AFRICAN STANDARD

UHT (Ultra High Temperature) milk — Specification

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Foreword

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This African Standard was prepared by ARSO TC 04, Milk and Milk Products.

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UHT (Ultra High Temperature) milk — Specification

1 Scope

This African Standard specifies requirements, sampling and test methods for UHT milk obtained from cow, goat, sheep or camel milk intended for direct human consumption or further processing. This includes also standardized, recombined and reconstituted UHT 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.

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AOAC 925.22, Specific Gravity of Milk: Pycnometer Method

AOAC 947.05-1947*, Acidity of milk. Titrimetric method*

ARS 53, *General Principles of Food Hygiene — Code of practice*

ARS 56*, Pre-packaged Foods – Labelling*

ARS 1034*, Dairy industry — Glossary of terms*

ARS 1036, *Code of Hygienic Practice for Milk and Milk Products*

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

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

ISO 2446*, Milk — Determination of fat content*

ISO 5764*, Milk — Determination of freezing point — Thermistor cryoscope method (Reference method)*

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

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

ISO 8968-4, *Milk and milk products — Determination of nitrogen content — Part 4: Determination of protein and non-protein nitrogen content and true protein content calculation (Reference method)*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ARS 1034 and the following shall apply.

3.1
pasteurized milk
milk which has been subjected to heat treatment either by batch method, flash pasteurization or High Temperature Short Time method (HTST)

3.2
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

3.3
UHT milk
milk that is treated under ultra-high temperatures (process criteria as ~~at~~ 127 °C – 150 °C for 1 s - 6 s), homogenized, filled and sealed aseptically into sterile retail containers to maintain commercial sterility under room temperatures and to ensure a prolonged shelf life without refrigeration.

4 Requirements

4.1 Raw materials

Raw materials and ingredients used shall comply with relevant standards.

These include:

a) Raw milk complying with relevant African standard.

b) Pasteurized milk complying with relevant African standard.

c) Reconstituted milk or

d) Recombined milk.

4.2 General requirements

UHT milk shall:

a) Retain the characteristics of raw material.

b) Have characteristic texture and colour.

c) Be free from off-flavours and odour.

d) Be free from additives, preservatives, any other unauthorized substances, and

e) Be free from added water (except for reconstituted milk).

4.3 Specific requirements

UHT milk shall meet the compositional requirements given in Table 1 when tested in accordance with the test methods specified therein. UHT milk may be classified as identified in Table 1 and meet the compositional requirements, as shown.

Composition:

UHT milk shall be categorized as follows:

a) whole milk/full cream milk,

b) fat reduced milk/semi skimmed milk,

c) low fat milk, and

d) fat free milk/skimmed milk.

UHT milk shall comply with the specific requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Compositional requirements for UHT milk

Parameter	Requirement	Test method
pH variation, max.	0.3	Annex A
Titratable acidity variation, %, max.	0.02	AOAC 947.05
Density at 20 °C, g/ml	1.028 - 1.034	AOAC 925.22
Milk fat content, %, m/m		ISO 2446
High fat milk	More than 4.5	
Full fat/Whole milk	More than 3.0 but not more than 4.5	
Medium fat milk/ Fat-reduced/ Semi-skimmed	More than 1.5 but not more than 3.0	
Partly skimmed milk/ Low Fat	More than 0.5 but not more than - 1.5	
Fat free milk/ Skimmed	Not more than 0.5	
Milk solids non-fat, %, minimum	8.5	ISO 6731
Protein content, %, min.	3	ISO 8968-4

5 Food additives

Food additives may be used and only within the limits specified in accordance with CXS 192.

6 Contaminants

6.1 Heavy metals

The products covered by this African Standard shall comply with those maximum limits for metal contaminants specified in CXS 193.

6.2 Aflatoxins

When tested in accordance with ISO 14501, the level of aflatoxin M_1 shall not exceed 0.50 µg/kg.

6.3 Pesticides residues

Pesticide residue limits shall be in accordance with limits set by the Codex Alimentarius Commission for the product.

6.4 Veterinary drug residues

Veterinary drug residue limits shall be in accordance with limits set by the Codex Alimentarius Commission for the product.

7 Hygiene

The products covered by this African standard shall be produced, prepared and handled in accordance with the provisions of the appropriate sections of ARS 53 and ARS 1036.

