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**Instant fortified whole maize flour—
Specification**

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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.

DRS 436 was prepared by Technical Committee RSB/TC 22, *Nutrition and Foods for Special Dietary Uses*.

This second edition cancels and replaces the first edition (RTS 436: 2020) of which has been technically revised.

Committee membership

The following organizations were represented on the Technical Committee on Nutrition and Foods for Special Dietary Uses (RSB/TC 22) in the preparation of this standard.

Africa Improved Foods (AIF)

Amazon Nutrition Cabinet

ANARECO Ltd

Farmfresh Company Ltd

Global Alliance for Improved Nutrition (GAIN)

ISHYO FOODS Ltd

MINIMEX Ltd

National Industrial Research and Development Agency (NIRDA)

One Acre Fund Tubura

Rwanda Consumer's Rights Protection Organization (ADECOR)

Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA)

SOSOMA Industries Ltd

University of Rwanda-College of Agriculture, Forestry and Food Sciences (UR-CAFF)

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World Food Program (WFP)

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Instant fortified whole maize flour— Specification

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for instant fortified whole maize flour intended for human consumption

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.

AOAC 2001.04, *Determination of Fumonisin B1 and B2 in Corn and Corn Flakes Liquid Chromatography with Immunoaffinity Column Cleanup*

AOAC 2001.13, *Determination of Vitamin A (Retinol) in food — Liquid Chromatography*

AOAC 2004.05, *Total folates in cereal and cereal foods — Microbiological Assay-Trienzyme Procedure*

AOAC 2011.14, *Calcium, Copper, Iron, Magnesium, Manganese, Potassium, Phosphorus, Sodium and Zinc in fortified food products. Microwave Digestion and Inductively Coupled Plasma-Optical Emission Spectrometry*

AOAC 944.02, *Determination of Iron in flour. Spectrophotometric method*

AOAC 952.13, *Arsenic in food — Silver diethyldithiocarbamate*

AOAC 953.17, *Thiamine (vitamin B1) in grain products. Fluorometric (rapid) method*

AOAC 961.15, *Vitamin B6 (pyridoxine pyridoxal pyridoxamine) in food extracts. Microbiological method*

AOAC 970.65, *Riboflavin (Vitamin B2) in foods and vitamin preparations*

AOAC 975.41, *Niacin and niacinamide in cereal products. Automated method*

EAS 900, *Cereals and Pulses — Sampling*

EAS 901, *Cereals and cereal products — Test methods*

ISO 20634, *Infant formula and adult nutritionals — Determination of vitamin B12 by reversed phase high performance liquid chromatography (RP-HPLC)*

RS CXC 1, *General Principles of Food Hygiene*

RS CXS 192, *general standard for food additives*

RS EAS 2, *Maize grains — Specification*

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

RS EAS 44, *Milled maize (corn) products — Specification*

RS EAS 803, *Nutrition labelling — Requirements*

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

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 5bromo4-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 0,95*

RS ISO 2171, *Cereals, pulses and by-products — Determination of ash yield by incineration*

RS ISO 4833-1, *Microbiology of the food chain — Horizontal method for the enumeration of microorganisms — Part 1: Colony count at 30 degrees C by the pour plate technique*

RS ISO 5498, *Agricultural food products — Determination crude fibre Content-General method*

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

RS ISO 6579-1, *Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp.*

RS 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 BairdParker agar medium*

RS ISO 7305, *Milled cereal products — Determination of fat acidity*

3 Terms and definitions

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

3.1

instant fortified whole maize flour

whole maize flour subjected to heat treatment process with added micronutrients to the extent of ready to be used food product without further cooking

3.2

whole maize flour

food prepared from fully mature sound, un-germinated kernels of maize by a grinding process in which the entire grains is comminuted to a suitable degree of fineness

3.3

fortificant

compound which contains the essential micronutrient intended to be added to a foodvehicle

4 Requirements

4.1 Raw materials

Instant fortified whole maize flour shall be prepared from milled maize products complying with RS EAS 44 or maize grains complying with RS EAS 2.

4.2 General requirements

Instant fortified whole maize flour shall be:

- a) free from foreign matter such as insects, fungi or dirt or any other objectionable matter;
- b) free from fermented musty or other objectionable odour; and
- c) wholesome and fit for human consumption.

4.3 Specific requirements

Instant fortified whole maize flour shall comply with the requirements given in Table 1 when tested in accordance with test methods specified therein.

