



DRAFT TANZANIA STANDARD

Cooked maize grain- Specification

TANZANIA BUREAU OF STANDARDS

0. Foreword

Cooked maize refers to ready to eat maize grain which have been subjected to heat through boiling in water or steaming. The cooked maize is then prepackaged and sold to consumers.

This draft Tanzania Standard has been developed to keep up with advancements of the food industry and to ensure the safety and quality of the product traded in the markets in order to safeguard the health of the consumers.

In reporting the result of a test or analysis made in accordance with the Tanzania Standard, if the final value observed or calculated is to be rounded off, it shall be done in accordance with TZS 4 (see clause 2)

1 Scope

This Draft Tanzania Standard specifies the requirements, sampling and test methods for cooked maize (*Zea mays indentata*L. and/or *Zea mays indurata*L. or their hybrids) intended for direct human consumption.

This standard does not include corn-on-the-cob.

2. Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 11289, Heat-processed foods in hermetically sealed containers — Determination of pH

TZS 109,, General principles of food hygiene

CODEX STAN 192, General standard for food additives

CODEX STAN 193, General Standard for Contaminants and Toxins in Food and Feed

TZS 330, Cereals and cereal products - Sampling

TZS 331, Cereals and cereal products — Testing

TZS 438/EAS 2, Maize Grains — Specification

TZS 252/EAS 22, Butter — Specification

TZS 132/EAS 35, Fortified edible salt - Specification

TZS 538/EAS 38, Labelling of pre-packaged foods — General requirements

TZS789/EAS 12, Drinking (Potable) water -

Specification

TZS 799/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

TZS 730-2/ISO 16649-2, 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 131, Microbiology of food and animal feeding stuff – General guidance for enumeration of yeasts and moulds – Colony count technique at 25oC

TZS 122, Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp

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

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

3. Terms and definitions

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

3.1

cooked maize grain

ready to eat maize which have been subjected to boiling or steaming

3.2

food grade packaging material

packaging material, made of substances which are safe and suitable for their intended use and which will notimpart any toxic substance or undesirable odour or flavour to the product.

3.3

drained weight

weight of the contents of the container after draining

3.5 foreign matter all organic and inorganic material inorganic matter stones, glass, pieces of soil and other mineral matter

3.2.2

organic matter

any animal or plant matter (seed coats, straws, weeds) other than barley, damaged grains, other kernels, inorganic extraneous matter and harmful/toxic seeds

4.0 Requirements

4.1 Ingredients

4.1.1 Essential ingredients

The following essential ingredients shall be used in the preparation of cooked maize and shall comply with relevant standards:

- a) maize grains complying with TZS 438; and
- b) potable water complying with TZS 789.

4.1.2 Optional ingredients

The following optional ingredients including but not limited to the following may be used in cooked maize and shall comply with relevant standards

- a) sweetening ingredients such as sucrose, invert sugar, dextrose, glucose syrup;
- b) herbs and spices;
- c) butter complying with TZS 252;
- d) salt complying with TZS 132;
- e) pieces of green or red peppers or mixture of both, or other vegetables; and
- f) starches natural (native), physically or enzymatically modified in whole kernel style, only when used with butter.

4.2 General requirements

Cooked maize grain shall:

- (i) be free from extraneous matter or foreign matter;
- (ii) be free from off flavours and odours;
- (iii) be free from any insects, moulds and fungal infestation;
- (iv) be safe and suitable for human consumption; and
- (v) have colour characteristic of the product.

4.3 Specific requirements

Cooked maize grain shall comply with the requirements in Table 1 when tested in accordance with test

methods specified therein.

Table 1 — Specific requirements for cooked maize grain

S/N	Parameter	Requirements	Test method
i.	Minimum drained weight, % of net weight	80	Annex A
ii.	pH aqueous solution,	5-6	ISO 11289
iii.	Salt content (as sodium chloride), % m/m max.	1.2	Annex C

5 Food additives

Food additives which may be used in the preparation of cooked maize grains shall comply with CODEX STAN 192.

