

Exhibit C

STANDARD FOR HONEY

CODEX STAN 12-1981, Rev.1 (1987), Rev.2 (2001)

~~The Annex to this Standard is intended for voluntary application by commercial partners and not for application by Governments.~~

1. SCOPE

~~Part One of this~~ This Standard applies to all honeys produced by honey bees and covers all styles of honey presentations which are processed and ultimately intended for direct consumption and to all honeys packed, processed or intended for sale in bulk containers as honey, which may be repacked for retail sale, or for sale or use as an ingredient in other foods. ~~Part Two covers honey for industrial uses or as an ingredient in other foods.~~

~~1.2 Parts Two of this Standard also covers honey which is packed for sale in bulk containers, which may be re-packed into retail packs.~~

~~Part One~~

2. DESCRIPTION

2.1 DEFINITION

Honey is the natural sweet substance produced by honey bees from the nectar of plants or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in the honey comb to ripen and mature.

2.1.1 Blossom Honey or Nectar Honey is the honey which comes from nectars of plants.

2.1.2 Honeydew Honey is the honey which comes mainly from excretions of plant sucking insects (*Hemiptera*) on the living parts of plants or secretions of living parts of plants.

2.2 DESCRIPTION

Honey consists essentially of different sugars, predominantly fructose and glucose as well as other substances such as organic acids, enzymes and solid particles derived from honey collection. The colour of honey varies from nearly colourless to dark brown. The consistency can be fluid, viscous or partly to entirely crystallised. The flavour and aroma vary, but are derived from the plant origin.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Honey sold as such shall not have added to it any food ingredient, including food additives, nor shall any other additions be made other than honey. Honey shall not have any objectionable matter, flavour, aroma, or taint absorbed from foreign matter during its processing and storage. The honey

shall not have begun to ferment or effervesce. No pollen or constituent particular to honey may be removed except where this is unavoidable in the removal of foreign inorganic or organic matter.

3.2 Honey shall not be heated or processed to such an extent that its essential composition is changed and/ or its quality is impaired.

3.3 Chemical or biochemical treatments shall not be used to influence honey crystallisation.

3.4 MOISTURE CONTENT

~~(a) Honeys not listed below not more than 20%.~~

~~(b) Heather Honey (*Calluna*) not more than 23%.~~

No water may be added to honey in the course of extraction or packing for sale or resale as honey.

Honey shall not have a moisture content exceeding 23%.

3.5 SUGARS CONTENT

3.5.1 FRUCTOSE AND GLUCOSE CONTENT (SUM OF BOTH)

(a) Honey not listed below - not less than 60 g/100g

(b) Honeydew honey,

blends of honeydew honey with blossom honey - not less than 45 g/100g

3.5.2 SUCROSE CONTENT

(a) Honey not listed below - not more than 5 g/100g

(b) Alfalfa (*Medicago sativa*), Citrus spp., False Acacia (*Robinia pseudoacacia*), French Honeysuckle (*Hedysarum*), Menzies Banksia (*Banksia menziesii*), Red Gum (*Eucalyptus camaldulensis*), Leatherwood (*Eucryphia lucida*), *Eucryphia milligani* - not more than 10 g/100g

(c) Lavender (*Lavandula spp*), Borage (*Borago officinalis*) - not more than 15 g/100g

3.6 WATER INSOLUBLE SOLIDS CONTENT

(a) Honeys other than pressed honey - not more than 0.1 g/100g

(b) Pressed honey - not more than 0.5 g/100g

4. CONTAMINANTS

4.1 HEAVY METALS:

~~Honey shall be free from heavy metals in amounts which may represent a hazard to human health. The products covered by this Standard shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission.~~

4.2 RESIDUES OF PESTICIDES AND VETERINARY DRUGS

~~The products covered by this standard shall comply with those relevant maximum residue limits for honey established by the Codex Alimentarius Commission.~~

5. HYGIENE

~~5.1 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice—General Principles of Food Hygiene recommended by the Codex Alimentarius Commission (CAC/RCP 1-1969, Rev 3-1997), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.~~

~~5.2 The products should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21-1997).~~

6. LABELLING

~~In addition to the provisions of the General Standard for the Labeling of Pre-packaged Foods (CODEX STAN 1-1985, Rev 2-1999), the following specific provisions apply:~~

6.1 THE NAME OF THE FOOD

~~6.1.1 Products conforming to Part One of the Standard shall be designated 'honey'. [Foods containing honey and any flavoring, spice or other added ingredient or if honey is processed in such a way that a modification to honey occurs that materially changes the flavor, texture, color, viscosity, and other material characteristics of pure honey, such foods shall be distinguished in the food name from honey by declaration of the ingredient or modification.]~~

