KENYA STANDARD

KS 2839-3:2023
ICS 67.060

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Blended flour — Specification

Part 3:

Maize and millet blend

TECHNICAL COMMITTEE REPRESENTATION

The following organizations were represented on the Technical Committee:
Agriculture and Food Authority (AFA)
Agriculture Sector Development Support Programme (ASDSP)
Farm Concern International.
Zeelandia EAST Africa Ltd.
Kenya Agriculture and Livestock Research Organization (KALRO)
Kenya Industrial Research and Development Institute (KIRDI)
Ministry of Agriculture, Livestock, Fisheries and Irrigation (MOALF&I)
Ministry of Health — Food Safety Unit
Ministry of Health — Nutrition and Dietetic
National Cereals and Produce Board (NCPB)
University of Nairobi
World Food Programme (WFP)
Kenya Medical Research Institute (KEMRI)
National Public Health Labs (NPHL)
Government Chemist
Mennonite Economic Development Associates (MEDA)
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.

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Foreword

This Kenya Standard was prepared by the Joint Technical Committee comprising of key stakeholders under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

Flour blending initiative is aimed at contributing towards food security, improved nutrition and increased employment opportunities in Kenya through flour blending based on under-utilized high value foods. This multi-sectoral approach has been designed through a consultative process that targets a high-impact approach aimed at integrating Arid and Semi Arid Lands (ASALs) as food and nutrition secure regions to contribute to the national food basket.

This Workshop Agreement forms part of a series of standards aimed at blending traditional sources of flours mainly maize and wheat with the underutilized foods. This will reduce over reliance on maize and wheat as well as improve both food security and nutritional qualities of the products.

In the preparation of this Workshop Agreement, reference was made to the following documents:

KS EAS 44, Maize flour — Specification.

KS EAS 2, Maize grains — Specification.

KS EAS 89, Millet flour — Specification.

KS EAS 284, Pearl millet grain — Specification.

KS EAS 758, Finger millet — Specification.

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

Blended flour — Specification

Part 3:

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1 Scope

This Kenya Standard specifies the requirements, methods of sampling and test for blended maize and millet flour prepared from the grains of common maize (*Zea mays L*.) and pearl millet of varieties (cultivars) “souna” and “sanio” grown from *Pennisetum glaucum* (L.) *R.Br* or finger millet grown from *Eleusine coracana* (L.) Gaertner or a mixture of their flour thereof 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 2001.06, *Total fumonisins in corn. Competitive direct enzyme-linked immunosorbent assay*

AOAC 2013.06, *Arsenic, Cadmium, Mercury and Lead in foods*

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

KS CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

KS EAS 2, *Maize grains — Specification*

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

KS EAS 38*, Labelling of pre-packaged foods — Specification*

KS EAS 39*, Hygiene in the food and drink manufacturing industry — Code of practice*

KS EAS 89, Millet flour — Specification

KS EAS 284, Pearl millet — specification

KS EAS 758, Finger millet — Specification

KS EAS 768, Fortified milled maize products — *Specification*

KS EAS 803, *Nutrition labelling — Requirements*

KS EAS 804, *Claims on food — General requirements*

KS EAS 805, *Use of nutrition and health claims — Requirements*

KS ISO 712, *Cereals and cereal products — Determination of moisture content — Reference method*

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

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

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

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

KS ISO 9648, *Sorghum — Determination of tannin content*

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

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*

KS 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*

KS 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*

KS ISO 24333, *Cereals and cereal products — Sampling*

3 Terms and definitions

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

3.1 blended flour
a mixture of two different milled food crop produce. This can be obtained by mixing the food crop produce before milling or their flours thereof

3.1.2 food grade packaging material
material which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the product

3.1.3 musty odour
stale, mouldy or dump smell

3.2 wholesome
free from disease and physiological deterioration (such as but not limited to decay, breakdown, freezing damage) or adulteration/contamination, that appreciably affects their appearance, edibility, the keeping quality of the produce or market value.

3.2.1 foreign matter
all organic and inorganic material

3.2.2 inorganic **matter**
stones, glass, pieces of soil and other mineral matter

3.2.3
organic matter
any animal or plant matter (seed coats, straws, weeds) other than maize and millet grain, damaged maize grain, other grains, inorganic extraneous matter, and harmful/toxic seeds.

3.3 Extraneous matter
Extraneous matter are all organic and inorganic materials other than maize and millet, broken kernels, other grains, and filth.

3.3.1 Millet flour product obtained from millet grains grown from Pennisetum glaucum (L.) R.Br., Penicum maliaceum and Eleusine coracana (L.) Gaertner through a process of milling.

3.3.2 milled maize (corn)
product obtained from maize grains (Zea mays L.) through milling process.

4 Requirements

4.1 Raw materials

Blended maize and millet flour shall be prepared by blending maize flour complying with KS EAS 44 or maize grains complying with KS EAS 2 and millet flour complying with KS EAS 89 or millet grains complying with KS EAS 284 and/or KS EAS 758.

4.2 General requirements

Blended maize and millet flour shall be:

a) of characteristic colour of maize grains/flour and millet grains/flour from which they were prepared;

b) free from foreign matter such as insects, insects' parts, fungi or dirt;

c) free from fermented musty or other objectionable odour; and

d) wholesome and fit for human consumption.

4.3 Specific requirements

4.3.1 The minimum content of millet flour in the blended product shall be 10 %.

4.3.2 Blended maize and millet flour shall comply with the requirements given in Table 1 when tested in accordance with tested method specified therein.

