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Raw Milk — Specification

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Foreword

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This African Standard was prepared by ARSO Technical Committee on *Milk and Milk Products* (ARSO/TC 04)

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Introduction

In Africa, an average of 45.7 million tonnes of milk is put on the market each year. Cow's milk production in Africa represents less than 5% of world production, while small ruminants (goats and sheep), Africa produces 20% of world production volume.

Raw milk is not currently traded across borders in Africa and is considered to be a raw material for products which are traded across borders.

The handling of raw milk is governed by National regulations; therefore, this standard will only focus on the raw milk of different species intended for further processing.

Raw Milk — Specification

1 Scope

This African Standard specifies requirements, sampling, and test methods of raw milk of (Cow milk (*Bos spp*.); Goat (*Capra spp*.); Sheep (*Ovis spp*.); Camel (*Camelus dromedarius*) for further processing.

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.

CODEX STAN 206-1999, *General Standard for the Use of Dairy Terms*

CODEX STAN 192-1995*, General Standard for Food Additives*

CXS 193-1995, *General Standard for Contaminants and Toxins in Food and Feed*

CXC 1-1969, *General Principles of Food Hygiene*

CXC 57-2004, *Code of Hygienic Practice for Milk and Milk Products*

CXG 21-1997, Establishment and Application of Microbiological Criteria Related to Foods

CXS 1-1985, General Standard for the Labelling of Prepackaged Foods

CAC/MRL 1*; Maximum Residue Limits (MRLs) for pesticides*

CAC/MRL 3*, Maximum Residue Limits (MRLs) and Risk Management Recommendations (RMRs) for Residues of Veterinary Drugs in Foods*

3 Terms & definitions

For the purpose of this African Standard, the following definition shall apply:

3.1
Raw Cow milk: it shall mean the normal, clean, liquid, and fresh secretion obtained by practically emptying the udder of a healthy [1] lactating female cattle *(Bos spp.)* but excluding that obtained during the first seven days after calving and free from colostrum. This milk should not have undergone any form of heat treatment above the temperature of 40 °C[2].

3.2
Raw Goat and sheep milk: it shall mean the normal, clean, liquid, and fresh secretion obtained by practically emptying the udder of a healthy (1) lactating female *goats (Capra spp.) and female sheep (ovis spp.)* but excluding that obtained during the first seven days after calving and free from colostrum. This milk should not have undergone any form of heat treatment above the temperature of 40 °C (2).

3.3
Raw Camel milk: it shall mean the normal, clean, liquid, and fresh secretion obtained by practically emptying the udder of a healthy (1) lactating *camel (Camelus dromedarius)* but excluding that obtained during the first seven days after calving and free from colostrum. This milk should not have undergone any form of heat treatment above the temperature of 40 °C (2).

[1] Free from brucellosis, tuberculosis and other diseases that can be transmitted by raw milk
[2] Milk that has not been subjected to pasteurization, sterilization, ultra-high temperature treatment or any other form of treatment

For the other terms and definition refer to the African Standard of Glossary of terms & definitions for Milk and Milk products (ARS XXX).

4 Essential Composition and quality factors

4.1 Raw materials

Raw milk shall be directly obtained from a healthy lactating/milking animal species covered by this standard. (Cow milk *(Bos spp*.); Goat milk (*Capra spp*.); Sheep (*Ovis spp*.); Camel (*Camelus dromedarius*); Buffalo (*Bubalus spp*.).

4.2 Compositional Requirements

The mean composition of raw milk of different species is shown in Table 1 below:

Table 1: Composition of raw milk of different species Cow milk (Bos spp.); Goat milk (Capra spp.); Sheep (Ovis spp.); Camel (Camelus dromedarius).

