GAMBIAN STANDARD GAMS 18:2018

STANDARD FOR FORTIFIED WHEAT FLOUR

ICS No: 67.060.00

Committee Representatives

The Technical Committee on National Food Standards which supervised the development of this Gambian Standard consists of representatives from the following organizations:

Food Safety and Quality Authority of The Gambia (FSQA)
National Beekeepers Association of The Gambia (NBAG)
National Nutrition Agency (NaNA)
Food Technology Services of Department of Agriculture (DoA/FTS)
Plant Protection Services (PPS)
National Agricultural Research Institute (NARI)
National Association of Food Processors (NAFP)
National Poultry Farmers Association of The Gambia (NPFA)
National Women Farmers Association (NAWFA)
Consumer Protection Association of The Gambia (CPAG)
Cashew Alliance of The Gambia
Agribusiness Services and Production Association (ASPA)
Fisheries Department
Medical Research Council (MRCG@LSHTM)
World Food Programme (WFP)
Food and Agricultural Organization (FAO)
Nessim Trading Limited
Gambia Milling Corporation (GMC)

The Subcommittee on Food fortification Standards which developed this Gambian Standard consists of representatives from the following Organizations:

Plant Protection Services (PPS)
National Women Farmers Association (NAWFA)
Food Safety and Quality Authority of The Gambia (FSQA)
National Nutrition Agency (NaNA)
Food Technology Unit of Department of Agriculture (FTU-DOA)
Consumer Protection Association of The Gambia (CPAG)
Medical Research Council (MRCG@LSHTM)
United Purpose (UP)
GamHope
National Agricultural Research Institute (NARI)
Gambia Milling Corporation (GMC)
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FOREWORD

The food TC developed the Standard in accordance with The Procedures of the *ISO/IEC Guide 21-1 - Regional or national adoption of International Standards and other International Deliverables - Part 1: Adoption of International Standards*. The method of adoption was Modified Adoption.

This Gambian Standard applies to fortified wheat flour intended for human consumption.

The Standard addresses the following:

- SCOPE
- ESSENTIAL COMPOSITION AND QUALITY FACTORS
- FOOD ADDITIVES
- CONTAMINANTS
- HYGIENE
- PACKAGING AND LABELLING
- METHODS OF ANALYSIS AND SAMPLING

This Standard can be obtained from The Gambia Standards Bureau.

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1. SCOPE

This standard applies to wheat flour for direct human consumption prepared from common wheat, Triticum aestivum L., or club wheat, Triticum compactum Host., or mixture thereof, which is fortified and prepackaged ready for sale to the consumer or destined for use in other food products.
It does not apply:

- to any product prepared from durum wheat, *Triticum durum* Desf., singly or in combination other wheat;
- to whole meal, whole-wheat flour or semolina, farina milled from common wheat, *Triticum aestivum* L., or club wheat, *Triticum compactum* Host., or mixtures thereof;
- to wheat flour destined for use as a brewing adjunct or for the manufacture of starch and/or gluten;
- to wheat flour for non-food industrial use;
- flours whose protein content have been reduced or which have been submitted after the milling process to a special treatment other than drying or bleaching and/or to which have been added other ingredients than those mentioned under Sections 3.2.2 and 4.

2. NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For references, the latest edition of the referenced document (including any amendments) applies.

- GAMS CODEX CAC/RCP 1 – 1969, *General principles of food hygiene*
- GAMS CODEX STAN, 1 - 1985 *Labelling of Prepackaged foods*
- *ISO 2171, Cereals, pulses and by-products -- Determination of ash yield by incineration*
- ISO 7305, *Milled cereal products — Determination of fat acidity*
- ISO 24333, *Cereals and cereal products — Sampling*
- ISO 1871:2009, *Food and feed products -- General guidelines for the determination of nitrogen by the Kjeldahl method*
- AOAC 952.13, *Arsenic in food — Silver diethyldithiocarbamate*
- ISO 6633, *Fruits, vegetables and derived products — Determination of lead content — Flameless atomic absorption spectrometric 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 16649-2, *Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of betaglucuronidase-positive Escherichia coli -- Part 2: Colony-count technique at 44 degrees C using 5-bromo-4-chloro-3indolyl beta-D-glucuronide*

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

- ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulasepositive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

- 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*

3. DEFINITIONS

3.1 Wheat flour

Wheat flour is the product prepared from grain of common wheat, *Triticum aestivum* L., or club wheat, *Triticum compactum* Host., or mixtures thereof, by grinding or milling processes in which the bran and germ are partly removed and the remainder is comminuted to a suitable degree of fineness.

3.2 Fortification

Practice of deliberately adding essential micronutrients in a food to improve the nutritional quality of the food and to provide a public health benefit with minimal risk to health

3.3 Diluent

A suitable, inert, edible food-grade carrier for micronutrients

3.4 Premix

A blend of fortificants and diluents formulated to provide specified and determinable amounts of micronutrients.

3.5 Fortified wheat flour

Wheat flour to which micronutrients have been added in accordance with this standard.

3.6 Fortificant

A compound which contains the specified micronutrient intended to be added to a food

4. ESSENTIAL COMPOSITION AND QUALITY FACTORS

4.1. Quality factors – general

4.1.1 Fortified wheat flour and any added ingredients shall be safe and suitable for human consumption.

4.1.2 Fortified wheat flour shall have the characteristic colour and shall be free from any objectionable flavors.

4.1.3 The flour shall be free from insects, worms, fungal infestation, rodent contaminations and foreign matter.

4.2. Quality factors – specific

4.2.1. **Moisture content** 14% m/m max

4.3. Optional ingredients

The following ingredients may be added to wheat flour in amounts necessary for technological purposes:

– malted products with enzymatic activity made from wheat, rye or barley;

– vital wheat gluten;

– soybean flour and legume flour.