~~6.1.2 For products described in 2.1.1 the name of the food may be supplemented by the term "blossom" or "nectar".~~

~~6.1.3 For products described in 2.1.2 the word "honeydew" may be placed in close proximity to the name of the food.~~

~~6.1.4 For mixtures of the products described in 2.1.1 and 2.1.2 the name of the food may be supplemented with the words "a blend of honeydew honey with blossom honey".~~

~~6.1.5 Honey may be designated by the name of the geographical or topographical region if the honey was produced exclusively within the area referred to in the designation.~~

~~6.1.6 Honey may be designated according to floral or plant source if it comes wholly or mainly from that particular source and has the organoleptic, physicochemical and microscopic properties corresponding with that origin.~~

~~6.1.7 Where honey has been designated according to floral or plant source (6.1.6) then the common name or the botanical name of the floral source shall be in close proximity to the word "honey".~~

6.1.8 Where honey has been designated according to floral, plant source, or by the name of a geographical or topological region, then the name of the country where the honey has been produced shall be declared.

6.1.9 The subsidiary designations listed in 6.1.10 may not be used unless the honey conforms to the appropriate description contained therein. The styles in 6.1.11 (b) and (c) shall be declared.

6.1.10 Honey may be designated according to the method of removal from the comb.

(a) Extracted Honey is honey obtained by centrifuging decapped broodless combs.

(b) Pressed Honey is honey obtained by pressing broodless combs.

(c) Drained Honey is honey obtained by draining decapped broodless combs.

6.1.11 Honey may be designated according to the following styles:

(a) Honey which is honey in liquid or crystalline state or a mixture of the two;

(b) Comb Honey which is honey stored by bees in the cells of freshly built broodless combs and which is sold in sealed whole combs or sections of such combs;

(c) Cut comb in honey, [honey with comb,] or chunk honey which is honey containing one or more pieces of comb honey.

~~6.1.12 Honey which has been filtered in such a way as to result in the significant removal of pollen shall be designated filtered honey.~~

~~6.2 LABELLING OF NON-RETAIL CONTAINERS~~

~~6.2.1 Information on labeling as specified in The General Standard for the Labeling of Prepackaged Foods and in Section 6.1 shall be given either on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the producer, processor or packer shall appear on the container.~~

~~7. METHODS OF SAMPLING AND ANALYSIS~~

~~The methods of sampling and analysis to be employed for the determination of the compositional and quality factors are detailed below:~~

~~7.1 SAMPLE PREPARATION~~

~~Samples should be prepared in accordance with AOAC 920.180.~~

~~7.2 DETERMINATION OF MOISTURE CONTENT~~

~~AOAC 969.38B / J. Assoc. Public Analysts (1992) 28 (4) 183-187 / MAFF Validated method V21 for moisture in honey.~~

~~7.3 DETERMINATION OF SUGARS CONTENT~~

~~7.3.1 FRUCTOSE AND GLUCOSE CONTENT (SUM OF BOTH)~~

~~Determination of sugars by HPLC—Harmonised Methods of the European Honey Commission, Apidologie—Special Issue 28, 1997, Chapter 1.7.2~~

~~7.3.2 SUCROSE CONTENT~~

~~Determination of sugars by HPLC—Harmonised Methods of the European Honey Commission, Apidologie—Special Issue 28, 1997, Chapter 1.7.2~~

~~7.4 DETERMINATION OF WATER-INSOLUBLE SOLIDS CONTENT~~

~~J. Assoc. Public Analysts (1992) 28 (4) 189-193/MAFF Validated method V22 for water insoluble solids in honey~~

~~7.5 DETERMINATION OF ELECTRICAL CONDUCTIVITY~~

~~Determination of electrical conductivity—Harmonised Methods of the European Honey Commission, Apidologie—Special Issue 28, 1997, Chapter 1.2~~

~~7.6 DETERMINATION OF SUGARS ADDED TO HONEY (AUTHENTICITY)~~

~~AOAC 977.20 for sugar profile, AOAC 991.41 internal standard for SCIRA (stable carbon isotope ratio analysis).~~

Annex- Deleted in its entirety

REVISED CODEX STANDARD FOR HONEY**CODEX STAN 12-1981, Rev.1 (1987), Rev.2 (2001)¹**

The Annex to this Standard is intended for voluntary application by commercial partners and not for application by Governments.

