% of the production of sunflower oil in the Northeast (NEA) of Argentina presented higher values of oleic fatty acid to those covered by Codex, this may represent between 10 and 20% of Argentine oil exported.

*d) Amenability of the commodity to standardization.*

This commodity is already regulated by CODEX STAN 210 in force since 1999. However, due to the appearance of new sunflower hybrids and production under new agroclimatic conditions, differences in composition parameters mainly based on production areas with wider temperature variation and high temperatures are becoming increasingly evident.

The proposed changes can easily be introduced in the standard as there are scientific studies and analytical data supporting the rationale for amendment of Codex Stan 210.

Also, we believe that consensus should be reached to reduce the gaps existing between the defined categories because the regulated gaps may affect the definition of a commodity.

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

The Codex Standard in force does not address the natural variation in the fatty acid composition of sunflower oil according to the new hybrids and the agroclimatic conditions of production areas worldwide. Moreover, the gaps established between categories may affect the classification of certain oils whose parameters fall within those values.

Therefore, the amendment to the Codex Standard will contribute to the proper classification of the different kinds of sunflower oil and will improve the information provided to consumers, in addition to ensuring fair practices in the trade in these oils.

*f) Number of commodities which would need separate standards indicating whether raw, semi processed or processed.*

Not relevant.

*g) Work already undertaken by other international organizations in this field and/or suggested by the relevant international intergovernmental body(ies).*

None known.

## **5. Relevance to the Codex Strategic Objectives:**

The proposed new work would contribute to guaranteeing the proper identification of sunflower oil in international trade, taking into account the special needs and concerns of all countries, as it will meet the following goals and strategic priorities of the 2008-2013 Strategic Plan of the Codex Alimentarius Commission. 7

Goal 1: Promoting sound regulatory frameworks.

The elaboration of Codex standards that are more representative of the world conditions will help to ensure their wider adoption by Member States and reduce to a minimum their possibility of causing negative effects on international trade as it is guaranteed that they do not represent any technical barriers to trade. This activity is very important considering the efforts being made by the international community to increase the production of food in order to guarantee food security, for which new regions that used to be unproductive have been incorporated into the productive system over the years.

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 this Codex Standard (CODEX STAN 210) will facilitate fair trade in sunflower oil, as the production conditions of other geographic areas with parameters different from those regulated by Codex are considered thus reflecting the existing world variations; also, this will prevent genuine oils from being classified under undefined areas or areas with overlapping values among ranges that do not allow for their proper classification. Both aspects will contribute to guaranteeing consumers the acceptable fatty acid parameters and corresponding indexes that define each sunflower oil category, so that they are not misled over the true characteristics of the products they choose.

## **6. Information on the Relation between the Proposal and other Existing Codex Documents**

Codex has elaborated standards for almost all edible fats and oils, including:

- Codex General Standard for Edible Fats and Oils not covered by individual standards [*CODEX STAN 19- 1981 (Rev. 2-1999, as amended in 2009)*].
- Standard for Olive Oils and Olive Pomace Oils [*CODEX STAN 33-1981 (Rev. 2-2003, as amended in 2009)*].
- Standard for Named Vegetable Oils [*CODEX STAN 210 (as amended in 2003, 2005, 2011)*].
- Standard for Named Animal Fats (CODEX STAN 211-1999, as amended in 2009).

**7. Identification of any Requirement for and Availability of Expert Scientific Advice:**

None identified.

**8. Identification of any Need for Technical Input to the Standard from External Bodies so that this can be Planned for:**

None identified.

**9. Proposed Time-Line for Completion of the New Work, Including the Start Date, the Proposed Date for Adoption at Step 5/8, and the Proposed Date for Adoption by the Commission.**

February 2013	23 <sup>rd</sup> Session of the Codex Committee on Fats and Oils	Submission of the proposed revision. The Committee recommends the Codex Alimentarius Commission to undertake new work to amend the Standard for Named Vegetable Oils in relation to sunflower oil, mid oleic sunflower oil and high oleic sunflower oil.
July 2013	36 <sup>th</sup> Session of the Codex Alimentarius Commission	Adoption of the new work to amend the sunflower oil standard.
From August 2013 to April 2014	Intersession - Electronic Working Group	Circulation of the document for comments and revision, and final report to the working group. The draft document is sent to the Secretariat.
August 2014	The Secretariat circulates the draft document for Members' consideration.	Step 3.
February 2015	24 <sup>th</sup> Session of the Codex Committee on Fats and Oils	To fast-track 5/8 Step.
July 2015	38 <sup>th</sup> Session of the Codex Alimentarius Commission	<b>Final Adoption</b> of the Draft Amendment to the Standard.



