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**Milled maize (corn) products — 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**

Maize products are processed from maize grain which is produced in larger quantities in Africa. Maize is a major food security crop in Sub-Saharan Africa, being the staple food for an estimated 50 percent of the population.

This standard has been revised to take 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.

The scope of this African Standard has also been expanded to cover sifted maize meal, granulated maize meal, maize flour and whole maize meal as opposed to covering only whole maize meal which was the case in the previous edition.

This African Standard is a technical revision of the earlier ARS 466:2013 (E), *Whole maize meal — Specification* which is hereby superseded and cancelled.



## Milled maize (corn) products — Specification

### 1 Scope

This African Standard specifies requirements, sampling and test methods for whole maize meal, granulated maize meal, sifted maize meal, maize grits and maize flour from the grains of common maize (*Zea mays* L.) intended for human consumption.

This standard does not apply to fortified milled maize (corn) products and maize grits intended for brewing, manufacturing of starch and any other industrial use.

### 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*

ARS 461, *Maize grains — Specification*

ARS 471, *Food grade salt — Specification*

CODEX Stan 192, *General standard for food additives*

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

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

ISO 711, *Cereals and cereal products — Determination of moisture content (Basic reference method)*

ISO 712, *Cereals and cereal products — Determination of moisture content — Routine reference method*

ISO 1871, *Food and feed products — General guidelines for the determination of nitrogen by the Kjeldahl method*

ISO 2171, *Determination of ash content*

ISO 2591-1, *Test sieving — Part 1: Methods using test sieves of woven wire cloth and perforated metal plate*

ISO 4832, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 5498, *Agricultural food products — Determination crude fibre content — General method*

ISO 5985, *Animal feeding stuffs — Determination of ash insoluble in hydrochloric acid*

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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 7932, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of presumptive Bacillus cereus — Colony-count technique at 30 degrees C*

ISO 9526, *Fruits, vegetables and derived products — Determination of iron content by flame atomic absorption spectrometry*

ISO 11085, *Cereals, cereals-based products and animal feeding stuffs — Determination of crude fat and total fat content by the Randall extraction method*

ISO 24333, *Cereals, and cereal products — Sampling*

ISO 16050, *Foodstuffs — Determination of aflatoxin B<sub>1</sub>, and the total content of aflatoxins 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/TS 21872-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 1: Detection of Vibrio parahaemolyticus and Vibrio cholerae*

ISO/TS 21872-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 2: Detection of species other than Vibrio parahaemolyticus and Vibrio cholerae*

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*

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*



### 3 Terms and definitions

For the purpose of this standard the following terms and definitions apply.

#### 3.1

##### **milled maize (corn) products**

products obtained from maize grains (*Zea mays* L.) through milling process

#### 3.2

##### **whole maize meal**

food prepared from fully mature, sound, un-germinated, whole kernels of maize, (*Zea mays* L.), by a grinding process in which the entire grain is comminuted to a suitable degree of fineness

#### 3.3

##### **granulated maize meal**

coarse product obtained from the milling and sifting of clean shelled maize

#### 3.4

##### **sifted maize meal**

form of granulated maize meal that has been reduced to a certain degree of fineness

#### 3.5

##### **sifting**

particle size separation by sieving and aspiration of roll-milled products

#### 3.6

##### **cleaned maize**

shelled maize that shall have been subjected to a cleaning process for the removal of foreign and objectionable matter originally present

#### 3.7

##### **maize flour**

product obtained by removing the germ and bran followed by grinding, clean maize kernels using roller mills or other methods and sifting the resulting product to suitable degree of fineness.

#### 3.8

##### **foreign matter and extraneous matter**

all organic and inorganic material other than maize

##### 3.8.1

##### **organic foreign matter**

any animal or plant matter other than milled maize products

##### 3.8.2

##### **inorganic foreign matter**

components, such as stone, sand and dust

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## 4 Requirements

### 4.1 Raw materials

Milled maize (corn) products shall be made from shelled maize kernels conforming to the requirements given in ARS 461.

