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EAST AFRICAN STANDARD

**Fortified Processed Cereal Based Foods (FPCBF) —Specification —Part
2: For persons of 5 years and above**

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 018, Nutrition and Foods for Special Dietary Uses.

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

DEAS 1126 consists of the following parts, under the general title *Fortified Processed Cereal Based Foods (FPCBF) — Specification*

- *Part 1: for persons of 6 to 59 months*
- *Part 2 : for persons of 5 years and above*

Introduction

Food fortification is one of the most effective health interventions that currently exist to address micronutrient malnutrition. Three major types of fortification have been recognized. Those are mass fortification, targeted fortification and market-driven fortification.

Main methods of food fortification are named so as to indicate the procedure that is used in order to fortify a certain food type. Those are bio fortification (breeding crops to increase their nutritional value, which can include both conventional selective breeding, and modern genetic modification); commercial and industrial fortification (flour, rice, oils common cooking foods); home fortification for example vitamin D drops and synthetic biology for example the addition of probiotic bacteria to foods.

The public health benefits of fortification include but are not limited to prevention or minimization of the risk of occurrence of micronutrient deficiency in a population or specific population groups and contribution to the correction of a demonstrated micronutrient deficiency in a population. Typical foods fortified include cereals and cereal based products (mainly wheat and maize flours); milk and milk products; fats and oils; infant formulas and various beverages.

For instance, women have increased nutrient needs while pregnant and breastfeeding. Adequate intake of micro- and macro-nutrients during this time is critical both to support women's own health, and to put their children on a trajectory for healthy growth and development. Undernourished women are at greater risk for all cause maternal mortality, and their infants are more likely to be born small for gestational age (SGA). SGA infants are at greater risk of neonatal and post-neonatal mortality, and are more likely to be stunted than infants born at an appropriate weight for gestational age. Balanced energy protein supplementation, containing up to 25 % of the total energy from protein, is considered an important intervention to prevent adverse perinatal outcomes in malnourished women. Balanced energy protein supplementation reduces the incidence of SGA by 34 % and the risk of stillbirths by 38 %, and increases mean birth weight by 73 grams; these effects are more pronounced among underweight women.

This "Fortified Processed Food" is suitable for children aged five years and above, adults and elderly. The product specification aligns with the requirements of a balanced energy protein supplement for pregnant and breastfeeding women. The recommended Fortified Processed Cereal Based Food (FPCBF) formulation is designed to supplement women's diets in order to make a significant contribution towards the increased macro- and micro-nutrient requirements of pregnancy and breastfeeding. The recommended intake of balanced energy-protein supplements in pregnancy is 350 Kcal - 500 Kcal per day, which would be provided in 100 g - 130 g of "Fortified Processed Food". The same quantity of FPCBF would provide a significant contribution towards women's increased energy requirements when breastfeeding (675 Kcal per day).

Fortified Processed Cereal Based Foods (FPCBF) may include but not limited to the following categories:

- a) Fortified Processed Cereal Based Foods which are or have to be prepared for consumption with milk or other suitable liquids;
- b) Fortified Processed Cereal Based Foods with an added high protein food which are or have to be prepared for consumption with water or other suitable protein-free liquid;
- c) Products which are to be used after cooking in boiling water or other suitable liquids; and
- d) Rusks, paste and biscuits which are to be used either directly or, after pulverization, with the addition of water, milk or other suitable liquids;

Fortified Processed Cereal Based Foods (FPCBF)—Specification— Part 2: For persons of 5 years and above

1 Scope

This Draft East African Standard specifies the requirements and methods of sampling and test for Fortified Processed Cereal Based Food (FPCBF) intended for special dietary uses of persons of 5 years and above.

This standard excludes fortified composite flour EAS 1024, composite flour EAS 782, Ready to Use Therapeutic Foods DEAS 1127, Processed Cereal foods for old infants and young children DEAS 72.

