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Agenda Item 4.1

**CX/FO 24/28/4**  
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## JOINT FAO/WHO FOOD STANDARDS PROGRAMME

### CODEx COMMITTEE ON FATS AND OILS

Twenty-Eighth Session

Kuala Lumpur, Malaysia,

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### **DRAFT AMENDMENT/REVISION TO THE STANDARD FOR NAMED VEGETABLE OILS (CXS 210-1999): INCLUSION OF AVOCADO OIL (Step 6/7)**

(Prepared by the Electronic Working Group chaired by Mexico and co-chaired by the United States of America)<sup>1</sup>

Codex Members and Observers wishing to submit comments, at Step 6/7, on this draft (Annex I) should do so as instructed in CL 2023/57/OCS available on the Codex webpage/Circular Letters 2023: <http://www.fao.org/fao-who-codexalimentarius/resources/circular-letters/en/>

#### INTRODUCTION

1. The 27th Session of the Codex Committee for Oils and Fats (CCFO27) agreed on: the definition for 'avocado oil; the value ranges in: a) Table 1: Fatty acid composition of avocado oil as determined by gas liquid chromatography from authentic samples; b) Table 2: Chemical and physical characteristics of crude avocado oil; c) Table 3 Levels of desmethylsterols in crude avocado oil from authentic samples as a percentage of total sterols, with the exception of the following proposed values which were put in square brackets for further consideration:
  - The two proposed minimum values "Beta-sitosterol" i.e. [71.0] and [79.0]
  - The two proposed maximum values "Delta-7-stigmastenol" i.e., [1.0] and [3.5] in the square brackets for further consideration as the of the range.
  - The two proposed minimum values for "Total sterols (mg/kg)" i.e., [3000] and [3500].
2. CCFO27 included Others and "clerosterol" in Table 3 and put these parameters together with their proposed corresponding values in square brackets. CCFO27 also agreed to include the provision for clerosterol as a note to the 'Others' category in the table but put it in square brackets for further consideration of its appropriate content/placement.
3. Further the Committee agreed to include Table 4: Levels of tocopherols and tocotrienols in crude vegetable oils from authentic samples.
4. CCFO27 agreed to forward the proposed draft revision to the *Standard for Named Vegetable Oils* (CXS 210-1999) – inclusion of avocado oil, for adoption at Step 5 by CAC45.
5. CAC45 adopted at Step 5 the draft revision to the Standard for Named Vegetable Oils (CXS 210-1999): inclusion of avocado oil, noting that pending technical comments should be submitted at Step 6 and endorsed the extension of the deadline for completion of the work to CCFO28.

#### TERMS OF REFERENCE

6. CCFO27 agreed to establish an EWG, chaired by Mexico, and co-chaired by the USA, working in English and Spanish, to consider proposed values/texts in square brackets; the comments submitted in reply to CLs; and to prepare a report of the EWG to be submitted to the Codex Secretariat, at least 3 months in advance of CCFO28.

<sup>1</sup> Members of the EWG included: Australia, Brazil, Canada, Colombia, Ecuador, Egypt, India, Iran, Italy, Malaysia, Mexico, Netherlands, New Zealand, Peru, Republic of Korea, Rwanda, Sierra Leone, Thailand, UK, USA and FEDIOL.

## PARTICIPATION AND METHODOLOGY

7. The kick-off message calling for registration of both Members and Observers to participate in the EWG was issued in January 2022, and twenty (20) Members and one (1) Observer registered to participate in the EWG. The EWG undertook its work through the Codex online platform.

8. In accordance with the CCFO27 mandate and to prepare the final report that this EWG must send to the Codex Secretariat 3 months in advance of CCFO28, the Avocado Oil EWG Chair and Co-Chair requested to Codex Members the following statistical information: a) data and information only on the proposed values/texts in square brackets Table 3. Levels of desmethylsterols in crude avocado oil from authentic samples as a percentage of total sterols; and b) data on Table 4: Levels of tocopherols and tocotrienols in crude vegetable oils from authentic samples (mg/kg).

9. The statistical information received from the Member countries of the Codex originated from two documents: a) a working draft prepared by the Co-Chairs (México and the United States), which received responses from the United States and Iran; and b) a Circular Letter (CL) issued by the Codex Secretariat, which received responses and comments from the United States, Canada, New Zealand and Ecuador.

10. Both, the working draft and the CL placed special emphasis on the source of the information. Statistics and parameters shared by the Codex Member countries should come from scientific sources, from recognized laboratories accredited to ISO standards, as well as from producers whose data were obtained from accredited laboratories and using the methods of analysis of the levels of desmethyl sterols, accredited by the accreditation body of each country.

