

DRAFT KENYA STANDARD

DKS 169: 2009
ICS 67.060

Wheat flour — Specification

PUBLIC REVIEW DRAFT

©KEBS 2009

Fourth Edition 2009

DKS 169: 2009

TECHNICAL COMMITTEE REPRESENTATION

The following organizations were represented on the Technical Committee:

National Cereals and Produce Board
Ministry of Health — Department of Public Health
— Division of Nutrition
Egerton University
Pembe Flour Mills Ltd.
Nestle Foods
Unga Ltd.
Capwell Industries Ltd
Proctor and Allan (EA) Ltd.
Ministry of Trade and Industry — Department of Industry
Government Chemist's Department
Jambo Biscuits Ltd.
Consumer Information Network (CIN)
Kenyatta National Hospital
Kenya Bureau of Standards — Secretariat

REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

© Kenya Bureau of Standards, 2009

Copyright. Users are reminded that by virtue of Section 25 of the Copyright Act, Cap. 12 of 2001 of the Laws of Kenya, copyright subsists in all Kenya Standards and except as provided under Section 26 of this Act, no Kenya Standard produced by Kenya Bureau of Standards may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from the Managing Director.

Wheat flour — Specification

PUBLIC REVIEW DRAFT

KENYA BUREAU OF STANDARDS (KEBS)

Head Office: P.O. Box 54974, Nairobi-00200, Tel.: (+254 020) 605490, 602350, Fax: (+254 020) 604031
E-Mail: info@kebs.org, Web: <http://www.kebs.org>

Coast Region

P.O. Box 99376, Mombasa-80100
Tel.: (+254 041) 229563, 230939/40
Fax: (+254 041) 229448

Lake Region

P.O. Box 2949, Kisumu-4010
Tel.: (+254 057) 23549, 22396
Fax: (+254 057) 21814

Rift Valley Region

P.O. Box 2138, Nakuru-20100
Tel.: (+254 051) 210553, 210555

DKS 169: 2009

Foreword

This Fourth Edition of KS 169 was prepared by the Technical Committee on Processed Cereals and Pulses and it is in accordance with the procedures of the Kenya Bureau of Standards.

This standard incorporates the specific compositional requirements for both fortified and non-fortified wheat flour. The standard has prescribed the permissible levels of food additives in wheat flour. Microbiological requirements for wheat flour have also been stipulated.

This revision was done mainly to provide a guidelines of formulation of premix to be used in fortification as well as to align the microbiological limits in line with the best international practices

During the preparation of this standard, reference was made to the following documents:

Methods for microbiological examination of foods by Mossel, D.A.A. and Taminga, S.K. (*Third Edition*).

Technology of cereals by N.L. Kent (*1998 Fourth Edition*).

Guidelines on food fortification with micronutrients, 2006, WHO/FAO

Acknowledgement is hereby made for the assistance derived from these sources.

Wheat flour — Specification

1 Scope

This Draft Kenya Standard specifies the requirements and methods of test for both fortified and non-fortified wheat flour (other than durum wheat flours) intended for baking and other modes of human consumption.

2 Definitions

For the purposes of this standard, the following definitions shall apply:

2.1

wheat flour

is the product made from milling clean wheat grains conforming to the requirements of KS 01-136, Specification for wheat grades

2.2

Fortified/enriched wheat flour

product prepared from grain of common wheat, *Triticum aestivum* L., or club wheat, *Triticum compactum* wheat, *Triticum aestivum* L., or mixture thereof, by grinding or milling processes in which the endosperm is comminuted to a suitable degree of fineness to which nutrients have been added in accordance with this standard

2.3

white wheat flour

is the wheat flour obtained by milling wheat grains at low extraction rates that leaves negligible amounts of bran

2.4

bakers flour

white wheat flour obtained by milling high protein wheat intended for bread making

2.5

household or home baking flour

white wheat flour obtained by milling wheat grades or blends of hard and soft wheat intended for domestic use

2.6

biscuit flour

white wheat flour obtained by milling a blend of hard and soft wheat with a high percentage of soft wheat for biscuit manufacture

2.7

cracker flour

{white wheat flour obtained by milling wheat with no improvers}

2.8

self-raising flour

white wheat flour obtained by milling a blend of soft and hard wheat to which raising agents are added