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, *Official method for the determination of Fumonisin B1 and B2 in corn and corn flakes*

AOAC 944.02, *Official method for the determination of Iron in flour, Spectrophotometric method*

AOAC 965.33, *Official method for the determination of Peroxide value*

AOAC 984.27, *Official method for the determination of calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium and zinc in infant formula*

AOAC 986.18, *Determination of Deoxynivalenol in wheat, gas chromatographic method*

AOAC 992.04, *Official method for the determination of Vitamin A in milk and milk infant formula*

AOAC 999.11, *Determination of Lead, Cadmium, Copper, Iron, and Zinc in Foods. Atomic Absorption Spectrophotometry*

AOAC Ba 9-58, *Official method for the determination of urease activity of soya and soybean product*

CODEX STAN 193, *General Standard for Contaminants and Toxins in Food and Feed*

CODEX STAN 73, *Standard for Canned Baby Foods*

CODEX STAN 74, *Standard for Processed Cereal-Based Foods for Infants and Young Children*

ISO 15141-1; *Foodstuffs — Determination of ochratoxin A in cereals and cereal products — Part 1: High performance liquid chromatographic method with silica gel clean up*

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*

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 24333; *Cereals and cereal products — Sampling*

ISO 5498, *Agricultural food product — Determination of crude fiber content — General method*

CAC/GL 21, *Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods*

CAC/GL 23, *Guidelines for Use of Nutrition and Health Claims*

CAC/RCP 1, *General Principles of Food Hygiene*

EAS 38, *Labeling of pre-packaged foods combined*

EAS 803, *Nutritional labeling — Requirements*

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

ISO 15214, *Microbiology of food and animal feeding stuffs —Horizontal method for the enumeration of mesophilic lactic acid bacteria —Colony-count technique at 30 degrees C*

ISO 16649-1; *Microbiology of food and animal feeding stuffs —Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli —Part 1: Colony-count technique at 44 degrees C using membranes and 5-bromo-4-chloro-3-indolyl beta-D-glucuronide*

ISO 20483, *Cereals and pulses —Determination of the nitrogen content and calculation of the crude protein content —Kjeldahl method*

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

ISO 6579, *Microbiology of food and animal feeding stuffs —Horizontal method for the detection of Salmonella spp.*

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 Baird-Parker agar medium*

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

ISO 7932, *Microbiology of food and animal feeding stuffs —Horizontal method for the enumeration of presumptive Bacillus cereus —Colony-count technique at 30 degrees C.*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

Special dietary uses

foods which are specially processed or formulated to satisfy particular dietary requirements which exist because of a particular physical or physiological condition and/or specific diseases and disorders and which are presented as such.¹ The composition of these foodstuffs must differ significantly from the composition of ordinary foods of comparable nature, if such ordinary foods exist (Ref: CXS 146)

3.2

Fortified Processed Cereal Based Foods (FPCBF)

processed cereal based foods to which micronutrients have been added specifically to provide additional nutrients which are either lacking or are present in insufficient quantities in the diet

3.3 fortification
practice of deliberately adding micronutrient(s) that is vitamins and minerals (including trace elements) in a food, so as to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health”

3.4 essential micronutrient

any micronutrient, which is needed for growth and development and the maintenance of healthy life, that is normally consumed as a constituent of food and cannot be synthesized in adequate amounts by the body.

3.5 fortificant
compound which contains essential micronutrient intended to be added to a food”

3.6 diluent
suitable, inert, edible food-grade carrier of micronutrients for the preparation of premix’

3.7 Fortification premix
Blend of fortificants and diluents formulated to specified and determined amount of micronutrients

3.8 extraneous matter
organic matter originating from food plants and/or their products other than the designated product

3.9 foreign matter
organic and inorganic materials (such as sand, soil, glass) other than extraneous matter in the designated product.

