ETHIOPIAN STANDARD

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Dried fruits – Specification

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Foreword

This Ethiopian Standard has been prepared under the direction of the Technical committee for fruit and vegetable (TC-13) and published by Ethiopian Standard Agency (ESA).

The standard has been developed to address observed needs and to support the local industry in order to make progress through upraising competitiveness and maintain comparative market advantage both domestically and internationally.

In the preparation of this standard reference has been made to the following:

KS 2786: 2018*, Dried fruits – Specification.*
CAC RCP 3, *Recommended international code of hygienic practice for dried fruits.*
CAC/GL 66, *Guidelines for the use of Flavourings.*
Codex Stan 192, *General Standard for Food Additives.*
Codex Stan 193, *General Standard for contaminants and toxins in food and feed.*

Acknowledgment has been made for the use of information from the above publications.

Dried Fruits - Specifications

1. Scope

This Ethiopian Standard specifies requirements and methods of test and sampling for dried fruits and which are offered for direct consumption or further processing, including for catering purposes or for repackaging if required.

2. Normative References

The following referenced documents are indispensable for the application 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.

CES 73, General standard for prepackaged foods - Labeling.

ES 577, Recommended code of practice - General principle of food hygiene.

ES ISO 763, Fruit and vegetable products - Determination of ash insoluble in hydrochloric acid.

ES ISO 874, Fresh fruits and vegetables - Sampling.

ES 929, Code of practice-food hygiene management.

ES ISO 2447, Fruits, vegetables and derived products - Determination of tin content.

ES 2834, ES 2834, Sampling plans for prepackaged foods (AQL6.5).

ES ISO 4125, Dry fruits and dried fruits - Definitions and nomenclature.

ES ISO 4832, Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of Coliforms - Colony-count technique.

ES ISO 4833-1, Microbiology of the food chain - Horizontal method for the enumeration of microorganisms - Part 1: Colony count at 30 ^{0}C by the pour plate technique.

ES ISO 5522, Fruits, vegetables and derived products - Determination of total sulphur dioxide content.

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

ES ISO 6579-3, Microbiology of the food chain - Horizontal method for the detection, Enumeration and serotyping of Salmonella - Part 3 Guidelines for serotyping of Salmonella spp.

ES I SO 6633, F ruits, v egetables and der ived pr oducts - Determination of l ead c ontent - Flameless a tomic absorption spectrometric method.

ES I SO 6637, F ruits, v egetables an d der ived p roducts - Determination of m ercury c ontent - Flameless at omic absorption method.

ES I SO 6 888-1, M icrobiology of f ood and ani mal f eeding s tuffs - Horizontal m ethod f or t he enum eration of coagulase-p-staphylococci (Staphylococcus aur eus and other s pecies) - Part 1: T echnique us ing B aird - Parker agar medium.

ES I SO 6 888-2, M icrobiology of f ood and ani mal f eeding s tuffs - Horizontal m ethod f or t he enum eration of coagulase-p-staphylococci (Staphylococcus aureus and ot her species) - Part 2: T echnique u sing r abbit pl asma fibrinogen agar medium.

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

ES ISO 17239, Fruits, vegetables and derived products - Determination of arsenic content - Method using hydride generation atomic absorption spectrometry.

ES 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.

ES ISO 21527-2, Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of yeasts and moulds - Part 2: Colony count technique in products with water activity less than or equal to 0.95.

ES ISO 21567, Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Shigella spp.

ES ISO 21872-1, Microbiology of the food chain - Horizontal method for the determination of Vibrio spp. - Part 1: Detection of potentially enteropathogenic Vibrio parahaemolyticus, Vibrio cholerae and Vibrio vulnificus.

ES ISO 22002-1, Prerequisite programmes on food safety - Part 1 Food manufacturing.

3. Terms and definitions

For the purposes of this standard, the terms and definitions given in ES ISO 4125 shall apply.