1. SCOPE

- 1.1 Part One of this Standard applies to all honeys produced by honey bees and covers all styles of honey presentations which are processed and ultimately intended for direct consumption. Part Two covers honey for industrial uses or as an ingredient in other foods.
- 1.2 Parts Two of this Standard also covers honey which is packed for sale in bulk containers, which may be repacked into retail packs.

PART ONE**2. DESCRIPTION****2.1 DEFINITION**

Honey is the natural sweet substance produced by honey bees from the nectar of plants or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in the honey comb to ripen and mature.

- 2.1.1 Blossom Honey or Nectar Honey is the honey which comes from nectars of plants.
- 2.1.2 Honeydew Honey is the honey which comes mainly from excretions of plant sucking insects (*Hemiptera*) on the living parts of plants or secretions of living parts of plants.

2.2 DESCRIPTION

Honey consists essentially of different sugars, predominantly fructose and glucose as well as other substances such as organic acids, enzymes and solid particles derived from honey collection. The colour of honey varies from nearly colourless to dark brown. The consistency can be fluid, viscous or partly to entirely crystallised. The flavour and aroma vary, but are derived from the plant origin.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

- 3.1 Honey sold as such shall not have added to it any food ingredient, including food additives, nor shall any other additions be made other than honey. Honey shall not have any objectionable matter, flavour, aroma, or taint absorbed from foreign matter during its processing and storage. The honey shall not have begun to ferment or effervesce. No pollen or constituent particular to honey may be removed except where this is unavoidable in the removal of foreign inorganic or organic matter.
- 3.2 Honey shall not be heated or processed to such an extent that its essential composition is changed and/ or its quality is impaired
- 3.3 Chemical or biochemical treatments shall not be used to influence honey crystallisation.

¹ Secretariat Note: The Revised Codex Standard for Honey was adopted by the 24th Session of the Codex Alimentarius Commission in 2001. At the time of the adoption the Commission agreed that further work would be undertaken on certain technical issues, particularly the provisions concerning Moisture Content.

3.4 MOISTURE CONTENT

- (a) Honeys not listed below - not more than 20%
- (b) Heather honey (*Calluna*) - not more than 23%

3.5 SUGARS CONTENT**3.5.1 FRUCTOSE AND GLUCOSE CONTENT (SUM OF BOTH)**

- (a) Honey not listed below - not less than 60 g/100g
- (b) Honeydew honey,
blends of honeydew honey with blossom honey - not less than 45 g/100g

3.5.2 SUCROSE CONTENT

- (a) Honey not listed below - not more than 5 g/100g
- (b) Alfalfa (*Medicago sativa*), Citrus spp., False
Acacia (*Robinia pseudoacacia*), French
Honeysuckle (*Hedysarum*), Menzies Banksia
(*Banksia menziesii*), Red Gum (*Eucalyptus
camaldulensis*), Leatherwood (*Eucryphia
lucida*), *Eucryphia milligani* - not more than 10 g/100g
- (c) Lavender (*Lavandula spp*), Borage (*Borago
officinalis*) - not more than 15 g/100g

3.6 WATER INSOLUBLE SOLIDS CONTENT

- (a) Honeys other than pressed honey - not more than 0.1 g/100g
- (b) Pressed honey - not more than 0.5 g/100g

4. CONTAMINANTS**4.1 HEAVY METALS²**

Honey shall be free from heavy metals in amounts which may represent a hazard to human health. The products covered by this Standard shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission.

4.2 RESIDUES OF PESTICIDES AND VETERINARY DRUGS

The products covered by this standard shall comply with those maximum residue limits for honey established by the Codex Alimentarius Commission.

5. HYGIENE

- 5.1 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene recommended by the Codex Alimentarius Commission (CAC/RCP 1-1969, Rev 3-1997), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.
- 5.2 The products should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21-1997).

² These levels will be established in consultation between the Codex Committee on Sugars and the Codex Committee on Food Additives and Contaminants as soon as possible.

6. LABELLING

In addition to the provisions of the General Standard for the Labelling of Pre-packaged Foods (CODEX STAN 1-1985, Rev 2-1999), the following specific provisions apply:

