

Mozzarella cheese — Specification

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Directorate of Livestock production
Directorate of Veterinary Services
Egerton University — Department of Dairy and Food Science Technology
Government Chemist’s Department
National Public Health Laboratory Services
Kenya Industrial Research and Development Institute (KIRDI)
New Kenya Creameries Cooperative (NKCC)
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Happy Cow Ltd
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Mozzarella cheese — Specification

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Foreword

This Kenya Standard was prepared by the Milk and Milk Products Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

Cheese is the ripened or unripened soft, semi-hard, hard, or extra-hard product, which may be coated, and in which the whey protein/casein ratio does not exceed that of milk, obtained by:

- (a) coagulating wholly or partly the protein of milk, skimmed milk, partly skimmed milk, cream, whey cream or buttermilk, or any combination of these materials, through the action of rennet or other suitable coagulating agents, and by partially draining the whey resulting from the coagulation, while respecting the principle that cheese-making results in a concentration of milk protein (in particular, the casein portion), and that consequently, the protein content of the cheese will be distinctly higher than the protein level of the blend of the above milk materials from which the cheese was made; and/or
- (b) processing techniques involving coagulation of the protein of milk and/or products obtained from milk which give an end-product with similar physical, chemical and organoleptic characteristics as the product defined under (a).

There are various types of cheese that are produced and marketed worldwide. This standard specifies the requirements for the type of unripened semi-soft cheese being marketed in Kenya as mozzarella cheese.

In the preparation of this standard useful information was derived from members of the technical committee, Codex standard for Mozzarella Cheese (CODEX STAN 262-2006) and local manufacturers

Mozzarella cheese — Specification

1 Scope

This Kenya Standard specifies requirements and methods of sampling and test for Mozzarella cheese intended for direct consumption or for further processing, in conformity with the description in Clause 3 of this standard.

This standard applies to mozzarella cheese made from cow's milk.

2 Normative references

The following referenced documents 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 document (including any amendments) applies.

KS 28-1:2009, *Cheese — Specification — Part 1: General requirements*

KS 2787, Group Standard for Unripened Cheeses Including Fresh Cheeses

KS EAS 69, Pasteurized milk- Specification

KS 35, creams and prepared creams

KS EAS 38, *Labelling of pre-packaged foods*

KS CAC/GL 23, *Guidelines for use of nutrition claims*

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

KS ISO 1735, *Cheese and processed cheese products — Determination of fat content — Gravimetric method (Reference method)*

KS ISO 2962, *Cheese and processed cheese products — Determination of total phosphorus content — Molecular absorption spectrometric method*

KS ISO 3433, *Cheese — Determination of fat content — Van Gulik method*

KS ISO 5534, *Cheese and processed cheese — Determination of the total solids content (Reference method)*

KS ISO 6731, *Milk, cream and evaporated milk - Determination of total solids content (reference method)*

KS ISO 6732; Milk and milk products -- Determination of iron content -- Spectrometric method (Reference method)

KS ISO/TS 6733; Milk and milk products -- Determination of lead content -- Graphite furnace atomic absorption spectrometric method

KS ISO 11866-2:2007; Milk and milk products-Enumeration of presumptive escherichia coli - Part 2: Colony-count technique at 44 °C using membrane

KS ISO 6579:2002 Microbiology of food and animal feeding stuffs - Horizontal method for the detection of Salmonella spp

KS ISO 11866-2, *Milk and milk products-Enumeration of presumptive escherichia coli - Part 2: Colony-count technique at 44 °C using membrane*

KS ISO/TS 11869:2012; Fermented milks -- Determination of titratable acidity -- Potentiometric method

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KS ISO 14501:2007 Milk and milk powder - Determination of aflatoxin M content - Clean-up by immunoaffinity chromatography and determination by high-performance liquid chromatography

KS ISO 16649-1:2001; Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of beta-glucuronidase-positive *Escherichia coli* -- Part 1: Colony-count technique at 44 degrees C using membranes and 5-bromo-4-chloro-3-indolyl beta-D-glucuronide

KS ISO 4833-1:2013; 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

KS ISO 5738:2004 (IDF 76:2004); Milk and milk products -- Determination of copper content -- Photometric method (Reference method)

KS ISO 6611, Milk and milk products — Enumeration of colony—forming units of yeasts and/or moulds — Colony-count technique at 25 degrees C

KS ISO 6888-1:1999; 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

KS ISO 8968-1:2014 (IDF 20-1:2014); Milk and milk products -- Determination of nitrogen content -- Part 1: Kjeldahl principle and crude protein calculation