## ANALYSIS OF RESPONSES

11. Responses from EWG Members on both the working draft and the CL were technically analyzed by the EWG chair and co-chair, with the focus that the proposed parameters define a 100% authentic and or pure avocado oil, while promoting an inclusive proposal that considers the characteristics of avocado oil produced in the various regions of the world.

12. During the analysis priority was given to: data obtained from scientific sources and data endorsed by accredited laboratories over data obtained from samples acquired in supermarkets, which could reflect the problem of adulteration that is intended to be avoided as much as possible.

13. With this analysis methodology and with the goal of reaching a proposal that guarantees 100% authentic and or pure avocado oil (thus avoiding adulteration) and that, at the same time, includes avocado oil produced in all regions of the world, the EWG chair and co-chair prepared the final draft included in the Annex.

14. The EWG appreciates the responses received from the United States, Iran, New Zealand, Canada, and Ecuador in this consultation period. It is important to mention that the responses received by the EWG were only about the values of the sterols in square brackets, as well as proposed values for the levels of tocopherols and tocotrienols. No other comments were received.

**15. The EWG chair and co-chair consider it important to share the following comments to help understand the proposed values for sterols in brackets in Table 3:**

### Delta-7-stigmastenol

- i. Regarding the value for the upper limit of the range for Delta-7-stigmastenol, the EWG chair and co-chair analysed the information submitted and found that majority of the data provided for this value did not exceed 1%; however, there were some samples from Mexico where the values reached a maximum 1.3.

*Recommendation:* It is proposed that the upper value for Delta-7-stigmastenol be established at 1.5, thus providing a range for "Delta-7-stigmastenol as: ND – [1.5]". However, for the purpose of establishing a range of values that includes avocado oils from different parts of the world, the EWG chair and co-chair propose the maximum value be set at 1.5. Any value higher than 1.5 could encourage adulteration since this parameter is fundamental to define the identity of avocado oil.

### "Others" parameter

- ii. In the case of the "Others" parameter, the EWG chair and co-chair recommend that a range [ND] – 2.0" be considered.

### Clerosterol

- iii. It is also recommended that the clerosterol values be added to Table 3 as a footnote, since no values are presented for this sterol for the other vegetable oils in the Codex *Standard for Named Vegetable Oils* (CXS 210-1999). The proposed wording for the footnote of Table 3 is as follows: "[Note: Avocado oil also contains [1.0] - 2.0% Clerosterol]".

In addition, the EWG considered the result of laboratory analyses carried out by accredited laboratories during the last two years on samples of crude avocado oil from various origins (Mexico, Colombia, New Zealand, Kenya). This information was shared by Mexican avocado oil manufacturing companies, contacted by the EWG chair.

**16. The EWG chair and co-chair consider it important to share the following comments to help understand the proposed values for tocopherols and tocotrienols in Table 4:**

- i. In its response, Canada informed the EWG that they had no data to report on the levels of tocopherols and tocotrienols in crude avocado oil from authentic samples. However, they submitted data on avocado oils sold in the Canadian market and this was shared for information purposes only. Canada recognized that their data supported the position that alpha-tocopherol is the major component in avocado oil, but in their opinion, it was uncertain whether the levels found in the samples may be the result of adding back the tocopherols lost during refining.
- ii. In the case of Iran, the data received corresponds to imported avocado oils, so it is not clear whether the statistics are for crude or refined avocado oils.
- iii. Ecuador informed the EWG that they did not have data on tocopherols and tocotrienols for avocado oil, since these analyses are not required by its national regulation.
- iv. The United States provided data on tocopherol and tocotrienol content in authentic crude avocado oils obtained from: a) Crude (Hass) avocado oil produced from mesocarp tissue of avocados; b) Crude (Hass) avocado oil produced from whole avocados; c) Average from crude avocado oil from avocados sourced regionally from US and Mexico; d) An analysis of value ranges obtained from 32 laboratories of crude avocado oil samples produced from two regions (California, USA, and Mexico) and representing two grades (Grade 1-high quality ripe; Grade 4-overly ripened, server rot and decay) as well as processing whole and mesocarp only tissue; e) crude (Hass) avocado oil sourced regionally from Mexico; and f) Analysis for 57 lots sampled in 2020-2022 with 9 samples being refined oils, while the remaining were crude).
- v. Based on the data received, the final draft provisions for Table 4 took into consideration mainly the values provided for crude avocado oils, since refined and commercial oils may show loss of tocopherols during storage and refining or have alterations due to the addition of tocopherols as preservatives.
- vi. Additionally, the EWG also considered the preliminary results of the study “Characteristic Tocopherol and Phytosterol Profiles of Crude Avocado Oils from Different World Regions”, prepared by the Tecnológico de Monterrey, in Mexico. This study includes analysis of avocado oil obtained from avocado varieties from various regions of Mexico, Chile, the United States and Australia in its first stage. The final version of the study will be available in the coming months, previously to the next plenary. The results of the last two years of analyses carried out by accredited laboratories on samples of crude avocado oil from various origins were considered: Mexico, Colombia, New Zealand, Kenya. This information was shared by Mexican avocado oil manufacturing companies, contacted by the presidency of this EWG before CCFO28.

