

**RWANDA
STANDARD**

**DRS
170**

Second edition

2018-mm-dd

Macadamia kernels — Specification



Reference number

DRS 170:2018

© RSB 2018

In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

© RSB 2018

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without prior written permission from RSB.

Requests for permission to reproduce this document should be addressed to:

Rwanda Standards Board

P.O Box 7099 Kigali-Rwanda

KK 15 Rd, 49

Tel. +250 788303492

Toll Free: 3250

E-mail: info@rsb.gov.rw

Website: www.rsb.gov.rw

ePortal: www.portal.rsb.gov.rw

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Requirements	3
4.1 Classification	3
4.2 General requirements	3
4.3 Specific requirements	4
5 Contaminants	4
5.1 Pesticide residues	4
5.2 Heavy metals	4
6 Mycotoxin limits	4
7 Hygiene	4
8 Packaging	5
9 Weights and measures	5
10 Labelling	5
11 Sampling	5
Annex A (normative) Determination of moisture content in macadamia kernels	6
A.1 Procedure	6
Annex B (normative) Determination of oil content	7
B.1 Reagents	7
B.2 Procedure	7
B.3 Calculation and expression of results	7
Annex C (informative) Provisions concerning sizing	8
C.1 Sizing	8
C.2 Presentation	9

Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 170 was prepared by Technical Committee RSB/TC 016, *Fresh fruits and vegetables*.

In the preparation of this standard, reference was made to the following standard (s):

- 1) KS 868: 2009 - Macadamia kernels — Specification

The assistance derived from the above source is hereby acknowledged with thanks.

This second edition cancels and replaces the first edition (RS 170:2012), which has been technically revised.

Committee membership

The following organizations were represented on the Technical Committee on Fresh fruits and vegetables (RSB/TC 016) in the preparation of this standard.

Enterprise Urwibutso

FRESHCO

National Agricultural Export Development Board (NAEB)

NORELGA Macadamia

PEBEC Ltd

Rwanda Nuts Company

SORWATOM

Rwanda Standards Board (RSB) – Secretariat

Macadamia kernels — Specification

1 Scope

This Draft Rwanda Standard specifies the requirements, sampling and test methods for macadamia kernels of varieties (cultivars) grown from *Macadamia integrifolia*, *Macadamia tetraphylla*, *Macadamia ternifolia* and their hybrids.

This standard does not apply to macadamia kernels that are processed by salting, sugaring, flavouring or roasting or for industrial processing of macadamia product other than food.

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 999.10, *Lead, Cadmium, Copper, Iron, and Zinc in foods, Atomic Absorption Spectrophotometry after microwave digestion*

RS CAC/RCP1, *Code of Practice — General Principle for food Hygiene*

RS EAS 38, *Labelling of pre-packaged foods*

RS 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*

RS ISO 16649-2, *Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli -- Part 2: Colony-count technique at 44 degrees C using 5-bromo-4-chloro-3-indolyl beta-D-glucuronide*

RS ISO 4833-1, *Microbiology of the food chain -- Horizontal method for the enumeration of microorganisms -- Part 1: Colony count at 30 degrees C by the pour plate technique*

RS ISO 6579-1, *Microbiology of the food chain -- Horizontal method for the detection, enumeration and serotyping of Salmonella -- Part 1: Detection of Salmonella spp.*

3 Terms and definitions

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

3.1

macadamia kernel

shelled or decorticated and/or dry macadamia

3.2

whole kernel

kernel which has not lost more than $\frac{1}{4}$ of it

3.3

half kernel

Approximately half of a whole kernel, with not more than $\frac{1}{8}$ of its mass chipped off or missing

3.4

piece

kernel which is less than half a kernel

3.5

extraneous matter

inorganic and organic matter other than macadamia kernels

3.6

defective kernels

defective kernels mean any or all of the following:

- a) kernels with adherings of extraneous matter;
- b) insect damaged kernels;
- c) diseased kernels (rotten, decayed or mould kernels);
- d) rancid kernels;
- e) immature kernels;
- f) heat damaged kernels;
- g) weather-damaged kernels.

