

CODEX ALIMENTARIUS COMMISSION



Food and Agriculture
Organization of the
United Nations



World Health
Organization

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Agenda Item 4.1

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FATS AND OILS

Twenty-Eighth Session

Kuala Lumpur, Malaysia

19 - 23 February 2024

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

Comments in reply to CL 2023/57/OCS-FO

Comments of Brazil, Canada, Chile, China, Ecuador, Egypt, Iraq, Saudi Arabia, Sierra Leone, Thailand, USA and Fediol

Background

1. This document compiles comments received through the Codex Online Commenting System (OCS) in response to CL 2023/57/OCS-FO issued in November 2023. Under the OCS, comments are compiled in the following order: general comments are listed first, followed by comments on specific sections.

Explanatory notes on the Annex

2. The comments submitted through the OCS are hereby attached as **Annex I** and are presented in table format.

ANNEX I**General comments**

COMMENT	MEMBER / OBSERVER
Brazil appreciates the excellent work chaired by Mexico and co-chaired by the United States of America. Brazil has no objection to the standard for avocado oil proposed on CL 2023/57/OCS-FO.	Brazil
<p>Canada is pleased with the outcome of the 27th session of CCFO which completed most of the work to revise the Standard for Named Vegetable Oils (CXS 210-1999) to include the draft standard for avocado oil. There were only a few parameters where proposed values were placed in square brackets, mostly under Table 3 - Levels of desmethylsterols and Table 4 - Levels of tocopherols and tocotrienols.</p> <p>The EWG that was established following CCFO27 discussed these parameters with the goal to seek additional analytical data to support establishing the range of values for authentic avocado oil from various regions, in order for the standard to be inclusive of these oils. However, it is also recognized that the levels of certain sterols are indicators of adulteration with other vegetable oils. This needs to be considered carefully to avoid setting the ranges too wide, which would make it difficult to detect adulteration.</p> <p>Canada's comments are indicated below. For reference, both the options in the REP22 FO and the proposed amendment in the CL 2023/57/OCS-FO are included.</p>	Canada
Ecuador appreciates the work done to prepare the document "DRAFT AMENDMENT/REVISION TO THE STANDARD FOR NAMED VEGETABLE OILS (CXS 210-1999): INCLUSION OF AVOCADO OIL". Ecuador has no comments on the product definition, essential composition and quality factors, chemical and physical characteristics, identity characteristics (levels of desmethylsterols in crude avocado oil from authentic samples as a percentage of total sterols, levels of tocopherols and tocotrienols in crude vegetable oils from authentic samples), since no national standard exists. However, we encourage the continuation of this work and look forward to any future requests, which we will reply to with more information, if available.	Ecuador
Egypt thanks The EWG chair and co-chair for the good work and agrees with the request of the 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.	Egypt
Agree with no comment. Regards	Iraq
Saudi Arabia support the proposed draft	Saudi Arabia
Sierra Leone supports the draft amendment to the standard for named vegetable oils	Sierra Leone
<ul style="list-style-type: none"> The United States supports the efforts to amend the Standard for Named Vegetable Oils (CXS 210-1999) for the inclusion of avocado oil and supports final adoption of the proposed revision at CCFO28 at Step 5/8 subject to the Committee's consideration of the points outlined below. 	USA
FEDIOL appreciates the opportunity to comment on the provisions of the present draft left for consideration at the CCFO28 meeting.	FEDIOL