**PROPOSED AMENDMENT TO THE CODEX STANDARD FOR NAMED VEGETABLE OILS  
(CODEX STAN 210-1999): SUNFLOWER OILS**

**3. ESSENTIAL COMPOSITION AND QUALITY FACTORS**

**3.1 Fatty acid composition of vegetable oils as determined by GLC (expressed as percentages)**

- *Table1: Fatty acid composition of vegetable oils as determined by gas liquid chromatography from authentic samples (expressed as percentage of total fatty acids). Current values for the 3 categories of sunflower.*

Fatty acid	Sunflower oil		Mid oleic sunflower oil		High oleic sunflower oil	
	Current value	Proposed value	Current value	Proposed value	Current value	Proposed value
<b>C18:1 - Oleic acid</b>	14.0 – 39.4	Max. 54.9	43.1 – 71.8	55 – 74.9	75 – 90.7	Maintain current value
<b>C18:2 - Linoleic acid</b>	48.3 – 74.0	35.1 – 74.0	18.7 – 45.3	15.1 – 35.0	2.1- 17.0	2.1 – 15.0

The parameters proposed by Argentina relate to the study carried out by ASAGA and the updated version for oils from Northeast Argentina prepared by CIARA.

Also, we have sought to reduce the gaps between categories to avoid uncertainty in trade in sunflower oil.

- Appendix *Other Quality and Composition Factors - Table 2: Chemical and physical characteristics of crude vegetable oils*, as regards the relative density, refraction index, iodine value and saponification value for each sunflower oil category regulated.

Chemical and physical characteristics	Sunflower oil		Mid oleic sunflower oil		High oleic sunflower oil	
	Current value	Proposed value	Current value	Proposed value	Current value	Proposed value
<b>Relative density (x°C/water at 20°)</b>	0.918 – 0.923 x=20°C	0.9151 – 0.9193 x=20°C**	0.914 – 0.916 x=20°C	0.9124 – 0.9150 x=20°C**	0.909 – 0.915 x=20°C	0.909 – 0.9123 X=20°C
<b>Refractive index (ND 40°)</b>	1.461 – 1.468	1.4706 – 1.4740 at 25°C	1.461 – 1.471 at 25°C	1.4684 – 1.4705 at 25°C	1.467 – 1.471 at 25°C	1.467 – 1.4683 at 25°C
<b>Saponification value (mg KOH/g of oil)</b>	188 – 194	188 – 192	190 – 191	188 – 192	182 – 194	188 – 192
<b>Iodine value</b>	118 – 141	110 – 140	94 – 122	91.1 – 109.9	78 – 90	78 – 91.0

\* **Saponification value.** We propose to maintain a range of 188-192 for all sunflower oil categories, considering that this index is heavily dependent on C18 fatty acids and the variation in the content of each of them does not imply a major change in the index, since such variation is of approximately 0.014.

\*\* We suggest to standardize the temperature of oil in relation to water at 20°C, which is how Argentina has calculated it, to facilitate the comparison between the categories of sunflower oil.

