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DRAFT EAST AFRICAN STANDARD

Fortified yoghurt — Specification

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.

Introduction

Fortified yoghurt is product made from coagulation of milk by adding thermophilic starter culture with the addition of micronutrients.

The fermentation is carried out by the mixed cultures of Lactic acid bacteria or any other suitable cultures. It may be plain or sweetened and/or flavored, dairy product.

This standard has been developed to keep up with advancements of the food industry and to ensure the safety and quality of the product traded in the markets in order to safeguard the health of the consumers.

Fortified yoghurt— Specification

1 Scope

This Draft East African standard specifies requirements, sampling and test methods for fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk intended for human consumption.

This standard only covers fortified yoghurt products from animal source milk.

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 2001.13*, Determination of Vitamin A (Retinol) in food — Liquid Chromatography*

AOAC 2004.05*, Total folates in cereal and cereal foods — Microbiological Assay-Trienzyme Procedure*

AOAC 2011.14, *Calcium, Copper, Iron, Magnesium, Manganese, Potassium, Phosphorus, Sodium and Zinc in fortified food products. Microwave Digestion and Inductively Coupled Plasma-Optical Emission Spectrometry*

CXC 57*, Code of hygienic practice for milk and milk products*

CXG 66, *Guidelines for the Use of Flavourings*

CXS 192*, General standard for food additives*

EAS 38, *Labelling of pre-packaged foods — General requirements*

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

EAS 803*, Nutrition labelling — Requirements*

EAS 804*, Claims on food — General requirements*

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

ISO 11290-1*, Microbiology of the food chain — Horizontal method for the detection and enumeration of Listeria monocytogenes and of Listeria spp. — Part 1: Detection method*

ISO 13580*, Yogurt — Determination of total solids content (Reference method)*

ISO 14501*, Milk and milk powder — Determination of aflatoxin M1 content — Clean-up by immunoaffinity chromatography and determination by high-performance liquid chromatography*

ISO 20128*, Milk products — Enumeration of presumptive Lactobacillus acidophilus on a selective medium — Colony-count technique at 37 degrees C*

ISO 22662*, Milk and milk products — Determination of lactose content by high-performance liquid chromatography (reference method)*

ISO 23318, *Milk, dried milk products and cream — Determination of fat content — Gravimetric method*

ISO 29981*, Milk products — Enumeration of presumptive bifidobacteria — Colony count technique at 37 degrees C*

ISO 4832, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

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 6611, *Milk and milk products — Enumeration of colony-forming units of yeasts and/or moulds — Colony-count technique at 25 degrees C*

ISO 6888-1*, Microbiology of the food chain — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Method using Baird-Parker agar medium*

ISO 707*, Milk and milk products — Guidance on sampling*

ISO 7889*, Yogurt — Enumeration of characteristic microorganisms — Colony-count technique at 37 degrees C*

ISO 8968-1*, Milk and milk products — Determination of nitrogen content — Part 1: Kjeldahl principle and crude protein calculation*

ISO/TS 11869*, Fermented milks — Determination of titratable acidity — Potentiometric method*

ISO/TS 6733*, Milk and milk products — Determination of lead content — Graphite furnace atomic absorption spectrometric method*

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
yoghurt
cultured milk product obtained by lactic acid fermentation through the action of *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp*. Bulgaricus*

3.2
plain/natural yoghurt
yoghurt produced using appropriate cultures without addition of any other ingredients

3.3
flavoured yoghurt
yoghurt into which permitted flavours, and/or sweeteners and/or food colours have been added

3.4
fruit yoghurt
yoghurt to which fruits or fruit pulp have been added

3.5
probiotic yoghurt/ probiotic alternate culture yoghurt/ probiotic acidophilus milk
yoghurt, alternate culture yoghurt and acidophilus milk which contain live and beneficial microorganisms in amounts that can confer health benefits

3.6
alternate culture yoghurt
cultured milk product obtained by lactic acid fermentation through the action of Streptococcus thermophilus and any Lactobacillus species

3.7
acidophilus milk
cultured milk product obtained by lactic acid fermentation through the action of Lactobacillus acidophilus

3.8
greek yoghurt
yoghurt that has been strained to remove its whey resulting to a thicker and creamy consistency

