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DRAFT EAST AFRICAN STANDARD

Flavoured honey — 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 011, *Apiary and apiary products*

TAttention 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.

Flavoured honey — Specification

1 Scope

This Draft East African Standard specifies the requirements, sampling and test methods for Flavored Honey intended for human consumption.

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, 920.183, *Sugars (reducing) in honey*

AOAC 920.184, *Sucrose in honey*

AOAC 958.09, *Determination of diastase activity*

AOAC 980.23, *Determination of hydroxymethylfurfural (HMF) content*

AOAC 962.19, *Determination of acidity (free, lactone, and total). Titrimetric method*

AOAC 969.38b, *Determination of moisture content*

AOAC 920.181, *Ash of honey*

AOAC 999.1, *General atomic absorption spectrophotometric method for determination of lead in food and food stuffs*

EAS 36, *Honey — Specification*

EAS 38, *Labelling of pre-packaged foods — General Requirement*

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

ISO 4833-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30^0c*

ISO 6579-1, Microbiology of food and feeding stuffs — Horizontal method for the detection of *salmonella spp*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species)*

ISO 6634, *Fruits, vegetables and derived products — Sampling and methods of test Part 14: Determination of arsenic content — Silver diethyldithocarbamate spectrophotometric method*

ISO 6561-2, *Fruits, vegetables and derived products — Determination of cadmium content — Part 2: Method using flame atomic absorption spectrometry*

ISO 21527-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 1: Colony count technique in products with water activity greater than 0,95*

ISO 16649-3, *Microbiology of the food chain — Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli — Part 3: Detection and most probable number technique using 5-bromo-4-chloro-3-indolyl-ß-D-glucuronide*

ISO 16050, *Foodstuffs — Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products — High-performance liquid chromatographic method*

ISO 11290-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of Listeria monocytogenes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10185 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
honey
natural sweet substance produced by honeybees of genus Apis from the nectar of blossoms or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of the plants, which honeybees collect, transform and combine with specific substances of their own, deposit, dehydrate, store and leave in the honey comb to ripen and mature.

3.2
flavoured honey
product obtained by mixing honey with flavouring agents

3.3
flavouring agents
products that are added to food to impart, modify or enhance the flavour of food, flavourings do not include substances that have an exclusively sweet, sour, or salty taste (e.g. sugar, vinegar, and table salt).

3.4
foreign matter
organic or inorganic material other than Honey or Flavouring agent added

3.5
Contaminant
Any substance not intentionally added to food or feed for food producing animals, which is present in such food or feed as a result of the production (including operations carried out in crop husbandry, animal husbandry and veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food or feed, or as a result of environmental contamination. The term does not include insect fragments, rodent hairs and other extraneous matter”

4 Requirements

4.1 Description

Flavoured honey is the product that is prepared by mixing honey with flavouring agents that comply with the relevant standards. It shall not contain any extraneous substances other than the material used for flavouring.

4.2 Ingredients

a) Honey shall comply with specification of EAS 36.

b) Flavouring agents should be used in accordance with CAC/GL 66 and shall conform with relevant standards.

4.3 General requirements

4.2.1 Taste and odour of Flavoured honey shall be pleasant and characteristic of the designated product. It shall not have a rancid taste or musty smell and shall be free from adulteration.

4.2.2 If spices are used in powder form they shall be ground to fineness.

4.2.3 Flavoured honey shall be free from extraneous matter, dirt, fungal growth and insect infestation.

4.4 Specific requirements

Flavoured honey shall comply with the specific quality requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Specific requirements for flavoured honey

S/N	Characteristic	Requirement	Test method
i	Reducing sugar content calculated as invert sugar, % m/m, min.	60	AOAC 920.183
ii	Moisture content, % m/m, max.	20	AOAC 969.38 b
iii	Sucrose content, % m/m, max.	5	AOAC 920.184
iv	Water insoluble solids, % m/m, max.	0.5	Annex A
v	Total ash, % m/m, max.	0.6	AOAC 920.181
vi	Acidity as meq acid per kg, max.	40	AOAC 962.19
vii	Diastase activity, Schade units, min.	8	AOAC 958.09
viii	Hydroxymethylfurfural (HMF), mg/kg, max.	40	AOAC 980.23
ix	Fructose-glucose ratio min.	1	Annex B
x	Fiehe's test	Negative	Annex C

5 Contaminants

5.1 Heavy metals

Flavoured honey shall not contain any metal contaminants in excess of levels specified in Table 2.

Table 2 — Requirements heavy metal in flavoured honey

S/No	Characteristic	Maximum limit (mg/kg)	Test method
i)	Arsenic	0.2	ISO 6634
ii)	Lead	0.5	AOAC 999.1
iii)	Cadmium	0.1	ISO 6561-2

5.2 Pesticides residues

Flavoured honey shall comply with the pesticide residue limits prescribed by the Codex Alimentarius Commission.