**COMMENTS BY COUNTRIES - REFLECTIONS AND PROPOSALS TO BE CONSIDERED**

<b>COUNTRY</b>	<b>COMMENT</b>	<b>REFLECTION</b>
<b>FRANCE</b>	Changes in values should be based on statistical data on the composition of genuine sunflower oils and the risk of adulteration by other vegetable oils.	<p>Argentina's proposal was based on the ASAGA R&amp;D paper "<b>Composición de ácidos grasos del aceite de girasol obtenido de semillas certificadas sembradas en distintas zonas de la República Argentina – Cosecha 2001-2002</b>" (<b>Fatty Acid Composition of the Sunflower Oil Obtained from Certified Seeds Sown in Different Areas of the Republic of Argentina - 2001/2002 Harvest</b>). This paper refers to 12 certified varieties of traditional sunflower seeds which are representative samples of 15 different soils of the Argentine territory and whose oil was extracted in laboratories. For each variety, seeds were obtained from three sowings in different plots per district, totaling 441 individual samples.</p> <p>In addition to the content of fatty acids, the genuineness of an oil may be determined by its content of sterols.</p> <p>These values have been maintained over time. A document (2011-12 crop year) prepared by the Argentine Oil Industry Chamber, CIARA, on the basis of the test results of sunflower seed samples received from its partner companies which sell sunflower oils from the areas concerned confirms the trend of the values informed in the ASAGA paper.</p>
<b>FRANCE</b>	In France, there is a premium market for high oleic sunflower oil; for this reason, maintaining the gap between categories is important to avoid the misclassification of mid oleic sunflower oil as high oleic. Therefore, this gap should be at least higher than analytic uncertainty.	<p>Argentina understands the concern raised by France. We do not intend to mislead consumers over the nature or quality of oils. However, we believe that it is possible to eliminate or reduce the error by repeating the tests in those cases where values are at the limits of ranges. We believe that those extreme cases are very unusual.</p> <p>We consider that current gaps are very wide and could be reduced. Argentina is mainly concerned with the existing gap between sunflower oil and mid oleic sunflower oil. At present, when values fall within a gap, this may cause uncertainty as to its solution as both consumers and producers may be affected by an inappropriate or confusing classification of these oils. Specifically, what value would France suggest?</p>
<b>AUSTRALIA</b>	Australia suggests maintaining the upper linoleic acid limit of 74% for the category of traditional sunflower oil or eliminating it.	Argentina can accept to maintain the 74% limit for linoleic acid, as proposed by Australia.

<p><b>AUSTRALIA</b></p>	<p>Australia supports the reduction of the linoleic acid value to address Argentina's concerns but believes that the minimum value for linoleic acid in traditional oil should be above 40% and not 31.8% as proposed by Argentina.</p>	<p>For traditional sunflower seeds, the addition of oleic and linoleic acids (O+L) is approximately 90%. Taking into account this value as a constant in traditional sunflower seed oils, if the minimum 40% linoleic acid level proposed by Australia were used, a maximum oleic acid value of around 50% for traditional oils would be obtained as a consequence.</p> <p>The study of the analytical data of Argentine oils shows that, for the northern area of Argentina, about 7.9% of its production exceeds the 50% oleic acid level.</p> <p>This is due to the effect produced by high temperature on the oleic acid content in traditional varieties, which increases naturally as a result of a decreased oleoyl-CoA-desaturase activity. This enzyme desaturates oleic acid to linoleic acid. When temperature is higher, the enzyme decreases its activity making the oleic/linoleic relation increase. (Garcés, R., Sarmiento, C., and Mancha, M. "Temperature Regulation of Oleate Desaturase in Sunflower (<i>Helianthus Annuus</i> L.) Seeds." <i>Planta</i> 186, no. 3 (1992): 461-465.)</p> <p>Argentina's proposal to widen the linoleic acid ranges for traditional oil up to a lower limit of 31.8 % is part of the reality of the values found for "traditional" sunflower oils currently traded in Argentina, and Codex should reflect this reality.</p> <p>The Argentine proposal refers to the characterization of the fatty acid profile of sunflower seed oils as defined in Codex Stan 210. If this modification is not accomplished, genuine oils from traditional seeds may not be named "sunflower oil".</p> <p>Argentina has examined Australia's comments; we hope to find a balanced solution. The reality is that, if we considered the 40% limit suggested by Australia to highlight the healthy properties of its oils, which is not regulated according to Codex limits, a percentage of our genuine oils from traditional seeds would be directly excluded from the standard because their percentages of fatty acids for oleic and linoleic acids correspond to the mid oleic acid category.</p> <p>In order to reach consensus, Argentina could accept to take the lower limit for linoleic acid to 35.1% and maintain the 74% linoleic acid limit as the maximum value for traditional sunflower:  <b>Linoleic: 35,1% – 74.0</b>  <b>Therefore, the oleic acid for this category would have a 54.9% upper limit.</b></p>
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<p><b>CANADA</b></p>	<p>Evidence of the trade in sunflower oils that do not comply with current limits should be submitted.</p>	<p>In the document "Perfil de ácidos grasos de semillas de girasol del Noreste Argentino (NEA) - Campaña 2011/12" (Fatty Acids Profile of Sunflower Seeds from the Northeast Argentina (NEA) - Harvest 2011/12) prepared by CIARA, there is an estimation of the proportion of genuine oil that is not within the current limits set by Codex.</p> <p>According to this document, in the Chaco region 346,000 hectares of traditional sunflower seed were sown in the 2010-2011 crop year. Sunflower production was 648,218 tons, from which 269,529 tons of sunflower oil were extracted. Of these 269,529 tons of sunflower oil, 184,578 tons were intended for export, which represents 19 per cent of the country's total.</p> <p>According to the document prepared by CIARA, 16 out of 44 analyzed samples from the NEA (i.e. 36%) presented a percentage of oleic fatty acid higher than 39.4%, which is the upper limit currently set by CODEX for sunflower oils from traditional sunflower seeds (Table 3). On average, these samples have 45.9% of oleic acid. The chromatographies of the 44 samples are attached.</p> <p>In order to provide more information to the Committee, CIARA and the National Institute of Agricultural Technology (INTA) are working on the re-examination of samples for the preparation of new studies. The first report will be based on samples already used in previous harvests and the preliminary results will be available in December 2012. The second report will be prepared with samples from the 2012/13 harvest in March/April 2013.</p> <p>Also, it should be highlighted that some countries, which observe the Codex Standard and import oils from Argentina, have expressed their concern over shipments from northern Argentina which are not within the oleic/linoleic acid limits. This could mean a trade disruption or a penalty on a genuine and quality product.</p> <p>For these reasons, and considering that the agricultural frontier has expanded into areas that were previously unproductive, and also that the agri-food production is important for food security, we believe that the request for a change in the proposed percentages of fatty acids for these categories is appropriate. In particular, the changes proposed for sunflower oil and mid oleic sunflower oil. Finally, we believe that, beyond the volume of oil affected, the gaps between categories generate uncertainty as regards the treatment these oils would receive when they reach their markets of destination.</p>
<p><b>CANADA</b></p>	<p>Canada suggests amendments to the wording of some paragraphs:</p> <ul style="list-style-type: none"> <li>- That the three categories of fatty acids be specifically identified.</li> </ul>	<p>The comments submitted by Canada have been taken into consideration. For this reason, the proposed values of fatty acid for the 3 categories were included in the proposed draft, as well as the refractive index, relative density, iodine index, and saponification values.</p>