AOAC 942.17, *Arsenic in foods Molybdenum blue method*

AOAC 999.10, *Lead, Cadmium, Copper, Iron, and Zinc in foods, Atomic Absorption Spectrophotometry after dry ashing*

AOAC 962.16 Beta-lactam Antibiotics in milk

AOAC 980.21, Aflatoxin M1 in milk and cheese—thin layer chromatographic method

AOAC 980.21, *organochlorine and organophosphorous pesticide residues in milk and milk products*

KS ISO 3890-1:2009 (IDF 75-1:2009); Milk and milk products -- Determination of residues of organochlorine compounds (pesticides) -- Part 1: General considerations and extraction methods

KS ISO 3890-2:2009 (IDF 75-2:2009); Milk and milk products -- Determination of residues of organochlorine compounds (pesticides) -- Part 2: Test methods for crude extract purification and confirmation

3 Description

3.1

mozzarella

is an unripened cheese in conformity with the KS 28-1 and the *Standard for Unripened Cheese Including Fresh Cheese* (KS 2787). It is a smooth elastic cheese with a long stranded parallel-orientated fibrous protein structure without evidence of curd granules. The cheese is rindless and may be formed into various shapes.

Mozzarella is made by “pasta filata” processing content is a soft cheese with overlying layers that may form pockets containing liquid of milky appearance. It may be packed, which consists of heating curd of a suitable pH value kneading and stretching until the curd is smooth and free from lumps. Still warm, the curd is cut and moulded, then firmed by cooling. Other processing techniques, which give end products with the same physical, chemical and organoleptic characteristics, are allowed.

3.2

mozzarella with high moisture content

is a soft cheese with overlying layers that may form pockets containing liquid of milky appearance. It may be packed with or without the liquid. The cheese has a near white colour.

3.3

mozzarella with low moisture content

is a firm/semi-hard homogeneous cheese without holes and is suitable for shredding

4 Essential composition and quality factors

4.1 Raw materials

Milk and/or products obtained from milk complying with relevant Kenya standard

4.2 Permitted ingredients

- Starter cultures of harmless lactic acid and/ or flavour producing bacteria and cultures of other harmless microorganisms;
- Rennet or other safe and suitable coagulating enzymes;
- Potable water; complying with KS EAS 12;
- Vinegar;
- Sodium chloride; and potassium chloride as a salt substitute; complying with KS CODEX STAN 150.
- Calcium chloride in an amount not more than 0.02 percent (calculated as anhydrous calcium chloride) of the weight of the dairy ingredients, used as a coagulation aid.
- Safe and suitable enzymes to enhance the ripening process; and
- Safe and suitable processing aids.
- Rice, corn and potato flours and starches: Notwithstanding the provisions in KS 28-1, these substances can be used in the same function as anti-caking agents for treatment of the surface of cut, sliced, and shredded products only, provided they are added only in amounts functionally necessary as governed by Good Manufacturing Practice, taking into account any use of the anti-caking agents listed in Clause 6.

4.3 Compositional requirements

Compositional requirements for mozzarella cheese shall be as given in Table 1.

Table 1 — Compositional requirements for mozzarella cheese

Milk constituent	Minimum content (m/m)	Maximum content (m/m)	Reference level (m/m)	Methods of analysis
Milk fat in dry matter:				KS ISO 1735
With high moisture	20 %	Not restricted	40 % to 50 %	

with low moisture	18 %	Not restricted	40 % to 50 %	
Dry matter (Total solids):	Depending on the fat in dry matter content.			KS ISO 5534
	Corresponding minimum dry matter content (m/m)			
	Fat in dry matter content (m/m):			
		With low moisture	With high moisture	
	Equal to or above 18 % but less than 30 %:	34 %	Not more than 10.8%	
	Equal to or above 20 % but less than 30 %:	–	24 %	
	Equal to or above 30 % but less than 40 %	39 %	26 %	
	Equal to or above 40 % but less than 45 %:	42 %	29 %	
	Equal to or above 45 % but less than 50 %	45 %	31 %	
	Equal to or above 50 % but less than 60 %	47 %	34 %	
Equal to or above 60 % but less than 85 %:	53 %	38 %		
Moisture, %, max.			60.0%	KS ISO 5534
Salt % max.		3%	3%	KS ISO 5943

Compositional modifications beyond the minima and maxima specified above for milkfat and dry matter are not considered to be in compliance with section 4.3.3 of the General Standard for the Use of Dairy Terms (KS CODEX STAN 206-1999).