3.1 Product definition

3.1.1 Dehydrated/Dried fruits are the products:

a) Prepared from edible parts of suitable varieties of named sound fruit, free from blemishes, insect or fungal infection, of appropriate maturity, from which, moisture has been removed, under controlled conditions of temperature, humidity and airflow, to the extent that the product is preserved.

b) It may be whole, sliced, cubed/diced, chunks, chips, trips, bulbs/balls, crisps, flakes, quarters, pieces or powdered. When in powder form, it shall be free flowing and free from agglomerates. other presentation such as leathers, rolls or sheets of the product may be used provided that the product:

i. Is sufficiently distinctive from other forms of presentation laid down in this standard;

ii. Meets all relevant requirements of this standard; and,

iii. Is adequately described on the label to avoid confusing or misleading the consumer

c) The product may contain permitted food additives

d) Dry fruits can be certain nuts or kernels, drupes, legumes, capsules and/or follicles.

4. Ingredients

4.1 Basic Ingredients

Fruits as defined in clause 3

Examples of the commonly dried fruits are but not limited to those listed in Annex **A**

4.2 Optional ingredients

These include other edible material as may be appropriate to stuffing the product provided it is suitable for consumption.

5. Requirements

5.1 General Requirements

5.1.1 Colour, odour and flavour

Dried fruits shall have characteristic colour, flavour and odour of dried fruits, corresponding to the type and variety of the named fruit and shall possess and maintain the product's essential texture, physical, chemical and nutritional characteristics of the fruit(s).

5.1.2 Moulds, insects etc.

The finished product shall be free from living insects, mites or other parasites and moulds, and shall be practically free from dead insects, insect fragments and rodent contamination visible to the naked eye (corrected, if necessary, for abnormal Vision) or with such magnification as may be necessary in any particular case. If the magnification exceeds x 10, this fact shall be stated in the test report.

5.1.3 Extraneous matter

Dried fruits shall be practically free from extraneous matter including soil, dirt, twigs, bits of wood and

loose stalks, peel(where applicable) , stems, calyx, peduncle and leaves or any other foreign matter.

5.2 Chemical requirements

Dried fruits shall conform to the requirements given in Table 1 below.

Table 1 - Requirement for dried fruits

Characteristic	Requirement	Test Methods
Moisture, % (m/m), Max.	20	Annex B
Acid insoluble ash, % (m/m) on dry basis, Max.	0.1	ES ISO 763
Residual sulfur dioxide, mg/kg, Max.	2 000	ES ISO 5522
Water activity a_w	0.7%	--

On-chemically preserved dried mangoes shall have a moisture content that does not exceed 10 % (m/m). Non-chemically preserved dried mangoes shall have a moisture content that does not exceed 10 % (m/m).

6. Food Additives

Colours, Carbohydrate sweeteners, preservatives and nutritive carbohydrates used shall be in accordance to the *General Standard for Food Additives* (Codex Stan 192-1995)
Flavourings used in dried fruits should comply with the Guidelines for the Use of Flavourings (CAC/GL 66- 200).

7. Contaminants

The products covered by this Standard shall comply with the maximum levels of the General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995).

7.1 Pesticide residues

The products covered by this Standard shall comply with the maximum residue limits for pesticides established by the Codex Alimentarius Commission.

7.2 Heavy Metal Contaminants

The products covered by the provisions of this standard shall conform to those maximum limits for Heavy metals contaminants established by the Codex Alimentarius Commission for these products in Table 2 below.

Table 2- Heavy metals maximum limits for Dried fruits

Contaminants	Limit (mg/kg, Max.)	Test Methods
Arsenic (as As)	0.2	ES ISO 17239
Lead (as Pb)	1.0	ES ISO 6633
Tin (as Sn)	250	ES ISO 2447
Mercury (as Hg)	0.01	ES ISO 6637
Cadmium (as Cd)	0.05	ES ISO 6561-2

8. Hygiene

8.1 Dried fruits shall be manufactured and handled in a hygienic manner in accordance with ES 577, ES 929, ES ISO 22002-1 and CAC RCP 3:1969.

8.2 Dried fruits shall be free of pathogenic microorganisms and shall conform to the microbiological requirements in Table 3 below.

