
Draft COMESA/East African Standard

UHT milk — Specification

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Foreword

DRAFT EAST AFRICAN/COMESA STANDARD

UHT milk — Specification

1 Scope

This COMESA/East African Standard prescribes the requirements, methods of sampling and test for UHT milk.

2 Normative

The following referenced standards are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced standard (including any amendments) applies.

Codex Alimentarius Commission pesticides residue limits

CAC/MRL 02-2006, Maximum residue limits for veterinary drugs in foods

CAC/RCP 57, Code of hygiene practice for milk and milk products

CODEX STAN 1: General standard for the labeling of prepackaged foods

CODEX STAN 192-1995, Codex general standard for food additives

CODEX STAN 193, Codex general standard for contaminants and toxins in foods

EAS 67: Raw cow milk — Specification

ISO 707, Milk and milk products — Guidance on sampling

ISO 2446, Milk — Determination of fat content (Routine method)

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

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

ISO 5764, Milk — Determination of freezing point — Thermistor cryoscope method

ISO 6731: Milk, cream and evaporated milk — Determination of total solids content (reference method)

ISO 11866: Milk and milk products — Enumeration of presumptive *Escherichia coli*

3 Definitions

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

3.1 milk

means the normal, clean and fresh secretions, without any addition or subtraction, extracted from the udder of a healthy cow, and free from colostrum, i.e. excluding that got during the first seven days after calving.

3.2 pasteurized milk

milk which has been subjected to pasteurisation

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3.3 homogenization

process by which milk fat globules are finely divided and interspersed to form a homogeneous product so as to prevent the fat from floating on the surface and adhering to the inside of the container

3.4 UHT milk

the milk, ultra-high temperature treated, homogenized, filled and sealed aseptically into sterile retail containers in order to achieve commercial sterility.

3.5 commercial sterility

the attained practical sterility after the product has been treated aiming at absolute sterility.

4 Requirements for UHT milk

4.1 Raw materials

UHT milk shall be produced from milk which conforms to EAS 67.

When determined in accordance with ISO 6731, the milk shall contain not less than 8.5 % milk-solids not-fat. It shall not contain added water, preservatives, or other added substances.

UHT milk shall comply with the requirements given in Table 1.

Table 1 — Chemical requirements for UHT milk

	Whole milk	Fat reduced milk	Low fat milk	Fat-free milk	Test methods
pH variation on 7 days incubation	0.3 units (max)	0.3 units (max)	0.3 units (max)	0.3 units (max)	Annex A
Titrateable acidity variation on 7days incubation, % lactic acid	0.02 units (max)	0.02 units (max)	0.02 units (max)	0.02 units (max)	Annex B
Milk fat %	3.25 min	1.51% - 3.24%	0.51% - 1.50%	0.50% max	ISO 2446
Milk solids not fat % (min)	8.5	8.5	8.5	8.5	ISO 6731

Note: Solids-non-fat content is calculated from total solids and fat contents

4.2 The density of the milk at 20 °C shall be not less than 1.028 g/ml and not more than 1.036 g/ml.

4.3 Milk shall not contain added water. When determined in accordance with ISO 5764, the freezing point depression of milk shall be not less than 0.525 °C and not more than 0.550 °C.

4.4 UHT milk shall be normal in texture and colour. It shall be processed without affecting the composition of the product and shall be free from off-flavours and taints.

5 UHT milk process requirements

5.1 The milk shall be subjected to temperatures between 135 °C and 150 °C for 2 to 6 seconds, sufficient to attain commercial sterility, followed by immediate cooling to ambient temperature and aseptically packaged in sterile containers.

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5.2 Direct heat

Where steam injection is used for heating, only culinary steam shall be used, and the compositional quality of the milk shall be the same before and after treatment.

5.3 Holding time before sale

UHT milk shall be held by the processor at ambient temperatures for at least seven days before release to the market. When samples are tested organoleptically after this storage, the flavour shall be normal, and all signs of spoilage shall be absent.

5.4 Shelf life

UHT milk shall have a minimum shelf life of 90 days at 30°C.

6 Sampling

For the purpose of determining the compliance to this standard, sampling shall be done in accordance with ISO 707.

7 Hygiene

Milk shall be produced, processed and handled in accordance with *CAC/RCP 57*.

Note: Reference to *CAC/RCP 57* does not mean an endorsement of the use of lactoperoxidase system as a means of preservation of raw milk as contained therein

UHT milk shall comply with the microbiological limits given in Table 2.

Table 2 — Microbiological limits for UHT milk

Micro-organism	Maximum level	Method of test
Total plate count, per mL	10	ISO 4833
Total Coliforms, per mL	absent	ISO 4832
<i>Escherichia coli</i> per mL	Absent	ISO 11866

8 Contaminants

8.1 Heavy metals

The products covered by this Standard shall comply with the maximum limits as specified in *CODEX STAN 193-1995*

8.2 Pesticide residues

The products covered by this Standard shall comply with the maximum residue limits established by the Codex Alimentarius Commission

8.3 Veterinary drug residues

The products covered by this Standard shall comply with the maximum residue limits specified in *CAC/MRL 02-2006*

9 Packaging

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9.1 UHT milk shall be packaged in properly sealed, safe, food grade sanitised packaging materials. The product when marketed shall be packaged in well-sealed packaging materials in order to prevent spoilage or contamination of the product.

The packaging material used for UHT milk shall be:

- i) lightproof,
- ii) gas proof,
- iii) mechanically strong,
- iv) non-toxic
- v) not impart any off-flavour to the milk,
- vi) able to withstand aseptic packaging pre-treatment procedure, and
- viii) able to allow hermetic sealing.

