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## Sorghum flour — Specification

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This Draft Uganda Standard, DUS ARS 468: 2022, *Sorghum flour — Specification*, is identical with and has been reproduced from an African Standard, ARS 468: 2022, *Sorghum flour — Specification*, and adopted as a Uganda Standard.

The committee responsible for this document is Technical Committee UNBS/TC 203, *Cereals, pulses and related products and processes*.

Wherever the words, "African Standard" appear, they should be replaced by "Uganda Standard".

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**Sorghum flour — Specification**



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## Foreword

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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

The importance of sorghum in Africa can be adjudged from the fact that there is a wide variety of African traditional sorghum foods and beverages. These include: whole grain rice-type products, breads and pancakes, dumplings and couscous, porridges, gruels, opaque and cloudy beers, and non-alcoholic fermented beverages. Recent products include: instant soft porridge, malt beverages and lager beer.

This African Standard is a technical revision of the earlier ARS 468:1987(E), *Standard for sorghum flour* which is hereby superseded and cancelled.

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## Sorghum flour — Specification

### 1 Scope

This African Standard specifies requirements, methods of sampling and test for sorghum flour obtained from whole or decorticated sorghum grain of varieties *Sorghum bicolor* (L) Moench. for human consumption. It does not apply to grits or meal obtained from sorghum.

### 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 462, *Sorghum grains — Specification*

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

ARS 56, *Prepackaged foods — Labelling*

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 192, *General standard for food additives*

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

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 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 3310-1, *Test sieves of metal wire cloth*

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

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

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

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

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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 9648, *Sorghum — Determination of tannin*

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

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

ISO 24333, *Cereals and cereal products — Sampling*

## 3 Terms and definitions

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

### 3.1

#### **sorghum flour**

product destined for human consumption which is obtained from sorghum grains (*Sorghum bicolor* (L.) Moench) through a process of milling during which the grain is cleaned, and the endosperm is reduced to a powder

### 3.2

#### **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

### 3.3

#### **filth**

impurities of animal origin, including dead insects

## 4 Requirements

### 4.1 Raw materials

Sorghum grains from which the flour is obtained shall be complying with ARS 462.

## 4.2 General requirements

4.2.1 Sorghum flour shall be:

- i. safe, wholesome and uniform in colour.
- ii. free from filth (impurities of animal origin, including dead insects) in amounts which may present a hazard to human health.
- iii. practically free from live pests

4.2.2 All processing of the sorghumgrains including drying, milling or other treatments of the sorghum, intermediate milling products and the milled sorghum flour shall be carried out in a manner that:

- a) minimizes loss of nutritive value, particularly protein quality;
- b) avoids undesirable changes in technological properties of the sorghum flour;
- c) avoids having unground grains and hull in the flour.

## 4.3 Specific requirements

### 4.3.1 Particle size

Using a standard method of sifting, not less than 85 per cent of the flour shall pass through a sieve of mesh diameter 1  $\mu\text{m}$  for 'medium' flour and 0.5  $\mu\text{m}$  for 'fine' flour. The sieve shall comply with ISO 3310-1.

4.3.2 Sorghum flour shall conform to the specific requirements in Table 1

**Table 1 — Specific requirements for sorghum flour**

| S/NO | Characteristic  | Requirement | Method of test               |
|------|---|-------------|------------------------------|
| 1    | Moisture content, % max. m/m  | 13.5        | ISO 711/ ISO 712             |
| 2    | Total ash content, % max.   | 1.7         | ISO 2171                     |
| 3    | Acid insoluble ash, % max.  | 0.40        | ISO 5985                     |
| 4    | Protein content, % by dry mass basis min. (Nx6.25)  | 7           | ISO 1871                     |
| 5    | Crude fat content, % max.   | 4.7         | ISO 11085                    |
| 6    | Crude fibre content, % max.   | 2.5         | ISO 5498                     |
| 7    | Tannin content %m/m max.  | 0.3         | ISO 9648                     |
| 8    | Total Aflatoxin (AFB <sub>1</sub> +AFB <sub>2</sub> +AFG <sub>1</sub> +AFG <sub>2</sub> ), ppb, max | 10          | ISO 16050                    |
| 9    | Aflatoxin B1 only, ppb, max   | 5           |                              |
| 10   | Fumonisin, ppm, max   | 2           | AOAC Official Method 2001.04 |

## 5 Food additives

Sorghum flour shall contain only permitted additives complying with CODEX STAN 192.

## 6 Contaminants

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## 6.1 Heavy metal contaminants

Sorghum flour shall comply with those maximum limits for metal contaminants specified in CODEX STAN 193 .

## 6.2 Pesticide residues

Sorghum flour shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

## 7 Hygiene

Sorghum flour 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               | 10 <sup>4</sup> | ISO 4833       |
| 2   | <i>Staphylococcus aureus</i> cfu/g max | 10 <sup>2</sup> | ISO 6888       |
| 3   | <i>Escherichia coli</i> , cfu/g, max.  | absent          | ISO 7251       |
| 4   | <i>Salmonella</i> , per 25g, max.      | absent          | ISO 6579       |
| 5   | Yeasts and moulds, cfu/g, max.         | 10 <sup>4</sup> | ISO 21527-2    |

## 8 Packaging

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

## 9 Labelling

### 9.1 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 “Sorghum flour” and the terms ‘Fine’ or ‘Medium’, in accordance with 4.3.1, shall appear in close proximity to the name of the food.
- ii) name, address and physical location of the manufacturer/ packer/importer;
- iii) lot/batch/code number;
- iv) net weight, metric units;
- v) the declaration “Food for Human Consumption”;
- vi) storage instruction as “Store in a cool dry place away from any contaminants”;
- vii) Date of manufacture;

- viii) best before / expiry date;
- ix) instructions on disposal of used package;
- x) country of origin;

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

Information detailed in 9.1 shall be given either on the container or in accompanying documents. However, 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.

## **10 Weights and measures**

Sorghum flour shall be packaged in accordance with the weights and measures regulations of the destination country.

NOTE Maximum package weight of 50 kg where human loading and offloading is involved'

## **11 Sampling**

Sampling shall be done in accordance with the ISO 24333.

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EAS 95:2011, *Sorghum flour — Specification*

CODEX STAN 173-1989 (Rev. 1 - 1995), *CODEX Standard for sorghum flour*

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