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EAST AFRICAN STANDARD

Beeswax — Specification

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 005 *Food additives*.

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

Introduction

Beeswax is a complex mixture of saturated and unsaturated linear and complex monoesters, hydrocarbons, free fatty acids, free fatty alcohols, and other minor substances secreted in form of scales by worker bees through their wax glands. It is extracted from honeycombs of either wild or domesticated bees after the removal of honey. The beeswax as obtained from the combs is called 'raw beeswax' and is progressively modified by physical treatment to yield crude and refined beeswax, and by chemical treatment to yield bleached beeswax.

Beeswax has many uses such as making adhesives, candles, cosmetics, electrical insulation, explosives, polishes, lubricants, pencils, pharmaceuticals, printing inks, shoe creams, varnishes and in leather. Additionally, it is used in the moulding, paper and rubber industries.

In the food industry, beeswax is used:

- as a glazing agent on confectionery, small products of fine bakery wares coated with chocolate, snacks, nuts and coffee beans;
- as a texturiser for chewing gum base;
- as a clouding agent;
- surface coating of fruits such as fresh citrus fruits, melons, apples, pears, peaches and pineapples; and
- as a carrier for food flavours and colours.

This standard has been developed to ensure the safety and quality of beeswax used in the food industry.

Beeswax — Specification

1 Scope

This Draft East African Standard specifies requirements, sampling and test methods for food grade beeswax used in the food industry.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

AOAC 972.25, *Lead in Food Atomic Absorption Spectrophotometric Method*

ISO 660, *Animal and vegetable fats and oils — Determination of acid value and acidity*

ISO 3657, *Animal and vegetable fats and oils — Determination of saponification value*

ISO 3961, *Animal and vegetable fats and oils — Determination of iodine value*

ISO 6320, *Animal and vegetable fats and oils — Determination of refractive index*

ISO 6321, *Animal and vegetable fats and oils — Determination of melting point in open capillary tubes (Slip point)*

CODEX STAN 107, *General standard for the labelling of food additives when sold as such*

EAS 39, *Hygiene in the food and drink manufacturing industry — Code of practice*

CAC/RCP 1, *General principles of food hygiene*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
beeswax
product obtained from honeycombs of bees after the removal of honey

3.2
bleached beeswax
refined beeswax that has been bleached and finely filtered

3.3
crude beeswax
wax obtained from the honeycombs after the removal of honey and after being subjected to a preliminary treatment such as melting, scumming, decantation and/or moulding

3.4
food grade material
material, made of substances which are safe and suitable for their intended use and which will not impart any toxic substance or undesirable odour or flavour to the product

3.5
refined beeswax
wax obtained after subjecting crude beeswax to further purification by melting using hot water or steam followed by finer filtration

4 Types of beeswax

Beeswax shall be of the following two types:

a) crude beeswax; and

b) refined beeswax (bleached or not).

5 Requirements

5.1 General requirements

Crude and refined beeswax shall:

a) be whitish yellow to yellowish brown in colour;

b) be very soluble in ether, sparingly soluble in alcohol and insoluble in water;

c) not contain any other waxes such as paraffin, microcrystalline or synthetic waxes or adulterated in any other way; and

d) be free of inorganic or organic matter such as bees, brood, debris, sand or any other extraneous matter.

5.2 Specific requirements

All crude and refined beeswax shall comply with the specific requirements given in Table 1 when tested in accordance with the methods specified therein.

Table 1 — Specific requirements for beeswax

S/No	Characteristic	Limit		Test method
		Crude	Refined	
i	Specific gravity at 25 °C	0.950 – 0.995	0.945 – 0.980	Annex A
ii	Refractive index at 75 °C	1.440 – 1.445		ISO 6320
iii	Melting point, °C	58 – 64	59 – 66	ISO 6321
iv	Acid value (mg KOH/g), max.	12	10	ISO 660
v	Saponification value (mg KOH/g), max.	80	105	ISO 3657
vi	Iodine value (mgI_2/g of product)	5.5 – 10.0		ISO 3961
vii	Ash, %mm, max.	0.6	0.5	Annex B
viii	Sulphated ash[a], % mm, max.	0.006	0.005	Annex C
ix	Total volatile matter, % mm, max.	1.0	0.75	Annex D
xii	Paraffin and other waxes	To pass test		Annex E

[a] Shall not contain any particles of gritty nature which are retained on a 425-µm IS sieve

6 Hygiene

Beeswax shall be produced, processed and handled in accordance with CAC/RCP 1.

Contaminants

6.1 Heavy metals

Lead (as Pb), shall not exceed 1 mg/kg when tested in accordance with AOAC 972.25.

6.2 Residues of pesticides and veterinary drugs

Beeswax shall conform to the Maximum Residue Limits for pesticides and veterinary drugs for foodstuffs of animal origin established by the Codex Alimentarius Commission.

7 Packaging

Beeswax shall be securely packaged in containers made of food grade materials. The packages shall preserve the safety and quality of the product, prevent entry of light and preclude contamination from the external environment.