DKS 169: 2009

2.9

standard flour

wheat flour obtained by milling wheat grains at a higher extraction than home baking flour

2.10

wholemeal flour

wheat flour obtained by milling the entire wheat grain to fine particle size without any separation

2.11

atta flour

wheat flour to which pollard or other material has been added to increase the coarseness of the flour

2.11

diluent

a suitable, inert, food-grade carrier for micronutrients

2.12

fortificant

prescribed compound which provides a specified micronutrient

2.13

Premix

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

3 Quality requirements

3.1 General requirements for wheat flour

3.1.1 All types of wheat flour shall have the characteristic colour and shall be free from any objectionable flavours and odours.

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

3.1.3 The flour shall not contain flour from other cereals. However, the addition of malted barley flour not exceeding 1 % is permissible in the case of baker's flour.

3.1.4 The flour shall be produced under GMP conditions.

3.1.5 The shelf life shall be three months for wholemeal, standard flour and atta, but six months for other types wheat flours.

3.2 Compositional requirements for wheat flour

3.2.1 The types of wheat flour shall comply with the compositional requirements given in Table 1 and shall be free of bromates.

3.2.2 Self-raising flour

In addition to the specifications in Table 1, compositional requirements for self-raising wheat flour may contain the following:

3.2.2.1 Edible salt conforming to KS 05-229, Specification for edible salt.

3.2.2.2 Acid ingredients

The acid ingredients shall be one or any combination of the following:

- i) sodium acid pyrophosphate;
- ii) mono acid calcium phosphate;
- iii) sodium aluminium phosphate;
- iv) disodium bicarbonate shall be in sufficient amounts to provide not less than 0.4 % of available carbon dioxide.

Table 1 — Compositional requirements/limits

SI No.	Types of flour	Moisture content, max. %, m/m	Fibre content, max. %, m/m	Total ash content, max. %, m/m	Residue on sieving through 180 micron-sieve, max. %	Protein content, min. %, m/m	Mixture of acid-ingredients and sodium bicarbonate added, max. %, m/m
i)	White wheat flour:						
	Baker's flour	13.5	1.0	0.70	0.80	11.0	—
	Home baking flour	13.5	1.0	0.70	0.80	9.0	—
	Biscuit flour	13.5	1.0	0.55	0.50	8.0	—
	Cracker flour	13.5	1.0	0.70	0.50	10.0	—
	Self-raising flour	13.5	1.0	2.0	0.80	8.0	4.5
ii)	Standard flour	13.5	1.5	1.10	30.0	11.0	—
iii)	Atta flour	13.5	2.0	2.0	55.0	12.0	—
iv)	Whole-meal flour	13.5	2.0	2.0	30.0	12.0	—
v)	Test methods	KS 171, Part 1 ^{a)}	KS 171, Part 1	KS 171: Part 2 ^{b)}	KS 171: Part 1	KS 171, Part 3 ^{c)}	KS171, Part 1

DKS 169: 2009

- a) Milled cereals products — Part 1: Moisture determination.
- b) Milled cereals products — Part 2: Total ash determination.
- c) Milled cereals products — Determination of protein in animal feedstuffs, cereal and cereal products, meat and meat products using Kjtec auto analyzer.

4 Heavy metal contaminants

When tested in accordance to Atomic Absorption Spectrophotometry (AAS)

Table 2 — Limits for heavy metal contaminants in wheat flour

Sl no	Contaminant	Maximum limit ppm
i)	Arsenic (As)	1.0
ii)	Lead (Pb)	0.2
iii)	Cadmium	0.2

5 Permissible additives

For improving the quality of flour, the following substances may be added in quantities specified in KS 05-660, Specification for food additives, and those given in the Food, Drugs and Chemical Substances Act, Cap. 254 of the Laws of Kenya.

5.1 Improvers

Improvers may be added singly or in combination, including but not limited to:

	Maximum permitted level (mg/kg)
i) L. ascorbic acid and its sodium and potassium salts	300 ppm
iii) mono calcium phosphate	2 500
iv) chlorine dioxide	30
v) L-cystein hydrochloride	90
vi) Sulphur dioxide (In flour for biscuits & pastry)	200
vii) Lecithin	2000

NOTE Azodicarbonamide (ADA) shall not be used at all.

