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# Dried fruits — Specification

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# Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Tourism, Trade and Industry established under Cap 327, of the Laws of Uganda. UNBS is mandated to co-ordinate the elaboration of standards and is

(a) a member of International Organisation for Standardisation (ISO) and

(b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and

(c) the National Enquiry Point on TBT/SPS Agreements of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of representatives of consumers, traders, academicians, manufacturers, government and other stakeholders.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

**Committee membership**

The following organisations were represented on the Technical Committee TC 2 on Agricultural and Food Products during the preparation of this standard:

- Africa 2000 Network
- Department of Food science and Technology Makerere University
- Flona Commodities Limited
- Fruits of the Nile (U) Ltd
- Horticultural Exporters Association of Uganda
- National Organic Agricultural Movement of Uganda
- Uganda Export Promotion Board
- Uganda National Farmers Federation
- Ministry of Tourism, Trade and Industry
- Uganda Consumer Protection Association

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# Dried fruits — Specification

## 1 Scope

This Uganda Standard specifies requirements and methods of sampling and test for tropical dried fruits and other fruits which have been suitably treated and which are offered for direct consumption or further processing.

It also covers dried fruits which are packaged in bulk containers and which are intended for repackaging into consumer size containers or for direct sale to consumers.

This draft standard applies to fruits below;

- mango, *Mangifera spp.*;
- banana, *Musa spp.*;
- pawpaw, *Carica spp.* (papaya);
- pineapple, *Ananas spp.*;
- jackfruit, *Artocarpus spp.*;
- guava, *Psidium guajava;* and
- others fruits such as apples as may be applicable.

## 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.

US 7, *General standard for labeling of prepackaged foods*

US 28, *Code of practice for hygiene in the food and drink manufacturing industry*

US 45, *General standard for food additives*

US 217-2, *Methods for the Microbiological Examination of Foods — Part 2: General Guidance for the Enumeration of Micro-Organisms-Colony Count Technique at 30 °C*

US 500, *General requirements for nutrition labelling*

US 508, *General requirements for nutrition and health claims*

US 566, *Use of nutrition terms — Requirements*

US 570, *Code of hygienic practice for dried fruits*

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US 738, *General standard for contaminants and toxins in foods*

US ISO 762, Fruit and vegetable products — Determination of mineral impurities content

US ISO 2447, *Fruit and vegetable products — Determination of tin content*

US ISO 3094*, Fruit and vegetable products — Determination of copper content — Photometric method*

US ISO 4125, *Dry fruits and dried fruits — Definitions and nomenclature*

US ISO 6633, *Fruit and vegetable products — Determination of lead content — Flameless atomic absorption spectrometric method*

US ISO 6634, *Fruit and vegetable products — Determination of arsenic content — Silver diethyldithiocarbamate spectrophotometric method*

US ISO 6636-3, *Fruit and vegetable products — Determination of zinc content — Dithizone spectrometric method*

US ISO 6637, *Fruit and vegetable products — Determination of mercury content — Flameless atomic absorption method*

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

US 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*

## 3 Terms and definitions

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

## 4 Description

### 4.1 Product definition

Dried fruit is the product:

a) prepared from sound ripe fruit of varieties characteristic of the named fruit; and

b) processed by drying either by the sun or by other recognized methods of dehydration, which may be preceded by sulphuring, with or without added sweetening agent and food additives, into a form of marketable dried product.

### 4.2 Presentation

The product shall be presented in one of the following styles:

- slices;
- cubes/dices;
- chunks, chips and strips;
- bulbs/balls;

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- flakes; and
- crisps.

### 4.3 Other styles

Any other presentation such as leathers, rolls or sheets of the product may be used provided that the product:

a) is sufficiently distinctive from other forms of presentation laid down in this standard;

b) meets all relevant requirements of this standard; and,

c) is adequately described on the label to avoid confusing or misleading the consumer.

## 5 Requirements

### 5.1 Basic ingredients

Fruit to be used shall be fresh, sound, clean and at an appropriate level of maturity conforming to the characteristics of the fruits and of a quality suitable for human consumption.

