

CODEX ALIMENTARIUS COMMISSION



Food and Agriculture
Organization of
the United Nations



World Health
Organization

Viale delle Terme di Caracalla, 00153 Rome, Italy - Tel: (+39) 06 57051 - Fax: (+39) 06 5705 4593 - E-mail: codex@fao.org - www.codexalimentarius.org

Agenda Item 4

CX/FO 13/23/4

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FATS AND OILS

Twenty-third Session

Langkawi, Malaysia, 25 February – 1 March 2013

PROPOSED DRAFT AMENDMENT TO PARAMETERS FOR RICE BRAN OIL IN THE STANDARD FOR NAMED VEGETABLE OILS

Governments and interested international organizations are invited to submit comments on the Proposed Draft Amendments (sections A. and B. below) at Step 3, preferably by email, to the Secretariat, Codex Alimentarius Commission, Joint WHO/FAO Food Standards Programme, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy, Fax +39-06-5705-4593, e-mail codex@fao.org with copy to the Malaysian Secretariat for CCFO, Food Safety and Quality Division, Ministry of Health Malaysia, Level 3, Block E7, Parcel E, Federal Government Administrative Centre, 62590 Putrajaya, Malaysia, E-mail: ccfo_malaysia@moh.gov.my, by **15 January 2013**.

Background

1. The 22nd Session of the Codex Committee on Fats and Oils held in Penang, Malaysia on 21-25 February 2011 considered and agreed to the proposal of Thailand on new work to amend the level of desmethylsterols and fatty acid composition of rice bran oil in Codex Standard for Named Vegetable Oils (CODEX STAN 210-1999).
2. The 34th Session of the Codex Alimentarius Commission approved this new work proposal which will be considered by the 23rd Session of the CCFO.
3. Thailand has circulated a called for data request for information on the level of desmethylsterols and fatty acid composition for rice bran oils to codex's member countries in order to get representative data for the preparation of the proposed draft amendment to the Codex Standard for Named Vegetable Oils. Analysis data of rice bran oil were received from Thailand and the United States of America. Summary of data and recommendations for the amendments are presented in Part A for the fatty acid composition and Part B for the level of desmethylsterols.

A. Fatty acid compositions of Refined Rice Bran Oil as determined by gas liquid chromatography from authentic samples (Table 1 of CODEX STAN 210-1999)

4. The following data were received and used in preparing the recommendations:
 - 45 samples of refined rice bran oil, analyzed in 2011-2012, submitted by the National Bureau of Agricultural Commodity and Food Standards (ACFS), Thailand.
 - 2 samples of crude rice bran oil, analyzed in 2012, submitted by the US Codex Office, the USA.

5. The analysis of each fatty acid composition of refined and crude rice bran oil is presented in Table 1. With respect to data of refined rice bran oil, it was observed that the minimum and maximum values of the fatty acid profile of refined rice bran oil of 2011-2012 fell within the specific range for Rice Bran Oil in Table 1 of the Codex Standard for Named Vegetable Oils. However, considering to the $\bar{x} \pm 3\sigma$, the present data indicated a possible out of Codex's range for C14:0, C18:2, C22:0 and C24:0. In this case, it may reflect from natural variations such as variety of rice, season, geographical location, climate variability or growing conditions.

Table 1 Fatty acid composition of rice bran oil (expressed as percentage of total fatty acids)