3.10 immunocompromised people
people having an impaired immune system and particularly vulnerable to opportunistic infections

4 Raw materials

Fortified Processed cereal-based foods for persons of 5 years and above shall be prepared primarily from one or more milled cereal products, such as wheat, rice, barley, oats, rye, maize, millet, finger millet, bulrush millet sorghum and buckwheat complying with the relevant East African Standards which shall constitute not less than 25 % of the final mixture on dry weights basis.

5 Optional ingredients

The following optional ingredients may be used and shall comply with relevant standards

- a) pulses, legumes; and starchy roots;
- b) oil seed flours and oil seed protein products;
- c) animal source foods;
- d) fats and oils excluding partially hydrogenated fats and oils;

6 Requirements

6.1 General requirements

FPCBF shall be:

- a) free from live insects;
- b) free from extraneous matter and foreign matter;
- c) have no rancid or musty odour or flavour;

6.2 Specific requirements

6.2.1 FPCBF shall conform to the specific requirements specified in Table 1.

Table 1 — Specific requirements for FPCBF for persons of 5 years and above

S/N	Parameter	Requirement	Test method
i.	Moisture content, %, by mass, max.	7.0	ISO 712
ii.	Protein, m/m flour (N x 6.25), %, Min. Total energy	14	AOAC 981.10
iii.	Fat, %, m/m Min.	4	ISO 11085
iv.	Crude fiber, m/m%, Max.	4	ISO 5498
v.	Acid insoluble ash, %, by mass on dry matter basis, max.	0.4	ISO 5985
vi.	Urease index, pH units, Max.	0.20	AOAC Ba 9-58

6.2.2 Micro-nutrient content of FPCBF shall conform to the specific requirements for vitamin and minerals in specified in Table 2.

Table 2 —Additional specific requirements on micronutrients

Nutrients	400kcl per 100g dry product			
	Units	Av, RDI	Min (30% of RDI)	Max (60% of RDI)
Vitamin A	mcg	658.3	217.3	395
Vitamin D3	mcg	8.0	2.6	5
Vitamin K 1	mcg	59.0	19.5	35
Vitamin B1	mg	1.3	0.4	
Vitamin B2	mg	1.4	0.4	
Niacinamide	mg	16.3	5.4	
Panthenic Acid	mg	5.8	1.9	
Vitamin B6	mg	1.6	0.5	
Biotin	mcg	31.3	10.3	
Folic acid	mcg	475.0	156.8	
Vitamin B12	mcg	2.5	0.8	
Vitamin C	mg	51.7	17.1	
Iodine	µg	183.3	60.5	110

Iron	mg	27.3	9.0	16
Zinc	mg	11.9	3.9	7
Calcium	mg	1133.3	374.0	680
Magnesium	mg	223.5	73.8	134
The minimum was calculated based on 30% of RDI while the maximum was based on 60% RDI				

6.2.3 Testing for micronutrients shall be conducted using any internationally recognized test methods

7 Fortification requirements

7.1 Fortificants

Fortificants for use shall be stable compounds conforming to specifications in any internationally recognized documents including but not limited to the following:

- 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 (CAC).

7.2 Fortification premix

The fortificants shall be mixed with diluents or carriers as appropriate to form a premix. Diluents or carriers shall conform to USP, BP, Ph Eur, NF, MI, FAO/WHO, or FCC requirements

8 Food additives

Only the food additives CODEX STAN 192 may be used in FPCBF to maximum limits given in those standards

9 Hygiene

9.1 Fortified processed Foods shall be produced, prepared and handled in accordance with the provisions of appropriate sections of EAS 39.