4 Requirements

4.1 Classification

In accordance with the defects allowed, macadamia kernels shall be classified into the following classes as specified in Table 1:

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

Table 1 — Specific requirements for each class

Defects allowed	Tolerances allowed (percentage of defective kernels, number by number or mass by mass)		Test method
	Class I	Class II	
Not sufficiently developed, shrunken and shrivelled	3	5	EAS 901 Clause 4
Mouldy	Absent	Absent	
Rancid or damaged by pests, rotting or deterioration	1.5	2	
Off-odour or off-flavour by any cause	Absent	Absent	
(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	10	10	
[Foreign matter, loose shells, shell fragments, fragments of hull, particles of the shell, dust (by weight)]	Absent	Absent	

4.2 General requirements

Macadamia kernel shall:

- a) have characteristic colour;
- b) have the characteristic flavour of the fresh macadamia kernels;

- c) be free from surface oil and dust; and
- d) be free from live insects, insect fragments and mites;

4.3 Specific requirements

Macadamia kernels shall comply with the requirements stipulated in Table 2 when tested in accordance with test methods specified therein.

Table 2 — Specific requirements limits for macadamia kernels

S/N	Characteristic	Limits	Test method
i.	Moisture content, %, m/m, max.	2.0	Annex A
ii.	Oil content on dry weight basis, %, m/m, min.	70	Annex B

5 Contaminants

5.1 Pesticide residues

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

5.2 Heavy metals

Macadamia kernels shall not contain heavy metals in amounts which can represent a hazard to human health and shall comply with the limits in Table 3. when tested in accordance with test methods specified therein.

Table 3 — Heavy metals contaminant limits

S/N	Heavy metal	Maximum limit mg/kg	Test method
i.	Lead (Pb),	0.10	AOAC 999.10
ii.	Cadmium (Cd),	0.02	

6 Mycotoxin limits

Total aflatoxin levels in macadamia kernels for human consumption shall not exceed 10 µg/kg and aflatoxin B1 shall not exceed 5 µg/kg when tested in accordance with ISO 16050.

7 Hygiene

7.1 Macadamia kernels shall be handled in hygienic manner in accordance with RS CAC/RCP 1.

7.2 Macadamia kernels shall comply with the microbiological limits given in Table 4 when tested in accordance with test methods specified therein.

Table 4 — Microbiological limits for macadamia kernels

S/N	Microorganisms	Maximum limit	Test Method
i.	Total plate count, CFU/g	10 ⁴	RS ISO 4833-1
ii.	<i>Escherichia coli</i> , CFU/g	<1	RS ISO 16649-2
iii.	<i>Salmonella spp</i> in 25g	absent	RS ISO 6579-1

8 Packaging

8.1 Macadamia kernels shall be packaged in food grade materials that will safeguard the hygienic, nutritional, technological and organoleptic qualities of the produce. They shall be packaged in such a way to protect the product from mechanical, heat and frost damage.

8.2 The packaging materials shall conform to the environmental legislation of the destination country.

9 Weights and measures

Macadamia kernels shall be packaged in accordance with the national weights and measurement regulations and environmental requirements in the destination country.

10 Labelling

In addition to the requirements of EAS 38, the following information 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;
- c) country of origin
- d) net weight
- e) lot identification (batch number);
- f) packing date;
- g) expiry date; and
- h) Storage conditions.

11 Sampling

Sampling shall be done in accordance with RS ISO 24333.

Annex A (normative)

Determination of moisture content in macadamia kernels

A.1 Procedure

A.1.1 Weigh accurately about 10 g of the material in a suitable moisture dish previously dried in an electric oven and weighed. Place the dish in a vacuum oven at 95 °C to 100 °C under pressure 100 mm/Hg. Cool the dish in a desiccator and weigh with the lid on. Repeat the process of heating, cooling and weighing at halfhour intervals until the loss in weight between two successive weighings is less than 1 mg. Record the lowest weight obtained.