**17. The EWG chair and co-chair are open to having one-to-one informal meetings with all interested countries, prior to the date of the CCFO28 in order to resolve doubts and concerns and promote as much as possible the advancement of the process of inclusion of the parameters proposed for avocado oil in the Standard for Named Vegetable Oils.**

**CONCLUSIONS AND RECOMMENDATIONS**

18. The EWG chair and co-chair requests CCFO28, to consider advancing as currently drafted, the draft provision for Avocado oil for inclusion in the Codex *Standard for Named Vegetable Oils* (CXS 210-1999) as presented in the Annex to this report.

## ANNEX I

**DRAFT AMENDMENT/REVISION TO THE STANDARD FOR NAMED VEGETABLE OILS (CXS 210 -1999):  
INCLUSION OF AVOCADO OIL.**

**(Step 6/7)**

**2. DESCRIPTION**

**2.1 Product definitions**

Avocado oil may be derived from either the mesocarp of avocado fruit (*Persea americana*) or obtained by processing the whole avocado fruit.

**3. ESSENTIAL COMPOSITION AND QUALITY FACTORS**

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

Samples falling within the appropriate ranges specified in Table 1 are in compliance with this Standard. Supplementary criteria, for example national geographical and/or climatic variations, may be considered, as necessary, to confirm that a sample is in compliance with the Standard.

**Table 1: Fatty acid composition of avocado oil as determined by gas liquid chromatography from authentic samples** (expressed as percentage of total fatty acids)

Fatty acid	Avocado Oil
C6:0	-
C8:0	-
C10:0	-
C12:0	-
C14:0	ND - 0.3
C16:0	11.0 - 26.0
C16:1	4.0 – 17.1
C17:0	ND – 0.3
C17:1	ND - 0.1
C18:0	0.1 - 1.3
C18:1	42.0 - 75.0
C18:2	7.8 - 19.0
C18:3	0.5 - 2.1
C20:0	ND - 0.7
C20:1	ND - 0.3
C20:2	-
C22:0	ND - 0.5
C22:1	-
C22:2	-
C24:0	ND - 0.2
C24:1	ND – 0.2

**APPENDIX TO CXS 210-1999: OTHER QUALITY AND COMPOSITION FACTORS****3. CHEMICAL AND PHYSICAL CHARACTERISTICS**

Chemical and Physical Characteristics are given in Table 2.

**Table 2: Chemical and physical characteristics of crude avocado oil**

Parameter	Avocado Oil
Relative density (x°C/water at 20°C)	0.910 – 0.920
Refractive Index (ND 40°C)	1.458 – 1.470
Saponification Value (mg KOH/g oil)	170 – 202
Iodine Value	78 – 95
Unsaponifiable matter (g/Kg)	19.0 max

**4. IDENTITY CHARACTERISTICS**

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

**Table 3. Levels of desmethylsterols in crude avocado oil from authentic samples as a percentage of total sterols.**

	Avocado Oil
Cholesterol	ND - 0.5
Brassicasterol	ND - 0.5
Campesterol	4.0 - 8.3
Stigmasterol	0.3 - 2.0
Beta-sitosterol	<b><u>79.0</u></b> - 93.4
Delta-5-avenasterol	2.0 - 8.0
Delta-7-stigmasterol	ND – <b><u>1.5</u></b>
Delta-7-avenasterol	ND – 1.5
[Others	<b><u>ND</u></b> - <b><u>2.0</u></b>
Total sterols (mg/kg)	<b><u>3500</u></b> - 6500

[Note: Avocado oil also contains **1.0** - 2.0% clerosterol

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

	Avocado oil
Alpha-tocopherol	<b><u>45 – 270</u></b>
Beta-tocopherol	<b><u>ND – 36</u></b>
Gamma-tocopherol	<b><u>ND – 62</u></b>
Delta-tocopherol	<b><u>ND – 50</u></b>
Alpha-tocotrienol	<b><u>ND – 20</u></b>
Gamma-tocotrienol	<b><u>ND – 20</u></b>
Delta-tocotrienol	<b><u>ND – 20</u></b>
Total (mg/kg)	<b><u>45 – 478</u></b>