3.9
greek style yoghurt
yoghurt that has been concentrated by addition of milk solids and permitted thickening agents resulting to a thicker and creamy consistency

3.10
heat-treated yoghurt
yoghurt that has been pasteurised, thermized or sterilized after fermentation

3.11
lactose free yoghurt
yoghurt whose lactose content has been significantly reduced using appropriate methods

3.12
frozen yoghurt
yoghurt that has been frozen and presented in such form to the consumer

3.13
stirred/drinking yoghurt
plain or flavoured yoghurt whose coagulum has been broken through stirring or agitation process to obtain a free-flowing product

3.14
set yoghurt
plain or flavoured yoghurt whose coagulum has not undergone any stirring or agitation process

3.15
food grade packaging material
packaging material made of substances which are safe and suitable for their intended use and which will not alter the quality, safety or organoleptic properties of the product

3.16
foreign matter
any kind of undesirable physical material introduced to a food product at any point in its production, handling, processing or distribution

3.17
diluent
suitable, inert, edible food-grade carrier for micronutrients

3.18
fortification premix
blend of fortificants and diluents formulated to provide specified and determinable amounts of micronutrients

3.19
fortified yoghurt
yoghurt to which essential micronutrients have been added

3.20
fortificant
compound which contains essential micronutrient intended to be added to a food/ vitamin and minerals intended to be added to yoghurt

3.21
food 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

3.22
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

3.23
yoghurt fortification
practice of deliberately adding micronutrients in yoghurt so as to improve the nutritional quality of the yoghurt and to provide a public health benefit with minimal risk to health.

3.24
sweetened fortified yoghurt
fortified yoghurt to which sugar has been added

3.25
plain/natural fortified yoghurt
fortified yoghurt to which no additional ingredients have been added other than micronutrients

3.26
flavoured fortified yoghurt
fortified yoghurt to which flavouring agents have been added

3.27
fruit fortified yoghurt
fortified yoghurt to which fruits or fruit pulp have been added

3.28
probiotic fortified yoghurt
fortified yoghurt which contains in addition to yoghurt starter culture Lactobacillus bulgaricus and Streptococcus thermophilus live lactic acid bacteria which when administered in adequate amounts, confer a health benefit on the host

3.29
greek fortified yoghurt
fortified yoghurt that has been strained to remove its whey resulting to a thicker and creamy consistency

4 Types of fortified yoghurt

Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk as presented in the form of either set, stirred/ drinking or frozen, greek, greek style or any other appropriate form may be classified in either of the following types:

a) plain/natural;

b) flavoured;

c) heat-treated;

d) probiotic;

e) fruit; and

f) lactose-free.

5 Categories of fortified yoghurt

Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall be categorized based on fat content as follows:

a) whole milk/full cream;

b) low fat;

c) fat reduced;

d) fat-free; and

e) high fat.

6 Requirements

6.1 Ingredients

6.1.1 Essential ingredients

Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall be made from the following ingredients and shall comply with relevant East African Standards:

a) milk and milk products which may include but not limited to the following:

   i) raw milk;

   ii) heat-treated milk;

   iii) reconstituted or recombined; or toned milk;

   iv) evaporated or condensed milk;

   v) pasteurized cream; or

   vi) a mixture of two or more milk products listed above.

b) specific starter cultures:

   i) yoghurt: cultures of Lactobacillus delbrueckii subsp. bulgaricus and Streptococcus thermophilus;

   ii) alternate culture yoghurt: cultures of Streptococcus thermophilus and any Lactobacillus species; and

   iii) acidophilus milk: Lactobacillus acidophilus.

c) fortificant/micro-nutrients premix

6.1.2 Optional ingredients

6.1.2.1 Ingredients, including but not limited to the following, may be added to all types of fortified yoghurt and shall comply with relevant standards:

a) cultures of suitable microorganisms;

b) milk powder and cream powder;

c) unfermented butter milk;

d) concentrated whey;

e) whey or whey proteins and/or their concentrates;

f) edible casein and caseinates;

g) sugars (in sweetened types of fortified yoghurt only),

h) approved flavouring agents (natural or synthetic) used in accordance with CXG 66 or other food ingredients made from preparations such as fruits, vegetables, juices, purees, pulps and preparations, cereals, honey, chocolate, nuts, coffee and spices.