Specific comments

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS	
TABLE 1: FATTY ACID COMPOSITION OF AVOCADO OIL AS DETERMINED BY GAS LIQUID CHROMATOGRAPHY FROM AUTHENTIC SAMPLES (EXPRESSED AS PERCENTAGE OF TOTAL FATTY ACIDS)	
For Table 1, the representation of "Non-detectable" is inconsistent with CXS 210. China suggests that replace "—" with "ND" and add " ND—Non-detectable, defined as ≤0.05%" below the table.	China
<p>Table 1: Fatty acid composition of avocado oil as determined by gas liquid chromatography from authentic samples (expressed as percentage of total fatty acids)</p> <p>We would like to propose the Committee for reconsideration on the value of fatty acid composition of avocado oil in Table 1, the value of oleic acid (C18:1) of 42.0-75.0 was included. However, based on our available analyzed data in 2022-2023, we found that the minimum value of oleic acid content in avocado oil produced in Thailand is 36.4%. Therefore, we propose to revise the value of oleic acid (C18:1) as follows:</p> <p>C18:1 36.4 – 75.0</p>	Thailand
<p>Avocado oil is vulnerable to economically motivated adulteration (EMA) due to its limited production and high value. Several studies have shown that there is significant adulteration of avocado oil sold in the United States^{1,2}, and that potential adulterants like high oleic sunflower and safflower oils have very similar fatty acid composition to avocado oil, making it difficult to detect adulteration, especially given the overlapping ranges for fatty acids in the proposed and accepted standards.</p> <p>A recent study has shown that cis-vaccenic acid (C18:1 n7), an isomer of oleic acid (C18:1 n9), was present at levels of around 5 - 7.5% (average 6.45%) in avocado oil, which was higher than the content in several vegetable oils, especially potential adulterants such as high-oleic sunflower (<1.0%) and safflower oil (<1.3%), canola oil (<3.4%), and soybean oil (<1.5%).³ Therefore, the addition of cis-vaccenic acid ranges for avocado oil under section 3.1 as an essential composition and quality factor, or as a footnote to Table 1 under section 3 may be necessary to discourage adulteration of avocado oil. In the current practice for GLC analysis of fatty acid composition for Table 1, cis-vaccenic acid, if present in a vegetable oil, is combined with oleic acid in the reporting of C18:1. However, it is possible to analyze and quantify these isomers separately within the parameters of the recommended methods for fatty acid analysis, as long as the appropriate gas chromatography column length and conditions are optimized for the separation of these isomers. There may not be enough data at this time to propose the addition of cis-vaccenic acid to section 3.1, but CCFO may want to consider this issue in the future. Other member countries and organizations, especially those involved in the production and trade of avocado oil, may need to consider the referenced studies, to collect data on cis-vaccenic acid content in regionally produced avocado oil, and to consider whether a future amendment/revision to the standard to include cis-vaccenic acid either as a footnote to Table 3 or as a direct provision under Section 3.1 might be a viable approach for discouraging adulteration of avocado oil while encouraging fair trade.</p> <p>References (available upon request)</p> <ol style="list-style-type: none"> Green, H. S., & Wang, S. C. (2020). First report on quality and purity evaluations of avocado oil sold in the US. Food Control, 116, Article 107328. https://doi.org/10.1016/j.foodcont.2020.107328 Green, H. S., & Wang, S. C. (2023). Purity and quality of private labelled avocado oil. Food Control, 152, Article 109837. https://doi.org/10.1016/j.foodcont.2023.109837 Green, H. S., & Wang, S. C. (2022). Cis-vaccenic acid: New marker to detect seed oil adulteration in avocado oil. Food Chemistry Advances, 1, Article 100107. https://doi.org/10.1016/j.focha.2022.100107 	USA