Table 1 — Compositional requirements for blended maize and millet flour

S/N	Parameter	Limit	Test method
i)	Crude fibre, % by m/m, max.	5	KS ISO 5498
ii)	Moisture, %, m/m, max.	14	KS ISO 712
iii)	Total ash, %, max.[a]	4.2	KS ISO 2171

iv)	Fat acidity, mg KOH per 100 g of product, m/m, max.	80	KS ISO 7305
v)	Tannin content, %, m/m, max.	0.3	KS ISO 9648
vi)	Acid insoluble ash, % by m/m, max.	0.4	KS ISO 5985
[a] % mass on dry matter basis.			

5 Fortification requirements

5.1 Levels of micronutrients

Fortified Blended maize and millet flour shall comply with the levels of micronutrients provided in Annex A

6 Food additives

Only the food additives permitted by KS CODEX STAN 192 may be used without exceeding the stated limits.

7 Hygiene

7.1 Blended maize and millet flour shall be produced, prepared and handled in accordance with KS EAS 39.

7.2 The product shall comply with microbiological limits given in Table 2 when tested in accordance with the test methods specified therein.

Table 2 — Microbiological limits for blended maize and millet flour

S/N	Micro-organism	Maximum limit	Test method
i)	*E. coli*, Cfu/g	10^2	KS ISO 16649-2
ii)	*Salmonella spp in* 25 g	Absent	KS ISO 6579-1
iii)	Yeast and moulds, Cfu/g	10^4	KS ISO 21527-2

8 Contaminants

8.1 Heavy metals

Blended maize and millet flour shall comply with KS CODEX STAN 193 for respective flours. In addition, the products shall comply with Table 3 when tested in accordance with test methods specified therein.

Table 3 — Heavy metal limits for blended maize and millet flour

S/N	Heavy metal	Limit, mg/kg	Test method
i)	Arsenic (As)	0.1	AOAC 2013.06
ii)	Lead (Pb)	0.2	
iii)	Cadmium (Cd)	0.1	

8.2 Pesticide residues

Blended maize and millet flour shall comply with the maximum residue limits established by the Codex Alimentarius Commission for this commodity.

8.3 Mycotoxins

Blended maize and millet flour shall comply with mycotoxin limits specified in Table 4 when tested in accordance with test methods specified therein.

Table 4 — Mycotoxin limits for blended maize and millet flour

S/N	Mycotoxin	Maximum limit, µg/kg	Test method
i)	Total aflatoxins	10	KS ISO 16050
ii)	Aflatoxins B_1	5	
iii)	Fumonisins	2 000	AOAC 2001.06

9 Packaging

9.1 Blended maize and millet flour shall be packaged in food grade packaging materials.

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

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

10 Labelling

10.1 General labelling

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

a) name of product such as "Blended Maize and Millet" flour or "Blended Millet and Maize Flour". The first name shall be that of the dominant flour in the blend;

b) name and address of the manufacturer/packer/importer;

c) brand name/registered trade mark, if any;

d) lot or batch number in code or in clear format;

e) net weight in metric units;

f) the statement "Store in a cool dry place and away from contaminants";

g) the statement "for human consumption";

h) country of origin;

i) date of manufacture;

j) expiry date; and

k) instructions for disposal of used package.

10.2 Nutrition labelling

The amount of nutrients in the Blended maize and millet flour shall be declared on the label in accordance with KS EAS 803.

10.3 Nutrition and health claims

Blended maize and millet flour may have claims on nutrition and health. Such claims when declared shall be in compliance with KS EAS 804 and KS EAS 805.

11 Sampling

Sampling shall be done in accordance with KS ISO 24333.

Annex A

Requirements for levels of micronutrients in fortified composite flour.

Nutrient	Fortificant	Limits mg/kg		Test method
		Min.	Max.	
Vitamin A[a]	Vitamin A (Retinyl) palmitate, spray-dried or equivalent, 75 000 µg RE/g[b] (7.5 % retinol), min.	0.5	1.4	AOAC 2001.13
Vitamin B_1[a]	Thiamin Mononitrate, 81 %, min.	4.6	NA[c]	AOAC 953.17
Vitamin B_2[a]	Riboflavin, 100 %, min.	3.3	NA	AOAC 970.65
Niacin[a]	Niacinamide, 99 %, min.	30	NA	AOAC 975.41
Vitamin B_6[a]	Pyridoxine hydrochloride, 82 %, min.	3	NA	AOAC 961.15
Folate	Folic acid, 90.5 %, min.	1.1	3.2	AOAC 2004.05
Vitamin B_{12}	Vitamin B_{12} (Water soluble), 0.1 %,min.	0.01	NA	ISO 20634
Zinc	Zinc oxide, 80 %, min.	40	80	AOAC 2011.14
Total iron	Total iron	20	NA	AOAC 944.02

[a] The addition of these micronutrients is optional in Tanzania.

[b] 1µg RE = 3.33 IU, RE = Retinol equivalent.

[c] NA-Not Applicable. The maximum limits for these nutrients are not necessary because the upper tolerance limits of these nutrients are very high.

NOTE 1 Any other fortificants listed by either British Pharmacopoeia (BP); Food Chemical Codex (FCC); Merck Index (MI); United States National Formulary (NF); European Pharmacopoeia (Ph Eur); United States Pharmacopoeia (USP); or FAO WHO Codex Alimentarius Commission may be used.

NOTE 2 Only NaFeEDTA, 12.5 % Fe, min or Ferrous fumarate, 32 %, min shall be used as a source of iron so as to provide iron at 20-40 mg/kg and 30-50 mg/kg respectively for wheat flour fortification.