Name of product	**Milk fat content (%) (m/m)**	**Minimum milk solids non-fat content (SNF)**		**Total milk protein content (%) (w/v)**	**Total acidity calculated as a lactic acid (%) (m/m)**	**pH value at 20-25°C**	**Moisture content (%) (m/m)**	**Density at 20 ºC g/mL**	**Ash content (%) (m/m)**	**Lactose content (%) (w/v)**	**Maximum Freezing point (°C)**
		Calculated on the total content (%) (m/m)	Calculated on a fat-free basis (%) (m/m)								
Cow Raw Milk	> 3.2	> 8.25	> 6	At least 2.9	< 0.17	6.6- 6.8	< 95	1.028–1.035	< 0.78	3.5 – 5.5	-0.550 to -0.520
Goat Raw Milk / Sheep Raw Milk	> 3	> 8.3	> 3	At least 3.5	< 0.18	6.5- 6.8	< 91	1.026–1.036	< 0.78	>4.2	-0.552 to 0.512
Camel Raw Milk	> 2.5	> 8	> 6	At least 2.9	< 0.19	6.2- 6.5	< 91	1.010–1.035	< 0.78	4 – 5	-0.500 to -0.610]

5 General quality characteristics

The raw milk of different species shall be:

a) clean and free from any impurities, foreign particles and extraneous matter and adulteration.

b) natural in odour (characteristic to the origin specie).

c) natural in consistency and homogeneous (characteristic to the origin specie).

d) free of objectionable flavour, off-flavours and taints and unacceptable taste such as rancid taste and decomposed milk, not be bitter.

e) have a characteristic creamy white colour (characteristic to the origin specie).

f) not contain added water or other added substances, nor shall any proportion of a natural constituent be removed (by standardisation or any other means).

g) not be mixed with milk of any other livestock other than the specified species neither powdered milk, nor liquid.

h) not coagulate in the clot on boiling test, when tested. (Annex XX or Test method reference)

i) test negative to the alcohol test, when tested (Annex XX or Test method reference) and;

j) test positive to peroxidase test, when tested. (Annex XX or Test method reference).

6 Food Additives

No Additives shall be added to raw milk.

7 Contaminants

The raw milk shall comply with the maximum Levels of the General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193);

The raw milk shall comply with the maximum residue limits for pesticides and veterinary drug residues established for milk by the Codex Alimentarius Commission.

The level of mycotoxins residues shall be in accordance with the requirements fixed by Code of Practice for the Reduction of mycotoxins in Raw Materials and Supplemental Feeding stuffs for Milk Producing Animals (CXC 45) when tested according to ISO 14501 or AOAC 980.21.

8 Hygiene

8.1 Hygiene Practices

It is required that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the General Principles of Food Hygiene (CXC 1), the Code of Hygienic Practice for Milk and Milk Products (CXC 57-2004) and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice and local national regulation.

8.2 Microbiological criteria

The products shall comply with relevant microbiological criteria established in accordance with the Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods (CXG 21).

Microbiological criteria for raw milk of different species is provided in Table 2.

Table 2: Microbiological Criteria Related to raw milk of different species

Food Category	Micro-organisms	Sampling plan		Limits		Test method reference
		n	c	m	M	
Raw Milk (Cow)	Somatic cell count[3]	-	-	< 500 000 cfu /mL		ISO 13366-2
Raw Milk (Goat, Sheep, Camel)		-	-	< 750 000 cfu /mL		
Raw Milk (Cow)	Total plate count (TVC) [4]	-	-	< 1.5 x 10^6 cfu/mL		ISO 6610
Raw Milk (Goat, Sheep, Camel)		-	-	< 2 x 10^5 cfu/mL		
Raw Milk (All species)	Salmonella	5	0	Absent in 25 g or mL		ISO 6579-1
Raw Milk (All species)	Listeria monocytogenes	5	0	Absent in 25 g or mL		ISO 11290-1
Raw Milk (All species)	Total coliform count	-	-	< 1 x 10^3 cfu/mL		ISO 4831 or ISO 4832
Raw Milk (All species)	Escherichia coli	-	-	not detectable		ISO 11866-1/2/3

9 Transportation and storage

The following conditions shall be taken into consideration:

a) The temperature of the raw milk collected from the milking area shall be reduced to 4 ºC or below within two hours and then stored at a temperature not exceeding 6 ºC; and not stored for longer than 24 hours.

b) The Raw milk shall be transported at a temperature not exceeding 10 ºC.

