NORTHERN CORRIDORSTANDARD NC 4:2018

Roasted Macadamia – Specification

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1 Scope

This Northern corridor Standard specifies the requirements, methods of sampling and testing for roasted macadamia of varieties (cultivars) grown from *Macadamia integrifolia, Macadamia tetraphylla and Macadamia ternifolia,* and their hybrids intended for direct consumption

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.

CODEX STAN 192, *general standard for food additives*

EAS 35, *Edible salt — Specification*

EAS 38, *Labeling of prepackaged foods — Specification*

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

ISO 542:1990, Oilseeds -- Sampling

ISO 735, Oilseed residues -- Determination of ash insoluble in hydrochloric acid

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

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

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

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

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella spp.*

*ISO 16050***,** *Foodstuffs — Determination of aflatoxin B_1, and the total content of aflatoxins B_1, B_2, G_1 and G_2 in cereals, nuts and derived products — High-performance liquid chromatographic method*

ISO 27107, *Animal and vegetable fats and oils — Determination of peroxide value — Potentiometric end-point determination*

3 Terms and definitions

For the purpose of this standard, the terms and definition in the standard for macadamia kernels and the following terms and definitions shall apply:

3.1

roasted macadamia

kernels which have been subjected to heat by dry or wet roasting and to which salt or other food ingredients may have been added

4 Requirements

4.1 General requirements

Roasted Macadamia shall have characteristic colour and be free from off-flavour

4.2 Macademia Kernels

Macadamia kernels for roasting shall conform to the standard for Macadamia kernels

4.3 Specific quality requirements

Roasted Macadamia shall comply with the requirements stipulated in Table 1.

Table 1 — Limits for Roasted macadamia

Characteristic	limit	Test method
Moisture content, % m/m, max.	1.5	ISO 1026
Acid insoluble ash (roasted and salted), % m/m, max.	0.5	ISO 735
Peroxide value, max. , meq/kg	3	ISO 3960

4.4 Grading

Roasted Macadamia may be graded. When graded the macadamia shall conform to the grades in Table 2.

Table 2 — Grades for Roasted Macadamia

S/N	Grade	Description	Whole kernel percentage	Size range (m/m)
i	Premium	Whole kernels	100	25 to 15
ii	Popular	Wholes and halves	min. 50	17 to 10
iii	Cocktail	Wholes and halves	11 to 49	17 to 10
iv	Medium	Halves and pieces	Max. 10	12 to 4
v	Chips	Pieces and bits	None	5 to 0.5
[a] Tolerance — Up to 5 % by mass of the next lower grade.				

5 Food additives

Roasted Macadamia may be preserved by using food additives complying with CODEX STAN 192.

6 Contaminants

6.1 Pesticide residues

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

6.2 Heavy metals

Roasted macadamia shall be free from heavy metals in amounts which may represent a hazard to health. Heavy metal contaminants, if present, shall not exceed the limits stipulated in Table 3.

Table 3 — Heavy metal contaminant limits

SL No.	Parameter	Maximum Limits	Test method
i)	Arsenic (As), ppm,	0.1	ISO 17239
iii)	Lead (Pb), ppm,	0.10	ISO 12193
iv)	Cadmium (Cd), ppm,	0.02	ISO 15774

6.3 Aflatoxin

Roasted macadamia kernels shall conform to those maximum limits for aflatoxin stated in Table 4

Table 4- Limits for aflatoxin in roasted macadamia kernels

SN	Aflatoxin type	Limits, µg/kg, max.	Methods of test
1	Aflatoxin B_1	5	ISO 16050
2	Total Aflatoxins	10	

7 Hygiene

Roasted Macadamia shall be handled in hygienic manner in accordance with EAS 39. Roasted Macadamia shall conform to the microbiological limits in Table 5

Table 5 — Microbiological limits for Roasted Macadamia

SL No.	Micro-organism	Maximum limits	Test method
i)	*Escherichia coli,* cfu/g	Absent	ISO 7251
ii)	*Salmonellae,* in *25g*	Absent	ISO 6579

9 Packaging

9.1 Roasted Macadamia may be sold packaged or loose. Packaged macadamia kernels shall be packaged in such a way to protect the produce from mechanical, heat and frost damage. Macadamia kernels shall be packaged in food grade materials that will safeguard the hygienic, nutritional, technological and organoleptic qualities of the produce.

