

DRAFT KENYA STANDARD

DKS 2996:2024

ICS 67.200

First Edition

Edible macadamia oil — Specification



**Kenya Bureau of
Standards**

Standards for Quality life

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Government Chemists Department

Agriculture and Food Authority (AFA) — Nuts and Oil Crops Directorate (NOCD)

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Foreword

This Kenya Standard was prepared by the Edible fats and oils Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards

This standard addresses the quality and safety requirements necessary to produce a safe product for human consumption. The development of this standard also seeks to promote local production, consumption, and trade of edible macadamia oil to reduce the overreliance on importation. Additionally, the standard specifies requirements for both virgin and refined (non-virgin) macadamia oils giving distinct quality and safety requirements for each.

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

CXS 19: Standard for Edible Fats and Oils not Covered by Individual Standards

Asian Journal of Agriculture and Food Sciences Vol. 11 No. 2

Chemistry Connection Macadamia Nut Oil Technical Data Sheet

HortScience Vol. 54 (4) Assessing Fatty Acid profiles of Macadamia Nuts

Processes 2022, Chemistry and Functionality of Cold-Pressed Macadamia Oil

Acknowledgement is hereby made for the assistance derived from these sources

PUBLIC REVIEW DRAFT

Edible macadamia oil — Specification

1 Scope

This draft Kenya standard specifies requirements, sampling and test methods for virgin and refined macadamia oil derived from the kernel of the macadamia nuts of varieties grown from *Macadamia integrifolia* and *Macadamia tetraphylla*, 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.

CXG 66, Guidelines for the Use of Flavourings

CXS 192, General Standard for Food Additives

KS EAS 38, Labelling of prepackaged foods — Specification

KS EAS 39, Hygiene in the food and drink manufacturing industry — Code of Practice

KS EAS 769, Fortified edible fats and oils — Specification

KS EAS 803, Nutrition Labelling — Requirements

KS EAS 804, Claims — General requirements

KS EAS 805, Use of nutrition and health claims — Requirements

KS ISO 660, Animal and vegetable fats and oils — Determination of acid value and acidity

KS ISO 661, Animal and vegetable fats and oils — Preparation of test sample

KS ISO 662, Animal and Vegetable fats and oils — Determination of moisture and volatile matter content

KS ISO 663, Animal and vegetable fats and oils — Determination of insoluble impurities content

KS ISO 3657, Animal and vegetable fats and oils — Determination of saponification value

KS ISO 3960, Animal and vegetable fats and oils — Determination of peroxide value

KS ISO 3961, Animal and vegetable fats and oils — Determination of iodine value

KS ISO 5555, Animal and vegetable fats and oils — Sampling

KS ISO 6320, Animal and vegetable fats and oils — Determination of refractive index

KS ISO 6883, Animal and vegetable fats and oils — Determination of conventional mass per volume (litre weight in air)

KS ISO 10539, Animal and vegetable fats and oils — Determination of alkalinity

KS ISO 12193, Animal and vegetable fats and oils — Determination of lead by direct graphite furnace atomic absorption spectroscopy

KS ISO 13547 -2, Copper, lead, zinc and nickel sulfide concentrates — Determination of arsenic Part 2: Acid digestion and by inductively coupled plasma atomic emission and spectrometric method

KS 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

ISO 21033, Animal and vegetable fats and oils — Determination of trace elements by inductively coupled plasma optical emission spectroscopy (ICP-OES)

3 Terms and definitions

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

3.1

virgin macadamia oil

edible macadamia oil obtained without altering its nature that may be obtained by use of mechanical procedures such as expelling or pressing, with or without the application of heat and without the use of solvents. It may have been purified by washing with water, settling, filtering and/or centrifuging only.

3.2

refined (non-virgin) macadamia oil

edible macadamia oil obtained by mechanical procedures and/or solvent extraction and subjected to refining processes.

3.3

foreign matter

any undesirable material visible with naked eye in a packaged macadamia oil.

3.4

food grade packaging material

packaging material, made of substances which are safe and suitable for the intended use and which will not impart any toxic substance or undesirable odour or flavour to the product.

4 Requirements

4.1 General requirements

Edible macadamia oil shall:

- a) be free from foreign matter
- b) be free from rancid or undesirable odour and/or taste.
- c) have colour characteristic of macadamia oil.

4.2 Specific requirements

Edible macadamia oil shall comply with the specific requirements given in Table 1, when tested in accordance with the methods specified therein.

