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COMPOSITE FLOUR – SPECIFICATION

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Composite flour — Specification



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Introduction

Composite flour is commonly used for porridge. Its composition varies from type to type, but the most common is a mixture of cereal flours in different ratios only or together with legumes and tubers. In some of the composite flour in the market, fortification with both macro and micronutrients in forms of vitamins and minerals as well as protein from both plant (mostly soya) and animal has been included. This is aimed at improving the nutritional value of the product for the benefit of the consumers.

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Composite flour — Specification

1 Scope

This African Standard specifies requirements, methods of sampling and test for composite flour intended for human consumption.

2 Normative references

The following referenced documents are indispensable for the application 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.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

ARS 844, *Cassava and cassava products — Determination of total cyanogens — Enzymatic assay method*

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

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

ISO 1842, *Fruit and vegetable products — Determination of pH*

ISO 1871, *Food and feed products — General guidelines for the determination of nitrogen by the Kjeldahl method*

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

ISO 3588, *Spices and condiments — Determination of degree of fineness of grinding — Hand sieving method (Reference method)*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 5498, *Agricultural food products — Determination of crude fibre content — General method*

ISO 5986, *Animal feeding stuffs — Determination of diethyl ether extract*

ISO 9648, *Sorghum — Determination of tannin content*

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

ISO 16050, *Foodstuffs — Determination of aflatoxin B₁ and the total content of aflatoxin B₁, B₂, G₁ and G₂ in cereals, nuts and derived products — High performance liquid chromatographic method*

ISO 24333, *Cereals and cereal products — Sampling*

3 Terms and definitions

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

3.1

composite flours

mixture of flours from tubers rich in starch (such as cassava, yams, sweet potato) and / or protein rich flours (such as soy, peanut) and / or cereals (such as maize, millet, rice, buckwheat), with or without wheat flour

3.2

sound/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

3.3

practically free

without defects in excess of those that can be expected to result from, and be consistent with good cultural and handling practices employed in the production and marketing of the composite flour

3.4

extraneous matter

organic matter originating from food plants and/or their products other than composite flour

3.5

foreign matter

organic and inorganic materials (such as sand, soil, glass) other than extraneous matter in the flour

4 Quality requirements

4.1 Raw materials

The food plants or their products from which the flour is milled shall be clean, sound, and practically free from foreign matter. The raw materials shall comply with the relevant African Standards.

4.2 General requirements

Composite flour shall be:

- a) practically free of extraneous matter;
- b) free of rancidity, objectionable flavours and odours;
- c) the colour, flavour (whether natural or induced by processing), and particle size of the non-wheat flour shall be of a proportion not noticeable in the product; and
- d) practically free from any insects and foreign matter.

4.3 Particle size

Testing for particle size shall be done in accordance with ISO 3588. Not less than 90% shall pass through a 600 μm sieve for fine flour and not less than 90% shall pass through a 1200 μm sieve for coarse flour.

Composite flour intended for baking purposes shall have particle size such that not less than 90% shall pass through 250 μm sieve.

4.4 Enrichment

4.4.1 High protein flours, when used as enrichment shall be free from harmful substances such as trypsin inhibitor in soybean flour, gossypol in cottonseed flour and aflatoxin in legumes and cereals. It shall have acceptable tastes and colour.

4.4.2 Levels of substitution of wheat flour with single non-wheat flour in composite flour shall be as shown in Table 1. Where more than one non-wheat flour is used, the sum of the individual components used shall not exceed the maximum level permitted for any one of the components.

Table 1 — Level of substitution of wheat flour with non-wheat flour

Type of flour	% weight of composite flour
Sorghum	10 – 20
Maize	10 – 25
Millet	10 – 20
Cassava flour	10 – 30
Cassava starch	10 – 30
Rice	10 – 30

4.5 Compositional requirements

4.5.1 Flours for use in composite flour shall meet the characteristics given in Table 2.

Table 2 — Characteristics of flours for use in composite flour

Type of flour	Moisture content, % m/m max	Total ash, % m/m max	Crude Fibre, % m/m max	Fat, % m/m max	Protein, % m/m, min	pH, 10 % solution	HCN content, mg/kg max	Acid insoluble ash, % m/m
Wheat	14.0	2.0	2.5	1.2	8	6 – 7	—	0.65
Sorghum	13.0	1.5	2.5	3.0	8.5	6 – 7	—	0.40
Maize	14.0	1.20	0.8	2.25	7.0	6 – 7	—	0.15
Millet	14.0	1.2 - 4.2	2.0	3.0	7.5	6 – 7	—	0.40
Cassava flour	13.0	3.0	2.0	—	1	6 – 7	10	0.60
Cassava starch	12.0	0.4-0.6	0.20	—	0.5	5 – 7	10	0.10
Rice	12	1.0 -1.5	0.2	0.25	5	6 – 7	—	0.30
Test	ISO 712	ISO 2171	ISO 5498	ISO 11085	ISO 1871	ISO 1842	ARS 844	Annex A