### 5.2 Optional ingredients

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

### 5.3 General quality requirements

#### 5.3.1 Colour, odour and flavour

Dried fruits shall have their characteristics colour, odour and flavour. They shall be free from off-odour, off-flavour and foreign taste including rancidity and mustiness.

#### 5.3.2 Moulds and insects

Dried fruits shall be free from moulds and insect infestation when examined visually.

#### 5.3.3 Extraneous matter

Dried fruits shall be practically free from extraneous matter including clay pieces and loose stalks, when examined visually.

### 5.4 Chemical requirements

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

**Table 1 — Requirement for dried tropical fruits**

| Characteristic | Requirement | Method of test |
|---|---|---|
| Moisture, % (m/m), max | 25 | Annex B |
| Acid insoluble ash, % (m/m), (on dry basis), max. | 0.1 | US ISO 762 |

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## 6 Food additives

Food additives such sweeteners, preservatives and nutritive carbohydrates may be used in accordance with US 45.

## 7 Contaminants

### 7.1 Heavy metals

Dried fruits shall conform to the tolerance limits for heavy metals given in Table 2

**Table 2 — Tolerance limits for trace metals in dried fruits**

| Heavy metal | Maximum limits, mg/kg | Method of test |
|---|---|---|
| Lead | 1 | US ISO 6633 |
| Zinc (Zn) | 1.5 | US ISO 6636-3 |
| Mercury (Hg) | 0.05 | US 242 ISO 6637 |
| Copper (Cu) | 1.5 | US ISO 3094 |

### 7.2 Pesticide residue

Dried fruits shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

### 7.3 Mycotoxins

Dried fruits shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity, US 738.

## 8 Hygiene

Dried fruits shall be produced and handled in accordance with US 570 and US 28. The products shall conform to the requirements for microbiological limits in Table 2.

**Table 3 — Requirements for microbiological limits in dried fruits**

| Microbiological parameter | Required limit | Method of test |
|---|---|---|
| Total plate, cfu/g, max. | 50 000 | US 217-2 |
| E coli, cfu/g, max. | < 1 | US ISO 7251 |
| Yeast and moulds, cfu/g, max | 2000 | US ISO 21527-2 |


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## 9 Packaging

Dried fruits shall be packed in clean food grade containers, made of a material which does not affect the products and which protects it from moisture, and from loss of volatile matter.

The container shall protect the product from any form of contamination.

## 10 Weights and measures

Containers shall be as full as practicable without impairment of quality and shall be consistent with a proper declaration of contents for the product.

## 11 Labelling

Dried fruits shall be labelled in accordance with the requirements of US 7. In addition the following specific provisions shall apply:

a) the name of the product as declared on the label shall be "Dried XXX fruit", where XXX is the name of the dried fruit;

b) there shall appear on the label as part of the name or in close proximity to the name, the form of presentation as indicated below:

   i. slices;

   ii. cubes/dices;

   iii. chunks, chips and strips;

   iv. bulbs/balls;

   v. flakes;

   vi. crisps; and

   vii. other styles, if the product is produced in accordance with the other styles provision the label shall contain in close proximity to the name of the product such additional words or phrases that will avoid misleading or confusing the consumer.

Nutritional labelling, nutrition and health claims may be made in accordance with US 500, US 508 and US 566.

## 12 Sampling

Representative samples of the material shall be drawn and tested for conformity to this specification as prescribed in Annex A.

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# Annex A
(normative)

# Sampling of dried fruits

## A.1 Definitions

### A.1.1 Package

Individually packaged part of a lot, including contents so as to facilitate handling and transport of a number of sales units or of products loose or arranged, in order to prevent damage by physical handling and transport. Road, rail, ship and air containers are not considered as packages.

### A.1.2 Sales package

Individually packaged part of a lot, including contents, which is so as to constitute a sales unit to the final user or consumer at the point of purchase

### A.1.3 Pre-packages

Pre-packages are sales packages such as the packaging which encloses the foodstuff completely or only partially, but in such a way that the contents cannot be altered without opening or changing the packaging. Protective films covering single product are not considered as a pre-package.

### A.1.4 Consignment

Quantity of product to be sold by a given trader found at the time of inspection and defined by a document. A consignment may consist of one or several types of product; it may contain one or several lots of dried fruit.

