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

Reply to comments received contained in CX/FO 24/28/5 Add.1

(Prepared by China, Chair of the Electronic Working Group on Camellia Seed Oil, based on comments received contained in CX/FO 24/28/5 Add.1)

Background

1. This document was prepared by the Chair of Camellia seed oil EWG to consider the report of the EWG and comments received contained in the document CX/FO 24/28/5 Add.1. The Proposed Draft Revision to the Standard is hereby attached as Annex I.

Considerations and Conclusions

2. The following changes are proposed:

2.1 Product definition

Camellia seed oil (youcha oil) is derived from the seeds of cultivated *Camellia* species (*C.oleifera*, *C.oleifera* var. *meiocarpa*, *C.chekiangoleosa*, and *C.vietnamensis*).

Considerations:

- To delete the species *Camellia oleifera* var. *meiocarpa*, as it is considered a variant of *Camellia oleifera*. Despite its separate listing in breeding and the Chinese standard, the studies utilizing molecular biology techniques have demonstrated that this variant is closely related to the *Camellia oleifera*, with no significant reproductive isolation.
- Not to add the word “including” or other *Camellia* species reported in literature that are cultivated for oil purposes. Although there are other species cultivated for oil purposes, it’s important to note that those listed in the proposed draft are predominant, constituting approximately 95% of *Camellia* species. The addition of the word “including” might introduce ambiguity regarding the species range. Furthermore, the data collected is based on the species listed in the proposed draft.

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

| Fatty acid | Camellia seed oil |
|------------|-------------------|
| C6:0 | ND |
| C8:0 | ND |
| C10:0 | ND |
| C12:0 | ND |
| C14:0 | ND-0.8 |
| C16:0 | 3.9-14.5 |
| C16:1 | ND-0.2 |

| | |
|-------|-----------------------------|
| C17:0 | <u>ND</u> |
| C17:1 | ND <u>ND-0.1</u> |
| C18:0 | <u>0.3-4.8</u> |
| C18:1 | <u>68.0-87.0</u> |
| C18:2 | <u>3.8-14.0</u> |
| C18:3 | <u>ND-1.4</u> |
| C20:0 | <u>ND-0.5</u> |
| C20:1 | <u>ND-0.7</u> |
| C20:2 | <u>ND</u> |
| C22:0 | ND <u>ND-0.1</u> |
| C22:1 | <u>ND-0.5</u> |
| C22:2 | <u>ND</u> |
| C24:0 | <u>ND</u> |
| C24:1 | <u>ND-0.5</u> |

ND - Non-detectable, defined as $\leq 0.05\%$

Considerations:

- To revise the fatty acid contents of C17:1 and C22:0 from “ND” to “ND-0.1”, according to the data from Thailand.

APPENDIX TO CXS 210-1999 - OTHER QUALITY AND COMPOSITION FACTORS

Table 2: Chemical and physical characteristics of crude camellia seed oil

| | Camellia seed oil |
|---|-----------------------------------|
| Relative density ($x^{\circ}\text{C}/\text{water}$ at 20°C) | <u>0.912-0.922 (x=20°C)</u> |
| Refractive index (ND 40°C) | <u>1.460-1.464</u> |
| Saponification value (mg KOH/g oil) | 188-199 <u>187-199</u> |
| Iodine value | <u>83-89</u> |
| Unsaponifiable matter (g/kg) | <u>≤ 15</u> |

Considerations:

- To revise the saponification value (mg KOH/g oil) from “188-199” to “187-199”, according to the data from Thailand.

Table 4: Levels of tocopherols and tocotrienols in crude camellia seed oil from authentic samples (mg/kg)

| | Camellia seed oil |
|-------------------|------------------------------------|
| Alpha-tocopherol | <u>30-950</u> |
| Beta-tocopherol | 0-11 <u>ND-11</u> |
| Gamma-tocopherol | <u>2-56</u> |
| Delta-tocopherol | 0-28 <u>ND-28</u> |
| Alpha-tocotrienol | <u>13-35</u> |
| Gamma-tocotrienol | <u>5-39</u> |
| Delta-tocotrienol | <u>ND</u> |
| Total (mg/kg) | 70-1000 <u>100-1000</u> |

Considerations:

- To revise the Beta-tocopherol from “0-11” to “ND-11” and the Delta-tocopherol from “0-28” to “ND-28”, according to the comment from China.
- To revise the total levels of tocopherols and tocotrienols from “70-1000” to “100-1000”, responding to the comment from the United States that the suggested ranges for Total (mg/kg) 70 – 1000 is an unusually broad range, and may allow for undetected adulteration of Camellia seed oil. Since 2020, over 280 camellia seed samples have been collected from the main producing areas in China. The crude oils extracted from these samples were analyzed for their tocopherol and tocotrienol contents.
 - The majority of the samples exhibited total tocopherol and tocotrienol levels ranging from 100 to 700 mg/kg.

- Samples with levels below 100 mg/kg accounted for approximately 0.7% of the total, comprising one sample with 74 mg/kg and another with 89 mg/kg.
- Samples exceeding 700 mg/kg represented around 3.9% of the total, consisting of 11 samples from the same production area. The highest value was 986 mg/kg.
- Considering the geographical and climatic variations that impact the tocopherol and tocotrienol contents, along with the minimal proportion of samples falling below 100 mg/kg (0.7%), it is recommended to revise the minimum level of total tocopherols and tocotrienols from 70 to 100. The maximum level remains unchanged.

3. The comment from the United States on the total sterol content has been taken into consideration, and it has been decided to keep the current levels (100-4000 mg/kg) unchanged.