4.5.2 Composite flour shall conform to the requirements in Table 3 below.

Table 3 — Compositional requirements for composite flour

S/N	Parameter	Requirement	Method of test
1	Total ash content %, by mass on dry matter basis, max.	4.0	ISO 2171
2	Fat acidity, mg KOH, max	50.0	ISO 5986
3	Acid insoluble ash, % m/m on dry matter basis, max.	0.40	Annex A
4	Moisture content, %, by mass, max.	13.5	ISO 712
5	Crude fibre, %, by mass on dry weight basis, max.	5.0	ISO 5498
6	Total Aflatoxin (AFB ₁ +AFB ₂ +AFG ₁ +AFG ₂), ppb max	10	ISO 16050
7	Aflatoxin B ₁ only, ppb max	5	

ARS 841:2016(E)

4.6 Hydrocyanic acid content

If cassava is used in blending the composite flour, the total hydrocyanic acid content of composite flour shall not exceed 10 mg/kg, when tested using ARS 844.

4.7 Anti-nutritional factors

If soy flour is used in blending the composite flour intended for instant consumption such as instant porridge, trypsin inhibitor activity in the composite flour shall not exceed 5 mg/g when tested in accordance with ISO 14902.

If sorghum flour is used in blending the composite flour, the tannin content of the composite flour shall not exceed 0.3% by mass on a dry matter basis when tested in accordance with ISO 9648.

5 Food additives

Food additives may be used in the preparation of composite flour in accordance with CODEX Stan 192. Composite flour may be fortified with vitamin A to the level not below 30 000 IU/g.

6 Contaminants

6.1 Pesticide residues

Composite flour shall conform to maximum residue limits for pesticide residues established by the Codex Alimentarius Commission for this commodity.

6.2 Other contaminants

Composite flour shall comply with the maximum levels of the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193).

7 Hygiene

7.1 The product covered by the provisions of this standard shall be prepared and handled in accordance with ARS 53 and the relevant public health regulations and shall conform to microbiological limits specified in Table 4.

Table 4 — Microbiological limits for composite flour

S/N	Micro-organism(s)	Requirements	Method of test
1	Total plate count, cfu/g	10 ³	ISO 4833
3	<i>Escherichia coli</i> , cfu/g, max.	absent	ISO 7251
4	<i>Salmonella</i> , 25g, max.	absent	ISO 6579
5	Yeasts and moulds, cfu/g, max.	10 ³	ISO 21527-2

8 Packaging

8.1 Composite flour shall be packaged in food grade material which will safeguard the hygienic, physical, nutritional and organoleptic qualities of the product.

8.2 The net weight of the packages for composite flour may be required to meet the relevant regulations of the destination country.

9 Marking and labelling

9.1 In addition to the requirements of ARS 56, the following specific labelling requirements shall apply and shall be legibly and indelibly marked:

- a) Common name of the product "composite flour"/"blended flour"/"mixed flour";
- b) Name, and physical address of the manufacturer/ distributor and /or trade name/ brand name;
- c) List of ingredients;
- d) Date of manufacture;
- e) The words "food for human consumption"
- f) Lot / batch identification in code or clear;
- g) Expiry date;
- h) Country of origin;
- i) The net weight in metric units; and
- j) 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 composite flour shall be done in accordance with ISO 24333.

Annex A
(normative)

Determination of acid insoluble ash

A.1 Reagent

A.1.1 Dilute hydrochloric acid — 1:1, prepared from concentrated hydrochloric acid.

A.2 Procedure

A.2.1 Weigh accurately about 2 g of the dried material in a tared porcelain, silica or platinum dish. Ignite with a meker burner for about 1 hour. Complete the ignition by keeping in a muffle furnace at 500 °C to 570 °C until grey ash results.

Cool and filter through whatman filter paper No. 42 or its equivalent. Wash the residue with hot water until the washings are free from chlorides as tested with silver nitrate solution and return the filter paper and residue to the dish. Keep it in an electric air oven maintained at 135 ± 2 °C for about 3 hrs. Ignite the dish again for about 30 minutes, cool and weigh. Repeat this process till the difference between two successive weighings is less than 1 mg. Note the lowest weight.

A.3 Calculation

A.3.1 Acid insoluble ash, per cent by weight

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

where,

M_2 = the lowest weight, in g, of the dish with the acid insoluble ash;

M = weight, in g, of the empty dish; and

M_1 = weight, in g, of the dish with the dried product taken for the test.

Bibliography

Nigerian Industrial Standard, NIS 294:2004, *Standard for composite flour*

EAS 782:2012, *Composite flour — Specification*

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