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**Lentils — Specification**

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This African Standard was prepared by the ARSO Technical Committee on *Cereals, pulses and derived products* (ARSO/TC 12).

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ARSO Central Secretariat  
International House 3rd Floor  
P. O. Box 57363 — 00200 City Square  
NAIROBI, KENYA

Tel. +254-20-2224561, +254-20-3311641, +254-20-3311608

E-mail: [arso@arso-oran.org](mailto:arso@arso-oran.org)

Web: [www.arso-oran.org](http://www.arso-oran.org)

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ARSO Central Secretariat  
International House 3rd Floor  
P.O. Box 57363 — 00200 City Square  
NAIROBI, KENYA

Tel: +254-20-2224561, +254-20-3311641, +254-20-3311608

E-mail: [arso@arso-oran.org](mailto:arso@arso-oran.org)  
Web: [www.arso-oran.org](http://www.arso-oran.org)

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## Introduction

Lentils play a major role in food and nutritional security because of the high protein content of their seed. As is the case for many pulses, lentils play an important role as a rotation crop, enhancing soil fertility and providing other environmental services in production systems. Among lentil-producing developing countries, policies have not yet focused on lentil development needs to enhance food security and provide a remunerative rotation crop for cereals. Looking towards a future in which there is likely to be less water available to agriculture, climate change, food insecurity, rising costs for inorganic nitrogen fertilizer, and an increasingly nutrition-conscious society—collectively these give a bright future for a highly nutritious food produced by a nitrogen-fixing crop such as lentil adapted to the farming systems of marginal lands.

Lentils are part of the strategic food commodity basket recognized by the declaration of the African Union Food Security Summit held in December 2006 in Abuja, Nigeria. This standard was harmonized as part of the response by the resolution of the AU Food Security Summit to harmonize standards and grades for strategic food commodities as a means of promoting and facilitating intra-African food trade. Such facilitation would lead to free movement of food commodities from areas of surplus to areas of deficit, leading to overall achievement of food and nutrition security, food self-sufficiency and socioeconomic development of the African continent.

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## Lentils — Specification

### 1 Scope

This African Standard specifies the requirements and methods of sampling and test for shelled whole lentils of varieties (cultivars) grown from *Lens culinaris* Medic. Syn. *Lens esculenta* Moench. intended for human 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.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

AOAC Official Method 999.10:1999, *Determination of lead, cadmium, copper, iron and zinc in foods — Atomic absorption spectrophotometry after microwave digestion*

AOAC Official Method 999.11:1999, *Determination of lead, cadmium, copper, iron and zinc in foods — Atomic absorption spectrophotometry after dry ashing*

AOAC Official Method 2001.04, *Determination of Fumonisin B<sub>1</sub> and B<sub>2</sub> in corn and corn flakes — Liquid chromatography with immunoaffinity column cleanup*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

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

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

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

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 16050, *Foodstuffs — Determination of aflatoxin B<sub>1</sub>, and the total content of aflatoxin 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*

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*

ISO 24333, *Cereals and cereal products — Sampling*

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ISO 24557, *Pulses — Determination of moisture content — Air-oven method*

## 3 Terms and definitions

For the purpose of this standard the following definitions shall apply.

### 3.1

#### **lentils**

threshed seeds of the lentil plant (*Lens culinaris* Medic. Syn. *Lens esculenta* Moench)

### 3.2

#### **peeled, split and broken**

lentils which are otherwise sound but which are less than three-quarters of whole seeds or where less than one-half of the seed coat is intact

Note 1 to entry: Lentils with cracked or clipped seed coats are considered sound when the cotyledons are firmly held together.

### 3.3

#### **damaged lentils**

whole and pieces of lentils which are distinctly damaged by frost, weather, disease, heat (other than to a material extent), immature, or other causes, except weevil or material heat damage or are distinctly soiled or stained by nightshade, dirt, or toxic material or otherwise damaged in a way which materially affects quality.

NOTE    Kernels that are deformed are considered sound unless there is another reason for the damage beyond the deformity.

### 3.4

#### **defective lentils (total)**

weevil damaged lentils, heat-damaged lentils, damaged lentils, and split lentils

### 3.5

#### **foreign matter**

all organic and inorganic material (such as plant parts, sand, soil, glass, filth) other than lentils

### 3.6

#### **toxic, poisonous and/or harmful seeds**

any seed which if present in quantities above permissible limit may have damaging or dangerous effect on health, organoleptic properties or technological performance such as Jimson weed — *Datura* (*D. fastuosa* Linn and *D. stramonium* Linn.) corn cockle (*Agrostemma githago* L., *Machai Lallium remulenum* Linn.) Akra (*Vicia* species), *Argemone mexicana*, Khesari and other seeds that are commonly recognized as harmful to health

### 3.7

#### **whole lentils**

lentils with one-fourth or less of the cotyledons removed and with the remainder of the cotyledons firmly held together

### 3.8

#### **immature lentils**

lentils that do not have a traditional lens shaped profile due to immaturity. Immature lentils are characterized as having a thin or flat (wafer-like), wrinkled, and misshapen appearance. Lentils may also be discoloured.

