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DRAFT TANZANIA STANDARD

Malted sorghum flour — Specification

TANZANIA BUREAU OF STANDARDS

Malted sorghum flour — Specification

1 Scope

This draft Tanzania Standard specifies requirements, sampling and test methods for malted sorghum flour obtained from varieties (cultivars) of sorghum grains (Sorghum bicolor (L.) 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.

TZS 109, Code of practice — General principles of food hygiene

TZS 538, Labelling of pre- packaged foods— General requirements

TZS 962, Native starch — Determination of starch content — Ewers polarimetric method

TZS 730-2, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli — Part 2: Colony-count technique at 44 degrees C using 5-bromo-4-chloro-3-indolyl beta-D-glucuronide

TZS 118, Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of microorganisms – Colony-count technique at 30oC

TZS 131, 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

TZS 122, Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp. — Amendment 1: Broader range of incubation temperatures, amendment to the status of Annex D, and correction of the composition of MSRV and SC

TZS 125, Microbiology of the food chain — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Method using Baird-Parker agar medium

TZS 330, Cereals and pulses — Sampling

TZS 331, Cereals and pulses — Test methods

TZS 1669, Whole sorghum grains — Specification

TZS 799, 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 Specifies a reverse-phase high-performance liquid chromatographic method, with immunoaffinity column clean-up and post-column derivatization, for the determination of aflatoxins in cereals

TZS 963 (Part 3), Starch and derived products – Heavy metals content – Part 3 – Determination of lead content by atomic absorption spectrometry with electro-thermal atomization

TZS 963 (Part 4), Starch and derived products – Heavy metals content – Part 4 – Determination of cadmium content by atomic absorption spectrometry with electro-thermal atomization

TZS 2701, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of mesophilic lactic acid bacteria — Colony-count technique at 30 degrees C

3 Terms and definitions

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

3.1

malted sorghum grains

germinated and dried sorghum grains

3.2

malted sorghum flour

comminuted flour produced by milling malted sorghum grains

3.3

extraneous matter

inorganic materials other than the malted sorghum flour, other grains and filth

3.4

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

3.5

foreign matter

organic and inorganic materials other than malted sorghum flour

4 Requirements

4.1 Raw material

Whole Sorghum grains used in manufacturing malted sorghum flour shall comply with TZS 1669.

4.2 General requirements

Malted sorghum flour shall:

i. have characteristic colour of the sorghum variety;

ii. be free from any objectionable flavours;

iii. be free from live insects, worms, fungal infestation, rodent contaminations;

iv. not contain flour from other cereals; and

v. be practically free from any foreign matter and filth;

4.3 Specific requirements

Malted sorghum flour shall comply with the specific requirements given in Table 1 when tested in accordancewith test methods specified therein

Table 1 Specific requirements for Malted sorghum flour

S/N	Characteristic		Requirement	Test method
i.	Moisture %, m/m, max.		13.5	TZS 331
ii.	Total ash (on dry basis), % m/m max.		4.0	
iii.	Tannin content, % m/m, max.		0.5	
iv	Diastetic power sdu/g/min		20	
v.	Acid insoluble ash % m/m, max		0.40	
vi.	Particle size:	Medium flour, min	85 % shall pass through a 1204µmsieve	
		Fine flour, min.	85 % shall pass through a 500 µm sieve	

5 Contaminants

5.1 Pesticides residues

Malted sorghum flour shall comply with those maximum residue limits for pesticides established by the Codex Alimentarius Commission.

5.2 Heavy metals

Malted sorghum flour shall comply with the maximum limits for heavy metals given in Table 2 when tested in accordance with the test method specified therein.

Table 2 — Maximum limits for heavy metal contaminants in Malted sorghum flour

S/N	Heavy metal	Maximum limit (mg/kg)	Test method
i.	Lead (Pb)	0.2	TZS 963 -3
ii.	Cadmium (Cd)	0.1	TZS 963-4

5.3 Mycotoxins

Malted sorghum flour shall not exceed aflatoxin limits in Table 3 when tested in accordance with test method specified therein.

