DEAS 67: 2022

ICS 67.100.10

DRAFT EAST AFRICAN STANDARD

Raw cow milk — Specification

EAST AFRICAN COMMUNITY

Fourth Edition 2022

Copyright notice

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 017, *Milk and milk products*.

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.

This fourth edition (DEAS 67: 2022) cancels and replaces the third edition (EAS 67: 2019), which has been technically revised.

Raw cow milk — Specification

1 Scope

This Draft East African Standard specifies requirements, sampling and test methods for raw cow 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 999.10, *Official method for lead, cadmium, zinc, copper, and iron in foods Atomic absorption Spectrophotometry after microwave Digestion*

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

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

ISO 13366-1, *Milk — Enumeration of somatic cells — Part 1: Microscopic method (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 2446, *Milk — Determination of fat content*

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

ISO 4833-1, *Microbiology of the food chain — Horizontal method for the enumeration of microorganisms — Part 1: Colony count at 30 degrees C by the pour plate technique*

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*

3 Terms and definitions

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

3.1
raw cow milk
normal, clean and fresh secretion extracted from the udder of a healthy cow

3.2
cow
lactating female of cattle (Bos indicus and Bos taurus or their crosses)

4 Requirements

4.1 General requirements

Raw cow milk shall:

a) be clean and obtained from a healthy cow;

b) have normal organoleptic characteristics; and

c) not have added or removed substances.

d) be free from colostrum

4.2 Specific requirements

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

Table 1 — Specific requirements for raw cow milk

S/N	Characteristic	Requirement	Test method
	Milk fat, %, min.	3.25	ISO 2446
	Freezing point, °C	-0.550 to -0.525 **[-0.534 to -0.490]**	ISO 5764
	Alcohol test	Negative	Annex A
	Clot-on-boiling test	Negative	Annex B
	pH	6.6 – 6.8	Annex C
	Density at 20 °C, g/ml	1.028 – 1.034	Annex D
	Titratable acidity, %, max.	0.17	Annex E
	Milk solids non-fat, %, min.	8.5	ISO 6731

5 Hygiene

5.1 Raw cow milk shall be produced and handled in accordance with CAC/RCP 57 and EAS 39.**5.2** Raw cow milk shall comply with microbiological limits given in Table 2 when tested in accordance with the test methods specified therein.

Table 2 — Microbiological limits in raw cow milk

S/N	**Microorganism**	**Maximum limit CFU/ml**	**Test method**
1.	Total plate count	2×10^6	ISO 4833-1
2.	Total coliform	5×10^4	ISO 4832
3.	Somatic cell count	3×10^5	ISO 13366-1

6 Contaminants

6.1 Pesticide residues

Raw cow milk shall comply with maximum residue limits residues set by Codex Alimentarius Commission CX/MRL2.

6.2 Veterinary drugs residues

Raw cow milk shall comply with maximum residue limits for antibiotics and other veterinary drugs set by Codex Alimentarius Commission CX/MRL2.

6.3 Heavy metals

When tested in accordance with AOAC 999.10, the level of Lead (Pb) shall not exceed 0.02 mg/kg.

6.4 Mycotoxins

When tested in accordance with ISO 14501, the level of aflatoxin M1 shall not exceed 0.5 µg/l.

7 Sampling

Sampling of raw cow milk shall be done in accordance with ISO 707.

Annex A
(normative)

Alcohol test

A.1 General

The alcohol test is used for rapid assessment of stability of milk to processing, particularly for condensing and sterilization. The alcohol test is useful as an indication of the mineral balance of milk and not as much as an index of developed acidity. This test aids in detecting abnormal milk, such as a colostrum, milk from animals in late lactation, milk from animals suffering from mastitis and milk in which the mineral balance has been disturbed.

A.2 Apparatus

A.2.1 **Test-tubes**, 150 mm x 19 mm, preferably with graduation marks at 5 ml and 10 ml

A.2.2 **Measure for alcohol**, for 5 ml

A.3 Reagent

Ethyl alcohol, minimum 75 % by volume (density 0.8675 g/ml at 27 °C)

A.4 Procedure

Place 5 ml of milk in a test tube and add an equal quantity of alcohol. Mix the contents of the test tube by inverting several times. Note any flakes or clots. The presence of a flake or a clot denotes a positive test.

