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**Dry beans — Specification**

Public Review Draft for comments only — Not to be cited as African Standard



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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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## Introduction

Dry beans *Phaseolus spp.*, are the most important food legumes for direct consumption in Africa. Among major food crops, beans have one of the highest levels of variation in growth habit, seed characteristics (size, shape, colour), maturity, and adaptation. Dry beans are harvested mature and dry. The common bean is grown for its green leaves, green pods, and immature and/or dry seeds. The dry seeds of *P. vulgaris* are the ultimate economic part of the bean plant. They are appreciated throughout the developing world because they have a long storage life, good nutritional properties and can be easily stored and prepared for eating.

Dry beans have been characterized as a nearly perfect food because of their high protein, fibre, probiotic, vitamin B, and diverse micronutrient content. Dry beans are used throughout the world representing 50 % of the grain legumes consumed as a human food source.

Consumption of dry beans has also increased over the past few years due to the potential link of bean rich diets to lower risks of multiple diseases

Dry beans is distributed in a variety of forms, such as whole unprocessed seeds, as part of mixes, canned products, or as a wheat flour substitute depending on the bean variety.

This African Standard has been prepared taking into account:

- a) the needs of the market for the product;
- b) the need to facilitate fair domestic, regional and international trade and prevent technical barriers to trade by establishing a common trading language for buyers and sellers;
- c) the structure of the CODEX, UNECE, USA, ISO and other internationally significant standards;
- d) the needs of the producers in gaining knowledge of market standards, conformity assessment, commercial cultivars and crop production process;
- e) the need to transport the product in a manner that ensures keeping of quality until it reaches the consumer;
- f) the need for the plant protection authority to certify, through a simplified form, that the product is fit for cross-border and international trade without carrying plant disease vectors;
- g) the need to promote good agricultural practices that will enhance wider market access, involvement of small-scale traders and hence making farming a viable means of wealth creation; and
- h) the need to ensure a reliable production base of consistent and safe crops that meet customer requirements.



## Dry beans — Specification

### 1 Scope

This African Standard specifies requirements and methods of sampling and test for dry beans (*Phaseolus vulgaris*) intended for human consumption. It does not apply to processed beans.

### 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*

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 6561-1, *Fruits, vegetables and derived products — Determination of cadmium content — Part 1: Method using graphite furnace atomic absorption spectrometry*

ISO 6561-1, *Fruits, vegetables and derived products — Determination of cadmium content — Part 2: Method using flame atomic absorption spectrometry*

ISO 6633, *Fruits, vegetables and derived products — Determination of lead content — Flameless atomic absorption spectrometric method*

ISO 24333, *Cereals and cereal products — Sampling*

ISO/TS 16634-2, *Food products — Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content — Part 2: Cereals, pulses and milled cereal products*

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

ISO 27085, *Animal feeding stuffs — Determination of calcium, sodium, phosphorus, magnesium, potassium, iron, zinc, copper, manganese, cobalt, molybdenum, arsenic, lead and cadmium by ICP-AES*

### 3 Terms and Definitions

For the purpose of this standard the following definitions apply.

#### 3.1

##### **dry beans**

dried, threshed field and garden beans (*Phaseolus vulgaris*), intended for human consumption

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## 3.2

### **rotten and damaged beans**

beans and pieces of beans that are materially damaged or discoloured by frost, weather, disease, weevils or other insects, or other causes so as to materially affect the appearance and quality of the beans

## 3.3

### **broken/chipped/loose coat**

beans whose cotyledons are separated or one or both of the cotyledons have been broken

## 3.4

### **germinated beans**

beans which have sprouted

## 3.5

### **shriveled beans**

beans which are under-developed and wrinkled over their entire surface

## 3.6

### **defective beans**

beans that have been either damaged, pest-damaged, broken, shriveled, immature, rotten, mouldy, diseased, germinated, discoloured and heat-damaged

## 3.7

### **pest damaged**

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

## 3.8

### **contrasting varieties:**

other varieties that are of a different colour, size, or shape from the beans of the designated variety

## 3.9

### **discoloured beans**

beans which are damaged by heat, frost or water

## 3.10

### **foreign matter**

all organic and inorganic materials other than beans, broken kernels, and other grains

### 3.10.1

#### **inorganic foreign matter**

components, such as stones, sand and dust

### 3.10.2

#### **organic foreign matter**

any animal or plant matter (e.g. dead insects, seed coats, straws, weeds) other than grain of maize and damaged maize grain.

### 3.10.3

#### **filth**

impurities of animal origin, including dead insect

## 3.11

### **split**

pieces of beans that are not damaged, each of which consists of 75 % or less of the whole bean, and shall include any sound bean the halves of which are held together loosely



**3.12****food grade packaging material**

packaging 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

**3.13****heat damaged beans**

beans which are discoloured and damaged by excessive high temperature.