5.2 Bleachers (added singly)

	Maximum permitted level
i) benzoyl peroxide	60 ppm

5.3 Diastatically actives (singly or combined)

		Maximum permitted level
i)	malt flour (milled from highly diastatic barley)	GMP
ii)	fungal enzyme (amylzyme or MYL-X)	GMP

NOTE All food additives shall be of food grade quality.

6 Wheat flour fortification/enrichment

6.1 The fortification of wheat flour with vitamins and minerals is optional. Any wheat flour that is declared as fortified with vitamins and minerals shall comply with the specification in Table 3.

6.2 Wheat flour shall only be fortified with the forms of fortificants and the number of nutrients as indicated in Table 3:

Table 3 — Wheat flour fortification requirements

Nutrient	Fortification compound	Recommended factory average (mg per kg)	Regulatory requirements (mg/kg)	
			Minimum	Maximum
Vitamin A	Vitamin A palm. SD	2 ± 1	0.5	3.0
Thiamine (Vit. B1)	Thiamin mononitrate	10 ± 5	5.0	15
Riboflavin (Vitamin B2)	Riboflavin	6 ± 3	2.5	9
Niacin (Vitamin B3)	Niacinamide	60 ± 15	40	75
Folates	Folic acid	1.5 ± 1	0.5	2.5
Pyrodoxine (Vitamin B6)	Pyrodoxine	6.5 ± 3.5	3.0	10
Cobalamine (Vitamin B12)	Vitamin B12 0.1% WS	0.015 ± 0.005	0.005	0.025
Iron	Ferrous fumerate	40 ± 10	30	50
	Total iron	50 ± 10	40	60
Zinc	Zinc oxide	40 ± 10	30	50

6.3 Premix Formulation

6.3 .1 The levels provided in table 4 provides a guideline for fortificants in the formulation of premix for maize fortification

6.3 .2 The activity levels of the various nutrients shall conform to the requirements provided in table 4

6.3 .3 The premix package should be labeled with the recommended addition rate in grams of premix per metric ton of wheat flour and the proposed dilution factor.

6.3 .4 The supplier of the premix should provide an accompanying stability data for the fortificants and premixes.

Table 4 – Guidelines for premix formulation

Nutrient	Fortificant compound	Activity level (minimum)	Fortificant (g/kg of premix, min.
Vitamin A	Retinyl Palmitate-250 IU/g (dry)	0.075	53.3
Vitamin B1	Thiamin mononitrate	0.81	19.8
Vitamin B2	Riboflavin	1	10
Niacin	Niacinamide	0.99	121.2
Vitamin B6	Pyridoxine	0.82	14.6
Folates	Folic Acid	0.9	6.5
Vitamin B12	Vitamin B12 0.1 % WS	0.1	30
Iron	NaFeEDTA	0.32	187.5
Zinc	Zinc Oxide	0.8	75
Diluent			477.1
Total			1000
<p>Note 1: The premix formulated based on this guidelines shall have an addition rate of 500 g of the premix per metric ton of maize flour (Dilution factor 1/2000).</p> <p>Note 2: This premix formulation is designed with minimum nutrient composition and does not take into consideration factory overages and other losses that may occur in the preparations of the premix.</p>			

7 Hygiene

7.1 flour shall be manufactured in premises complying with the hygienic practices stipulated in the Public Health Act, Cap. 242, the Food, Drugs and Chemical substances Act, Cap. 254 of the Laws of Kenya and KS 05-1500, Code of practice for food and drink manufacturing industry.

7.2 Microbiological limits

The flour shall not contain any pathogenic microbes and shall also comply with the microbiological limits given in Table 4.

Table 4 — Microbiological requirements

SI no.	Types of micro-organism	Max. number of counts permissible	Test method
i)	Total viable counts	10 ⁵ per g	KS 05-220 ^{a)}
ii)	<i>Coliforms</i> , per g	Shall be absent	
iii)	<i>Escherichia coli</i> , per g	Shall be absent	
iv)	<i>S. aureas</i> , per g	Shall be absent	
v)	<i>Salmonella</i> , per 25 g	Shall be absent	
vi)	Yeasts and moulds, per g	10 ⁴	Annex A
vii)	Bacterial rope spore count, per g	10 ²	

^{a)} Methods for the microbiological examination for foods.