A.5 Interpretation

A negative test indicates low acidity and good heat stability of the milk sample. Milk showing positive is not considered suitable for the manufacture of evaporated milk, which has to be sterilized to ensure that its quality is maintained.

Annex B
(normative)

Clot-on-boiling (COB) test

B.1 General

This is a quick test to determine developed acidity and the suitability of milk for processing.

B.2 Apparatus

B.2.1 **Test-tube,** 15.6 cm x 1.9 cm, preferably with a mark at 5 ml

B2.2 **Water-bath**

B.3 Procedure

Transfer 5 ml of the sample to the test-tube and smell. Place the tube in a boiling water-bath and hold for about 5 min, and smell again for any acidic flavour. Remove the tube and rotate it in an almost horizontal position and examine the film of milk or side of the test-tube for any precipitated particles. The formation of clots indicates a positive test.

B.4 Interpretation

The principal features of the boiling test are speed and definiteness of results. Milk either remains unchanged or coagulates. Milk, which gives a positive COB test, has acidity generally above 0.17 % (as lactic acid) and is not suitable for distribution as liquid milk or for processing.

Annex C
(informative)

Determination of pH

C.1 General

The pH value or hydrogen ion concentration gives a measure of the true acidity of milk. The relationship between pH and acidity of milk is only approximate. In normal raw cow milk the pH ranges from 6.6 to 6.8. The value is reduced by the development of acidity. On the other hand, the pH value of milk from a cow suffering from mastitis is alkaline in reaction, the value being over 7.0. The pH test is mainly used for the detection of abnormal mastitis in milk. The pH of milk may be determined rapidly by using the indicator strips.

C.2 Indicator strips

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

A rough estimate of pH is obtained by dipping a strip of the prepared paper in milk and observing the colour. Bromocresol purple (pH range 5.2 to 6.8; colour changes from yellow to purple) and bromothymol blue (pH range 6.0 to 7.6; 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 to 10.5.

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

C.3 pH meter

The pH meter may be used to determine pH in raw cow milk

C.4 Interpretation

In normal raw cow milk, the pH is well below 6.9. On an average, raw cow milk gives a pH of 6.6. Milk of pH over 6.9 should be regarded with suspicion as indication of some diseases of the udder or of late lactation milk.

Annex D
(normative)

Determination of density

D.1 General

The density is a relationship between the body mass and the volume this body occupies in the space. The density test is performed in order to be used in the detection of adulteration in the milk since, the addition of water only would cause the decrease in density, whereas the skimming (fat removal) would cause an increased density in the milk, beside supplying important information for the determination of the total dry extract.

D.2 Equipment

D.2.1 Thermolactodensimeter (TLD)

D.2.2 Test tube, 250 ml

D.3 Method

The density determination is accomplished by the thermolactodensimeter (TLD) because of the practicability of this method.

D.4 Procedure

D.4.1 Place the sample to be analysed in the clean and dry test tube by carefully inclining the test tube and allowing the liquid to flow down the walls of the glass to avoid incorporation of air which would reduce the density of the milk.

D.4.2 Immerse TLD into the test tube and make it rotate slowly on its own axis.

D.4.3 Take the reading of both density and temperature of the milk as soon as TLD stabilizes.

D.4.4 By using an adequate scale, correct the influence of the temperature. The result will correspond to the corrected milk density.

Annex E
(normative)

Determination of titratable acidity

E.1 Apparatus

E.1.1 Incubator

E.1.2 Burette, with soda-lime guard tube

E.1.3 Porcelain dishes, white hemispherical of approximately 60 ml

E.1.4 Stirring rods, of glass, flattened at one end

E.2 Reagents

E.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.

E.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.

E.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.

E.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.

E.3 Procedure

E.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.

E.4 Calculation

E.4.1 Acidity of fresh sample

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

where

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

M is the molarity of the standard sodium hydroxide solution (see E.3); and

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

Bibliography

EAS 67: 2019, *Raw cow milk — Specification*