### A.1.5 Lot

Quantity of product which, at the time of inspection at one place, has similar characteristics with regard to:

a) packer and/or dispatcher;

b) country of origin;

c) nature of product;

d) class of product;

e) size (if the product is graded according to size);

f) variety or commercial type (according to the relevant provisions of the standard); and

g) type of packaging and presentation.

If it is difficult to distinguish between different lots and/or presentation of individual lots is not possible, all lots of a specific consignment may be treated as one lot if they are similar in regard to type of product, dispatcher, country of origin, class and variety or commercial type, if this is provided for in the relevant marketing standard.


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### A.1.6 Sampling

Collective samples taken temporarily from a lot during conformity check

#### A.1.6.1 Primary sample

Package taken at random from the lot, in case of packed product or, in case of bulk product (direct loading into a transport vehicle or compartment thereof), a quantity taken at random from a point in the lot

#### A.1.6.2 Bulk sample

Several primary samples supposed to be representative for the lot so that the total quantity is sufficient to allow the assessment of the lot with regard to all criteria

#### A.1.6.3 Secondary sample

An equal quantity of product taken at random from the primary sample. The secondary sample shall comprise 30 units, in case the net weight of the package is 25 kg or less and the package does not contain any sales packages. In certain cases this means that the whole content of the package has to be checked, if the primary sample contains not more than 30 units.

#### A.1.6.4 Composite sample

A composite sample is a mix, weighing at least 3 kg, of all the secondary samples taken from the bulk sample. Product in the composite sample shall be evenly mixed.

#### A.1.6.5 Reduced sample

Quantity of product taken at random from the bulk or composite sample whose size is restricted to the minimum quantity necessary but sufficient to allow the assessment of certain individual criteria.

If the inspection method would destroy the product, the size of the reduced sample shall not exceed 10 % of the bulk sample. In the case of small dry or dried products (that is, 100 g include more than 100 units) the reduced sample shall not exceed 300 g.

Several reduced samples may be taken from a bulk or composite sample in order to check the conformity of the lot against different criteria.

## A.2 Sampling method

### A.2.1 Identification of lots and/or getting a general impression of the consignment

The identification of lots shall be carried out on the basis of their marking or other criteria. In the case of consignments which are made up of several lots it is necessary for the inspector to get a general impression of the consignment with the aid of accompanying documents or declarations concerning the consignments. The inspector shall then determine how far the lots presented comply with the information in these documents.

If the product is to be or has been loaded onto a means of transport, the registration number of the latter shall be used for identification of the consignment.

### A.2.2 Presentation of product

The inspector shall decide which packages are to be checked. The presentation shall be made by the operator and shall include the presentation of the bulk sample as well as the supply of all information necessary for the identification of the consignment or lot.

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If reduced or secondary samples are required, these shall be identified by the inspector from the bulk sample.

The inspector shall determine the size of the bulk sample in such way as to be able to assess the lot. The inspector selects at random the packages to be inspected or in the case of bulk product the points of the lot from which individual samples shall be taken.

Care shall be taken to ensure that the removal of samples does not adversely affect the quality of the product.

Damaged packages shall not be used as part of the bulk sample. They shall be set aside and may, if necessary, be subject to a separate examination and report.

The bulk sample shall comprise the following minimum quantities whenever a lot is declared unsatisfactory or the risk of a product not conforming to the standard has to be examined:

| **Number of packages in the lot** | **Number of packages to be taken (primary samples)** |
|---|---|
| **Packaged products** | |
| Up to 100 | 5 |
| From 101 to 300 | 7 |
| From 301 to 500 | 9 |
| From 501 to 1 000 | 10 |
| More than 1 000 | 15 (minimum) |
| **Product in bulk** | |
| **Quantity of lot in kg or number of bundles in the lot** | **Quantity of primary samples in kg or number of bundles** |
| Up to 200 | 10 |
| From 201 to 500 | 20 |
| From 501 to 1 000 | 30 |
| From 1 001 to 5 000 | 60 |
| More than 5 000 | 100 (minimum) |

In the case of bulky dried fruit and vegetables (over 2 kg per unit), the primary samples shall be made up of at least five units. In the case of lots comprising fewer than five packages or weighing less than 10 kg, the check shall cover the entire lot.