<b>CANADA</b>	The parameters of fatty acids that define the categories of sunflower oils do not adequately reflect the oils that are being produced and marketed worldwide. Moreover, the existing gaps between categories are too wide for stakeholders to be certain how to identify the category within which their products fall.	The proposals for changes to the text have been taken into consideration. Relevant information about the problem has been included.
	It requests further information that proves the diversification of national legislations.	<p>With regard to the diversification of national legislations, members should be requested to provide the information or standards on sunflower oil available.</p> <p>Argentina is currently in the process of adapting its provisions on sunflower oil in the Argentine Food Code as proposed. The Codex standard does not reflect the current oil situation in Argentina. Considering the importance of the matter for the oil sector, IRAM, the Argentine standardization body and an ISO member, established a standard for sunflower oil that reflects more adequately the production situation (the standard is here attached). It is important to stress that many traders and governments take into account the parameters set by Codex. That is what motivates the request for change.</p> <p>All members are invited to submit the information or standards on sunflower oil available.</p>
<b>MALAYSIA</b>	In the document submitted by Argentina, the comments made by the members of the eWG were not included.	We would like further clarification on the Members' specific comments not included in the first text, given that they were general comments. Could Malaysia help us clarify what aspects have not been addressed?
	The standard should be established on the basis of the data collected from all producing countries.	<p>We are not sure if all producing countries usually provide data. In the case of Argentina, we are producers and exporters and, therefore, we do not have information available on oils from other parts. We are open to data that may be submitted by other Members, which does not invalidate the fact that genuine sunflower oils from Argentine traditional sunflower seeds show a difference between the oleic/linoleic acid relation and what was originally established by Codex for the sunflower oil category.</p> <p>All members are invited to submit the information or standards on sunflower oil available.</p> <p>The study carried out by ASAGA and an updated version prepared by CIARA are attached to this document for consideration.</p>

