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DRAFT TANZANIA STANDARD

UHT milk – Specification Part 2: Reconstituted/Recombined/Toned milk

TANZANIA BUREAU OF STANDARDS

UHT Milk – Specification Part 2: Reconstituted/Recombined/Toned milk

0 FOREWORD

Ultra-high temperature processed (UHT)–sterilized milk is one of the dairy products produced and traded in the country for human consumption. Whereas raw milk is the commonly used raw material, reconstituted, recombined and toned milk are increasingly been used to fill the raw milk supply gap; especially during the dry season or periods of prolonged droughts. Hence it has been necessary to prepare this standard to make sure that the products produced from these raw materials are of the required safety and quality.

In the preparation of this Tanzania standard assistance was drawn from EAS 27:2007, *UHT Milk – Specification*; published by the East African Community.

In reporting, the results of a test or analysis made in accordance with this standard, if the final value observed or calculated, is to be rounded off, it shall be done in accordance with TZS 4 (see clause 2).

1.0 SCOPE

This Tanzania standard prescribes the requirements, methods of sampling and test for UHT milk derived from reconstituted, recombined or toned milk.

2.0 REFERENCES

For the purpose of this Tanzania standard, the following references shall apply. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced standard (including any amendments) applies:

TZS 4 – Rounding off numerical values.
TZS 109 – Food processing units – code of hygiene.
TZS 112 – Milk – Production, processing, transportation and distribution – code of hygiene.
TZS 118 – Microbiology of food and animal feeding stuffs – Horizontal method for enumeration of microorganisms – Colony count technique at 30 ^{0}C.
TZS 119 – Microbiology – General guidance for the enumeration *of coliforms* – Most Probable Number technique (MPN).
TZS 122 – Microbiology of food and animal feeding stuffs – Horizontal method for the detection of *Salmonella spp.*
TZS 124 - Milk and milk products – sampling for microbiological examination.
TZS 125 – 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 – Amendment 1: Inclusion of precision data.
TZS 131 – Microbiology - General guidance for enumeration of yeast and moulds – Colony count technique at 25 ºC.
TZS 538 – Labelling of pre-packaged foods — General requirements
Codex Stan 193 – Codex General Standard for Contaminants and Toxins in Food and Feed
ISO 6888 – Enumeration of coagulase positive *Staphylococcus spp*

3.0 TERMS AND DEFINITIONS

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

3.2 milk
normal, clean and fresh secretions extracted from the udder of a healthy milking cow, properly fed and kept, but excluding that got during the first seven days after calving. Compare with other standards

3.3 pasteurized milk
milk which has been efficiently heat treated at a sufficiently high temperature for appropriate period of time to ensure complete destruction of all pathogenic organisms, so as to enable the product to be transported, distributed and consumed as liquid milk.

3.4 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.

3.5 UHT
Utra high temperature treatment usually above 135^0C for 1 to 2 seconds; in milk it aims to destroy all microorganisms including spores.

3.5 UHT milk
milk that has under gone a ultra-high temperature treatment, homogenized, filled and sealed aseptically into sterile retail containers in order to achieve commercial sterility.

3.6 commercial sterility
attained practical sterility after the product has been treated and aseptically packaged aiming at long shelf life without refrigeration.

3.7 reconstituted milk
is a product resulting from the addition of water to the dried or concentrated form of the product in the amount necessary to re-establish the appropriate water to solids ratio.

3.8 recombined milk
is a product resulting from the combining of milkfat and milk-solids-non-fat in their preserved forms with or without the addition of water to achieve the appropriate milk product composition.

3.9 toned milk
is a product prepared by a mixture of raw cow milk with skimmed milk or powdered milk in the amount necessary to re-establish the appropriate milk product composition.

4.1 Culinary steam

4.0 REQUIREMENTS

4.1 General requirements
4.1.1 Raw materials

a) Cream and cream powder, butter oil, milk powder, skimmed milk powder when used shall comply with specific Tanzania standard.
b) UHT milk shall not contain added water, preservatives, or any other added substances.

4.1.2 Process requirements

The milk shall be subjected to temperatures between 135 °C and 150 °C for 2 to 6 seconds, direct or indirect heating sufficient to attain commercial sterility, followed by immediate cooling to ambient through temperature and aseptically packaged in sterile containers. Allign with the definition

4.1.3.1 **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.