6.1.2.2 Where non-dairy ingredients are used, they shall not be more than 50 % m/m of the total composition.

6.2 General requirements

Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall:

a) be free from off odours and off flavours such as metallic flavour or yeast flavour;

b) be free from foreign matter;

c) have the characteristic texture, flavour and taste; of the type of fortified yoghurt and

d) not whey off.

6.3 Specific requirements

Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall comply with the requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Specific requirements for fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk

S/N	Characteristic	Requirement					Test method
		Whole milk/full cream	Fat-reduced	Low fat	Fat-free	High fat	
i.	Milk fat content, %,m/m	3.25 - 4.5	1.51 – 3.24	0.5 – 1.50	< 0.5	4.6 - 15	ISO 23318
ii.	Milk solids non-fat, %, m/m, min.	8.5	8.5	8.5	8.5	8.5	ISO 13580
iii.	pH	4.0 – 4.6	4.0 – 4.6	4.0 – 4.6	4.0 – 4.6	4.0 – 4.6	Annex A

iv.	Titratable acidity, %,lactic acid, min.	0.6	0.6	0.6	0.6	0.6	ISO/TS 11869
v.	Sum of microorganisms constituting the starter culture, CFU/g in total[a] min	10^7	10^7	10^7	10^7	10^7	ISO 7889
vi.	Labelled microorganisms CFU/g in total[b] min	10^6	10^6	10^6	10^6	10^6	ISO 29981 ISO 20128
vii.	Milk protein %, min	2.7	2.7	2.7	2.7	2.7	ISO 8968-1
viii.	Lactose content[c] ,% m/m, max	0.1	0.1	0.1	0.1	0.1	ISO 22662

[a] The requirement on sum of microorganisms and labelled microorganisms do not apply for heat treated fortified yoghurt, heat treated fortified alternate culture yoghurt and heat treated fortified acidophilus milk

[b] Applies where a content claim is made in the labelling that refers to the presence of a specific microorganism other than *Lactobacillus delbrueckii subsp. bulgaricus and Streptococcus thermophilus* that has been added as supplement to the specific starter culture

[c] Lactose content applies to lactose-free fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk

7 Fortification requirements

7.1 Levels of micronutrients

Fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall comply with the levels of micronutrients given in Table 2 when tested in accordance with test methods specified therein.

[Table 2 — Requirements for levels of micronutrients in fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk.]

S/N	Micronutrient	Required level (µg/100g)	Test method
i.	Vitamin A[a]	109 - 227	AOAC 2001.13
ii.	Folic Acid	31.5 - 49.2	AOAC 2004.05
iii.	Vitamin B_{12}[a]	0.3 - 0.82	ISO 20634
iv.	Vitamin D[a]	1.0 - 2.6	AOAC 995.05
v.	Iodine	26.6 - 66.4	AOAC 2012.15
vi.	Selenium	4.3 - 10.7	AOAC 2011.19
vii.	Zinc	836 - 2090	AOAC 2011.14

Note: Fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall be added with at least three (3) micronutrients indicated in Table 1

[a] The addition of these micronutrients shall be mandatory

7.2 Fortificants

Fortificants for use shall be stable compounds complying with the specification of any of the following documents;

a) British Pharmacopoeia (BP);

b) Food Chemical Codex (FCC);

c) Merck Index (MI);

d) United States National Formulary (NF);

e) European Pharmacopoeia (Ph Eur);

f) United States Pharmacopoeia (USP); and

g) FAO/WHO Codex Alimentarius Commission (CAC)

8 Hygiene

8.1 Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall be produced and handled in accordance with CXC 57 and EAS 39.

8.2 Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall comply with microbiological limits given Table 3 when tested in accordance with the test methods specified therein.

Table 3 — Microbiological limits for Fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk

S/No	Microorganism	Limit	Test method
i.	Coliforms, CFU/g, max.	10	ISO 4832
ii.	*Salmonella* spp. in 25 g	Absent	ISO 6579-1
iii.	*Staphylococcus aureus,* CFU/g	<10	ISO 6888-1
iv.	*Listeria monocytogenes* in 25 g	Absent	ISO 11290-1
v.	Yeasts and moulds, CFU/g, max.	10^2	ISO 6611
NOTE <10 CFU/g should be interpreted as equivalent to “absent” based on the limit of detection for the method applied			

9 Food additives

Food additives, when used in fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall comply with CXS 192.