### 4.2 General requirements

4.2.1 Milled maize (corn) products shall:

- a) be of natural colour conforming to the colour of maize from which it was prepared.
- b) not contain any foreign matter such as insects, fungi, dirt or other contaminants
- c) be free from fermented musty or other objectionable colours.
- d) be free from rancidity and foreign odours.
- e) be wholesome and fit for human consumption in all aspects.

### 4.3 Specific requirements

Milled maize products shall conform to the requirements given in Table 1.

Table 1 — Specific requirements

S/No.	Characteristic	Type				Test method
		Sifted maize meal	Granulated maize meal	Whole maize meal	Maize flour	
(1)	Fibre content, % by m/m, max.	0.8	1.8	3.0	0.7	ISO 5498
(2)	Crude fat on a moisture free basis, % by m/m, max.	2.5	2.25	3.1*	2.2	ISO 11085
(3)	Moisture content, % by m/m, max.	13	13	13	13	ISO 711/ ISO 712
(4)	Total ash, % by m/m, max.	1.2	1.7	3.0	1.0	ISO 2171
(5)	Acid insoluble ash, % by m/m, max.	0.15	0.15	0.30	0.1	ISO 5985
(6)	Fat acidity, mg KOH per 100g of product, on dry mass basis max	45	40	50	50	ISO 660
(7)	Total Aflatoxin (AFB1+AFB2+AFG1+AFG2), ppb max	10				ISO 16050
(8)	Aflatoxin B1 only, ppb max	5				
(9)	Fumonisin ppm max	2				AOAC Official Method 2001.04
NOTE	Milled maize products destined for processing baby foods shall have total aflatoxin level of not more than 4 ppb. * Minimum crude fat on moisture free basis for whole maize meal					

## 5 Food additives

The product shall contain only permitted additives complying with CODEX STAN 192.

## 6 Hygiene

Milled maize products shall be produced and handled under hygienic conditions in accordance with ARS 53 and shall comply with the microbial limits given in Table 2 when tested in accordance with the test methods prescribed therein.

**Table 2 — Microbiological limits**

S/N	Micro-organism(s)	Requirements	Method of test
(1)	Total plate count, cfu/g max	10 <sup>5</sup>	ISO 4833
(2)	<i>Staphylococcus aureus</i> cfu/g max	< 10	ISO 6888
(3)	<i>Escherichia coli</i> , cfu/g	Absent	ISO 7251
(4)	<i>Salmonella</i> , per 25g	Absent	ISO 6579
(6)	Yeasts and moulds, cfu/g, max.	10 <sup>4</sup>	ISO 21527-2
(7)	<i>Vibrio cholerae</i>	absent	ISO/TS 21872

## 7 Contaminants

### 7.1 Heavy metals

Milled maize products shall comply with those maximum limits for metal contaminants specified in CODEX STAN 193

### 7.2 Pesticide residues

Milled maize products shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

## 8 Packaging

Milled maize shall be packed in food grade packaging material, which will safeguard the hygienic, nutritional and organoleptic qualities of the products.

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### **9 Labelling**

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

- i) name of product as "Whole Maize Meal, Sifted Maize Meal, Maize Flour or Granulated Maize Meal";
- ii) name and address of the manufacturer/packer/importer;
- iii) brand name/registered trade mark;
- iv) batch or code number;
- v) net weight in metric units;
- vi) the statement "Store in a Cool and Dry Place";
- vii) the statement "Human Food";
- viii) country of origin;
- ix) date of manufacture;
- x) best before date;
- xi) instructions for disposal of used package.

### **10 Sampling**

Sampling shall be done in accordance with the ISO 24333.

**Bibliography**

EAS 44:2011, *Milled maize (corn) products — Specification*

CODEX STAN 154:1985(Rev.1:1995), *Standard for Whole Maize (Corn) Meal*

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