A.1.2 Calculation and expression of results, moisture % by mass

$$\frac{(m_1 - m_2)}{(m_1 - m_3)} \times 100$$

where,

m_1 is the mass in g of the dish and sample before drying;

m_2 is the mass in g of the dish and sample after drying; and

m_3 is the mass in g of the dish only

Annex B (normative)

Determination of oil content

B.1 Reagents

B.1.1 Petroleum ether, of boiling range 40 °C to 60 °C.

B.1.2 Hexane, food grade.

B.2 Procedure

Weigh accurately about 2.5 g of the sample, dried as described under A.1.1, and extract with petroleum ether or hexane, food grade, in a Soxhlet or other suitable extractor. The extraction period may vary from 4 h at a condensation rate of 5.6 drops per second. Dry the extract on a steam bath for 30 min., cool in a desiccator and weigh. Continue at 30 min. intervals this alternative drying and weighing until the difference between two successive weighing is less than 1 mg.

Note the lowest mass.

B.3 Calculation and expression of results

Crude fat (on moisture-free basis), % by mass=

$$100 \frac{(m_1 - m_2)}{m_3}$$

where,

m_1 is the mass in g of the extraction flask with dried extract;

m_2 is the mass in g of extraction flask; and

m_3 is the mass in g of the dried sample for the test.

Annex C (informative)

Provisions concerning sizing

C.1 Sizing

C.1.1 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.

C.1.2 In case style designations are used; the following provisions apply:

C.1.2.1 Style 0 - (Wholes) shall consist of not less than 98 % whole kernels with the remaining percentage consisting of pieces of which not more than 1 % will pass through > 21 mm (1/4 inch) square opening.

C.1.2.2 Style I - (Wholes) shall consist of not less than 95 % whole kernels, with the remaining percentage consisting of pieces of which no more than 1 % will pass through between 19 mm to 21 mm (¾ inch) square opening.

C.1.2.3 Style II - (Wholes and halves) shall consist of at least 50 % whole kernels, with the remaining percentage consisting of pieces of which no more than 2 % will pass through a 7.8-mm (5/16 inch) square opening.

C.1.2.4 Style III - (Cocktail) shall consist of at least 90 % half or larger kernels, included therein at least 15 % whole kernels, with the remaining percentage consisting of pieces of which no more than 2 % will pass through a 6.25-mm (¼ inch) opening.

C.1.2.5 Style IV - (Halves and pieces) shall consist of at least 50 % half kernels, with the remaining percentage consisting of pieces with no more than 5 % larger than half kernels.

C.1.2.6 Style V - (Large diced) shall consist of units which are smaller than half kernels but of such size that no more than 5 % will pass through a 7.8-mm x 25 mm (5/16-inch x 1 inch) opening, included therein not more than 2 % that will pass through a 2.34-mm (3/32 inch) square opening.

C.1.2.7 Style VI - (Chips) shall consist of units of such size that at least 95 % will pass through a 7.8-mm x 25 mm (5/16-inch x 1 inch) opening but no more than 2 % will pass through a 3/32-inch square opening.

C.1.2.8 Style VII - (Bits and diced) shall consist of units which are smaller than half kernels and of such size that at least 95 % will pass through a 7.8-mm (5/16 inch) square opening but no more than 10 % will pass through a 2.34-mm (3/32 inch) square opening.

C.1.2.9 Style VIII - (Fines) shall consists of broken, chipped or chopped kernels of such size that all units will pass through a 6.25-mm (¼ inch) square opening and most will also pass through a 2.34p-mm (3/32 inch) square opening.

C.2 Presentation

C.2.1 The contents of each package shall be uniform and contain only macadamia kernels of the same, quality, size (if sized) and variety or commercial type (if indicated).

C.2.2 The visible part of the contents of the package shall be representative of its entire contents.

Copy for public comments

Copy for public comments