<b>MALAYSIA</b>	Current values of sunflower oils have not been made available in the document to substantiate the need to amend the current standard. It is important that data be reflective of the global variability, which takes into account geographical, climatic or seasonal variations, varietal differences and adequate sample size.	<p>Current values and those proposed by Argentina have been introduced in the revised draft.</p> <p>The work done by ASAGA R&amp;D: "<b>Composición de ácidos grasos del aceite de girasol obtenido de semillas certificadas sembradas en distintas zonas de la República Argentina – Cosecha 2001-2002</b>" (<b>Fatty Acid Composition of the Sunflower Oil Obtained from Certified Seeds Sown in Different Areas of the Republic of Argentina - 2001/2002 Harvest</b>) is also attached to this document. This paper refers to 12 certified varieties of traditional sunflower seeds which are representative samples of 15 different soils of the Argentine territory and whose oil was extracted in laboratories. For each variety, seeds were obtained from three sowings in different plots per district, totaling 441 individual samples. These duplicate samples were then analyzed.</p> <p>Also attached to this document, you will find the report "Perfil de ácidos grasos de semillas de girasol del Noreste Argentino (NEA) - Campaña 2011/12" (Fatty Acids Profile of Sunflower Seeds from the Northeast Argentina (NEA) - 2011/12 Harvest) prepared by CIARA for the purpose of showing that the parameters for fatty acids currently under analysis have been maintained or increased in the Northeast region.</p>
<b>MALAYSIA</b>	The change in the percentage of a fatty acid will also affect the proportion of other acids and related indexes.	<p>We understand the concern expressed by Malaysia. The relation between different fatty acids and iodine value, refractive index and density was considered in the development of Argentina's proposal. However, we believed that first it was necessary to agree on the levels for each category and then revise such indexes to adapt them to the new ones, since these are stoichiometric ratios.</p> <p>Considering the change in the proposed values established for oleic and linoleic acid in the 3 categories of sunflower oil, Argentina has calculated the relative density, iodine and refraction indexes, and makes a suggestion on the saponification value in the new text.</p>
<b>BRAZIL</b>	In several paragraphs of the English version of the document submitted by Argentina, there is a reference to "linolenic" acid where it should say "linoleic."	We appreciate Brazil's comments. The corresponding corrections have been incorporated in the new version, attached.
<b>BRAZIL</b>	In section "Main aspects to be covered" of the document submitted by Argentina, it would be interesting to list the specific parameters to be corrected in this revision, instead of mentioning the general issues of the standard.	The suggestion made by Brazil was considered and the proposed changes were included in the text.

<b>BRAZIL</b>	In section "Coverage of the main consumer protection and trade issues by existing or proposed general standards", Brazil suggests to include the following text: "the modification of the standard will contribute to the correct classification of sunflower oils."	The text has been modified according to the suggestion made by Brazil.
<b>BRAZIL</b>	At the next Session of the CCFO, this work proposal should be approved by the Committee and sent to the CAC for approval. Only then, the reform will be discussed in the Committee, following the Uniform Procedure/ Uniform Accelerated Procedure. The schedule should be revised according to the Procedural Manual.	The proposal includes a new schedule.
<b>MEXICO</b>	It supports Argentina's proposal.	
<b>UNITED STATES</b>	We continue to support the effort by Argentina to amend the Standard for Sunflower Oils in the Codex Standard for Named Vegetable Oils (Codex Stan 210-199). We believe that the changes suggested by Argentina are positive because they eliminate the gaps between the three different sunflower oil types and they will help correct the inconsistencies in Iodine Values and Refractive Indexes. The changes also raise the minimum limits of oleic acid for mid-oleic sunflower oil, but we believe that new oleic acid limits are appropriate.	
<b>EGYPT</b>	It states that the problems are found in oleic acid and linoleic acid, and not in oleic acid and linolenic acid.	We appreciate the comment. There was a mistake in the translation into English of the circulated document, which has been amended.