4.1.3.2 **Holding time before sale**
UHT milk shall be held by the processor at ambient temperatures for at least five 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.

4.1.4 Shelf life
UHT milk shall have a minimum shelf life of 90 days at ambient temperature.

4.1.5 UHT milk shall be;

a) normal in texture and colour.
b) processed without affecting the composition of the product
c) free from off-flavours and taints fat.

4.2 Specific requirements

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

Table 1: Chemical requirements for UHT milk

S/no.	Characteristic	Requirement	Method of test
	pH	Put a requirement	
1.	pH variation on 7 days incubation (max.)	0.3	Annex A
	Titrable acidity, % lactic acid	Put a requirement	
2.	Titratable acidity variation on 7 days incubation, % lactic acid (max)	0.02	Annex B
3.	Milk fat percentage (m/m) (a) Whole milk (min.) (b) Fat reduced milk (c) Low fat milk (d) Skimmed milk, max	 3.25 2.25 – 3.24 1.5 – 2.24 0.5	ISO 2446
4.	Milk solids not fat, min	8.5	ISO 2446
5.	Freezing point depression (^{o}C)	525 – 550	ISO 5764
	Milk density (g/ml) at 20 ^{o}C	1.028 – 1. 032	Lactometer

5.0 CONTAMINANTS

5.1 UHT Milk shall comply with the current maximum limits for contaminants in Codex Stan 193 and the current maximum residue limits for pesticides and veterinary drugs established in the CAC/MRL 2.

5.2 Pesticide and veterinary drug residues

UHT Milk shall comply with the current maximum residue limits for pesticides and veterinary drugs established in the CAC/MRL 2.

5.3 Heavy metals

UHT Milk shall comply with the current maximum residue limits for heavy metals as described in the CAC/MRL 2.

6.0 HYGIENE

6.1 The product shall be prepared under strictly conditions according to TZS 109 and TZS 112 (See clause 2).

6.2 The product on testing shall not contain microbiological count more than the level given in Table 2.

Table 2: Microbiological requirements

S/No.	Characteristic	Requirement	Methods of test (see clause 2)
1.	Total plate count per 10 ml max.	10	TZS 118

2.	Coliform, cfu/ml	Absent	TZS 119
3.	*Staphylococcus (coagulase positive), cfu/ml*	Absent	TZS 125

7.0 SAMPLING AND TESTS

7.1 Sampling

Sampling of the product covered under this standard shall be done according to TZS 124. (see clause 2).

7.2 Tests

Testing of this product shall be done according to test methods prescribed in Table 1 2 and 3.

8.0PACKAGING, MARKING AND LABELLING

8.1 Packaging

The milk shall be packaged aseptically into sterile food grade containers and sealed hermetically.

8.2 Marking and labelling

In addition to marking and labelling requirements prescribed in TZS 538, UHT milk containers shall be also legibly and indelibly marked with the following:

a) name of the product “Recombined UHT milk/Toned UHT milk/Reconstituted UHT milk “
b) The date of manufacture
c) Country of origin
d) Name and address of manufacturer
e) Expiry date
f) Net content in volume
g) Batch or code number
h) Nutritional information
i) Registered trade mark, if any
j) Instruction for use
k) Storage condition and hygienic handling of the product.
l) The language on the label shall be “Kiswahili” or Kiswahili and English. Additional language may be used depending on the designated market.

8.3 The container may also be marked with TBS Certification Mark.

NOTE – The TBS Standards Mark of Quality may be used by the manufacturers only under licence from TBS. Particulars of conditions under which the licenses are granted may be obtained from TBS.

AnnexA
(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

A.2.1 Determine the pH of 50 ml of the sample in the flask, with a glass electrode at 20 °C and note reading. Then incubate another 50 ml of the 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 of the contents is observed (coagulation with, or without exudation, grittiness, flocculation, formation of bubbles or scum peptonization or proteolysis) the result of the test shall be considered positive and the sample as nonsterile.

A.2.2 If no alteration takes place during the five days incubation at 55 ± 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 glass electrode at 20 °C. From this pH value subtract the initial pH value (A.2.1).

A.3 Interpretation of results

A sample which does not show any physical alteration during incubation at 55 ± 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.

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

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 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 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.

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 (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.

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 ml 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 g of the sample taken for test (see B.3.1).

B.4.2 Acidity after incubation

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

Where,

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

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

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

b) **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 steril