Fatty acid	CODEX STAN 210-1999	Refined (TH ¹ , n=45)						Crude (US ² , n=2)		
		Min	Max	Mean (\bar{x})	SD (σ)	$\bar{x} \pm 3\sigma$	Range	Min	Max	Mean
C6:0	ND	ND	ND					ND	ND	
C8:0	ND	ND	ND					ND	ND	
C10:0	ND	ND	ND					ND	ND	
C12:0	ND-0.2	ND	ND					ND	ND	
C14:0	0.1-0.7	0.3	0.7	0.5	0.2	0.5±0.6	ND-1.1	0.3	0.4	0.3
C16:0	14-23	18.0	19.9	19.2	0.6		17.5-21.0	15.1	15.5	15.3
C16:1	ND-0.5	ND	0.20	0.20				ND	ND	
C17:0	ND	ND	ND					ND	ND	
C17:1	ND	ND	ND					ND	ND	
C18:0	0.9-4.0	1.1	2.1	1.9	0.3		1.1-2.7	1.6	1.7	1.7
C18:1	38-48	38.6	44.3	41.3	1.8	41.3±5.4	35.9-46.8	42.3	43.6	42.9
C18:2	29-40	30.0	37.7	33.8	2.8	33.8±8.4	25-42	37.0	37.4	37.2
C18:3	0.1-2.9	0.9	3.0	1.5	0.5		0.1-2.9	1.2	2.0	1.6
C20:0	ND-0.9	ND	0.90					0.7	0.7	0.7
C20:1	ND-0.8	ND	0.50					ND	ND	
C20:2	ND	ND	ND					ND	ND	
C22:0	ND-0.5	0.2	1.0	0.4	0.2	0.4±0.6	ND-1.0	ND	0.2	
C22:1	ND	ND	ND					ND	ND	
C22:2	ND	ND	ND					ND	ND	
C24:0	ND-0.6	0.0	0.5	0.3	0.2	0.3±0.6	ND-0.9	ND	0.4	
C24:1	ND	ND	ND					ND	ND	

Note : - ¹ Refined rice bran oil samples : Thailand (45 samples). Method of analysis: 2011 : AOCS Ce 2-66, and 2012 : in-house method based on AOAC(2010) 963.22 and 969.33

- ² Crude rice bran oil samples : U.S. (2 samples). Method of analysis: In-house method (Sample converted by methanolic-HCl, extracted by water-hexane and detects by GLC).

- ND : non-detectable, defined as $\leq 0.05\%$

Recommendations for Consideration by CCFO:

6. Considering that refining process may change the fatty acid composition of crude rice bran oil, it is suggested not to combine the data of crude rice bran oil with refined rice bran oil and to use the data of refined rice bran oil as a basis for proposing the amendment. Therefore, the proposal for the amendment of the fatty acid composition of rice bran oil in Table 1 of CODEX STAN 210-1999 are:

- (1) Amend C14:0 from “ 0.1-0.7” to “ ND-1.1”
- (2) Amend C18:2 from “ 29-40” to “ 25-42”
- (3) Amend C22:0 from “ND-0.5” to “ ND-1.0”
- (4) Amend C24:0 from “ND-0.6” to “ ND-0.9”

B. Levels of desmethylsterols in crude Rice Bran Oil from authentic samples as a percentage of total sterols and as mg/kg oil (Table 3 of CODEX STAN 210-1999)

7. The following data were received and used in preparing the recommendations:

- 30 samples of crude rice bran oil, analyzed in 2011, submitted by the National Bureau of Agricultural Commodity and Food Standards (ACFS), Thailand.
- 10 samples of crude rice bran oil, submitted by the US Codex office, the United States of America.
-

8. The analysis of each desmethylsterols as identified in CODEX STAN 210-1999 and other desmethysterols in crude rice bran oil are presented in Table 2.

9. According to the results in Table 2, it can be observed that the level of 7 major compositions of desmethylsterols (Cholesterol, Campesterol, Stigmasterol, Beta-sitosterol, Delta-5-avenasterol, Delta-7-stigmastenol and Delta-7-avenasterol) found in 40 crude rice bran oil samples are in good agreement with CODEX STAN 210-1999 except for Brassicasterol and Other desmethysterols. For Thai samples, Brassicasterol were detected in trace amounts where as this sterol was not present in the U.S. samples. The minimum, maximum, means (\bar{x}) and standard deviation (σ) of Brassicasterol found in 40 samples were ND, 0.2, 0.14 and 0.07 % respectively.

10. In addition, small proportions of other desmethylsterols; 24-methylene-cholesterol, Campestanol, Cholesterol, Sitostanol, Delta-5, 23-stigmastadienol, Delta-5, 24-stigmastadienol, Delta-7-campesterol and 1 unknown (total 8) were observed in Thai samples whilst Campestanol, Sitostanol and 6 unknowns (total 8) were found in the U.S. samples. These desmethylsterols together were reported as sum of other desmethysterols. The level of Brassicasterol and other desmethylsterols of the two sets of data were combined and reported in the last column of Table 2. The minimum, maximum, means (\bar{x}), standard deviation (σ) and sum of other desmethysterols of 40 crude rice bran oil samples were 8.79, 12.62, 9.95 and 0.69 % respectively.