	<p>All actual analytical data of all global produced sunflowerseed oils which reflect geographical, climatic and varietal variations, besides volume of production, consumption and world trade market must be taken into consideration.</p>	<p>In principle, we recall that this is the revision of a standard, and as stated by the Codex Secretariat, this information was presented when it was agreed to adopt a standard for sunflower. Thus, for these amendments, it is not necessary to show again the volumes of production, geographical distribution, trade, and consumption. However, we are open to data that may be submitted by other Members, which does not invalidate the fact that Argentina's genuine sunflowerseed oil shows values above those originally regulated by Codex for the “traditional” sunflowerseed oil category.</p> <p>Attached is an FAO document from which data on volume of production, consumption and world trade market has been taken.</p>
	<p>Removing the gaps can affect not only iodine values, reflective index and density limits but also affect other items of essential composition and quality factors.</p>	<p>The relation between different fatty acids and iodine value, refractive index and density was considered in the development of Argentina's proposal.</p> <p>We also request eWG members to note any other parameters that may have been affected by the proposed amendment to oleic acid and linoleic acid values and that may not have been taken into consideration.</p>

### Conclusions of the working group on sunflower oil

As decided by the CCFO in its 22<sup>nd</sup> session in February 2011, an electronic working group was established to prepare a project document for new work on an amendment to the Codex Standard for Named Vegetable Oils (CODEX 210-1999): essential composition and quality factors for sunflower oil.

Twenty-two members participated in the eWG (see attached list) and two organizations: AOCS and FEDIOL. Argentina circulated an initial document on which there were two rounds of comments.

One member pointed out that there is a “premium” market for sunflower oil with high oleic acid and therefore stressed the importance of maintaining the gaps between categories. This will therefore avoid any incorrect classification of oils with medium oleic acid content as high oleic. Moreover it pointed out that the amendments in the values should be based on statistic composition data for genuine sunflower oils and that the risk of adulteration with other vegetable oils should be avoided. Taking into account these comments, the existing gap was retained between the medium and high categories, as in these ranges Argentina could not propose data. On the other hand, the existing gap between conventional and medium oleic acid oils was reduced as these are the categories for which Argentina requested a change in current values, due to the profile of its oils in new production areas, taking into account however that the values set should allow a clear distinction between categories.

As to the possibility of adulteration with other oils, it is important to take into account that sunflower oil is one of the lowest price oils which is more than sufficient to discourage any adulteration. In addition, other quality parameters are used in the standard to ensure the authenticity of sunflower oil.

Another member considered that the proposal from Argentina was positive because it eliminated the gaps between categories and moreover corrected the inconsistencies in the current parameters in the iodine value and refractive index, and in addition the oleic acid values were appropriate.



One member supported the reduction of the linoleic acid value to address the concern of Argentina, but considered that the minimum value for linoleic acid in conventional oil should not be below 40%, instead of the 31.8% value suggested by Argentina, as it was not consistent with its national legislation for health claims.

One member considered that evidence should be provided on trade in sunflower oils that do not comply with the current limits and also proposed to provide more information to demonstrate the diversification of national regulations. In this respect it is important to note that many importing countries have no national legislation but directly apply Codex standards or the standards of private associations, and for this reason it is difficult to find evidence of the normative basis followed by each country.

Two members pointed out that the standard should be established on the basis of data from all producing countries. It is important that data should reflect the global variability which includes geographical, climatic, seasonal and varietal variations and that the size of the sample should be adequate. The change in the percentage of a fatty acid will also affect the proportion of other fatty acids and the related indices. The comments were taken into account and the members were invited to present their available information or standards on sunflower seed oil.

Moreover the members suggested some corrections in the presentation. Other members supported the proposal of Argentina and the rest of the participants did not comment.

Argentina thanks the participants for their contribution, and has tried to respond to the majority of comments and submits to the members a discussion paper and proposed draft for consideration, together with supporting scientific and technical information

- Discussion paper on a proposal to amend the codex standard for named vegetable oils: sunflower oils (codex stan 210-1999), which includes the Proposal for new work to amend the Codex Standard for named vegetable oils (CODEX STAN 210-1999): Essential composition and quality factors of sunflower oil, mid oleic sunflower oil and high oleic sunflower oil.
- Fatty acids composition of sunflower seed oil obtained from certified seeds sown in different regions of the Argentine Republic.  
2001-2002 harvest. ASAGA I+D
- Perfil de ácidos grasos de semillas de girasol del Noreste Argentino (NEA). Campaña 2011 -2012. Cámara de la Industria Aceitera de la República Argentina (CIARA).