Table 3 - Microbiological limits

Microorganism	Limit	Test Methods
Total plate count, cfu/g, Max.	2×10^4	ES ISO 4833-1
Escherichia coli, cfu/g	Absent	ES ISO 7251
Staphylococcus aureas, cfu/25g	Absent	ES ISO 6888-1, ES ISO 6888-2
Shigella, cfu/25g	Absent	ES ISO 21567

Salmonella, cfu/25g	Absent	ES ISO 6579-3
Coliforms, cfu/g	Absent	ES ISO 4832
Vibrio cholera, cfu/25g	Absent	ES ISO 21872-1
Yeast and Moulds, cfu/25g	Absent	ES ISO 21527-1, ES ISO 21527- 2

9. Packaging and Labeling

9.1 Packaging

9.1.1 Dried fruits shall be packed which shall be clean, sound, free from insects and fungi infection and the packing material shall be of food grade quality.

9.1.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odor or flavor to the product.

Note 1. Packaging materials may be required to meet different regulations in Ethiopia.

9.2 Labelling

The labeling shall comply with the requirements of CES 73, and shall be legibly and indelibly marked with the following:

a) The name of the product:
The name of the product as declared on the label shall be Dried (X) fruits or Dried (X) fruits where X is the name of the dried fruit;

b) Name and physical and postal address of manufacturer, exporter/importer;

c) Batch or identification code;

d) Net weight in Kgs;

e) Expiry date;

f) List of ingredients;

g) Storage instruction;

h) Country of origin;

i) Date of manufacture;

j) Any other information required by the purchaser.

10. Methods of Sampling

Sampling of dehydrated vegetables shall be done in accordance with ES ISO 874.

ANNEX A

List of the fruits most commonly traded as dry fruits

Botanical name of the plant	Common name of the fruit
Anacardium occidentale L.	Cashew nut, bean of Malaca
Amygdalus communis L. syn. Prunus tenela Batsch	Almond
Arachis hypogaea L.	Peanut, Groundnut
	Brazil nut, Para nut,
Canarium ovatum Engelm.	Pili nut
* Canarium commune L.	Java almond, Pili, Pilaway
* Carya ilfinoiensis	Shagbark hickory
(Wangenh.) K. Koch	Souari nut, Butternut
* Carya a/ba (L.) Nutt.	Chestnut, Sweet chestnut
* Caryocar nuciferum L.	I-lazelnut, Cob-nut
Castanea sativa Miller	Oleaster, Russian Olive
Cera tonia siliqua L .	Java almond, Pili, Pilaway
Cocos nucifera L.	S hagbark hickory
Corylus avellana L.	Souari nut, Butternut
Corylus maxima Miller	Chestnut, Sweet chestnut
Eiaeagnus angustifolia L.	I-lazelnut, Cob-nut
Juglans regia L.	walnut
* L ecythis unsitata L.	Sapucaia nut
* L ecythis oflaria L.	Sapucaia nut, Monkeypot
* Lecythis lanciolata Aublet	Macadamia nut,
* Lecythis ternifolia Mueller	Queensland nut
Macadamia ternifofia F. Mueller	Sapucaia nut, Monkeypot
Pinus pinea L.	Pine nut
Pistacia Vera L.	Pistachio nut
Pistacia terebin thus L.	Terebinth berry
Prunus armeniaca L.	Apricot kernel
Prunus marhaleb L Syn. Cerasus mahaleb miller	Mahaleb cherry
Ribes grossularia L. syn. Ribes uva-crispa L.	Gooseberry
Ribes nigrum L.	Blackcurrant
Ribes rubrum L. syn. Ribes silvestre Lam.	Red currant, White currant
Rubus fruticosus L	Blackberry
Rubus idaeus L.	Raspberry
Vaccinium myrtilius L.	Bilberry
Vitis vinifera L	Grape, Raisinz), Sultana2), Currant2)
Zizyphus jujuba (Lam.) Miller	Jujube, Chinese date
Zizyphus vulgaris Lam.	Common juju be
	Apples
	Apricots
	Bananas
	Cherries
	Coconuts
	Figs
	Nectarines
	Peaches

	Pears
	Pineapples
	plums
	Dates
	Mangoes
Botanical names preceded by an asterisk have not yet been stabilized by the Inter-national Seed Testing Association (ISTA). The stabilized plant names given are in accordance with /STA List of Stabilized Plant names.3rd edition. Zurich: The International Seed Testing Association, 1988.	

ANNEX B

DETERMINATION OF MOISTURE CONTENT

C1. PRINCIPLE

Heating and drying of a test portion of dried fruit at a temperature of 70 ºC ± 1 ^{0}C under a pressure not exceeding 13 kPa (100 mm Hg).