5. FOOD ADDITIVES

5.1.	Enzymes	Maximum level in finished product
5.1.1	Fungal amylase from *Aspergillus niger*	GMP
5.1.2	Fungal amylase from *Aspergillus oryzae*	GMP
5.1.3	Proteolytic enzyme from *Bacillus subtilis*	GMP
5.1.4	Proteolytic enzyme from *Aspergillus oryzae*	GMP

5.2.	Flour treatment agents	Maximum level in finished product
5.2.1	L-ascorbic acid and its sodium and potassium salts	300 mg/kg
5.2.2	L-cysteine hydrochloride	90 mg/kg
5.2.3	Sulphur dioxide (in flours for biscuit and pastry manufacture only)	200 mg/kg
5.2.4	Mono-calcium phosphate	2 500 mg/kg
5.2.5	Lecithin	2 000 mg/kg
5.2.6	Chlorine in high ratio cakes	2 500 mg/kg
5.2.7	Chlorine dioxide for yeast raised bakery products	30 mg/kg
5.2.8	Benzoyl peroxide	60 mg/kg

5.3. Fortification

Wheat flour shall be fortified with folic acid and iron as specified in Table 1:

One of the three forms of Iron listed below can be added

Table 1 – Levels of iron and folic acid fortification of wheat flour

Fortificant	Quantity (mg/kg)	Tolerance
Folic Acid	2.6	±10% (2.34 – 2.86 mg/kg)
Iron	55 – 65	±10%

Fe fumerate	(60)	(54 – 66 mg/kg)
Sodium Iron EDTA (NaFeEDTA)	(40)	(36 – 44 mg/kg)
Fe Sulfate	(60)	(54 – 66 mg/kg)

6. CONTAMINANTS

6.1. Heavy metals

Wheat flour shall be free from heavy metals in amounts which may represent a hazard to human health.

Table 2: Maximum limits of heavy metals

Heavy metals	Maximal level (mg/kg)	Test methods
Arsenic (As)	0.1	AOAC 952.13
Lead (Pb)	0.2	ISO 6633
Cadmium (Cd)	0.1	ISO 6561-1/2

6.2. Pesticide residues

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

6.3. Mycotoxins

Wheat flour shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity as shown in the table below.

Table 3: Maximum limits of Mycotoxins

Mycotoxin	Maximum limit µg/kg
Total aflatoxins	10
Aflatoxin B_1	5
Fumonisins	2000

7. HYGIENE

7.1. It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the GAMBIAN Standard on *General principles of food hygiene* — **GAMS CODEX CAC/RCP 1 1969** and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

7.2. To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

– shall be free from micro-organisms in amounts which may represent a hazard to health;

– shall be free from parasites which may represent a hazard to health; and

– shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

Table 4: Microbiological limits for wheat flour

Microorganism	**Maximum limit**	**Test method**
Total aerobic count per g	10^5	ISO 4833-1
Escherichia coli per 1g	$<1 \times 10^2$	ISO 16649-2
Salmonella per 25g	Absent	ISO 6579- 1
Yeast and moulds cfu/g	10^4	ISO 21527- 2
Staphylococcus aureus per 25g	10^2	ISO 6888-1

8. PACKAGING AND LABELLING

8.1. PACKAGING

8.1.1 Fortified Wheat flour shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

8.1.2 The containers shall be food-grade, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

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

8.2. LABELLING

In addition to the requirements of the Gambian standard GAMS CODEX STAN, 1 - 1985 *Labelling of Prepackaged foods,* the following specific provisions apply:

8.2.1 **Name of the product**

The name of the product to be shown on the label shall be "fortified wheat flour."

8.2.2 **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.

9. METHODS OF ANALYSIS AND SAMPLING

Sampling shall be done in accordance with ISO 24333. Testing shall be done in accordance with the methods indicated against each requirement or other equivalent methods.

ANNEX: METHODS OF ANALYSIS

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

	Factor/Description	Limit	Method of analysis
	ASH	Buyer Preference	AOAC 923.03
			ISO 2171:1980
			ICC Method No. 104/1 (1990)
	FAT ACIDITY	MAX: 70 mg per 100 g flour on a dry matter basis	ISO 7305:1986
		expressed as sulphuric acid	– or –
		– or –	AOAC 939.05
		Not more than 50 mg of potassium hydroxide shall	
		be required to neutralize the free fatty acids in 100	
		grams flour on a dry matter basis	
	PROTEIN (N 5.7)	MIN: 7.0% on a dry weight basis	ICC 105/l Method for the Determination of Crude
			Protein in Cereals and Cereal Products for Food and
			for Feed (Type I Method) Selenium/Copper catalyst.
			– or –
			ISO 1871:1975
	NUTRIENTS		None Defined
	Vitamins A	2.0 mg/kg (±10%)	
	Thiamin	8.4 mg/kg (±10%)	
	Riboflavin	4.5 mg/kg (±10%)	
	Niacin	59.0 mg/kg (±10%)	
	Vitamin B12	0.01mg/kg (±10%)	
	Zinc	28.3 mg/kg (±10%)	
	Iron 55 – 65 mg/kg (±10%)	Folic Acid 2.6 mg/kg (±10%)	
	PARTICLE SIZE	98% or more of flour shall pass through a 212 micron (No. 70 sieve)	AOAC 965.22
	(GRANULARITY)		

Note: Vitamin A for Wheat flour fortification is a dry, encapsulated form of Vitamin A palmitate containing (75,000 g RE/g). The most common commercial Premix used contains a blend of Vitamin A palmitate, other vitamins and minerals.