

# DRAFT UGANDA STANDARD

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## Macadamia kernels — Specification

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The Executive Director  
Uganda National Bureau of Standards  
P.O. Box 6329  
Kampala  
Uganda  
Tel: +256 414 333 250/1/2/3  
Fax: +256 414 286 123  
E-mail: [info@unbs.go.ug](mailto:info@unbs.go.ug)  
Web: [www.unbs.go.ug](http://www.unbs.go.ug)

## Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to coordinate 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 Agreement 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 key stakeholders including government, academia, consumer groups, private sector and other interested parties.

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.

The committee responsible for this document is Technical Committee UNBS/TC 2, *[food and agriculture ]*, Subcommittee SC2, *[Edible oil seeds , fats and oils ]*.

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# Macadamia kernels— Specification

## 1 Scope

This Draft Uganda Standard specifies requirements and methods of sampling and test for macadamia kernels of varieties grown from *Macadamia integrifolia*, *Macadamia tetraphylla*, *Macadamia ternifolia* -Maiden & E.Betche, and their hybrids, intended for human consumption.

## 2 Normative references

The following referenced documents 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.

EAS 38, *Labeling of prepackaged foods — Specification*

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

US ISO 542, *Oilseeds -- Sampling*

US ISO 605, *Pulses -- Determination of impurities, size, foreign odours, insects, and species and variety -- Test methods*

US ISO 659, *Oilseeds -- Determination of oil content (Reference method)*

US ISO 665, *Oilseeds- Determination of moisture and volatile matter content*

US ISO 729, *Oilseeds -- Determination of acidity of oils*

US ISO 12193,, *Animal and vegetable fats and oils -- Determination of lead by direct graphite furnace atomic absorption spectroscopy*

US ISO 16050, *Foodstuffs-Determination of aflatoxin B<sub>1</sub>, and the total content of aflatoxins B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub> and G<sub>2</sub> in Cereals, nuts and derived products-High performance liquid chromatographic method*

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

US ISO 15774, *Animal and vegetable fats and oils — Determination of cadmium content by direct graphite furnace atomic absorption spectrometry*

## 3 Terms and definitions

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

### 3.1

#### **macadamia kernels**

decorticated kernels which have not been subjected to any heat treatment

### 3.2

#### **whole kernel**

kernel that is not split or separated into halves, and not more than ¼ of the kernel is chipped off or missing

### 3.3

#### **half kernel/split**

kernel with not more than 1/8 of its size chipped off or missing

### 3.5

#### **piece**

unit of a kernel which is less than half a kernel

### 3.6

#### **clean kernel**

kernel which is practically free from dirt or other foreign material.

### 3.7

#### **extraneous matter**

organic materials other than the macadamia kernels and other kernels; and inorganic materials

### 3.8

#### **defective/damaged kernels**

kernels of any or all of the following:

- a) kernels that have extraneous adhering matter attached on;
- b) pest damaged kernels;
- c) immature kernels;
- d) disease damaged
- e) weather-damaged kernels.

#### **3.8.1**

##### **adhering matter**

extraneous matter on the surface of the kernel causing permanent discoloration

#### **3.8.2**

##### **pest damaged kernels**

kernels which show damage or owing attack by rodents, insects, mites or other pests

#### **3.8.2**

##### **shrunken/shriveled kernels**

kernels which are underdeveloped with a slight to complete withering of the outer surface of the kernel and or are shriveled.

#### **3.8.3**

##### **disease damaged**

Kernels which are affected by mould growth, rotting, or bacterial decomposition, or other causes that may be noticed without having to cut the grains to examine them

**3.9****Off-flavour**

odour or flavour which is not characteristic of macadamia kernels and which appreciably affect the eating quality of the kernel

**4 Quality requirements****4.1 General requirements**

In all classes, subject to the special provisions for each class and the tolerances allowed, the macadamia kernel shall:

- a) have colour characteristic of variety.
- b) be free from off- flavor
- c) be free from living pests whatever their stage of development

**4.2 Specific quality requirements**

Macadamia kernels shall conform to the requirements/limits stipulated in Table 1.

**Table 1 — Requirements limits for macadamia kernels**

Characteristic	Limits	Test method
Moisture content, % m/m, max.	2.0	US ISO 665
Oil content on dry weight basis, %	70	US ISO 659
Filth, % m/m, max	0.1	US ISO 605
Free fatty acid, % m/m, max calculated as oleic acid	0.5	US ISO 729

**4.3 Classification**

Macadamia kernels may be classified into the following classes:

- a) Class I; and
- b) Class II.