5 Food additives

Only those additives classes indicated as justified in Tables 2 and 3 may be used for the product categories specified. Within each additive class, and where permitted according to the table, only those food additives listed below may be used and only within the functions and limits specified.

Table 2 — List of food additives

	JUSTIFIED USE	
Additive	Mozzarella with low moisture content	Mozzarella with high moisture content

functional class	Cheese mass		Surface treatment		Cheese mass			Surface treatment	
Colours:	X(a)		–		X(a)			–	
Bleaching agents:	–		–		–			–	
Acidity regulators:	X		–		X			–	
Stabilizers:	X		–		X			–	
Thickeners:	X		–		X			–	
Emulsifiers:	–		–		–			–	
Antioxidants:	–		–		–			–	
Preservatives:	X		X		X				
Foaming agents:	–		–		–			–	
Anti-caking agents:	–		X(b)		–				

(a) Only to obtain the colour characteristics, as described in Section 2.
(b) For the surface of sliced, cut, shredded or grated cheese, only.
X The use of additives belonging to the class is technologically justified.
– The use of additives belonging to the class is not technologically justified.

Table 3 — List of food additives (align to codex stan 262:2006)

INS no.	Name of additive	Maximum level
Preservatives		
200	Sorbic acid	1 000 mg/kg singly or in combination as sorbic acid
201	Sodium sorbate	
202	Potassium sorbate	
203	Calcium sorbate	
234	Nisin	12.5 mg/kg
235	Natamycin (pimaricin)	Not exceeding 2 mg/dm ² and not present in a depth of 5 mm
280	Propionic acid	Limited by GMP
281	Sodium propionate	
282	Calcium propionate	
283	Potassium propionate	
Acidity regulators		
170(i)	Calcium carbonate	Limited by GMP
260	Acetic acid, glacial	Limited by GMP
261(i)	Potassium acetate	Limited by GMP
261(ii)	Potassium diacetate	Limited by GMP
262(i)	Sodium acetate	Limited by GMP
263	Calcium acetate	Limited by GMP
270	Lactic acid, L-, D- and DL-	Limited by GMP
296	Malic acid, DL-	Limited by GMP
325	Sodium lactate	Limited by GMP
326	Potassium lactate	Limited by GMP
327	Calcium lactate	Limited by GMP
330	Citric acid	Limited by GMP

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338	Phosphoric acid	880 mg/kg as phosphorous
350(i)	Sodium hydrogen DL-	Limited by GMP
350(ii)	Sodium malate	Limited by GMP
351(ii)	Potassium malate	Limited by GMP
352(ii)	Calcium malate, D, L-	Limited by GMP

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INS no.	Name of additive	Maximum level
500(i)	Sodium carbonate	Limited by GMP
500(ii)	Sodium hydrogen	Limited by GMP
500(iii)	Sodium sesquicarbonate	Limited by GMP
501(i)	Potassium carbonate	Limited by GMP
501(ii)	Potassium hydrogen	Limited by GMP
504(i)	Magnesium carbonate	Limited by GMP
504(ii)	Magnesium hydrogen	Limited by GMP
507	Hydrochloric acid	Limited by GMP
575	Glucono-delta-lactone	Limited by GMP
577	Potassium gluconate	Limited by GMP
578	Calcium gluconate	Limited by GMP
Stabilizers		
331(i)	Sodium dihydrogen citrate	Limited by GMP
332(i)	Potassium dihydrogen	Limited by GMP
333	Calcium citrates	Limited by GMP
339(i)	Sodium dihydrogen	4 400 mg/kg, singly or in combination, expressed as phosphorus
339(ii)	Disodium hydrogen	
339(iii)	Trisodium phosphate	
340(i)	Potassium dihydrogen	
340(ii)	Dipotassium hydrogen	
340(iii)	Tripotassium phosphate	
341(i)	Calcium dihydrogen	
341(ii)	Calcium hydrogen	
341(iii)	Tricalcium phosphate	
342(i)	Ammonium dihydrogen	
342(ii)	Diammonium hydrogen phosphate	
343(ii)	Magnesium hydrogen	
343(iii)	Trimagnesium phosphate	
450(i)	Disodium diphosphate	
450(iii)	Tetrasodium diphosphate	
450(v)	Tetrapotassium	
450(vi)	Dicalcium diphosphate	
451(i)	Pentasodium triphosphate	
451(ii)	Pentapotassium	
452(i)	Sodium polyphosphate	
452(ii)	Potassium polyphosphate	
452(iv)	Calcium polyphosphate	
452(v)	Ammonium polyphosphate	