8 Weights and measures

The packages shall comply with the Weights and Measures Regulations of respective Partner States.

9 Labelling

In addition to the requirements of CODEX STAN 107, the product packages shall be legibly and indelibly labelled with the following information:

i) product name as “Beeswax” showing the type; either crude or refined;

ii) name and physical address of the processor/packer/importer;

iii) date of packaging;

iv) best before date;

v) storage conditions; and

vi) net weight of the product in metric units.

10 Sampling and sample preparation

Representative samples of the product shall be drawn and prepared in accordance with the procedure elaborated in Annex F.

Annex A
(normative)

Determination of specific gravity

A.1 Apparatus

A.1.1 Water bath maintained at 25 ºC ± 1 ºC.

A.1.2 Specific gravity bottle of 25-ml capacity

A.2 Reagents

A.2.1 Rectified spirit of specific gravity, *d*

A.3 Procedure

Melt 2 g of beeswax in a porcelain crucible at a temperature of about 100 ºC. Allow to cool at room temperature. Remove the solidified beeswax from the crucible, warming slightly if necessary. Attach a tared silk thread that will suspend the beeswax during weighing. Store the sample for 2 hours at 25 ºC ± 1 ºC. Determine the mass of the sample, first in air (M_1) and then in rectified spirit maintained at 25 ºC ± 1 ºC (M_2). Determine the specific gravity at 25 ºC of the rectified spirit by means of the specific gravity bottle.

The specific gravity at 25 ºC shall be calculated as:

$$\frac{M_1 d}{M_1 - M}$$

where

M_1 is the mass, in grams, of the sample in air;

d is the specific gravity of rectified spirit; and

M_2 is the mass, in grams, of the sample in rectified spirit.

Annex B
(normative)

Determination ash content

B.1 Apparatus

B.1.1 Platinum dish of 100-ml capacity

B.1.2 Weighing scale (0.1 mg accuracy)

B.1.3 Desiccator

B.1.4 Watch-glass

B.1.5 Bunsen burner

B.1.6 Muffle furnace

B.2 Procedure

Heat the platinum dish to redness, cool to room temperature in a desiccator and weigh. Take about 5 g of the sample in a watch-glass and weigh accurately (M_1). Transfer about three-quarters of the weighed sample into the platinum dish and heat using a Bunsen burner so that the wax burns gently at the surface. When about half of the wax is burnt away, stop heating, cool and add the remainder of the sample. Weigh the watch-glass again and find, by difference, the exact mass of the sample transferred to the platinum dish. Heat again as before till the sample is completely charred. Incinerate in a muffle furnace at 550 ºC – 650 ºC for 1 h. Cool to room temperature in a desiccator and weigh. Repeat incineration, cooling and weighing until the difference between two successive weighing is less than one milligram.

The ash content, expressed as percentage, mass by mass (% mm), shall be calculated as:

$$\frac{100 M_2}{M_1}$$

where

M_1 is the mass, in grams, of the sample analysed; and

M_2 is the mass, in grams, of the ash obtained.

Annex C
(normative)

Determination of sulphated ash

C.1 Apparatus

C.1.1 Platinum dish of 100-ml capacity

C.1.2 Analytical balance (0.1 mg accuracy)

C.1.3 Heating plate

C.1.4 Desiccator

C.1.5 Muffle furnace

C.2 Reagents

Sulphuric acid, 10 % (min)

C.3 Procedure

Accurately weigh about 5 g of the sample into a platinum dish and add 5 ml of sulphuric acid. Gently heat the dish until the sample is well carbonized, and then increase the heat until the evolution of sulphuric acid fumes ceases. Ash the carbonised matter in a muffle furnace at 550 °C ± 25 °C. Allow the ash to cool and moisten it with 2 ml – 3 ml of sulphuric acid. Heat strongly until the evolution of sulphuric acid fumes ceases and finally ash in the muffle furnace at 550 °C ± 25 °C for 2 h. Cool in a desiccator and weigh. Heat again in the muffle furnace for 30 min at 550 °C ± 25 °C. Cool in a desiccator and weigh. Repeat the process of heating in the muffle furnace for 30 min, cooling and weighing till the difference between two successive weighings is less than 1 mg. Record the lowest mass.

The sulphated ash content, expressed as percentage mass by mass (% mm), shall be calculated as follows:

$$\frac{100 M_1}{M_2}$$

where

M_1 is the mass, in grams, of the ash, and

M_2 is the mass, in grams of the sample tested.

Annex D
(normative)

Test for total volatile matter

D.1 Apparatus

D.1.1 Air oven maintained at 105 ºC

D.1.2 Analytical balance

D.1.3 Metal or aluminium dish, with a lid

D.1.4 Desiccator

D.2 Procedure

Weigh accurately about 10 g of the material in a metal or aluminium dish, previously dried and weighed, and heat in an air oven at 105 ºC for 6 h. Cool the dish in a desiccator and weigh with the lid on. Heat the dish again in the oven for 30 min. Repeat the process until the loss in mass between two successive weighings in less than one milligram. Record the lowest mass obtained.

