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MILLET FLOUR – SPECIFICATION

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Millet flour — Specification



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Introduction

Millet flour is commonly used for making porridge. It is also used as a supplement or substitute to maize for special dietary foods such as weaning. Its use has increased in recent years leading to increased production from domestic to commercial.

This standard has therefore been developed to protect the consumer from fraud and from many adulterations that may occur during production which may be hazardous to health. This standard is also formulated to guide the manufacturer in production. The revision was done to update the compositional requirements and microbiological limits with the current international standards as well as the practice in the industries.

This African Standard is a technical revision of the earlier ARS 469:1987(E), *Standard for pearl millet flour* which is hereby superseded and cancelled.

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Millet flour — Specification

1 Scope

This African Standard specifies requirements, methods of sampling and test for millet flour obtained from whole or decorticated pearl millet from varieties *Penicum maliaceum*) and finger millet grown from *Eleusine coracana* (L.) Gaertner 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 463, *Pearl millet grains — Specification*

ARS 857, *Finger millet 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 B₁ and B₂ 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 3310-1, *Test sieves — Technical requirements and testing — Par-1: Test sieves of metal wire cloth*

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*

ISO 6490-1, *Animal feeding stuffs — Determination of calcium content — Part 1: Titrimetric method*

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.*

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

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 content*

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 B₁ and the total content of aflatoxins B₁, B₂, G₁ and G₂ 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*

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 Term and definition

For the purpose of this standard the following term and definition apply.

3.1

millet flour

product destined for human consumption which is obtained from millet grains grown from *Pennisetum glaucum* (L.) R.Br., *Penicum maliaceum* and *Eleusine coracana* (L.) Gaertner through a process of milling during which the grain is cleaned, destoned and dehulled and the endosperm is reduced to a sufficiently fine powder food grade package which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.

4 Quality requirements

4.1 Raw materials

The millet from which the flour is obtained shall be complying with ARS 463 and ARS 857.

4.2 General requirements

4.2.1 Millet flour shall be safe and suitable for human consumption.

4.2.2 Millet flour shall be free from abnormal flavours, odours, and insects.

4.2.3 Millet flour shall be free from filth (impurities of animal origins, including dead insects) in amounts which may present a hazard to human health.

4.3 Specific requirements

4.3.1 Particle size

Using a standard sieve complying with ISO 3310-1, not less than 100 per cent of the product shall pass through a sieve the dimension of the mesh of which is: diameter of 500µm for 'fine' flour and diameter of 630µm for 'medium' flour.

4.3.2 The millet flour shall comply with the requirements of Table 1.

Table 1 — Specific requirements

S/No	Parameter	Pearl millet	Finger/ proso millet	Test method
1	Moisture content, % m/m max.	13.5	13.5	ISO 711/ ISO 712
2	Total ash content, % max.	1.2	4.2	ISO 2171
3	Acid insoluble ash, % max.	0.40	0.40	ISO 5985
4	Protein content, % min. (N × 6.25)	8.0	6.8	ISO 1871
5	Crude fat, % max.	5.0	2	ISO 11085
6	Crude Fibre content, % max.	1.8	3.0	ISO 5498
7	Calcium % as CaO, min.	0.02	0.10	ISO 6490-1
8	Tannin content, %m/m max.	0.3		ISO 9648
9	Total Aflatoxin (AFB ₁ +AFB ₂ +AFG ₁ +AFG ₂), ppb max	10		ISO 16050
10	Aflatoxin B ₁ only, ppb max	5		
11	Fumonisin, ppm max	2		AOAC Official Method 2001.04

5 Food additives

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

6 Hygiene

6.1 Millet flour shall be produced, prepared and handled in accordance with the provisions of appropriate sections of ARS 53.

6.2 When tested by appropriate methods of sampling and examination, the product:

- shall be free from microorganisms in amounts which may present a hazard to health;
- shall not contain any substance originating from microorganisms in amounts which may present a hazard to health.

6.3 The product shall be free from pathogenic micro-organism and shall comply with microbiological limits in Table 2.

Table 2 — Microbiological limits

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

7 Contaminants

7.1 Metals contaminants

Millet flour shall comply with those maximum limits for metal contaminants specified in CODEX STAN 193 and in particular those listed in Table 3.

Table 3 — Metal contaminants

S/N	Parameter	Limit (ppm max)	Test method
(1)	Arsenic (As)	0.1	ISO 27085
(3)	Lead (Pb)	0.1	ISO 6633
(4)	Cadmium (Cd)	0.02	ISO 6561-1 or ISO 6561-2

7.2 Pesticide residues

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

8 Packaging

8.1

Millet flour shall be packed in food grade in suitable packages which shall be clean, sound, free from insect and, fungal infestation. and the packing material shall be of food grade quality and shall be securely closed and sealed.

Millet flour are presented in bags, the bags shall also be free of pests and contaminants.

9 Marking and labelling

9.1 In addition to the requirements in ARS 56, each package shall be legibly and indelibly marked with the following:

- product name as “Finger/Proso millet or pearl millet flour” and the terms ‘Fine’ or ‘Medium’, in accordance with Clause 4.3.1, shall appear in close proximity to the name of the food.
- name, address and physical location of the manufacturer/ packer/importer;
- lot/batch/code number;

- iv) net weight, in kg;
- 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) expiry date;
- ix) instructions on disposal of used package;
- x) country of origin.

9.2 Labelling of Non-Retail Containers

Information for non-retail containers shall either be given on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

10 sampling

Sampling shall be done in accordance with the ISO 24333.

Bibliography

EAS 89:2012, *Millet flour — Specification*

CODEX STAN 170-1989 (Rev. 1 - 1995), *Pearl millet flour*

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