7.3 Aflatoxin

The total aflatoxin level shall not exceed 10 ppb, with aflatoxin B₁ not exceeding 5 ppb when tested in accordance with KS 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.

8 Packaging

8.1 The product shall be packed in food grade material that ensures product safety and integrity.

8.2 The package fill shall comply with the Weights and Measures Act, Cap. 513 of Laws of Kenya.

9 Labelling

9.1 In addition to the provisions of KS 05-40, Labelling of prepackaged foods, the following shall be legibly and indelibly marked:

- i) name and type of product;
- ii) brand name;
- iii) name and physical address of the manufacturer/packer/importer;
- iv) batch or code number;
- v) declaration of additives used;
- vi) net weight, in g or kg;
- vii) date of manufacture;
- viii) expiry date;
- ix) storage instruction;

DKS 169: 2009

- x) declared as “Human Food”;
- xi) where a product has been fortified, statement declaration, “Fortified with vitamins and minerals or the fortification logo or both” shall be included on the label.
- xii) country of origin;
- xiv) Caution “Store and transport away from any contaminants such as soaps, detergents, petroleum products, spices and other aromatic substances”.

9.2 Any Health and/or Nutrition claim on maize flour shall conform to the provisions of KS CAC/GL 23 *Guidelines for nutrition and health claims*.

Annex A (normative)

Determination of bacterial spore count

A.1 Reagents

- A.1.1 Peptone water, 0.1 %, sterilized.
- A.1.2 Tryptone glucose, (extract (TGE) agar.
- A.1.3 Tryptone, 5.0 g.
- A.1.4 Yeast extract, 2.5 g.
- A.1.5 Glucose (dextrose), 1.0 g.
- A.1.6 Sodium chloride, 6.5 g.
- A.1.7 Agar, bacteriological grade (see Note) 15.0.
- A.1.8 Water, distilled, 1 000.0 mL.
- A.1.9 Final pH, 7.0 ± 0.1.

NOTE Granulated or chopped shreds, practically free from thermophilic bacteria, shall be used.

A.2 Procedure

A.2.1 Weigh 22 g of flour in a suitable sterile container and transfer to 100 mL of sterile 0.1 % peptone water in a conical flask containing sterile sand or glass beads. Disperse by blending on a shaker for about 2 min. Dilute the blended material further 1:10, 1:100, 1:1 000, 1:10 000, etc., by dilution technique, using sterile peptone water.

A.2.2 Prepare tryptone glucose extract (TGE) agar or any other suitable medium 100 mL per 250 mL conical flask. Prepare one additional flask of medium to serve as a sterility control. Sterilize at 121 °C for 15 min and then cool to 45 °C in a water bath. Pipette volumes of blended material into a set of flasks of TGE agar while

they are held in the water bath; 10 mL into the first, 1 mL into the second and 1 mL of each dilution into the third, fourth and fifth TGE flask, and so on. Gently agitate the flask to disperse the blended material throughout the medium.

A.2.3 Transfer the flask without delay to a water bath adjusted to 85 °C to 90 °C and hold for 30 min with gentle shaking occasionally to assist heat distribution. After 30 min of heat treatment, cool the flasks to about 45 °C without allowing the agar to congeal. Pour the 100 mL medium in each flask representing the test material and sterility control into a set of 5 sterile petri dishes in approximately equal volumes that is about 20 mL per plate. When agar has solidified, invert the plates and incubate at 35 °C for 48 h.

A.2.4 Count the surface and sub-surface colonies. The sum of the colonies on the set of 5 plates poured from TGE agar, containing 10 mL of blended food material represent the number of aerobic and mesophilic spores per gram of material. Similarly, 1 mL of the blended and 1 mL of each dilution are equal to 0.01, 0.001 per gram, and shall be multiplied by the respective dilution factor. Generally, the set of plates showing about 30 – 60 colonies per plate are to be chosen for counting purposes.

A.3 Precautions and limitations

A.3.1 The procedure permits enumeration of aerobic and mesophilic spores in food samples containing relatively higher number of spores by higher dilution of the sample prior to heat treatment.

A.3.2 Certain thermophilic strains may also be indicated in this method in which case these shall be determined with an additional pre-heat treatment at 150 °C – 200 °C (to knock off all spores and account only for thermophiles) and their numbers be subtracted from the spore count.