Table 1 — Specific compositional and quality requirements for edible macadamia oil

| S/N | Characteristic | Requirement | Test method |
|-------|---|---------------|--------------|
| i) | Moisture and Volatile matter at 105 °C, % m/m, max. | 0.2 | KS ISO 662 |
| ii) | Insoluble impurities, % m/m, max. | 0.05 | KS ISO 663 |
| iii) | Soap Content, % m/m, max. | 0.005 | KS ISO 10539 |
| iv) | Acid value, (mg/KOH/g (max). | | KS ISO 660 |
| | Virgin | 4.0 | |
| | Refined | 0.6 | |
| v) | Peroxide value, (mEq oxygen/kg (max.)) | | KS ISO 3960 |
| | Virgin | 15 | |
| | Refined | 10 | |
| vi) | Iron (Fe) mg/kg, max.\ | | ISO 21033 |
| | Virgin | 5.0 | |
| | Refined | 2.5 | |
| vii) | Copper, mg/kg, max. | | |
| | Virgin | 0.4 | |
| | Refined | 0.1 | |
| viii) | Iodine Value gI_2 per 100g | 65-85 | KS ISO 3961 |
| ix) | Saponification value, mg KOH/g oil | 190-200 | KS ISO 3657 |
| x) | Refractive index, at 20°C | 1.460 - 1.470 | KS ISO 6320 |
| xi) | Relative density at 20 °C | 0.905-0.920 | KS ISO 6883 |

5 Fortification

Edible refined macadamia oil may be fortified. Where fortification of edible macadamia oil is done, it shall be in accordance with KS EAS 769

6 Food additives

6.1 Edible virgin macadamia oil shall not contain food additives.

6.2 Food additives when used in edible refined macadamia oil shall comply with CXS 192

7 Flavouring agents

7.1 Edible virgin macadamia oil shall not contain flavouring agents

7.2 Flavouring agents when used in edible refined macadamia oil shall comply with CXG 66.

8 Contaminants

8.1 Pesticide residues

Edible macadamia oil shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity.

8.2 Heavy metal contaminants

Edible macadamia oil shall comply with the maximum limits of heavy metals as specified in Table 2 when tested in accordance with the test methods therein.

Table 2 — Heavy metal contaminants limits in Edible macadamia oil

| S/N | Contaminant (mg/kg) | Max. limit | Test method |
|-----|---------------------|------------|-----------------|
| i) | Lead (Pb) | 0.08 | KS ISO 12193 |
| ii) | Arsenic (As) | 0.1 | KS ISO 13547 -2 |

8.3 Aflatoxins

Aflatoxin levels in edible macadamia oil shall not exceed the limits given in Table 3 when tested in accordance with the test method specified therein.

Table 3 — Aflatoxin limits for edible macadamia oil

| S/No. | Characteristic | Maximum limit µg/kg | Test method |
|-------|-----------------|------------------------|--------------|
| i. | Total aflatoxin | 10 | KS ISO 16050 |
| ii. | Aflatoxin B1 | 5 | |

9 Hygiene

Edible macadamia oil shall be produced, processed, handled, and stored in accordance with KS EAS 39.

10 Packaging

Edible macadamia oil shall be packaged in food grade packaging material and sealed in a manner that will safeguard the hygienic, nutritional, and organoleptic properties of the product.

11 Labelling

In addition to the labelling requirements specified in KS EAS 38, the following information shall be legibly and indelibly labelled;

- a) name of the product as Macadamia oil
- b) type of the oil as
 - i). Virgin
 - ii). Refined (Non-virgin)

12 Nutrition and health claims

Edible macadamia oil may have claims on nutrition and health. Such claims when declared shall comply with KS EAS 803, KS EAS 804 and KS EAS 805

13 Sampling

Sampling and sample preparation for test shall be done in accordance with KS 1SO 5555 and KS ISO 661 respectively.

Annex A
(informative)

Gas Liquid Chromatography (GLC) fatty acid composition

When required the fatty acid profile should be determined by Gas Liquid Chromatography. Ranges of fatty acids are as given in Table A.1.

Table A.1 — GLC fatty acid composition for edible macadamia oil

| Carbon configuration | Composition, % |
|----------------------|----------------|
| C12:0 | < 0.1 |
| C14:0 | < 1.5 |
| C16:0 | 7.0 – 12.0 |
| C16:1 | 14.0-25.0 |
| C17:0 | < 0.2 |
| C17:1 | < 0.1 |
| C18:0 | 2.0 – 6.0 |
| C18:1 | 50.0 – 70.0 |
| C18:2 | 1.0 – 5.0 |
| C18:3 | < 1.0 |
| C20:0 | 1.5 – 3.0 |
| C20:1 | 1.5- 3.0 |
| C22:0 | < 1.0 |
| C22:1 | < 1.0 |
| C24:0 | < 0.5 |

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