If the inspector discovers, after an inspection, that a decision cannot be reached, another physical check shall be undertaken and the overall result reported as an average of the two checks.

### A.2.3 Control of product

In case of packed product, the primary samples shall be used to check the general appearance of the product, the presentation, the cleanliness of the packages and the labelling. In all other cases, these checks shall be done on basis of the lot or transport vehicle.

The product shall be removed entirely from its packaging for the conformity check. The inspector may only dispense with this where the sampling is based on composite samples.

The inspection of uniformity, minimum requirements, quality classes and size shall be carried out on the basis of the bulk sample, or on the basis of the composite sample.


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When defects are detected, the inspector shall ascertain the respective percentage of the product not in conformity with the standard by number or weight.

External defects shall be checked on the basis of the bulk or composite sample. Certain criteria on the degree of development and/or ripeness or on the presence or absence of internal defects may be checked on the basis of reduced samples. The check based on the reduced sample applies in particular to checks which destroy the trade value of the product.

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# Annex B
(normative)

# Determination of the moisture content for dry fruit

NOTE This method is the same as that prescribed by the AOAC: Official Methods of Analysis, XIIIth edition, 1980, 22.013 - Moisture in Dried Fruits, Official Final Action.

## B.1 Definition

The moisture content of dried fruit is defined as being the loss of mass determined under the experimental conditions described in this annex.

## B.2 Principle

The principle of the method is the heating and drying of a sample of dried fruit at a temperature of 70 °C + 1°C at a pressure not exceeding 100 mm Hg.

## B.3 Apparatus

Usual laboratory apparatus is used together with the following items:

a) **Electrically heated constant-temperature oven**, capable of being controlled at 70°C + 1°C at a pressure of 100 mm Hg

b) **Dishes with lids**, of corrosion-resistant metal of about 8.5 cm in diameter

c) **Mincer**, either hand or mechanically operated

d) **Desiccator**, containing an effective desiccant

e) **Precision balance**

## B.4 Procedure

### B.4.1 Preparation of the sample

Take approximately 50 g of dried fruit from the laboratory sample, and mince these twice with the mincer.

### B.4.2 Test portion

Place 2 g of finely divided asbestos into the dish, tare the dish with its lid and the asbestos, dried beforehand. Weigh, to the nearest 0.01 g about 5 g of prepared sample.

NOTE Dried sand which has previously been washed in hydrochloric acid and then rinsed thoroughly with water may be used in the place of the asbestos. Analysts using this technique should note that it is a deviation from the AOAC procedure, and should mention this in their report.


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### B.4.3 Determination

Moisten the sample and the asbestos thoroughly with a few millilitres of hot water. Mix the sample and the asbestos together with a spatula. Wash the spatula with hot water to remove the sample residues from it, letting the residues and the water fall into the dish.

Heat the open dish on a boiling-water bath (bain-marie) to evaporate the water to dryness. Then place the dish, with the lid alongside it, in the oven and continue drying for six hours at 70 °C under a pressure not exceeding 100 mm Hg, during which time the oven should not be opened. During drying admit a slow current of air (about two bubbles per second) to the oven, the air having been dried by passing through $H_2S0_4$. The metal dish must 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. After cooling to ambient temperature, weigh the covered dish to the nearest 0.01 g.

## B.5 Calculation and expression of results

The moisture content of the sample, as percentage by mass is calculated as follows:

$$\text{Moisture content} = 100 \times \frac{(M_1 - M_2)}{(M_1 - M_0)}$$

where:

$M_0$ is the mass, in grams, of the empty dish with its lid and containing the asbestos;

$M_l$ is the mass, in grams, of the dish with its lid, asbestos and test portion before drying; and

$M_2$ is the mass, in grams, of the dish with its lid after drying.

The results are expressed to one decimal place.

Duplicate determinations should agree to 0.2 % moisture.

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# Bibliography

Kenya Standard, KS 1740:2001, *Specification for dried mangoes*


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