**3.14****poisonous, toxic 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* L. and *D. stramonium* L.) corn cockle (*Agrostemma githago* L., *Machai Lallium remulenum* L.) Akra (*Vicia* species), *Argemone mexicana*, Khesari and other seeds that are commonly recognized as harmful to health

**3.15****mature beans**

beans that have reached physiological maturity

**4 Requirements****4.1 General requirements**

. Dry beans shall be:

- (a) the dried mature beans of *Phaseolus vulgaris* L;
- (b) well-filled, clean, wholesome, uniform in size, and shape;
- (c) free from substances which render them unfit for human or animal consumption or processing into or utilisation thereof as food or feed;
- (d) free from abnormal flavours, musty, sour or other undesirable odour, obnoxious smell and discolouration;
- (f) free from mould, live pests, toxic or poisonous weed seeds.

**4.2 Specific requirements****4.2.1 Grading**

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

Table 1 — Specific requirements

S/No.	Characteristics	Maximum limits			Method of test
		Grade 1	Grade 2	Grade 3	
(1)	Foreign matter, % m/m max.	0.5	0.75	1	ISO 605
(2)	Inorganic matter, % m/m max.	0.1	0.2	0.3	
(3)	Other edible grains, % m/m max.	0.1	0.2	0.5	
(4)	Pest damagedbeans, % m/m max.	1	2	3	
(5)	Heat damagedbeans, % m/m max.	0.1	0.2	0.5	
(6)	Contrasting varieties, %m/m max.	1.5	3	5	
(7)	Broken and split beans % m/m max.	1	2	3	
(8)	Discoloured/shrivelled/diseased beans, %m/m max.	1	1	1	
(9)	Total defectives beans, % m/m max.	3.5	6.3	9.1	
(10)	Filth, % m/m max.	0.1	0.1	0.1	
(11)	Moisture, % m/m max.	14.0	14.0	14.0	ISO 24557

NOTE 1 The parameter, total defective beans is not the sum total of the individual defects. It is limited to 70% of the sum total of individual defects.

## 5 Contaminants

### 5.1 Heavy metals

Dry beans 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
(3)	Lead (Pb)	0.1	ISO 6633 (AAS)
(4)	Cadmium (Cd)	0.1	ISO 6561-1 or 6561-2

### 5.2 Pesticide residues

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

## 6 Hygiene

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

## 7 Packaging

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

**7.2** Dry beans shall be packaged in containers which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.

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

**7.4** If dry beans are presented in bags, the bags shall also be free of pests and contaminants.

## **8 Labelling**

### **8.1 General labelling**

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 "Dry beans";
- (ii) variety;
- (iii) grade;
- (iv) name, address and physical location of the producer/ packer/importer;
- (v) lot/batch/code number;
- (vi) net weight, in kg;
- (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 dry beans were genetically modified or not.

### **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**

Sampling shall be done in accordance with the ISO 24333.

**Annex A  
(informative)**

**Classification of pulses**

FAO recognizes 11 primary pulses.

1. Dry beans (*Phaseolus spp.* including several species now in *Vigna*)
  - Kidney bean, haricot bean, pinto bean, navy bean (*Phaseolus vulgaris*)
  - Lima bean, butter bean (*Phaseolus lunatus*)
  - Azuki bean, adzuki bean (*Vigna angularis*)
  - Mung bean, golden gram, green gram (*Vigna radiata*)
  - Black gram, urad (*Vigna mungo*)
  - Scarlet runner bean (*Phaseolus coccineus*)
  - Ricebean (*Vigna umbellata*)
  - Moth bean (*Vigna aconitifolia*)
  - Tepary bean (*Phaseolus acutifolius*)
2. Dry broad beans (*Vicia faba*)
  - Horse bean (*Vicia faba equina*)
  - Broad bean (*Vicia faba*)
  - Field bean (*Vicia faba*)
3. Dry peas (*Pisum spp.*)
  - Garden pea (*Pisum sativum var. sativum*)
  - Protein pea (*Pisum sativum var. arvense*)
4. Chickpea, garbanzo, Bengal gram (*Cicer arietinum*)
5. Dry cowpea, black-eyed pea, blackeye bean (*Vigna unguiculata*)
6. Pigeon pea, Arhar /Toor, cajan pea, Congo bean, gandules (*Cajanus cajan*)
7. Lentil (*Lens culinaris*)
8. Bambara groundnut, earth pea (*Vigna subterranea*)
9. Vetch, common vetch (*Vicia sativa*)
10. Lupins (*Lupinus spp.*)
11. Minor pulses, including:
  - Lablab, hyacinth bean (*Lablab purpureus*)
  - Jack bean (*Canavalia ensiformis*), sword bean (*Canavalia gladiata*)
  - Winged bean (*Psophocarpus teragonolobus*)
  - Velvet bean, cowitch (*Mucuna pruriens var. utilis*)
  - Yam bean (*Pachyrrhizus erosus*)

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