### 3.9

#### **food grade packaging material**

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

## 4 Requirements

### 4.1 General requirements

Lentils shall meet the following general requirements/limits.

Lentils shall be:

- (a) mature dry seeds obtained from the plant botanically known as *Lens culinaris* Medic. Syn. *Lens esculenta* Moench;
- (b) clean, well-filled, wholesome, uniform in size, shape, colour;
- (c) free from substances which render them unfit for human consumption;
- (d) free from abnormal flavours, musty, sour or other undesirable odour, obnoxious smell and discolouration;
- (e) free of pests, live insects, animal droppings, fungus infestation, added colouring matter, moulds, impurities of plant and animal origin including insects, rodent hair and excreta and shall meet any other sanitary and phytosanitary requirements;
- (g) free from toxic or poisonous or harmful seeds that are commonly recognized as harmful to health.

## **4.2 Specific requirements**

### **4.2.1 Grading**

Lentils shall be graded into three grades on the basis of the tolerable limits established in Table 1 which shall be additional to the general requirements set out in this standard.

Table 1 — Specific requirements

Parameter		Requirement			Method of test
		Grade 1	Grade 2	Grade 3	
(1)	Foreign matter, max % m/m	0.2	0.5	1	ISO 605
(2)	Inorganic matter, max % m/m	0.1	0.2	0.5	
(3)	Broken/split lentils, max % m/m	2	3.5	5	
(4)	Pest damaged lentils, max % m/m	0.3	0.5	0.6	
(5)	Rotten & Diseased lentils, max % m/m	0.2	0.5	0.5	
(6)	Discoloured lentils, max % m/m	1	2	3	
(7)	Immature/shriveled grains, max % m/m	1	2	5	
(8)	Filth, max % m/m	0.1	0.1	0.1	
(9)	Total defective lentils, max % m/m	2	3.5	5	
(10)	Moisture, max % m/m	14.0	14.0	14.0	ISO 24557
(11)					
(12)					
(13)					
NOTE 1 The parameter, total defective lentils is not the sum total of the individual defects. It is limited to 70% of the sum total of individual defects.					
N					

## 5 Contaminants

### 5.1 Heavy metals

Lentils shall comply with those maximum limits for metal contaminants specified in CODEX STAN 193 and in particular those listed in Table 2.

Table 2 — Heavy metal contaminants

S/N	Parameter	Limit (ppm max)	Test method
(1)	Lead (Pb)	0.1	AOAC 999.11 or AOAC 999.10
(2)	Cadmium (Cd)	0.1	AOAC 999.11 or AOAC 999.10

### 5.2 Pesticide residues

Lentils shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity

## 6 Hygiene

Lentils shall be produced and handled under hygienic conditions in accordance with ARS 53. .

## 7 Packaging

**7.1** Lentils shall be packaged in suitable packages which shall be clean, sound, free from insect, fungal infestation and the packaging material shall be of food grade quality and shall be securely closed and sealed.

**7.2** Lentils shall be packaged in food grade packaging materials which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.

**7.3** Each package shall contain lentils of the same type and of the same grade designation.

## **8 Labelling**

### **8.1 General**

The following specific labelling requirements shall apply and shall be legibly and indelibly marked in accordance with the requirements of ARS 56:

- (i) product name as "Lentils";
- (ii) variety and / or colour;
- (iii) grade;
- (iv) name, address and physical location of the producer/ packer/importer;
- (v) lot/batch/code number;
- (vi) net weight, in SI Units;
- (vii) the declaration "Food for Human Consumption"
- (viii) storage instruction as "Store in a cool and dry place away from any contaminants";
- (ix) crop year;
- (x) packing date;
- (xi) instructions on disposal of used package;
- (xii) country of origin;
- (xiii) a declaration on whether the lentils were genetically modified or not.
- (xiv) 'best before' date

### **8.2 Labelling of non-retail containers**

Information detailed in 8.1 shall be given either on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the processor or packer as well as storage instructions, shall appear on the container.

For products purchased for use by the buyer/retailer, at least the name of producer, lot number and/or 'crop year' shall be indicated on the container.

Lot identification and the name and address of the processor or packer may be replaced by an identification mark provided that such a mark is clearly identifiable with the accompanying documents.

## **9 Sampling methods**

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Sampling shall be done in accordance with the ISO 24333.

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## Bibliography

EAS 760:2012, *Lentils — Specification*

CODEX STAN 171:1989 (Rev.1:1995), *Standard for Certain Pulses*

*Lentils*, Official Grain Grading Guide, August 1, 2012, Canadian Grain Commission

*United States Standards for Lentils*, Effective December 19, 2008

Ethiopian Standard, ES 17:2001, *Pulses — Grading of lentils*

Australian Pulse Standards, 2012/2013: *Whole lentils — Minimum standards*



Lentil plants in farm



Red, yellow and green lentils



Lentil types



Mature lentil plant



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