9.1 Containers for transport/storage and shipment documentation

Raw milk, destined for processing plants, shall be transported, and stored in containers which is suitable food grade containers which will safeguard the hygienic, nutritional, technological safety, and organoleptic qualities of the product.

Milk tank trucks transporting raw milk to the milk processing plant, collection/receiving centre or transfer station shall be accompanied by documentation containing at least the following information:

a) Name, address of shipper and permit number as approved by the competent authority;
b) allowing movement either locally or for importation / exportation;
c) Point of origin;
d) Name of product, specie-specific;
e) Tanker identity number;

[3] Somatic cells are blood cells that fight infection and occur naturally in milk. The presence of mastitis (an infection of the mammary gland) in the cow will increase the somatic cell count. The somatic cell count can be determined by direct microscopic examination or by electronic instruments designed to count somatic cells.
[4] The total bacteria count is the number of bacteria in a sample that can grow and form countable colonies on Standard Methods Agar after being held at 32°C (90°F) for 48 hours.

f) Weight of product;
g) Date of shipment; and
h) Name and address of destination.

9.2 Methods of sampling and analysis

For checking the compliance with this standard, the methods of analysis and sampling contained in the Recommended Methods of Analysis and Sampling (CXS 234-1999) and African Standards relevant to the provisions in this standard, shall be used. The table below summarizes the main methods.

Table 3: Recommended Methods of Analysis and Sampling

Nature of determination	No. of publication	Date issued	Title
Count - Colony forming units	ISO 6611 IDF 94	2004	Colony forming units of yeasts and/or moulds (Colony count at 25 °C)
	ISO 20128 IDF 192	2006	*Lactobacillus acidophilus* (Colony count at 37 °C)
	ISO 7889 IDF 117	2003	*Lactobacillus delbrueckii subsp* bulgaricus & Streptococcus thermophilus (Colony count at 37 °C)
	ISO 27205 IDF 149 (Annex A)	2010	Microorganisms constituting the starter culture (Colony count at 25 °C, 30 °C, 37 °C and 45 °C according to the starter organism in question)
Fat content	ISO 1211 IDF 001	2010	Milk - Determination of fat content - Gravimetric method (Reference method)
	ISO 1735 IDF 005	2004	Cheese and processed cheese products – Determination of fat content – Gravimetric method (Reference method)
	ISO 1736 IDF 009	2008	Dried milk and dried milk products - Determination of fat content – Gravimetric method (Reference method)
	ISO 2450 IDF 016	2008	Cream - Determination of fat content – Gravimetric method (Reference method)
	ISO 7208 IDF 022	2008	Skimmed milk, whey and buttermilk - Determination of fat content - Gravimetric method (Reference method)
	ISO 488 IDF 105	2008	Milk - Determination of fat content - Gerber butyrometers
Milk protein content	ISO 8968-1 IDF 20-1	2001	Milk - Determination of nitrogen content – Part 1: Kjeldahl method (including calculation of crude protein content)
	ISO 8968-2 IDF 20-2	2001	Milk – Determination of nitrogen content - Part 2: Block-digestion method (Macro method) (including calculation of crude protein content)

Nature of determination	No. of publication	Date issued	Title
	ISO 8968-3 IDF 20-3	2004	Milk – Determination of nitrogen content – Part 3: Block-digestion method (Semi-micro rapid routine method) (including calculation of crude protein content)
	IDF 21B	2010	Milk, cream and evaporated milk – Determination of total solids content (Reference method)
Moisture content	ISO 5536 IDF 023	2009	Milkfat products - Determination of water content - Karl Fisher method
Freezing point depression	ISO 5764 IDF 108	2009	Milk - Determination of freezing point - Thermistor cryoscope method (Reference method)
Solids-non-fat content	ISO 6731	2010	The determination of the total solids content of milk, cream and evaporated milk. (Reference method)
Antibiotic residues	AOAC 982.17	2000	Beta-lactam antibiotics in milk. (To include additional relevant methods)

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>> Introduction source information to be added.