The total volatile matter, expressed as percentage, mass by mass (% mm), shall be calculated as follows:

$$\frac{100(M_1 - M_2)}{M_1 - M_3}$$

where

M_1 is the mass, in grams, of the dish with the sample before heating;

M_2 is the mass, in grams, of the dish with sample after heating; and

M_3 is the mass, in grams, of the empty dish.

Annex E
(normative)

Test for paraffin and other waxes

E.1 Apparatus

E.1.1 Analytical balance, readable to 0.1 g

E.1.2 Conical flask of 250-ml capacity

E.1.3 Reflux condenser

E.1.4 Water bath or heating plate

E.2 Reagents

E.2.1 Alcoholic potassium hydroxide solution approximately 0.5N, prepared by dissolving potassium hydroxide in 95 % ethanol.

E.2.2 Ethanol, 95 %

E.3 Procedure

Weigh 1.0 g of the sample and place it in a conical flask fitted with a water-cooled reflux condenser. Add 10 ml of alcoholic potassium hydroxide solution. Boil under reflux for one hour. Detach the flask from the condenser, insert suitably a thermometer into the liquid in the flask and allow to cool, stirring constantly. The material shall be taken to have passed the test if the following conditions are satisfied:

a) the liquid does not become cloudy at a temperature higher than 61 °C but becomes cloudy at a temperature between 61 °C and 59 °C; and

b) precipitation of large flocks occurs at not more than 2 °C below the temperature at which the liquid becomes cloudy.

Annex F
(normative)

Sampling and sample preparation

F.1 General requirements of sampling

In drawing, preparing, storing and handling samples, the following precautions and directions shall he observed:

a) samples shall be taken in a protected place not exposed to damp air, dust or soot;

b) the sampling instruments shall be clean and dry;

c) the samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample;

d) each container shall be sealed air-tight after sampling and marked with full details of the sample, such as; batch or code number, name of the manufacturer, and other important particulars of the consignment; and

e) samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

F.2 Scale of sampling

F.2.1.1 All the containers in a single consignment of the same material drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute a separate lot.

F.2.1.2 Samples shall be tested for each lot for ascertaining the conformity of the material to the requirement of this specification.

F.2.1.3 The number of containers to be selected from the lot shall depend on the size of the lot and shall be in accordance with the sampling criteria given in Table F.1.

Table F.1 — Number of containers to be selected for sampling

Lot size ***N***	**Number of containers to be selected** ***n***
Up to 25	3
26 – 100	4
101 – 500	5
501 – 1 000	7
1 001 and above	9

F.2.1.4 The containers shall be selected at random from the lot and for this purpose a random number table shall be used. If such a table is not available, the following procedure shall be adopted:

Starting from any container in the lot, count them as 1, 2, 3 up to *r* in a systematic manner, where *r* is equal to the integral part of *N/n, N* being the total number of containers in the lot and *n* the number of containers to be chosen (see Table 2). Every *r*th container thus counted shall be separated until the requisite number of containers is obtained from the lot to give samples for test.

F.3 Test and referee samples

F.3.1 Preparation of individual samples

Using suitable sampling instrument, draw equal quantities of the product from different parts of the container till 500 g of product is drawn and divide it into three equal parts. Each part of the three parts shall constitute an individual sample representing the container and shall be transferred immediately to thoroughly cleaned and dry containers, sealed air-tight and marked with particulars given under F.1 d). The individual sample so obtained shall be divided into three sets in such a way that each set has a sample representing each selected container. One of these shall be marked for the purchaser, another for the seller and the third for the referee.

F.3.2 Preparation of composite sample

From the product remaining after the individual sample has been taken from the selected containers, approximately equal quantities of the product shall be taken and mixed together so as to form a composite sample weighing 150 g. This composite sample shall be divided into three equal parts and transferred to clean and dry containers, sealed air-tight and labelled with particulars as given in F.1 d). One of these composite samples shall be for the purchaser, another for the vendor and the third for the referee.

F.3.3 Referee samples

Referee samples shall consist of a set of individual samples (F.3.1) and a composite sample (F.3.2) marked for this purpose and shall bear the seals of the purchaser and the seller. These shall be kept at an agreed place.

F.4 Number of tests

F.4.1 Tests for melting point, total volatile matter, ash and sulphated ash shall be conducted on each of the samples constituting a set of individual samples.

F.4.2 Tests for specific gravity, refractive index, acid value, saponification value and iodine value, matter insoluble in benzene and matter soluble in water shall be conducted on the composite sample.

Bibliography

[1] JECFA Specification (2005), Beeswax monograph

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[4] ET 1504: 2005, *Beeswax — Specification* (First Revision)

[5] IS 1504: 1996 (Reaffirmed in 2008), *Beeswax, Crude and refined — Specification* (Third Revision)

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