Table 2 Level of desmethylsterols in crude rice bran oil as a percentage of total sterols

Compound	CODEX STAN 210-1999	Crude ¹ (TH, n=30)					Crude ² (US, n=10)					Crude (TH & US, n=40)				
		Min	Max	Mean	σ	Range ($\bar{x} \pm 3\sigma$)	Min	Max	Mean	σ	Range ($\bar{x} \pm 3\sigma$)	Min	Max	Mean	σ	Range ($\bar{x} \pm 3\sigma$)
Cholesterol	ND-0.5	0.10	0.20	0.17	0.05		ND	ND				ND	0.20	0.14	0.07	
Brassicasterol	ND	0.10	0.20	0.17	0.05	ND-0.3	ND	ND			ND	ND	0.20	0.14	0.07	ND-0.3
Campesterol	11.0-35.0	17.10	25.40	23.37	2.70		18.20	20.45	19.37	0.71		17.10	25.40	22.37	2.93	
Stigmasterol	6.0-40.0	11.30	12.30	11.88	0.28		12.72	14.32	13.75	0.54		11.30	14.32	12.35	0.89	
Beta-sitosterol	25.0-67.0	43.40	48.60	44.71	1.65		48.26	51.84	50.18	1.19		43.40	51.84	46.08	2.85	
Delta-5-avenasterol	ND-9.9	3.20	3.90	3.58	0.16		2.11	2.98	2.48	0.23		2.11	3.90	3.31	0.52	
Delta-7-stigmastenol	ND-14.1	0.80	5.80	3.49	1.08		2.07	3.22	2.69	0.36		0.80	5.80	3.29	1.01	
Delta-7-avenasterol	ND-4.4	0.70	1.80	1.41	0.38		0.81	2.01	1.52	0.36		0.70	2.01	1.44	0.38	
Other Desmethysterols																
<i>Campestanol</i>		2.60	3.40	3.04	0.20		1.75	2.52	2.06	0.22		1.75	3.40	2.80	0.48	
<i>Sitostanol</i>		2.50	3.40	2.86	0.20		2.31	2.59	2.46	0.10		2.31	3.40	2.76	0.26	
<i>Chlerosterol</i>		0.10	1.00	0.75	0.15											
<i>24-methylene-cholesterol</i>		0.70	1.30	1.04	0.14											
<i>Delta-5,23-stigmastadienol</i>		0.10	0.50	0.15	0.10											
<i>Delta-5,24-stigmastadienol</i>		0.60	1.00	0.68	0.09											
<i>Delta-7-campesterol</i>		0.7	1.80	1.41	0.38											
<i>Unknown 1</i>		<0.1	<0.1	<0.1	0											
<i>Unknown 2</i>							0.79	1.12	0.95	0.10						
<i>Unknown 3</i>							0.49	4.52	1.32	1.15						
<i>Unknown 4</i>							0.51	1.60	1.10	0.31						
<i>Unknown 5</i>							0.50	0.61	0.55	0.03						
<i>Unknown 6</i>							0.36	0.64	0.49	0.08						
<i>Unknown 7</i>							0.24	2.14	1.10	0.79						
Sum of other desmethysterols	ND	9.10	10.70	9.93	0.44	8.6-11.3	8.79	12.62	10.02	1.20	6.4-13.6	8.79	12.62	9.95	0.69	7.9-12.0

Note ¹ Crude rice bran oil samples (total 8) (total 8) (total 8): Thailand (30 samples). Method of analysis : ISO 12228:1999

² Crude rice bran oil samples : U.S. (10 samples). Method of analysis: AOCS Official Method AOCS Ch 6-91 (97)

ND: non detectable, defined as $\leq 0.05\%$

Recommendation for consideration by the CCFO

11. Since the level of desmethylsterols in Table 3 of CODEX STAN 210-1999 are for crude vegetable oils, it is recommended that analysis data of crude rice bran oil in Table 2 are used to recommend the amendment of the standard. The proposal for the amendment of the level of desmethylsterols of rice bran oil in Table 3 of CODEX STAN 210-1999 are :

1. Amend the level of Brassicasterol from “ND” to “ND-0.3”
2. Amend the level of other desmethylsterols from ND to “7.9-12.0”