APPENDIX TO CXS 210-1999: OTHER QUALITY AND COMPOSITION FACTORS	
3. CHEMICAL AND PHYSICAL PROPERTIES	
TABLE 2: CHEMICAL AND PHYSICAL CHARACTERISTICS OF CRUDE AVOCADO OIL	
For Table 2, the representation of " Unsaponifiable matter" is inconsistent with CXS 210. China suggests that replace "19.0 max" with "≤19".	China
4. IDENTITY CHARACTERISTICS	
TABLE 3: LEVELS OF DESMETHYLSTEROLS IN CRUDE AVOCADO OIL FROM AUTHENTIC SAMPLES AS A PERCENTAGE OF TOTAL STEROLS.	
<p>Comments on Table 3: Levels of Desmethylsterols</p> <p>1) Beta-sitosterol: [71.0] [79.0] – 93.4. The draft standard proposes 79.0 - 93.4 Canada agrees with the proposal to set the lower limit to 79.0.</p> <p>2) Delta 7-stigmastenol: ND – [1.5] [3.5]. The draft standard proposes ND – 1.5. Canada notes that in earlier submissions in 2021, there were some authentic avocado oils that had values for delta-7-stigmastenol which were above the proposed limit of 1.5, hence we originally supported having this value set at 3.5. However, we note that major producing countries may have analytical data that could support a lower value of 1.5. Canada could agree with the proposal to set the range of values for this sterol at ND – 1.5, provided this does not discriminate against authentic avocado oils from certain regions due to various factors.</p> <p>3) Total Sterols: [3000] [3500] – 6500. The draft standard proposes 3500 – 6500. Canada supports a lower limit for total sterols at 3000 based on information gathered in 2021, including values generated at that time through the Food Chemicals Codex (FCC) work. Canada notes that this level would accommodate those authentic oils with total sterol values less than 3500. However, if the majority of the producing countries find that the levels for the majority of authentic avocado oils are above the 3500 level, Canada could agree with the proposal to set the lower value at 3500.</p> <p>4) Others: [ND][0.0] – 2.0. The draft standard proposes ND – 2.0 Canada agrees with this proposal.</p> <p>5) Clerosterol: [Note: Avocado oil also contains [0.6] [1.0] - 2.0% clerosterol]. The draft standard proposes a range of 1.0 – 2.0%. Canada agrees with proposal to set the lower value to 1.0% for clerosterol. Regarding the upper value of 2.0, the United States recently shared information which indicates that some authentic avocado oils from certain growing regions, such as in Kenya, have clerosterol levels that are higher than 2.0. If a proposal to increase the limit at 2.5 to accommodate these authentic avocado oils arise, Canada would be willing to support this change to make the draft standard more inclusive. With regards to the note for clerosterol, it is not clear where this note will be placed, and if there will be additional information to indicate that the range of values for "others" in avocado oil does not include clerosterol, since the latter has its own range of values. These were discussed at the last session and noted under paragraphs 77 to 79 in REP22 FO, and expected to be discussed at the upcoming CCFO28 session. Since this note is closely linked with "others" for avocado oil, Canada suggests to consider placing a letter superscript next to the range of values for "others" under the column for avocado oil, and the actual footnote for this could be placed at the bottom of Table 3. The footnote could then indicate the fact that avocado oil also contains 1.0 - 2.0% clerosterol. This is shown below. Additionally, if the amount of the unspecified sterols in "others" do not include the value for clerosterol, this could be indicated in the note, if needed.</p> <p>4. IDENTITY CHARACTERISTICS</p> <p>Table 3. Levels of desmethylsterols in crude avocado oil from authentic samples as a percentage of total sterols.</p>	Canada

<u>Avocado Oil</u>		
Cholesterol	ND - 0.5	
Brassicasterol	ND - 0.5	
Campesterol	4.0 - 8.3	
Stigmasterol	0.3 - 2.0	
Beta-sitosterol	79.0 - 93.4	
Delta-5-avenasterol	2.0 - 8.0	
Delta-7-stigmasterol	ND – 1.5	
Delta-7-avenasterol	ND – 1.5	
Others	ND - 2.0 d	
[Total sterols (mg/kg)]	3500 - 6500	
[d Note: Avocado oil also contains 1.0 - 2.0% clerosterol.]		
<p>6) Stigmasterol:</p> <p>Canada understands that the current range of values agreed to at the last CCFO session is 0.3 – 2.0. However, in light of new analytical data brought to our attention, which showed that some authentic samples had values less than 0.3%, Canada could support a change in the range of values from ND – 2.0, to accommodate these authentic avocado oils into the standard.</p>		
<ul style="list-style-type: none"> • United States has the following suggested changes to the proposed standard range for sterols <ul style="list-style-type: none"> ○ For stigmasterol, the United States recommends a range of ND – 2.0 ○ For clerosterol, the United States recommends a range of 1 – 2.5. • The United States has noted wide variation in data received on total sterols in avocado oil. In particular, the United States has recently received data of four crude oils samples originating from countries from the African region that show total sterols ranging from 3121 mg/kg to 7749 mg/kg. Overall, there is less data on sterols content and composition available compared to fatty acid composition, particularly from worldwide harvest regions. The United States can support the current draft provisions for total sterols, of 3500 – 6500 mg/kg, because these ranges encompass the sample data received from United States stakeholders for crude (non-refined), authentic avocado oils. However, the United States notes that as more data becomes available, in particular, data on sterols content from oils from other avocado production regions, these provisions may need to be revised. Alternatively, in order to be inclusive of oil from non-traditional avocado oil production areas, CCFO may consider including a footnote to Table 3, similar to what is included for fatty acids in section 3.1, e.g. “Samples falling within the appropriate ranges specified in Table 3 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.” <p>Table 3. Levels of desmethylsterols in crude avocado oil from authentic samples as a percentage of total sterols.</p> <ul style="list-style-type: none"> ○ For stigmasterol, the United States recommends a range of ND – 2.0 ○ For clerosterol, the United States recommends a range of 1 – 2.5. <p>In order to be inclusive of oil from non-traditional avocado oil production areas, CCFO may consider including a footnote to Table 3, similar to what is included for fatty acids in section 3.1, e.g. “Samples falling within the appropriate ranges specified in Table 3 are in compliance with this Standard. Supplementary criteria, for example national geographical</p>		USA