Table 1 — Specific requirements for instant fortified whole maize flour

S/N	Characteristic	Requirement	Test method
i.	Crude fibre, % by m/m, max.	3	RS ISO 5498
ii.	Crude fat on moisture free basis, % by m/m, min	2	RS ISO 11085
iii.	Moisture content, % by m/m, max.	5	EAS 901
iv.	Total ash, % by m/m, max.	1	RS ISO 2171
v.	Acid insoluble ash, %, m/m, max.	0.15	RS ISO 5985
vi.	Protein, %, m/m, min (on dry matter basis)	6	RS ISO 1871
vii.	Residue on sieving through 600-micron sieve, %, m/m, min	0.1	AOAC 965.22

4.4 Fortification requirements

Instant fortified whole maize flour shall comply with the levels of micronutrients provided in Table 2 when tested in accordance with test methods specified therein.

Table 2 — Requirements for micronutrients in instant fortified whole maize flour

S/N	Nutrient	Minimum	Maximum	Test method
i.	Vitamin A, µg/100g	217.3	395	AOAC 2001.13
ii.	Vitamin B1, mg/100g	0.4	N/A	AOAC 953.17
iii.	Vitamin B2, mg/100g	1.4	0.4	AOAC 970.65
iv.	Niacinamide, mg/100g	5.4	N/A	AOAC 975.41
v.	Vitamin B6, mg/100g	0.5	N/A	AOAC 961.15
vi.	Folic acid, µg/100g	156.8	N/A	AOAC 2004.05
vii.	Vitamin B12, µg/100g	0.8	N/A	RS ISO 20634
viii.	Zinc, mg/100g	3.9	7	AOAC 2011.14
ix.	Iron, mg/100g	9.0	16	AOAC 944.02

N/A: Not applicable

5 Food additives

Instant fortified whole maize flour may contain food additives. If used, they shall be in accordance with RS CXC 192.

6 Hygiene

6.1 Instant fortified whole maize flour shall be produced, prepared and handled in accordance with RS CXC 1.

6.2 Instant fortified whole maize flour shall comply with microbiological limits given in Table 3 when tested in accordance with the test methods specified therein.

Table 3 — Microbiological limits for instant fortified whole maize flour

S/N	Micro-organism	Maximum limit	Test method
i.	Total viable count, cfu/g, max	10 ³	RS ISO 4833-1
ii.	<i>Escherichia coli</i> , cfu/g	Absent	RS ISO 16649-2
iii.	<i>Salmonella spp</i> in 25 g	Absent	RS ISO 6579-1
iv.	<i>Staphylococcus aureus</i> , cfu/ g	Absent	RS ISO 6888-1
v.	Yeasts and moulds, cfu/g, max	10 ²	RS ISO 21527-2
vi.	Bacillus cereus, CFU/g, max	50	RS ISO 7932

7 Contaminants

7.1 Heavy metals

Instant fortified whole maize flour shall comply with maximum limits for heavy metals as given in Table 4 when tested in accordance with the test methods specified therein.

Table 4 — Heavy metals limits for instant fortified whole maize flour

S/N	Heavy metal	Limit mg/kg	Test method
ii.	Lead (Pb)	0.2	AOAC 999.11
iii.	Cadmium (Cd)	0.1	

7.2 Pesticide residues

Instant fortified whole maize flour shall comply with the maximum residue limits established by the Codex Alimentarius Commission for this commodity.

7.3 Mycotoxins

Instant fortified whole maize flour shall comply with mycotoxin limits specified in Table 5 when tested in accordance with test methods specified therein.

Table 5 — Mycotoxins limits for Instant fortified whole maize flour

S/N	Mycotoxin	Maximum limit, µg/kg	Test method
i.	Total aflatoxins	10	RS ISO 16050
ii.	Aflatoxins B1	5	
iii.	Fumonisin	2 000	AOAC 2001.04

8 Packaging

8.1 Instant fortified whole maize flour shall be packaged in food grade packaging materials.

8.2 When the product is packaged in sacks, these shall be clean, sturdy and strongly sewn or sealed.

8.3 Instant fortified whole maize flour shall be packed in suitable packages, which shall be clean, sound, and free from insects, fungal infestation, and the packing material shall be of food grade quality.

8.4 Instant fortified whole maize flour shall be packed in containers, which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.

8.5 Packaging material shall be made of materials, which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odour to the product.

8.6 Each package shall be securely closed and sealed.

9 Labelling

9.1 General labelling

In addition to the requirements in RS EAS 38, each package shall be legibly and indelibly marked with the following:

- a) name of product such as “Instant fortified whole maize flour”;
- b) instruction for preparation and use.
- c) micronutrients declaration

9.2 Nutrition labelling and health claims

9.2.1 Nutritional labelling shall be done in accordance with RS EAS 803.

9.2.2 Nutritional and health claims shall be declared in accordance with RS EAS 804 and RS EAS 805

10 Sampling

Sampling of instant fortified whole maize flour shall be done in accordance EAS 900.

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Bibliography

[1] EAS 768: 2025, Fortified milled maize (corn) products — Specification

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