When classified, the macadamia kernels shall conform to the requirements for the class I and class II in Table 2

**Table 2 — Specific requirements for each class**

Defects allowed	Tolerances allowed (% of defective kernels, by number or weight)		Test method
	Class I	Class II	
(a) Tolerances for general requirements			US ISO 605
Shrunken/shriveled	3	5	
Disease damaged	Nil	Nil	
Pest damaged kernels	1.5	2	
Living pests	0	0	
(b) Size tolerances			
-For produce not conforming to the size indicated, if sized+	7	7	
(c) Tolerances for other defects			
Macadamia kernels belonging to other varieties/types than those indicated on the package (Contrasting varieties)	10	10	
Extraneous matter	1	2	

## 5 Size classification

Sizing of macadamia kernels is optional. However, when sized, size is determined by the maximum diameter of the equatorial section of the whole nut or by widest diameter of the designated style size requirements.

In case style designations are used the provisions in Table 3 shall apply:

**Table 3-Designation of styles for macadamia kernels**

Style	Size
1	2
Style 0 (Wholes)	Minimum 95 % whole kernel, with the remaining 5 % consisting of pieces of which no more than 1% will pass through a 6.25mm (¼ inch) square opening.
Style I (Wholes)	Minimum 90 % whole kernel, with the remaining 10 % consisting of pieces of which no more than 1% will pass through a 6.25mm (¼ inch) square opening.
Style II ( Wholes and Halves)	Minimum 50 % whole kernel, with the remaining 50 % consisting of pieces of which no more than 2% will pass through a 7.8mm (5/16 inch) square opening.
Style III ( Cocktail)	Minimum 90 % half or larger kernel, included therein at least 15 % whole kernel, with the remaining percentage consisting of pieces of which no more than 2% will pass through a 6.25mm (¼ inch) square opening.
Style IV ( Halves and Pieces)	Minimum 50 % half kernels, with the remaining percentage consisting of pieces of which no more than 5% larger than the half kernels.



Style V ( Large Diced)	Shall consists of units which are smaller than half kernels but of such that no more than 5% will pass through a 7.8mm X 25mm (1/5 inch X 3/32 inch) opening and not more than 2% will pass through a 2.34 mm (3/32 inch) square opening.
Style VI ( Chips)	Shall consists of units which are smaller than half kernels but of such that no more than 5% will pass through a 7.8mm X 25mm (1/5 inch X 3/32 inch) opening and not more than 2% will pass through a 2.34 mm (3/32 inch opening).
Style VII ( Bits and Diced)	Minimum 90 % whole kernel, with the remaining 10 % consisting of pieces of which no more than 1% will pass through a 6.25mm square opening.
Style VIII ( Fines)	Shall consists of broken, chipped or chopped kernels of such size that all unit will pass through a 6.25mm(¼ inch) square opening and most will also pass through a 2.34mm (3/32 inch) square opening.

## 8 Contaminants

### 8.1 Pesticide residues

Macadamia kernels shall conform to those maximum residue limits for pesticide residues established by Codex Alimentarius Commission for this commodity.

### 8.2 Heavy metals

Macadamia kernels shall be free from heavy metals in amounts which may represent a hazard to health. If present, they shall not exceed the limits established in Table 4.

**Table 4 — Heavy metal contaminant limits**

S/N	Parameter	Limits	Test method
i)	Arsenic (As), ppm, max.	0.10	US ISO 17239
iii)	Lead (Pb), ppm, max.	0.10	US ISO 12193
iv)	Cadmium (Cd), ppm, max.	0.02	US ISO 15774

### 8.3 Aflatoxins

Total aflatoxin levels in Macadamia kernels for human consumption shall not exceed 10 ppb with aflatoxin B<sub>2</sub> not exceeding 5 ppb when tested according to ISO 16050.

## 9 Hygiene

Macadamia kernels shall be handled in hygienic manner in accordance with EAS 39.

## 10 Packaging

**10.1** Macadamia kernels may be sold packaged or loose. When packaged Macadamia kernels shall be packaged in such a way as to protect the produce from mechanical, heat and frost damage.

**10.2** Macadamia kernels shall be packaged in food grade materials that will safeguard the hygienic, nutritional, technological and organoleptic qualities of the produce.

**10.3** The contents of each package shall be uniform and contain only macadamia kernels of the same origin, quality, size (if sized) and variety or commercial type (if indicated).

## 11 Weights and Measures

The weight of the package of the product shall comply with Weights and Measures regulations of the importing Partner State.

## 12 Labelling

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

- a) name of the produce as “ Macadamia kernels ”
- b) name and location address of the exporter and/or packer shall be declared;
- c) country of origin
- d) Class
- e) net weight
- f) lot identification ( batch number)
- g) Storage conditions

**12.2** When labelling non-retail packages, information for non-retail packages shall either be given on the packages or in accompanying documents, except that the name of the produce, lot identification and the name and address of the manufacturer or packer shall appear on the package.

## 13 Sampling

Sampling shall be done in accordance with US ISO 542

## Bibliography

- [1] RS 170, *Macadamia kernel — Specification*

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## Certification marking

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