and/or climatic variations, may be considered, as necessary, to confirm that a sample is in compliance with the Standard.”																			
<p>With reference to the present consultation, FEDIOL supports the values in table 3 left in square brackets as indicated below:</p> <p>Beta-sitosterol:[71.0] - 93.4</p> <p>Delta-7-stigmastenol: ND - [1.0]</p> <p>Total sterols (mg/kg): [3000] – 6500</p> <p>Others: [ND] - 2.0</p> <p>Furthermore, regarding the upper value of total sterols, although outside the scope of the this consultation, FEDIOL nevertheless would like to express a general comment in favour of the value of 7500mg/kg, since according to the analysis of authentic samples, the value of 6500 could exclude some avocado oils from Kenya.</p>	FEDIOL																		
TABLE 4: LEVELS OF TOCOPHEROLS AND TOCOTRIENOLS IN CRUDE VEGETABLE OILS FROM AUTHENTIC SAMPLES (MG/KG) (SEE APPENDIX OF THE STANDARD)																			
<p>Comments on Table 4: Levels of tocopherols and tocotrienols</p> <table border="0" data-bbox="164 741 598 1077"> <tr> <td></td> <td style="text-align: center;">Avocado oil</td> </tr> <tr> <td>[Alpha-tocopherol</td> <td style="text-align: center;">[50 – 450]</td> </tr> <tr> <td>Beta-tocopherol</td> <td style="text-align: center;">[ND]</td> </tr> <tr> <td>Gamma-tocopherol</td> <td style="text-align: center;">[10 – 20]</td> </tr> <tr> <td>Delta-tocopherol</td> <td style="text-align: center;">[ND – 10]</td> </tr> <tr> <td>Alpha-tocotrienol</td> <td style="text-align: center;">[ND]</td> </tr> <tr> <td>Gamma-tocotrienol</td> <td style="text-align: center;">[ND]</td> </tr> <tr> <td>Delta-tocotrienol</td> <td style="text-align: center;">[ND]</td> </tr> <tr> <td>Total (mg/kg)</td> <td style="text-align: center;">[50 – 450]</td> </tr> </table> <p>Canada agrees with the range of values indicated in Table 4 for the various tocopherols and tocotrienols in Avocado Oil.</p>		Avocado oil	[Alpha-tocopherol	[50 – 450]	Beta-tocopherol	[ND]	Gamma-tocopherol	[10 – 20]	Delta-tocopherol	[ND – 10]	Alpha-tocotrienol	[ND]	Gamma-tocotrienol	[ND]	Delta-tocotrienol	[ND]	Total (mg/kg)	[50 – 450]	Canada
	Avocado oil																		
[Alpha-tocopherol	[50 – 450]																		
Beta-tocopherol	[ND]																		
Gamma-tocopherol	[10 – 20]																		
Delta-tocopherol	[ND – 10]																		
Alpha-tocotrienol	[ND]																		
Gamma-tocotrienol	[ND]																		
Delta-tocotrienol	[ND]																		
Total (mg/kg)	[50 – 450]																		
<p>Chile suggests setting the range of values for beta-sitosterol at 75 % - 93.4 %, considering that data from reliable sources about avocado oil extracted from samples of the mesocarp of the fruit show a minimum percentage of 75%.</p> <p>Chile supports the proposed levels of total sterols.</p> <p>Finally, Chile suggests a range of 75 - 270 mg/kg for alpha-tocopherols, since data obtained in our country indicate that the minimum values found in authentic avocado oil are above 100 mg/Kg.</p> <p>These ranges would have an effect on the total levels of tocopherols and tocotrienols, which would change to 100 and 270 mg/kg.</p>	Chile																		