6 Hygiene

Cooked maize grain shall be prepared and handled in accordance with TZS 109.

Cooked maize grains shall comply with the microbiological limits specified in Table 2 when tested in accordance with test methods specified therein.

S/N	Micro-organism	Maximum limits	Test method	
i.	Total viable count, CFU/g,	10 ³	TZS 118-2	
ii.	<i>E. coli,</i> CFU/g	Absent	TZS 730-2	
iii.	Salmonella spp, in 25g	Absent	TZS 122	
iv.	Yeasts and moulds, CFU/g	10 ²	TZS 131	

Table 2 — Microbiological limits for cooked maize grain

7 Contaminants

7.1 Pesticide residues and other contaminants

Cooked maize grain shall conform to maximum residue limits for pesticide residues established by the Codex Alimentarius Commission for this commodity and shall comply with the maximum levels of Contaminants and Toxins in Food stipulated in CODEX STAN 193.

7.2 Mycotoxins

Cooked maize grain shall not exceed the maximum limits of mycotoxins specified in Table 3 when tested in accordance with test methods specified therein.

Table 3 — Mycotoxin limits for Cooked maize grain

S/N	Mycotoxin	Maximum limit (µg/kg)	Test method
i.	Total aflatoxin	10	TZS 799
ii.	Aflatoxin B1	5	
iii.	Fumonisins	2000	TZS 331

7.3 Heavy metals

Cooked maize grain shall comply with the maximum heavy metal limits indicated in Table 4 when tested inaccordance with test method specified therein.

Table 4 — Maximum limits for heavy metal in Cooked maize grain

S/N	Heavy metal	Maximum limits(mg/kg)	Test method		
i.	Cadmium	0.1	TZS963-4		
ii.	Lead	0.1	TZS963-3		
iii.	Tin ^a	250	AOAC 985.16		
^a For canned cooked maize grain					

8 Packaging, marking and labelling

8.1 Packaging

Cooked maize grain shall be packaged in food grade packaging material that ensures the integrity and safety of the product

8.2 Marking and labelling

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

- a) name of the product "Cooked maize grain";
- b) name and address of the manufacturer/packer/distributor/ importer/exporter/vendor;
- c) date of manufacture;
- d) batch number;
- e) list of ingredients in descending order;
- f) expiry date;
- g) country of origin;

- h) the net content shall be declared in the metric system;
- i) instructions for use;
- j) the statement 'Human Food' shall appear on the package;
- k) storage instructions; and
- I) instructions on disposal of used package.
- m) Declaration of allegerns

8.2.2 When labelling non-retail packages, information for non-retail packages shall either be given on the packages 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 packages.

9 Sampling

Sampling of cooked maize grain shall be done in accordance with TZS 330.

Annex A

(normative)

Determination of drained weight

A.1 Definition

Drained weight expresses percentage of solid content as determined by the procedure described below.

A.2 Apparatus

A sieve 20 cm (check) in diameter. The meshes of such sieves are made by so weaving wire as to form square openings of 2.8 mm by 2.8 mm.

A.3 Procedure

Carefully weigh the clean and dry sieve. Weigh the container plus the contents. Empty the contents of the container into the sieve taking care to distribute the beans evenly. Without shifting the product, incline the sieve at an angle of approximately 17 % to 20° to facilitate drainage. Drain the product for two minutes and then weigh the sieve plus the product. Weigh the dry empty container

A.4 Calculation

Drained weight, as per cent of net weight =

Where,

M=is the weight, in grams, of the sieve;

 M_1 =is the weight, in grams, of the sieve with the product;

M₂=is the weight, in grams, of the empty container; and

M₃=is the weight, in grams, of the container with the

contents

Annex B

(informative)

Determination of water capacity of containers

B.1 Scope

This method applies to metals and glass containers.