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

10 Weights and measures

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

11 Labelling

11.1 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 product shall be “Roasted Macadamia

b) name of the product shall be “Roasted Macadamia”;
c) name and location address of the exporter and/or packer shall be declared;
d) country of origin;
e) Net weight;
f) lot identification (batch number);
g) declaration of ingredients, if used;

h) expiry date;
i) grade; and
j) storage instructions.

12 Sampling

Sampling shall be done in accordance to ISO 542.

Annex A
(normative)

Determination of moisture content

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 ^{0}C to 100 ^{0}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 half-hour 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

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

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 of 40 ^{0}C to 60 ^{0}C.

B.1.2 Hezane of food grade.

B.2 Procedure

Weigh accurately about 2.5 g of the sample, dried as described under A1.1, and extract with petroleum ether or hexane, food grade, in a Soxhlet or other suitable extractor. The extraction period may vary from 4h 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 weighings 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
(normative)

Determination of free fatty acid

C.1 Apparatus

Soxhlet fat extraction apparatus.

C.2 Reagents

C.2.1 Petroleum, ether, distilling below 65 ^{0}C, or ethylether.

C.2.2 Alcohol potassium hydroxide, 0.1N (use absolute or alcohol denatured with MeOH).

C2.3 Alcohol-ether mixture, equal volumes of 96 % alcohol and ethyl ether.

C.2.4 Phenolphathalein solution, one % in alcohol ether and add alcoholic KOH solution to a faint pink.

C.3 Procedure

C.3.1 Extract 10.00 ± 0.01 g of the sample taken in a thimble with petroleum ether for about 16 h in a Soxhlet extraction apparatus. Completely evaporate the solvent from extraction flask (weighed previously) on a steam bath, cool and weigh the Soxhlet flask with the residue and from the difference of the mass of fat obtained from the material. Dissolve the residue in the extraction flask with 50 ml of the alcohol-ether phenolphthalein solution. Titrate the dissolved extract, with standard potassium hydroxide solution to a faint pink colour which persists for 10s. If emulsion is formed during titration, dispel by adding second 50 ml portion of the alcohol-ether phenolphthalein solution.

C.3.2 Make a blank titration on 50 ml of the alcohol-ether phenolphthalein solution and subtract this value from the titration value of the sample. If the additional 50 ml portion of the alcohol-ether phenolphthalein solution is added, double the blank titration.

Annex D
(normative)

Determination of salt

D.1 Reagents

D.1.1 Acetone.

D.1.2 10 % calcium acetate solution.

D.1.3 $HNO_{3.}$

D.1.4 0,1 N $AgNO_{3.}$

D.1.5 FeAlum indicator.

D.1.6 0.1 N NH_4SCN.

D.2 Procedure

D.2.1 Weight 2 g of thoroughly mixed sample into a platinum or silica dish.

D.2.2 Disperse sample with 10 ml of acetone.

D.2.3 Remove acetone at room temperature, with air current.

D.2.4 Add, and thoroughly mix, 10 ml of 10 % calcium acetate.

D.2.5 Carefully dry on a steam bath.

D.2.6 Ash in a muffle oven at 550 ^{0}C (1022^{0}F) (complete ashing is not necessary).

D.2.7 Place ash in a beaker and dissolve ash in 25 ml HNO3 (1 + 3).

D.2.8 Add at least 2 - 4 ml of 0.1 N $AgNO_3$ that is just enough to precipitate all chloride present.

D.2.9 Add at least 5 ml of 0.1 N $AgNO_3$ in excess, to 8.

D.2.10 Heat to boil, cool, then add 5 ml FeAlum indicator.

D.2.11 Titrate excess Ag with 0.1 N NH4SCN (which has been standardized to equalize nomalities) to a permanent light brown end point.

D2.12 Subtract the amount of NH_4 SCN used (D.2.11) from the total $AgNO_3$ used in D.2.8 and D.2.9. The resulting difference is the ml of 0.1 N $AgNO_3$ used in the calculation of salt (D.2.13).

D.2.13 Calculate as % NaCl

$$= \frac{(\text{mL of 0.1N } AgNO_3)(0.058\,45)(100)}{}$$