6.1 THE NAME OF THE FOOD

- 6.1.1 Products conforming to Part One of the Standard shall be designated 'honey'.
- 6.1.2 For products described in 2.1.1 the name of the food may be supplemented by the term "blossom" or "nectar".
- 6.1.3 For products described in 2.1.2 the word "honeydew" may be placed in close proximity to the name of the food.
- 6.1.4 For mixtures of the products described in 2.1.1 and 2.1.2 the name of the food may be supplemented with the words "a blend of honeydew honey with blossom honey".
- 6.1.5 Honey may be designated by the name of the geographical or topographical region if the honey was produced exclusively within the area referred to in the designation.
- 6.1.6 Honey may be designated according to floral or plant source if it comes wholly or mainly from that particular source and has the organoleptic, physicochemical and microscopic properties corresponding with that origin.
- 6.1.7 Where honey has been designated according to floral or plant source (6.1.6) then the common name or the botanical name of the floral source shall be in close proximity to the word "honey".
- 6.1.8 Where honey has been designated according to floral, plant source, or by the name of a geographical or topological region, then the name of the country where the honey has been produced shall be declared.
- 6.1.9 The subsidiary designations listed in 6.1.10 may not be used unless the honey conforms to the appropriate description contained therein. The styles in 6.1.11 (b) and (c) shall be declared.
- 6.1.10 Honey may be designated according to the method of removal from the comb.
- (a) Extracted Honey is honey obtained by centrifuging decapped broodless combs.
- (b) Pressed Honey is honey obtained by pressing broodless combs.
- (c) Drained Honey is honey obtained by draining decapped broodless combs.
- 6.1.11 Honey may be designated according to the following styles:
- (a) Honey which is honey in liquid or crystalline state or a mixture of the two;
- (b) Comb Honey which is honey stored by bees in the cells of freshly built broodless combs and which is sold in sealed whole combs or sections of such combs;
- (c) Cut comb in honey or chunk honey which is honey containing one or more pieces of comb honey.
- 6.1.12 Honey which has been filtered in such a way as to result in the significant removal of pollen shall be designated filtered honey.

6.2 LABELLING OF NON-RETAIL CONTAINERS

- 6.2.1 Information on labelling as specified in The General Standard for the Labelling of Pre-packaged Foods and in Section 6.1 shall be given either on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the producer, processor or packer shall appear on the container.

7. METHODS OF SAMPLING AND ANALYSIS

The methods of sampling and analysis to be employed for the determination of the compositional and quality factors are detailed below:

7.1 SAMPLE PREPARATION

Samples should be prepared in accordance with AOAC 920.180.

7.2 DETERMINATION OF MOISTURE CONTENT³

AOAC 969.38B / J. Assoc. Public Analysts (1992) 28 (4) 183-187 / MAFF Validated method V21 for moisture in honey.

7.3 DETERMINATION OF SUGARS CONTENT⁴

7.3.1 FRUCTOSE AND GLUCOSE CONTENT (SUM OF BOTH)

Determination of sugars by HPLC - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue 28, 1997, Chapter 1.7.2

7.3.2 SUCROSE CONTENT

Determination of sugars by HPLC - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue 28, 1997, Chapter 1.7.2

7.4 DETERMINATION OF WATER-INSOLUBLE SOLIDS CONTENT

J. Assoc. Public Analysts (1992) 28 (4) 189-193/ MAFF Validated method V22 for water insoluble solids in honey

7.5 DETERMINATION OF ELECTRICAL CONDUCTIVITY⁵

Determination of electrical conductivity - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue 28, 1997, Chapter 1.2

7.6 DETERMINATION OF SUGARS ADDED TO HONEY (AUTHENTICITY)⁶

AOAC 977.20 for sugar profile,

AOAC 991.41 internal standard for SCIRA (stable carbon isotope ratio analysis).

³ These methods are identical

⁴ Subject to endorsement by CCMAS

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⁶ CCS noted that a screening method for the detection of cane sugar adulteration of honey was available.

ANNEX

This text is intended for voluntary application by commercial partners and not for application by governments.

1. ADDITIONAL COMPOSITION AND QUALITY FACTORS

Honey may have the following compositional and quality factors:

1.1 FREE ACIDITY

The free acidity of honey may be not more than 50 milliequivalents acid per 1000g.

1.2 DIASTASE ACTIVITY

The diastase activity of honey, determined after processing and/or blending, in general not less than 8 Schade units and in the case of honeys with a low natural enzyme content not less than 3 Schade Units.

1.3 HYDROXYMETHYLFURFURAL CONTENT

The hydroxymethylfurfural content of honey after processing and/or blending shall not be more than 40 mg/kg. However, in the case of honey of declared origin from countries or regions with tropical ambient temperatures, and blends of these honeys, the HMF content shall not be more than 80 mg/kg.

1.4 ELECTRICAL CONDUCTIVITY

- (a) honey not listed under (b) or (c), and blends of these honeys - not more than 0.8 mS/cm
- (b) Honeydew and chestnut honey and blends of these except with those listed under (c) - not less than 0.8 mS/cm
- (c) Exceptions : Strawberry tree (*Arbutus unedo*), Bell Heather (*Erica*), Eucalyptus, Lime (*Tilia spp*), Ling Heather (*Calluna vulgaris*) Manuka or Jelly bush (*Leptospermum*), Tea tree (*Melaleuca spp*).