UHT milk shall be free from microorganisms and products originating from microorganisms in amounts which may represent a hazard to human health.

UHT milk shall comply with microbiological limits given in Table 2 when tested in accordance with the methods specified therein.

Table 2 — Microbiological limits for UHT milk

Food category	Micro-organisms	Sampling plan		Limits		Test method reference	The stage at which the parameter is applied
		n	c	m	M		
	Commercial sterilization efficiency test: Total amount of aerobic bacteria	6	0	The packages are incubated at 30 °C for 10 days and at 55 °C for 5 days, and the maximum number of aerobic bacteria is less than 10 cfu/mL (≤ 10 cfu/mL)		ISO 4833-1	Final product before leaving the factory & during shelf-life
n = number of units comprising the sample c = number of sample units giving values between m and M m= The level of the microbiological criterion required in the product M= Value or level of microbial limit not to be reached or greater than in any unit of the sample							

8 Packaging

UHT milk shall be packaged in suitable food grade containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product during dispatch, transport and use of the product until the end of its shelf life.

9 Labelling

The containers shall be legibly and indelibly labelled and meets the requirements of Labelling ARS 56 and specifically meet the following requirements regarding the labelling of UHT milk.

a) The wording “ULTRA HIGH TEMPERATURE” or “UHT” shall be shown on the main panel.

Nutrition and health claims shall comply with relevant Codex Standards.

In addition to the provisions of ARS 56 and ARS 1034, the following specific provisions apply:

9.1 Name of the food

The name of the food shall be UHT milk, provided that the product is in conformity with this standard. Where customary in the country of retail sale, alternative spelling may be used.

The use of the name is an option that may be chosen only if the UHT milk complies with this standard. Where the name is not used for a UHT milk that complies with this standard, the naming provisions of ARS 1073 can be used.

9.2 Declaration of milk fat content

The milk fat content shall be declared in a manner found acceptable in the country of sale to the final consumer, either (i) as a percentage by mass, (ii) as a percentage of fat in dry matter, or (iii) in grams per serving as quantified in the label provided that the number of servings is stated.

10 Methods of sampling

For checking the compliance with this standard, the methods of sampling contained in ISO 707, shall be used.

Annex A

(normative)

Determination of pH variation

A.1 Apparatus

A.1.1 Incubator, adjusted at 55 °C ± 1 °C

A.1.2 pH meter

A.2 Procedure

Determine the pH of 50 ml of the sample in the flask, with a glass electrode at 20 °C and note the reading. Then incubate another 50 ml of the sample at 55 °C ± 1 °C for five days. Examine each day, then shake and return it in the incubator. After five days incubation at 55 °C ± 1 °C, remove the sample from the incubator and cool to room temperature. Take a small portion of it and measure the pH in the pH meter with the glass electrode at 20 °C. From this pH value, subtract the initial pH value.

A.3 Interpretation of results

A sample which does not show any physical alteration during incubation at 55 °C ± 1 °C for five days and where the pH does not show a difference of more than 0.3 unit from the initial pH is considered sterile.

If any physical alteration of the contents is observed (coagulation with, or without exudation, grittiness, formation of bubbles or scum peptonization or proteolysis) the product shall be considered as nonsterile.

Annex B
(normative)

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

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 standardized 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 glacial acetic acid. Make up to 100 ml with rectified spirit.

B.2.4 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.
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 °C ± 1 °C for five days. Examine the flask each day, then shake and replace it in the incubator. If any physical alteration of the content is observed the results of the test shall be considered positive and the sample as non-sterile.

If no alteration takes place during the five 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

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

where

V is the volume, in millilitres, of the standard sodium hydroxide required for titration (see B.3.1)

M is the molarity of the standard sodium hydroxide solution (see B.3), and

m is the mass, in grams, of the sample taken for test (see B.3.1).

B.4.2 Acidity after incubation

B.4.2.1 Titratable acidity (as lactic acid) percent by weight = $\frac{9V.M}{w}$

where

V is the volume, in millilitres, of the standard sodium hydroxide required for titration (see B.2.1),

M is the molarity of the standard sodium hydroxide solution (see B.2.1),

w is the weight, in grams, of the sample taken for the test (see B.2.1)

B.4.2.2 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

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

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