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DRAFT EAST AFRICAN STANDARD

Turmeric — 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. XXXXXX.

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 006, *Spices culinary herbs and condiments*.

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.

Turmeric — Specification

1 Scope

This Draft East African Standard specifies the requirements and methods of sampling and test for dried turmeric, *Curcuma longa* (L). whole, in pieces and ground.

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.

CODEX STAN 193*, General standard for contaminants and toxins in food and feed*

EAS 38, *Labelling of pre-packaged foods — Specification*

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

EAS 99*, Spices and condiments — Nomenclature*

ISO 927*, Spices and condiments — Determination of extraneous matter and foreign matter content*

ISO 928*, Spices and condiments — Determination of total ash*

ISO 930, *Spices and condiments — Determination of acid insoluble ash*

ISO 939*, Spices and condiments — Determination of moisture content Entrainment method*

ISO 948*, Spices and condiments — Sampling*

ISO 4833-1*, Microbiology of the food chain — Horizontal method for the enumeration of micro-organisms — Part 1: Colony-count at 30 degrees C — Pour plate technique*

ISO 6571*, Spices and condiments — Determination of volatile oil content (hydrodistillation method)*

ISO 6579*, Microbiology of food and animal feeding stuffs — Part 6: Horizontal method for the detection of Salmonella spp.*

ISO 7251*, Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 7954*, Microbiology of food and animal feeding stuffs — General guidance for enumeration of yeasts and moulds — Part 8: Colony count technique at 25 degrees C*

ISO 16050*, Foodstuffs — Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EAS 99 and the following apply.

3.1
turmeric whole and in pieces
Is the primary (bulb) or secondary (fingers) rhizomes of the plants of *Curcuma longa* L.; cured by boiling in water and drying for whole turmeric, or washing, slicing and drying for turmeric in pieces

3.2
rhizome
Is underground stem continuously growing horizontally and puts out lateral shoots and adventitious roots at intervals

3.3
extraneous matter
includes dust, dirt, stones, clay particles and pieces of wood, all particles originating from the plant other than turmeric

4 Requirements

4.1 General requirements

4.1.1 The rhizome shall be well developed and shall have the shape and colour characteristic of the variety. The cured rhizome may be in natural state or machine polished.

4.1.2 Turmeric whole, in pieces and ground shall have the taste and aroma or flavour characteristic of turmeric and shall be free from musty odour.

4.1.3 Turmeric powder shall be free from any added colouring matter such as lead chromate, preservatives and extraneous matter like cereal or pulse flour or any added starch.

4.1.4 Turmeric, whole, in pieces and ground shall be free from fungi, insect infestation, dead insects, insect fragments and rodent contamination.

4.1.5 Defective rhizomes shall include shrivelled fingers and/or bulbs internally damaged, hollow or porous rhizomes, scorched rhizomes due to boiling and other types of damaged rhizomes. The proportion of defective rhizomes in whole turmeric shall be not more than five per cent by mass when tested in accordance with the methods prescribed under ISO 927.

4.1.6 Pieces shall include rhizomes less than 15 mm in length. In whole turmeric the proportion of pieces shall be not more than seven per cent by mass when tested in accordance with the methods prescribed under ISO 927.

4.2 Specific quality requirements

4.2.1 Turmeric, whole, in pieces and ground shall comply with the specific quality requirements specified in Table 1.

Table 1 — Quality requirements for turmeric

S/No.	Characteristic	Requirement		Test method
		Whole or pieces	Ground	
i)	Moisture % m/m, max.	12	10	ISO 939
ii)	Volatile oil ml/100 g %m/m, min.	1.5	1	ISO 6571
iii)	Total ash % m/m, max.	7	7	ISO 928
iv)	Acid insoluble ash % m/m, max.	1	1	ISO 930
v)	Chromate test	Negative	Negative	Annex A
vi)	Colouring power, expressed as curcuminoids content, % (m/m) on dry basis, min.	Not specified	2	Annex B
vii)	Extraneous matter, % m/m, max.	2		ISO 927

4.2.2 Turmeric powder shall be of such fineness that all of it passes through 300 - 500 micron sieve (0.300 - 0.500 mm) based on grades identified in 5.2.

5 Types and grades of turmeric

5.1 Turmeric whole and in pieces

Turmeric, whole shall be graded in accordance with column 2 of Table 2

Table 2 — Characteristics of various grades of turmeric whole

Type	Grade	Flexibility	Surface	Pieces, percent by mass max	Extraneous matter percent by mass max.	Defective rhizomes percent by mass max.	Percent of bulks, percent by mass max.
Fingers	Special	Hard to touch to break with a metallic twang	Free from wrinkles	2	0.5	0.5	1.0
	Good	Hard to touch to break with a metallic twang	Free from wrinkles	3	1.0	1.0	1.0
	Fair	Hard	Hard	5	1.5	1.5	5.0
Fingerlets		Hard to touch	-	6	4.0	4.0	5.0
Bulbs/rounds	Special	-	-	0.5	1.0	1.0	-
	Goods	-	-	1.0	3.0	3.0	-
	Fair	-	-	2.0	5.0	5.0	-

5.2 Ground turmeric

Ground (powdered) turmeric is graded according to its particle size into two types, as follows:

a) Coarse powder: 98 % of the product shall pass through a sieve of aperture size 500 microns;

b) Fine powder: 98 % of the product shall pass through a sieve of aperture size 300 microns.

6 Food additives

Turmeric, whole, in pieces and ground shall be free from added colouring matter, flavour and preservatives.