2. METHODS OF SAMPLING AND ANALYSIS

The methods of sampling and analysis to be employed for the determination of the additional compositional and quality factors set out in Section 1 of this Annex are detailed below:

2.1 SAMPLE PREPARATION

The method of sample preparation is described in section 7.1 of the Standard. In the determination of diastase activity (2.2.2) and hydroxymethylfurfural content (2.2.3), samples are prepared without heating.

2.2 METHODS OF ANALYSIS

2.2.1 DETERMINATION OF ACIDITY

J. Assoc. Public Analysts (1992) 28 (4) 171-175 / MAFF validated method V19 for acidity in honey

2.2.2 DETERMINATION OF DIASTASE ACTIVITY

2.2.6.1 AOAC 958.09

or

Determination of diastase activity with Phadebas - Harmonised Methods of the European Honey Commission, *Apidologie* – Special Issue **28**, 1997, Chapter 1.6.2

2.2.3 DETERMINATION OF HYDROXYMETHYLFURFURAL (HMF) CONTENT

AOAC 980.23

or

Determination of hydroxymethylfurfural by HPLC - Harmonised Methods of the European Honey Commission, *Apidologie* – Special Issue **28**, 1997, Chapter 1.5.1

2.3. LITERATURE REFERENCES

Bogdanov S, Honigdiastase, Gegenüberstellung verschiedener Bestimmungsmethoden, *Mitt. Gebiete Lebensmitt. Hyg.* **75**, 214-220 (1984)

Bogdanov S and Lischer P, Interlaboratory trial of the European Honey Commission: Phadebas and Schade Diastase determination methods, Humidity by refractometry and Invertase activity: Report for the participants 1993.

Chataway HD (1932) *Canad J Res* 6, 540; (1933) *Canad J Res* 8, 435; (1935) *Canad Bee J* 43, (8) 215.

DIN-NORM 10750 (July 1990): Bestimmung der Diastase-Aktivität.

DIN. Norm, Entwurf: Bestimmung des Gehaltes an Hydroxymethylfurfural:

Photometrisches Verfahren nach Winkler (1990)

Determination of Diastase with Phadebas, *Swiss Food Manual*, Chapter 23A, Honey, Bern, 1995.

Figueiredo V, HMF Interlaboratory Trial, Report for the participants, Basel canton chemist laboratory, (1991)

Jeurings J and Kupperts F, High Performance Liquid Chromatography of Furfural and Hydroxymethylfurfural in Spirits and Honey. *J. AOAC*, 1215 (1980).

Determination of Hydroxymethylfurfural by HPLC, *Swiss Food Manual*, Kapitel Honig, Eidg. Druck und Materialzentrale 1995

International Honey Commission Collaborative Trial (in press).

Hadorn H (1961) *Mitt Gebiete Lebens u Hyg*, 52, 67.

Kiermeier F, Koberlein W (1954) *Z Unters Lebensmitt*, 98, 329.

Lane JH and Eynon L (1923) *J Soc Chem Ind* 42, 32T, 143T, 463T.

Schade J. E., Marsh G. L. and Eckert J. E.: Diastase activity and hydroxymethylfurfural in honey and their usefulness in detecting heat adulteration *Food Research* **23**, 446-463 (1958).

Siegenthaler U, Eine einfache und rasche Methode zur Bestimmung der α -Glucosidase (Saccharase) im Honig. *Mitt. Geb. Lebensmittelunters. Hyg.* **68**, 251-258 (1977).

Turner JH, Rebers PA, Barrick PL and Cotton RH (1954) *Anal Chem*, 26, 898.

Walker HS (1917) *J Ind Eng Chem*, 2, 490.

Wedmore EB (1955), *Bee World*, 36, 197.

White JW Kushnir I and Subors MH (1964) *Food Technol*, 18, 555.

FW (1959) *JAOAC*, 42, 344.

White J, Spectrophotometric Method for Hydroxymethylfurfural in Honey. *J. AOAC*, 509 (1979).

Winkler O: Beitrag zum Nachweis und zur Bestimmung von Oxymethylfurfural in Honig und Kunsthonig. *Z. Lebensm. Forsch.* **102**, 160-167 (1955)

Harmonised methods of the European Honey Commission, *Apidologie* - special issue, **28**, 1997

NOTE: CCS asked CCMAS to consider retaining only those essential references.

PART TWO

[Honey for Industrial Uses or as an Ingredient in other Foods]

This part is subject to further consideration.