5.3 Microbiological requirements

Flavoured honey shall be prepared in accordance with EAS 39, and shall comply with the microbiological limits given in Table 3.

Table 3 — Microbiological requirement for flavoured honey

S/No	Characteristic	Maximum limit	Test method
i)	*E. coli*, MPN	Absent	ISO 16649-3
ii)	Yeast/moulds, cfu/g	10^2	ISO 21527-1
iii)	Total plate count, cfu/g	10^3	ISO 21527-1
iv)	*Salmonella* spp /25g	Absent	ISO 6579-1
v)	*Listeria monocytogenes*,cfu/g	Absent	ISO 11290-1
vi)	*S. aureus*, cfu/g	Absent	ISO 6888-1

5.4 Aflatoxins

Flavoured honey shall not have more than 5 ppb for aflatoxin B1 and 10 ppb for total aflatoxins when tested according to ISO 16050.

6 Sampling

Sampling of flavoured honey shall be done in accordance with CAC/GL 50.

7 Packaging

7.1 Packing

Flavoured honey shall be packaged in a food grade material that protects the integrity and safety of the product.

7.2 Labelling

In addition to the labelling requirements given in EAS 38, the package shall be legibly and indelibly labelled with the following information;

a) name of the product" Flavoured honey"

b) list of ingredients in order of proportion;

c) batch number;

d) date of packing and expiry date;

e) name, contact and physical address of the manufacturer;

f) net weight;

g) country of origin;

h) storage condition;

i) direction for use and disposal of used packages

Annex A
(normative)

Gravimetric determination of water-insoluble solids content (Type II method)

A.1 Sampling

A.1.1 Liquid or strained honey

If sample is free from granulation, mix thoroughly by stirring or shaking; if granulated, place closed container in water-bath without submerging, and heat 30 min. at 60 °C; then if necessary, heat at 65 °C until liquefied. Occasional shaking is essential. Mix thoroughly and cool rapidly as soon as sample liquefies. Do not heat honey intended for hydroxymethylfurfural or diastatic determination. If foreign matter, such as wax, sticks, bee's particles or comb, etc., is present, heat sample at 40 °C in water-bath and strain through cheesecloth in hot-water-funnel before sampling.

A.1.2 Comb honey

Cut across top of comb, if sealed, and separate completely from comb by straining through a sieve the meshes of which are made by so weaving wire as to form square opening of 0.500 mm by 0.500 mm when portions of comb or wax pass through sieve, heat sample as in 7.1.3.1 and strain through cheesecloth. If honey is granulated in comb, heat until wax is liquefied; stir, cool and remove wax.

A.2 Procedure

A.2.1 Preparation of test sample

Honey (20 g) is weighted to the nearest centigram (10 mg) and dissolved in a suitable quantity of distilled water at 80 °C and mixed well.

A.2.2 Gravimetric determination

The test sample is filtered through a previously dried and weighed fine sintered glass crucible (pore size 15.40) and washed thoroughly with hot water (80 °C) until free from sugars (Mohr test). The crucible is dried for one hour at 135 °C, cooled and weighed to 0.1 mg.

A.2.3 Expression of results

The result is expressed as percent water insoluble solids (m/m)

Annex B
(normative)

Determination of fructose-glucose ratio

B.1 Principle of the method

The glucose portion of the invert sugar content of honey is determined by reacting it with iodine. The fructose content is calculated by subtraction.

B.2 Reagents

— 0.05 N iodine solution

— 0.01 N sodium hydroxide solution

— Standard sodium thiosulphate solution (0.05 N).

B.3 Procedure

Pipette 50 ml of honey solution in a 250 ml stoppered flask. Add iodine solution and 25 ml of sodium hydroxide solution. Stopper the flask and keep in dark for 20 min. Acidify with 5 ml of sulphuric acid and titrate quickly the excess of iodine against standard thiosulphate solution. Conduct a blank using 50 ml of water instead of honey solution.

B.4 Calculation and expression of results

B.4.1 Approximate glucose, percent by mass (g of glucose per 100 g honey):

$$w = \frac{(B-S)\times 0.004502\times 100}{a}$$

where

B is the volume of sodium thiosulphate solution required for the blank (ml).

S is the volume of sodium thiosulphate solution required for the sample (ml), and

a is the mass of honey taken for the test.

B.4.2 Approximate fructose, per cent by mass (g fructose per 100 g honey):

$$X = \frac{\text{Total reducing sugars (c) - approximate glucose content (w)}}{0.925}$$

B.4.3 Actual glucose content (g per 100 g honey), percent (y) = w - 0.012 x, and

$$\text{Fructose content (g per 100 g honey), per cent (z)} = \frac{\text{Total reducing sugars} - \text{y actual}}{0.925}$$

B.4.4 $$\text{Fructose-glucose ratio} = \frac{\text{Actual fructose content (z)}}{\text{Actual glucose content (y)}}$$

Annex C
(normative)

Fiehe's test

C.1 Reagent

Resorcinol solution

Dissolve 1 g of resublimed resorcinol in 100 ml of hydrochloric acid (sp. gr. 1.18 to 1.19).

