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**Cooked packaged maize— Specification**

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In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

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## Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

RS 150 was prepared by Technical Committee RSB/TC 003, *Cereals, pulses, legumes and cereal products*

In the preparation of this standard, reference was made to the following standard (s):

- 1) CODEX STAN 18, *Canned Sweet Corn — Specification*

The assistance derived from the above source is hereby acknowledged with thanks.

This third edition cancels and replaces the second edition (RS 150: 2018) which has been technically revised.

### Committee membership

The following organizations were represented on the Technical Committee on *Cereals, pulses, legumes and cereal products* (RSB/TC 003) in the preparation of this standard.

Enterprise URWIBUTSO/SINA GERARD

MANOSALIWA Food Industries Ltd

MINIMEX Ltd

National Agricultural Export Development Board (NAEB)

National Industrial Research and Development Agency (NIRDA)

Nyarutarama Business Incubation Center

One Acre Fund-Tubura

Rwanda Food and Drugs Authority

Zamura Feeds Ltd

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# Cooked packaged maize — Specification

## 1 Scope

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

AOAC 985.16, *Tin in Canned Foods. Atomic absorption Spectrophotometric method*

RS CAC/RCP 1, *General principles of food hygiene*

RS CODEX STAN 192, *General standard for food additives*

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

RS EAS 12, *Potable water — Specification*

RS EAS 2, *Maize Grains — Specification*

RS EAS 22, *Butter — Specification*

RS EAS 35, *Fortified edible salt — Specification*

RS EAS 38, *Labelling of pre- packaged foods — General requirements*

RS 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*

RS 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*

RS 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 0,9*

### 3 Terms and definitions

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

#### 3.1

##### **cooked packaged maize:**

maize which have been subjected to boiling or steaming and packed in food grade packaging materials

#### 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

##### **drained weight**

weight of the contents of the container after draining

### 4 Requirements

#### 4.1 Ingredients

##### 4.1.1 Essential ingredients

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

- a) maize grains complying with RS EAS 2; and
- b) potable water complying with RS EAS 12.

##### 4.1.2 Optional ingredients

The following optional ingredients including but not limited to the following may be used in cooked packaged 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 RS EAS 22;
- d) salt complying with RS EAS 35;
- 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 packaged maize shall:

- a) be free from extraneous matter;
- b) be free from off flavours and odours;
- c) be free from any insects and foreign matter;
- d) be safe and suitable for human consumption; and
- e) have colour characteristic of the variety.

#### 4.3 Specific requirements

Cooked packaged maize shall comply with the requirements in Table 1 when tested in accordance with test methods specified therein.

**Table 1 — Specific requirements for cooked packaged maize**

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

#### 4.4 Microbiological limits

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

**Table 2 — Microbiological limits for cooked packaged maize**

S/N	Micro-organism	Maximum limits	Test method
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i.	Total viable count, CFU/g,	10 <sup>3</sup>	RS ISO 4833-1
ii.	<i>E. coli</i> , CFU/g	Absent	RS ISO 16649-2
iii.	<i>Salmonella spp</i> , in 25g	Absent	RS ISO 6579-1
iv.	Yeasts and moulds, CFU/g	10 <sup>2</sup>	RS ISO 21527-2
v.	<i>Clostridium botulinum</i> , CFU/g	Absent	RS ISO 7937

## 5 Food additives

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

## 6 Hygiene

Cooked packaged maize shall be prepared and handled in accordance with RS CAC/RCP 1.

## 7 Contaminants

### 7.1 Pesticide residues and other contaminants

Cooked packaged maize 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 RS CODEX STAN 193.

### 7.2 Mycotoxins

Cooked packaged maize 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 packaged maize**

S/N	Mycotoxin	Maximum limit (µg/kg)	Test method
i.	Total aflatoxin	10	RS ISO 16050
ii.	Aflatoxin B1	5	
iii.	Fumonisin	2000	AOAC 2001.04

### 7.3 Heavy metals

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

**Table 4 — Maximum limits for heavy metal in Cooked packaged maize**

S/N	Heavy metal	Maximum limits(mg/kg)	Test method
i.	Cadmium	0.1	AOAC 999.11
ii.	Lead	0.1	

iii.	Tin <sup>a</sup>	250	AOAC 985.16,
<sup>a</sup> For canned cooked maize			

## 8 Packaging

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

## 9 Labelling

**9.1** In addition to the requirements of RS EAS 38, the following specific labelling requirements shall apply and shall be legibly and indelibly marked:

- a) name of the product "Cooked packaged maize";
- 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
- l) instructions on disposal of used package.

**9.2** 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.

## 10 Sampling

Sampling of Cooked packaged maize shall be done in accordance with RS ISO 24333.

## 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 =

$$= \frac{100(M_1 - M)}{M_3 - M_2}$$

Where,

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

M<sub>1</sub>=is the weight, in grams, of the sieve with the product;

M<sub>2</sub>=is the weight, in grams, of the empty container; and

M<sub>3</sub>=is the weight, in grams, of the container with the contents

## Annex B (normative)

### 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 filled.

#### 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 the height 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 level of 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 the weight of water required to fill the container. Results are expressed as milliliters of water.

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## 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 precipitable with 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  $\text{AgNO}_3$  in excess. Back titration of the surplus  $\text{AgNO}_3$  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**  $\text{AgNO}_3$  solution, 0.1 N (16.9888 g  $\text{AgNO}_3$ )

**C.4.3**  $\text{NH}_4\text{SCN}$  solution, 0.1 N (7.6113 g  $\text{NH}_4\text{SCN}$ ). In practice a slightly higher weight is taken and the solution is adjusted by dilution against a 0.1 N  $\text{AgNO}_3$  solution

**C.4.4** Cold saturated  $\text{NH}_4\text{Fe}(\text{SO}_4) \cdot 2.12\text{H}_2\text{O}$  solution (approximately 40 %). The ensuing brown colouring is eliminated by adding pure nitric acid drop wise

**C.4.5**  $\text{HNO}_3$  (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 AgNO<sub>3</sub> 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 solution 0.1 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 =

$$\frac{5.56(V_2 - V_3) * V * 100}{V_1 * P}$$

where,

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

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

V<sub>1</sub> = is the volume, in ml, stock solution used from titration;

V<sub>2</sub> = is the volume, in ml, AgNO<sub>3</sub> added; and

V<sub>3</sub> = is the volume, in ml, NH<sub>4</sub>SCN necessary for back titration.



## Bibliography

[1] RS 150: 2018 Cooked packaged maize-Specification, Second edition

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