10 Contaminants

10.1 Pesticide residues

Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall comply with maximum residue limits for pesticides established by Codex Alimentarius Commission.

10.2 Veterinary drugs residues

Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall comply with the maximum residue limits for antibiotics and other veterinary drugs established by Codex Alimentarius Commission.

10.3 Heavy metals

The level of lead (Pb) in fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall not exceed 0.02 mg/kg when tested in accordance with ISO/TS 6733.

10.4 Aflatoxin

The level of aflatoxin M1 in fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall not exceed 0.5 µg/kg when tested in accordance with ISO 14501.

11 Packaging

Fortified Yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk shall be packaged in food grade packaging material that safeguards the quality, integrity and safety of the product.

12 Labelling

12.1 General

In addition to the requirements of EAS 38, yoghurt, alternate culture yoghurt and acidophilus milk shall be legibly and indelibly labelled with the following information:

a) name of the product as “Fortified Yoghurt” or “Fortified Alternate culture yoghurt” or “Fortified Acidophilus milk”;

b) type of the product as “plain/natural” or “Flavoured” or “Lactose free” or “Heat-treated”, “Probiotic”, or “Fruit”;

c) category based on fat content as either whole milk/full cream or low fat or fat reduced or fat free or high fat;

d) fat content;

e) name of the animal from which milk was extracted

f) for “fortified yoghurt”, “fortified alternate culture yoghurt” or “ fortified acidophilus milk” labelled as probiotic, the type of beneficial microorganism shall be indicated;

g) the label shall carry the picture of the fruit, nuts, confectionary and their derivatives only when yoghurt, alternate culture yoghurt and acidophilus milk contains the real fruit, nuts, confectionary and/or their derivatives; and

h) declaration of lactose content for lactose free fortified yoghurt, fortified alternate culture yoghurt or fortified acidophilus milk.

NOTE Each product unit may also be marked with the national food fortification logo, where the industry qualifies to use the mark.

12.2 Nutrition labelling

Nutritional information shall be declared on the label in accordance with EAS 803.

12.3 Nutrition and health claims

Where permitted by national legislation, fortified yoghurt, fortified alternate culture yoghurt, fortified acidophilus milk may have claims on the importance of the micronutrients in nutrition and health. Such claims when declared shall be in compliance with EAS 804 and EAS 805.

13 Sampling

Sampling shall be done in accordance with ISO 707.

Annex A
(normative)

Determination of pH in fortified yoghurt, fortified alternate culture yoghurt and fortified acidophilus milk

A.1 Principle

The pH value or hydrogen ion concentration gives a measure of the true acidity of fortified yoghurt. The relationship between pH and acidity of the sample is only approximate. In yoghurt the pH ranges from 4.0 to 4.6. The value is reduced by the development of acidity. The pH of the sample may be determined rapidly by using the indicator strips.

A.2 Apparatus

A.2.1 Indicator strips: Indicator paper strips or discs are made by soaking strips of absorbent paper in a suitable indicator and drying them.

A.2.2 pH meter: The pH meter may be used to determine pH in the sample.

A.3 Procedure

A rough estimate of pH is obtained by dipping a strip of the prepared paper in a sample and observing the colour. Bromocresol purple (pH range 4 - 7, colour changes from yellow to purple) and bromothymol blue (pH range 4 -7, colour changes from straw yellow to bluish green) are commonly used as indicators. Both narrow and wide range ready-made indicator papers are available over the pH range 2.0 -10.5.

Indicator paper strips shall always be kept in closed containers and under dry conditions.

A.4 Interpretation of results

On average, the product sample should have a pH of 4.0-4.6. The product sample of pH over 4.6 should be regarded with suspicion as indication of poor fermentation as a result of starter culture inhibition. pH below 4.0 is as a result of over fermentation.

Bibliography

[1] *EAS 33: 2025 Yoghurt—Specification*

[2] *AFDC6 (2346) CD2:2023 Fortified yoghurt—Specification*