Considerations:

- Since 2020, over 280 camellia seed samples have been collected from the main producing areas in China. The crude oils extracted from these samples were analyzed for their sterol contents.
 - The majority of the samples (approximately 97.2%) exhibited total sterol levels ranging from 200 to 2200 mg/kg.
 - Samples with levels below 200 mg/kg accounted for approximately 1.4% of the total, comprising four samples (112, 127, 146 and 167 mg/kg).
 - Similarly, samples exceeding 2200 mg/kg represented around 1.4% of the total, consisting of one sample (3880) and three samples from the same production area (2690, 3382, and 3564 mg/kg).
- In response to the concern regarding the potential for undetected adulteration of Camellia seed oil with other oils or lower-quality oils, it's highlighted that the Delta-7-stigmastenol content of camellia seed oil falls within the range of 37.2-69.0%, significantly higher than that found in other vegetable oils. This notable difference in Delta-7-stigmastenol content may serve as a distinctive characteristic.

Recommendation

4. With the aforementioned changes, it is recommended that CCFO sends the provisions regarding camellia seed oil for inclusion in the Standard for Named Vegetable Oils to the Commission for adoption.

**PROPOSED AMENDMENT/REVISION TO THE STANDARD FOR NAMED VEGETABLE OILS (CXS 210-1999): INCLUSION ON CAMELLIA SEED OIL
(At Step 3)**

Notes on Proposed Amendment/Revisions to Current Standard:

Bold and underlined: proposed amendments based on the comments received at step 3

2. DESCRIPTION

2.1 Product definition

Camellia seed oil (youcha oil) is derived from the seeds of cultivated *Camellia* species (*C.oleifera*, *C.chekiangoleosa*, and *C.vietnamensis*).

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 camellia seed oil as determined by gas liquid chromatography from authentic samples (expressed as percentage of total fatty acids)

| Fatty acid | Camellia seed oil |
|-------------------|--------------------------|
| C6:0 | <u>ND</u> |
| C8:0 | <u>ND</u> |
| C10:0 | <u>ND</u> |
| C12:0 | <u>ND</u> |
| C14:0 | <u>ND-0.8</u> |
| C16:0 | <u>3.9-14.5</u> |
| C16:1 | <u>ND-0.2</u> |
| C17:0 | <u>ND-0.1</u> |
| C17:1 | <u>ND-0.1</u> |
| C18:0 | <u>0.3-4.8</u> |
| C18:1 | <u>68.0-87.0</u> |
| C18:2 | <u>3.8-14.0</u> |
| C18:3 | <u>ND-1.4</u> |
| C20:0 | <u>ND-0.5</u> |
| C20:1 | <u>ND-0.7</u> |
| C20:2 | <u>ND</u> |
| C22:0 | <u>ND-0.1</u> |
| C22:1 | <u>ND-0.5</u> |
| C22:2 | <u>ND</u> |
| C24:0 | <u>ND</u> |
| C24:1 | <u>ND-0.5</u> |

ND - Non-detectable, defined as $\leq 0.05\%$

APPENDIX TO CXS 210-1999 - OTHER QUALITY AND COMPOSITION FACTORS

3. CHEMICAL AND PHYSICAL CHARACTERISTICS

Chemical and Physical Characteristics are given in Table 2.

Samples falling within the appropriate ranges specified in Table 2 are in compliance with this Standard.

Table 2: Chemical and physical characteristics of crude camellia seed oil

| | Camellia seed oil |
|--------------------------------------|-----------------------------|
| Relative density (x°C/water at 20°C) | <u>0.912-0.922 (x=20°C)</u> |
| Refractive index (ND 40°C) | <u>1.460-1.464</u> |
| Saponification value (mg KOH/g oil) | <u>187-199</u> |
| Iodine value | <u>83-89</u> |
| Unsaponifiable matter (g/kg) | <u>≤15</u> |

4. IDENTITY CHARACTERISTICS

Table 3: Levels of desmethylsterols in crude camellia seed oil from authentic samples as a percentage of total sterols

| | Camellia seed oil |
|----------------------|-------------------|
| Cholesterol | <u>ND</u> |
| Brassicasterol | <u>ND</u> |
| Campesterol | <u>0.5-2.1</u> |
| Stigmasterol | <u>0.3-4.6</u> |
| Beta-sitosterol | <u>16.0-60.0</u> |
| Delta-5-avenasterol | <u>0.4-4.3</u> |
| Delta-7-stigmasterol | <u>37.2-69.0</u> |
| Delta-7-avenasterol | <u>0.9-8.5</u> |
| Others | <u>0.5-5.1</u> |
| Total sterols(mg/kg) | <u>100-4000</u> |

ND - Non-detectable, defined as ≤ 0.05%

Table 4: Levels of tocopherols and tocotrienols in crude camellia seed oil from authentic samples (mg/kg)

| | Camellia seed oil |
|-------------------|-------------------|
| Alpha-tocopherol | <u>30-950</u> |
| Beta-tocopherol | <u>ND-11</u> |
| Gamma-tocopherol | <u>2-56</u> |
| Delta-tocopherol | <u>ND-28</u> |
| Alpha-tocotrienol | <u>13-35</u> |
| Gamma-tocotrienol | <u>5-39</u> |
| Delta-tocotrienol | <u>ND</u> |
| Total (mg/kg) | <u>100-1000</u> |

ND - Non-detectable.

5. METHODS OF ANALYSIS AND SAMPLING

The recommended methods in CXS 210-1999 and CXS 234-1999 also apply to camellia seed oil.