Table 3 — Aflatoxin limits for malted sorghum flour

S/N	Type of aflatoxin	Maximum limit (µg/kg)	Test method
i.	Total aflatoxin	10	*TZS 799*
ii.	Aflatoxin B1	5	
iii.	Fumonisins	2 000	TZS 331

6 Hygiene

6.1 Malted sorghum flour shall be produced, prepared and handled in accordance with TZS 109

6.2 Malted sorghum flour shall not exceed the microbiological limits in Table 4 when tested in accordance withtest methods specified therein.

Table 4 Microbiological limits for malted sorghum flour

S/N	Microorganism	Maximum limit	Test method
i.	Total Plate Count, cfu/g	10^3	TZS 118
i.	*Salmonella spp.,* per 25 g	Absent	TZS 122-1
ii.	*Escherichia coli*, cfu/g	Absent	TZS730-2
iii.	*Staphylococcus aureus* per 25 g	Absent	TZS 125-1
iv.	Yeast and moulds, cfu/g	10^2	TZS 131
v.	Lactic Acid Bacteria, cfu/g	Absent	TZS 2701

7. Packaging

Malted sorghum flour shall be packed in suitable food grade packaging material capable of protecting quality and safety of the product.

8. Labelling

In addition to the requirements of TZS 538, the following specific labelling requirements shall be legibly and indelibly marked

a) name of product as “Malted sorghum flour” accompanied by whether “fine flour” or “Medium flour”; ;

b) name and address of manufacturer;

c) date of manufacture;

d) date of expiry;

e) instruction for use;

f) batch number;

g) storage conditions; and

h) country of origin.

9. Sampling

Sampling of malted sorghum flour shall be in accordance with TZS 330.

Annex A

Maltose determination

An aliquot (1 mL) of hydrolysed starch solution was added to 5 mL of 100 mM sodium maleate buffer (pH 6.5) (6-fold dilution) in a glass test tube and mixed thoroughly. Aliquots (0.5 mL, in duplicate) were dispensed into glass test tubes (16 x 120 mm) and placed into a water bath to pre-equilibrate at 30oC for 5 minutes. α-Glucosidase suspension (20 µL, 1000 U/mL) was added to each tube, mixed well and the tubes incubated at 30oC for 30 min. GOPOD Reagent (4 mL) (15) was added and mixed thoroughly and incubated at 40oC for 20 min. With each set of determinations, a reagent blank was included (in duplicate) (0.5 mL of maleate buffer plus 20 µL of α-glucosidase (1,000 U/mL) and 4 mL GOPOD Reagent). Glucose standards in quadruplicate (0.1 mL glucose control (1.5 mg/mL) plus 20 µL of α-glucosidase (1,000 U/mL), 0.4 mL of maleate buffer and 4 mL of GOPOD Reagent) were also included. All tubes were incubated at 40oC for 20 min and the absorbance at 510 nm measured against the reagent blank. If the absorbance value of any sample was above 1.2 (equivalent to a DP °ASBC of ~ 140, starch digestion was repeated using 0.1 mL of malt extract.

Calculation of maltose value (MV)

Maltose values are calculated as activity per g of malt.

where:
ΔAbs = GOPOD absorption value for sample – value for reaction blank. F = factor to convert from Abs to µg glucose (µg glucose/Abs for 150 µg glucose). 1/15 = conversion from 15 min incubation time to 1 min. 20/W = initial extraction of malt flour (1 g/20 mL). W = weight of malt in grams. 22.2/0.2 = 0.2 mL of malt extract incubated with 20 mL of starch and 2 mL of NaOH added to terminate the reaction. (If 0.1 mL of malt extract was employed, this factor became 22.1/0.1 and the equation was adjusted accordingly). 6 = 1 mL removed from starch digest and diluted 6-fold in maleate buffer. 1/0.5 = 0.5 mL analysed. 342/360 = conversion from µg glucose (x 2) to µg maltose. 1/1000 = conversion from µg to mg.