9.2 The UHT milk shall be packaged aseptically into sterile packaging material and sealed hermetically.

9.3 UHT milk packages shall be not deformed, creased, dented or have crushed corners

10 Labelling

10.1 The containers shall be labelled in accordance with provisions of the *CODEX STAN 1-1985*. In addition, the following particulars shall be legibly and indelibly labelled on the container:

- i) name of the product
- (ii) net content in volume (SI units)
- iii) name and address of manufacturer
- (iv) batch or code number
- v) registered trade mark, if any
- vi) the butterfat content
- vii) the date of manufacture and expiry of the product, and
- viii) instruction for storage and hygienic handling of the product.

11 Methods of sampling

For the purpose of determining the compliance to this standard, sampling shall be done in accordance with ISO 5538 and ISO 8197

12 Fill of container

UHT milk shall occupy not less than 90 % v/v of the water capacity of the container. The water capacity of the container is the volume of distilled water at 20 °C, which the sealed container will hold when completely filled.

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Annex A

Determination of pH variation

A.1 Apparatus

A.1.1 Two (2) incubators adjusted at $55\pm 1^{\circ}\text{C}$ and $35\pm 1^{\circ}\text{C}$

A.1.2 pH meter

A.2 Procedure

A.2.1 Randomly select 16 packets of product from the batch to be tested. Incubate 8 packets at $55\pm 1^{\circ}\text{C}$ and the other 8 packets at $35\pm 1^{\circ}\text{C}$

A.2.2 On day 1, open two packets from the each incubator, measure pH and record the result. Record any sign of spoilage.

A.2.3 Do as in A.2.2 for day 3, 5 and 7

A.3 Interpretation of results

A.3.1 If pH does not show a difference of more than 0.3 units for the sample tested, from the initial pH, the sample will be considered sterile. If 1 packet deviates from the results, the sample will be considered sterile

A.3.2 if two packets from the sample tested deviate from A.3.1, then the samples will be considered to have failed the test

Annex B

Determination of titratable acidity

B.1 Apparatus

B.1.1 Incubator

B.1.2 Burette

With soda-lime guard tube

B.1.3 Porcelain dishes

White hemispherical of approximately 60 ml.

B.1.4 Stirring rods

Of glass, flattened at one end.

B.2 Reagents

B.2.1 Standard sodium hydroxide solution

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0.1 M. Prepare concentrated stock solution of sodium hydroxide by dissolving equal parts of sodium hydroxide (stocks or pellets) in equal parts of water in a flask. Tightly stopper the flask with a rubber bung and allow any insoluble sodium carbonate to settle down for three to four days.

Use the clear supernatant liquid for preparing the standard 0.1 M solution. About 8 ml of stock solution is required per litre of distilled water. The solution should be accurately standardised against acidic potassium phthalate or oxalic acid.

B.2.2 Phenolphthalein indicator solution

Dissolve 1 g of phenolphthalein in 110 ml rectified spirit. Add 0.1 M sodium hydroxide solution until one drop gives a faint pink coloration.

B.2.3 Rosaniline Acetate Stock Solution

Dissolve 0.121 g of rosaniline acetate in approximately 50 ml of rectified spirit, containing 0.5 ml of facial acetic acid. Make up to 100 ml with rectified spirit.

B.2.3.1 Bench solution

Dilute 1 ml of stock solution to 500 ml with a mixture of rectified spirit and distilled water in equal proportions by volume.

NOTE: The stock and the bench solutions shall be stored in dark brown bottles securely stoppered with rubber bungs.

B.3 Procedure

B.3.1 Acidity of fresh sample

Weigh 10.0 g of the sample into each of the two white porcelain dishes of approximately 60 ml capacity; add to both 10 ml of water and stir to disperse the sample. Prepare from one dilution a colour control by adding and stirring 2 ml dilute rosaniline acetate solution. Stir 2 ml phenolphthalein solution into the other dilution and while stirring vigorously, add as rapidly as possible sodium hydroxide solution from a 10 ml burette fitted with a soda-lime guard tube, until the colour matches the pink colour of the control. The titration shall be done in bright light.

B.3.2 Acidity after incubation

Incubate another 20 g of sample at 55 ± 1 °C for seven days. Examine the flask each day, then shake and replace it in the incubator. If any physical alteration (as indicated in A.2.1) of the content is observed the results of the test shall be considered positive and the sample as non-sterile.

B.3.2.1 If no alteration takes place during the seven days incubation remove the sample from the incubator and cool to room temperature. Weigh 10 g of the incubated sample and determine acidity as described in B.3.1.

B.4 Calculation

B.4.1 Acidity of fresh sample

Titrateable acidity (as lactic acid) per cent by weight = $\frac{9V.M}{m}$

Where,

V = volume in ml of the standard sodium hydroxide required for titration (clause B.3.1)

M = molarity of the standard sodium hydroxide solution (Clause B.3), and

m = mass in g of the sample taken for test (clause B.3.1).

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B4.2 Acidity after incubation

$$\text{Titrateable acidity (as lactic acid) percent by weight} = \frac{9V.M}{w}$$

Where,

V = volume in ml of the standard sodium hydroxide required for titration (B.3.2.1),

M = molarity of the standard sodium hydroxide solution (B.3.2.1),

w = weight in g of the sample taken for the test (B.3.2.1)

B4.3 Subtract the value obtained in **B.4.1** from the value obtained in **B.4.2** which would give increase in acidity.

B.5 Interpretation of results

B.5.1 A sample which does not show any physical alteration during incubation at 55 ± 1 °C for seven days and where the acidity does not show a difference of more than 0.02 units from the initial acidity is considered sterile.