C2. APPARATUS

Usual laboratory equipment and, in particular, the following:

C2.1 Electric Oven — Capable of being maintained at 70 ^{0}C ± 1 ^{0}C at a pressure of 13 kPa (100 mm/Hg).

C2.2 Dish — Of corrosion-resistant metal, of diameter about 8.5 cm, with tight-fitting lid.

C2.3 Fruit Chopper — Made of a material which does not absorb moisture.

C2.4 Desiccator — Containing an effective desiccant.

C2.5 Steam Bath

C2.6 Sand

C2.7 Analytical Balance — Capable of an accuracy of ± 0.01 g.

C3. PREPARATION OF TEST SAMPLE

Take approximately 50 g of dried mango and pass it through the fruit chopper (**C2.3**) three times, mixing thoroughly after each grinding. Keep it in a completely filled, airtight, closed container to prevent absorption of water.

C4. PROCEDURE

NOTE: If it is required to check whether the repeatability requirement is met, carry out two determinations in accordance with **C4.1** to **C4.3** under repeatability conditions.

C4.1 Preparation of Dish and Lid — Add about 2 g of the sand (**C2.6**) to the dish (**C2.2**) and dry, with the lid, for 2 h in the oven (**C2.1**) set at 70 ^{0}C. Leave to cool to room temperature in the desiccator (**C2.4**) and weigh to the nearest 0.01 g. Repeat the same drying procedure until a constant weight is achieved.

C4.2 Test Portion — Weigh, to the nearest 0.02 g, about 5 g of the test sample (**C3**) and spread this test portion as evenly as possible over the bottom of the dish containing the sand (**C4.1**).

C4.3 Determination — Moisten the portion and the sand thoroughly with a few milliliters of hot water. Mix the test portion and sand with a spatula. Wash the sample residue on the spatula into the dish with the minimum volume of hot water. Heat the open dish on the steam bath (**C2.5**) to evaporate the water to dryness. Then put the dish, with the lid alongside, in the oven (**C2.1**) set at 70 ºC and continue drying for 6 h under a pressure not exceeding 13 kPa (100 mm/Hg). Do not open the oven during this period. During drying, admit to the oven a slow current of air (about 2 bubbles per second) dried by passing through sulphuric acid. The metal dish shall be placed in direct contact with the metal shelf of the oven. After drying, remove the dish, cover it immediately with its lid and place it in the desiccator (**C2.4**). After cooling to room temperature, weigh it, still covered, to the nearest 0.02 g.

C5. Calculation

The moisture content, expressed as a percentage by mass, of the test portion is equal to

$$\frac{m_1 - m_2}{m_1 - m_o} \times 100$$

where

m_o = the mass, in g, of the dish with its lid and the sand;

m_1 = the mass, in g, of the dish with its lid and the sand with the test portion before moistening and oven-drying;

m_2 = the mass, in g, of the dish with its lid and the sand with the test portion after oven-drying.

Give the result to one decimal place.

C6. REPEATABILITY

The absolute difference between two independent single test results obtained using the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, should not be greater than 0.2 g of water per 100 g of sample.

C 7. TEST REPORT

The test report shall specify

(i) the method in accordance with which sampling was carried out, if known;

(ii) the method used;

(iii) the test result obtained;

(iv) if the repeatability has been checked, the final quoted result obtained.

It shall also mention all operating details not specified in this standard, or regarded as optional, together with details of any incidents which may have influenced the test result.

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

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Ethiopian Standards Agency

Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010.ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1998.

ESA's objectives are:-

- ❖ Develop Ethiopian standards and establish a system that enable to check whether goods and services are in compliance with the required standards,
- ❖ Facilitate the country's technology transfer through the use of standards,
- ❖ Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational Institutions, research institutes, government or ganizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/ or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.
Orders for all Ethiopian Standards, International Standard and ASTM standards, including electronic versions, should be addressed to the Documentation and Publication Team at the Head office and Branch (Liaisons) offices. A catalogue of Ethiopian Standards is also available freely and can be accessed in from our website.

International Involvement

ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the International Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM).It is a founding member of the African Regional Organization for standardization (ARSO).

<u>More Information</u>?
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