B.2 Definitions

The water capacity of a container is the volume of water at room temperature which the sealed container will hold when completely filed.

B.3 Procedures

B.3.1 Metal containers

B.3.1.1 Select a container which is undamaged in all respects

B.3.1.2 Wash, dry and weigh the empty container after cutting out the lid without removing or altering theheight of the double seam

B.3.1.3 Fill the container with water at room temperature to 4.8 mm vertical distance below the top levelof the container, and weigh the container thus filled.

B.3.2 Glass containers

B.3.2.1 Select a container which is undamaged in all aspects

B.3.2.2 Fill the container with water at room temperature to the level of the top thereof, and weigh the container thus filled.

B.4 Calculation

B.4.1 Metal containers

Subtract the weight found in B.3.1.2 from the weight found in B.3.1.3. The difference shall be considered to be the weight of water required to fill the container. Results are expressed as milliliters of water.

B.4.2 Glass containers

Subtract the weight found in B.3.2.2 from the weight found in B.3.2.3. The difference shall be considered to be weight of water required to fill the container. Results are expressed as milliliters of water.

Annex C (normative)

Determination of Sodium chloride content

C.1 Scope

This method determines the content of chlorides.

C.2 Definition

The chloride content corresponds to the sum of all anions (halides) calculated as sodium chloride precipitablewith silver ions in a nitric acid solution.

C.3 Principle

Quantitative precipitation of the halides extracted from the ash in a nitric acid solution with AgNO3 in excess. Back titration of the surplus AgNO3 with ammonium thiocyanate, using ferric alum (ferric ammonium sulphate) as the indicator.

C.4 Reagents

- C.4.1 Distilled or demineralized water
- **C.4.2** AgNO3 solution, 0.1 N (16.9888 g AgNO3)

C.4.3 NH4SCN solution, 0.1 N (7.6113 g NH4SCN). In practice a slightly higher weight is taken and thesolution is adjusted by dilution against a 0.1 N AgNO3 solution

C.4.4 Cold saturated NH4Fe (SO4) 2.12H2O solution (approximately 40 %). The ensuing brown colouring iseliminated by adding pure nitric acid drop wise

- C.4.5 HNO3 (approximately 30 %)
- **C.4.6** Diethyl ether of nitrobenzene

C.5 Apparatus

- C.5.1 Measuring flask, 100 ml
- C.5.2 Burette, 50 ml
- C.5.3 Erlenmeyer flask, 200 ml

- C.5.4 Pipettes
- C.5.5 Funnel, filtering paper

C.6 Procedure

The ash (residue after carbonization and incineration of the potato crisp at a maximum temperature of 550 °C in a muffle furnace) obtained from 1 g – 2 g dry matter is extracted by means of 80 ml – 90 ml hot distilled water acidified with a few drops of nitric acid. The washings are filtered off into a 100-ml measuring flask; after cooling distilled water is added until the mark is reached (stock solution).

In proportion to the expected chloride content aliquot part of this solution, which should preferably contain 50 mg - 100 mg NaCl, taken off, distilled water being added to obtain a quantity of approximately 100 ml

Subsequently 5 ml ferric alum solution (see C.4.4), 20 ml 0.1 N AgNO3 solution (see C.4.2) and 5 ml - 10 ml ether or 1 ml nitrobenzene are added; titration is carried out by means of an ammonium thiocyanate solution0.1 N (see C.4.3), until the red coloring remains after stirring.

C.7 Expression of results

Report in percentage by weight to one decimal place.

Chloride content =

where,

P = is the test portion, in mg, incinerated;

V = is the ml of the stock solution derived from the ash;

 V_1 = is the volume, in ml, stock solution used from

titration; V_2 = is the volume, in ml, AgNO3 added; and

 V_3 = is the volume, in ml, NH4SCN necessary for back titration.