C.2 Procedure

Dissolve 2 g of honey in 10 ml of water and extract with 30 ml ether. A continuous extractor is preferable. Remove ether in a separating funnel and concentrate the layer at 5 ml. Add 2 ml of freshly prepared resorcinol solution, shake and note the colour.

C.3 Expression of results

A cherry red colour appearing in a minute indicates the presence of commercial invert sugar.

Annex D
(normative)

Determination of sugars by HPLC

D.1 Principle of the method

The method determines fructose, glucose, sucrose, turanose and maltose in honey. This method is based on the originally published method by Bogdanov and Baumann (1). After filtration of the solution, the sugar content is determined by HPLC (High Pressure Liquid Chromatography) with RI-detection. Peaks are identified on the basis of their retention times. Quantitation is performed according to the external standard method on peak areas or peak heights.

D.2 Reagents

- If not stated otherwise, chemicals of analytical purity grade should be used.

- The water must be distilled or should be of at least equivalent purity.

- Methanol for HPLC

- Acetonitrile for HPLC

Warning: Acetonitrile is a dangerous substance. Laboratory safety guidelines on dangerous substances at work should be consulted.

- Eluent solution for the HPLC. Mix 80 volumes of acetonitrile with 20 volumes of water. Degass prior to use.

- The standard substances, fructose, glucose, sucrose, turanose and maltose

- Pipette 25 ml methanol into a 100 ml calibrated flask. Depending on the sugars to be analysed, dissolve the amounts detailed below in approximately 40ml water and transfer quantitatively to the flask and fill to the mark with water.

fructose: 2.000 g

glucose: 1.500 g

sucrose: 0.250 g

turanose: 0.150 g

maltose: 0.150 g

-Use a syringe and a pre-mounted membrane filter to transfer the solution to sample vials.

-The standard solutions are stable for 4 weeks in the refrigerator at 40 C and for six months at -18^{0}C

D.3 Apparatus

- Sample vials.

- Ultrasonic bath.

- Calibrated flasks, volume 100 ml.

- 25-ml-pipette.

- Membrane filter for aqueous solutions, pore size 0.45 µm.

- Filter holder for membrane filters with suitable syringe.

- High Performance Liquid Chromatograph consisting of pump, sample applicator, temperature-

regulated RI-detector thermostated at 30° C*, temperature regulated column oven at 30^0 C, integrator.

-Analytical stainless-steel column, e.g. 4.6 mm in diameter, 250 mm length, containing amine-modified silica gel with 5-7 µm particle size. Before use, carry out a system suitability test to ensure all the sugars can be separated.

* Note: the chromatography can be carried out at room temperature without influence on the results of the sugars, determined by the present method. However, under these conditions no separation of erlose and melezitose is possible

D.4 Preparation of the sample solution

Weigh 5g of honey into a beaker and dissolve in 40 ml water. Pipette 25ml of methanol into a 100ml volumetric flask and transfer the honey solution quantitatively to the flask. Fill to the mark with water. Pour through a membrane filter and collect in sample vials. Store as for the standard solution.

- High Performance Liquid Chromatography (HPLC) If a column of the type described above is used, the following conditions have been found to give satisfactory separation. Flow rate: 1.3 ml/min mobile phase: Acetonitrile:water (80:20, v/v) column and detector temperature : 30^0 C sample volume: 10 µl

Note: If it is not possible to carry out the analysis at 30 0 C and if the detector cannot be thermostated at 30° C, carry out the analysis at ambient temperature. In this case it is not possible to separate melezitose and erlose.

Note: Identical volumes of sample and standard solution should be injected.

D.5 Calculation and expression of results

The honey sugars are identified and quantified by comparison of the retention times and the peak area of the honey sugars with those of the standard sugars.

The mass percentage of the sugars, W, to be determined of fructose, glucose, etc. and maltose in g/100g is calculated according to the following formula (external standard procedure): W = A 1 x V1 x m1 x 100/ A2 x V2 x m0

Where

A 1 = Peak areas or peak heights of the given sugar compound in the sample solution, expressed as units of area, length or integration.

A 2 = Peak heights of the given sugar compound in the standard solution, expressed as units of area, length or integration.

V 1 = Total volume of the sample solution in ml

V 2 = Total volume of the standard solution in ml

m1 = Mass amount of the sugar in grams in the total volume of the standard (V2)

m0 = sample weight in g

The result is rounded to one decimal place.

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