7 Contaminants

7.1 Pesticide residues

Pesticide residues in turmeric, whole, in pieces and ground shall not exceed maximum residue limit as established by the Codex Online Guideline for pesticide residues in food.

7.2 Heavy metal

Heavy metals in turmeric, whole, in pieces and ground shall not exceed maximum residue limit as stipulated in Codex Stan 193.

7.3 Aflatoxin limits.

Total aflatoxin shall not exceed 10 µg/L and aflatoxin B_1 shall not exceed 5 µg/L when tested with ISO 16050

8 Hygiene

Turmeric, whole, in pieces and ground shall be manufactured and handled in a hygienic manner in accordance with EAS 39 and shall conform to the microbiological limits stipulated in Table 3.

Table 3 — Microbiological limits for turmeric, whole, in pieces and ground

S/No.	Organism	Limit	Test method
i)	Total plate count, cfu/mL, max.	$1*10^5$	ISO 4833-1
ii)	Yeast and mould cfu/g, max.	$1*10^3$	ISO 7954
iii)	Salmonella spp. per 25 g, max.	Absent	ISO 6579
v)	*Escherichia coli* MPN/g, max.	Absent	ISO 7251

9 Weights and measures

The weight and fill of ginger, whole, in pieces and ground shall comply with the weights and measures regulations of Partner States or equivalent legislation.

10 Packaging

10.1 Turmeric shall be packed in clean and sound container made of food grade material and sealed with temper-proof seal. The container shall be made of a material which does not impart any smell, does not react with turmeric and protects it from ultra-violet radiation, ingress of moisture and loss of volatile matter

10.2 The packaging shall be easy to sterilize, shall not be a source of contamination, and shall protect the product safety and quality during transportation and storage.

10 Labelling

In addition to the requirements of EAS 38, the following specific labelling requirements shall apply and shall be legibly and indelibly marked:

a) Common name of the product

b) brand name or trade name if any;

c) name, physical location and address of manufacturer;

d) ingredients;

e) net weight;

f) date of manufacture/packing;

g) year of harvest for turmeric in whole and piece

h) batch identification number/code;

i) best before;

j) country of origin; and

k) storage condition.

11 Sampling

Sampling of turmeric, whole, in pieces and ground shall be done in accordance with ISO 948.

Annex A
(normative)

Chromate test

A.1 Reagents

A.1.1 Dilute sulphuric acid (1:7 by volume)

A.1.2 Diphenyl Carbozide Solution- 0.2% (W/v) in ethyl alcohol (95%v/v)

A.2 Procedure

Ash about 2 g of the material. Dissolve the ash in 4 to 5 ml of dilute sulphuric acid in a test tube and add one millilitre of diphenyl carbozide solution. The presence of chromate is indicated by the production of violet colour.

Annex B
(normative)

Determination of colouring power of turmeric by spectrophotometric method

B.1 Definition

Colouring power of turmeric: The curcuminoids content of turmeric, expressed as curcumin as a percentage by mass.

B.2 Principle

Extraction of the Pigments of turmeric with hot ethanol, dilution of the extract and spectrophotometric measurement at the wavelength of maximum absorption (i.e. 425 nm).

B.3 Reagent

B.3.1 Ethanol, 96 % (V/V).

B.4 Apparatus

Usual laboratory apparatus, and in particular

B.4.1 Round-bottomed extraction flask, of capacity 100 ml, fitted with a reflux condenser.

B.4.2 Pipette, of capacity 5 ml.

B.4.3 One-mark volumetric flasks, of capacities 100 and 250 ml.

B.4.4 Spectrophotometer, suitable for making measurements of absorbance at 425 nm.

B.4.5 Matched spectrophotometric cells (of silica), of optical path length 1 cm.

B.4.6 Analytical balance.

B.5 Test Portion

Weigh, to the nearest 0.001 g, about 0.5 g of the ground sample.

B.6 Determination

Place the test portion in the extraction flask (B.4.1), add 36 ml of the ethanol (B.3.1) and boil under reflux for 2.5 h. Allow the extract to cool and filter quantitatively into the 100 ml volumetric flask (B.4.3). Wash the residue on the filter thoroughly, collecting the washings in the volumetric flask. Dilute the contents of the flask to the mark with the ethanol (B.3.1). Transfer, by means of the pipette (B.4.1), 5 ml of the filtered extract to the 250 ml volumetric flask (B.4.3). Dilute to the mark with the ethanol. Fill one of the

spectrophotometric cells (B.4.5) with this solution and fill the other with the ethanol. Measure the absorbance (R) at 425 nm using the ethanol as the reference liquid.

B.7 Expression of results

The colouring power of turmeric, expressed as curcumin as a percentage by mass, is equal to

$$\frac{A \times D \times 100}{E^{1\%}_{1\ cm} \times m}$$

$$= \frac{A \times D \times 100}{1607 \times m}$$

where

A - is the measured absorbance;

D - is the dilution of the extract, i.e.

$$\frac{100}{5} \times \frac{250}{100}$$

$E^{1\%}_{1\ cm}$ - is the specific absorbance of a 1 % solution of curcumin measured at 425 nm in cells of Optical path length 1 cm, i.e. 1 607;

m - is the mass, in grams, of the test portion

NOTE The result may also be expressed on the dry basis by means of the formula

$$= \frac{A \times D \times 100 \times 100}{1607 \times m \times (100-H)}$$

where H is the moisture content of the Sample, expressed as a percentage by mass.

B.8 Test report

The test report shall show the method used and the results obtained.

It shall also mention all operating conditions not specified in this standard, or regarded as optional, as well as any circumstances likely to have influenced the results.

The test report shall include all the information necessary for the complete identification of the sample

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