9.2 The product shall comply with microbiological limits in Table 2.

Table 2 — Limit of microorganisms in FPCBF

S/N	Microorganisms	Maximum levels		Test methods
		Non-instant FPCBF	Instant FPCBF (ready to eat)	
i.	Total viable count CFU/g, max.	10 000	500	ISO 4833
ii.	Coliforms CFU /g. max.	10	Absent	ISO 4832

iii.	<i>Salmonella spp</i> in 25 g, max.	absent	Absent	ISO 6579-1
iv.	<i>Escherichia Coli</i> CFU/g, max.	Less than 10	Less than 10	ISO 16649-2
v.	<i>Staphylococcus aureus</i> CFU/ g, max.	Less than 10	Less than 10	ISO 6888-1
vi.	<i>Bacillus cereus</i> CFU/ g, max.	absent	Absent	ISO 7932
vii.	Yeasts and moulds CFU/ g. max.	100	100	ISO 21527-2
viii.	<i>Clostridium perfringens</i> CFU/g max	absent	Absent	ISO 7937

10 Contaminants

10.1 Heavy metals

Heavy metals in processed cereal-based foods for persons of 5 years and above shall not exceed the limits given in Table 3 when tested in accordance with test methods specified therein.

Table 3— Heavy metal maximum limits

S/N	Heavy metal	Maximum limit (mg/kg)	Test method
i.	Lead	0.2	AOAC 999.11
ii.	cadmium	0.1	

10.2 Pesticide residues

Fortified Processed cereal based foods shall comply with the maximum residue limit established by the codex Alimentarius Commission for this commodity.

10.3 Antinutritional factors

10.3.1 Fortified Processed cereal-based foods shall be processed such that they are practically free from anti-nutritional factors which may present a hazard to health or compromise nutrient absorption of the food.

10.3.2 When cassava is used, the cyanide content in the product shall not be more than 10 mg/kg when tested in accordance with EAS 744.

10.3.3 When sorghum is used, the tannin content in product shall not be more than 0.3 % when tested in accordance with ISO 9648.

10.3.4 When soybean is used, the trypsin inhibitor content shall not be more than 5 mg/g when tested in accordance with ISO 14902 and the urease activity shall not exceed 0.3 mg N/g/min when tested in accordance with ISO 5506.

10.4 Mycotoxins

FPCBF shall conform to those permissible mycotoxin limits established in Table 4.

Table 4 — Permissible mycotoxin limits

S/N	Parameters	Limits	Methods of test
i.	Total aflatoxins (B1, B2, G1, and G2), µg/kg	5	RS ISO 16050
ii.	Aflatoxin B1, µg/kg	3	

iii.	Fumonisin, µg/kg	2 000	AOAC 2001.04
iv.	Ochratoxin A, µg/kg	5	RS ISO 15141-1
v.	Deoxynivalenol (DON), mg/kg	0.2	AOAC 986.18

11 Packaging

11.1 FPCBF shall be packaged in food grade, material; which will safeguard the hygienic and product quality attributes.

11.2 Each package shall be securely closed and easily re-closable during use.

12 Labelling

In addition to the requirements of EAS 38 and EAS 803, each package shall be legibly and indelibly marked with the following:

- a) name of the product as Fortified processed Cereal Based Food;
- b) type of fortificants;
- c) serving instruction

13 Methods of sampling

Sampling shall be done in accordance with the CXC GL 50

Bibliography

- [1] ECSA, Manual of methods for determining micronutrients in fortified foods; www.a2zproject.org/a2zorg/pdf/Manual_Foods.pdf
- [2] FAO/WHO (2004) Reference nutrient intake or INL 98 from FAO/WHO Vitamins and Mineral requirements in Human Nutrition. 2nd Edition. (for all micronutrients except copper, manganese and phosphorus)
- [3] Black et al., Maternal and child underweight and overweight in low-income and middle-income countries. Lancet series: Published online at [http://dx.doi.org/10.1016/S0140-6736\(13\)60937-X](http://dx.doi.org/10.1016/S0140-6736(13)60937-X). June 6, 2013. ("Lancet 2013 MCN1")
- [4] FAO Food and Nutrition Technical Report Series, Human Energy Requirements: Report of a Joint FAO/WHO/UNU Expert Consultation. Rome, 17-24 October 2001.

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