INS no.	Name of additive	Maximum level
406	Agar	Limited by GMP
407	Carrageenan	Limited by GMP
407a	Processed eucheama seaweed	Limited by GMP
410	Carob bean gum	Limited by GMP
412	Guar gum	Limited by GMP
413	Tragacanth gum	Limited by GMP
415	Xanthan gum	Limited by GMP
416	Karaya gum	Limited by GMP
417	Tara gum	Limited by GMP
440	Pectins	Limited by GMP
466	Sodium carboxymethyl cellulose (Cellulose gum)	Limited by GMP
Colours		
140	Chlorophylls	Limited by GMP
141(i)	Chlorophyll copper	5 mg/kg singly or in combination
141(ii)	Chlorophyllin copper complex, sodium and potassium salts	
171	Titanium dioxide	Limited by GMP
Anticaking agents		
460(i)	Microcrystalline cellulose (Cellulose gel)	Limited by GMP
460(ii)	Powdered cellulose	Limited by GMP
551	Silicon dioxide, amorphous	10 000 mg/kg singly or in combination as silicon dioxide
552	Calcium silicate	
553(i)	Magnesium silicate,	

6. Hygiene

6.1 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections KS 1552 and other relevant Kenya standards and regulations. The products should comply with any microbiological criteria established in accordance with KS CAC/GL 21

6.2 The products shall comply with any microbiological criteria established in accordance with Table 2 below.

Table 4 — Microbiological requirements for mozzarella cheese

S/N	Quality	Requirements Cfu/g	Test method
	Total plate count /g max	2×10^4 cfu/g	KS ISO 4833

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	<i>Listeria monocytogenes max,</i>	<i>Nil per gram</i>	<i>KS ISO 4833</i>
	<i>Salmonella spp</i>	<i>Nil per gram</i>	<i>KS ISO 4833</i>
	<i>Shigella</i>	<i>Nil per gram</i>	<i>KS ISO 4833 KS ISO 21567</i>
	<i>Clostridium botulinum</i>	<i>Nil per gram</i>	<i>KS ISO 4833</i>
	<i>Staphylococcus aureus</i>	<i>Nil per gram</i>	<i>KS ISO 4833</i>
	<i>E.coli</i>	<i>Nil per gram</i>	<i>KS ISO 4833</i>
	<i>Faecal coliforms:, max</i>	<i>Nil per gram</i>	<i>KS ISO 4832</i>
	<i>Non-faecal coliforms, max</i>	<i>100 cfu/g</i>	<i>KS ISO 4832</i>
	<i>Mould, max</i>	<i>100 cfu/g</i>	<i>KS ISO 6611</i>
	<i>Yeast, max</i>	<i>10 cfu/g</i>	<i>KS ISO 6611</i>

7.1 Contaminants

The products covered by this Standard shall comply with the Maximum Levels for contaminants that are specified for the product in the *General Standard for Contaminants and Toxins in Food and Feed* (KS CODEX STAN 193-1995).

The milk used in the manufacture of the products covered by this Standard shall comply with the Maximum Levels for contaminants and toxins specified for milk by the *General Standard for Contaminants and Toxins in Food and Feed* (KS CODEX STAN 193-1995) and with the maximum residue limits for veterinary drug residues and pesticides established for milk by the CAC.

7.1 Heavy metals

The products covered by this standard shall comply with the maximum limits in Table 5

Table 5 — Limits for heavy metal contaminants for Cottage cheese

SL No	Heavy metal	MRL (Max.)	Test method
i).	Arsenic (AS)	0.1 mg/kg	AOAC 942.17
ii).	Lead (PH)	0.02 mg/kg	AOAC 972.25 / KS ISO 6733
iii).	Mercury (Hg)	1.0 mg/kg	AOAC 999.10
iv).	Copper (Cu)	5.0 mg/kg	AOAC972.25 / KS ISO 5738
v).	Zinc (Zn)		AOAC 999.10

		50 mg/kg	
vi).	Tin (Sn)	250 mg/kg	AOAC 999.10
vii).	Cadmium as Cd,	1.5 mg/kg	AOAC 999.10
viii).	Iron (fe),	0.5 mg/kg	AOAC 999.11/ KS ISO 6732

7.2 Pesticide residues

In addition to the maximum limits established by the Codex Alimentarius Commission for these products in codex Stan 193; the products covered by the provisions of this standard shall comply with the Maximum Levels for contaminants specified in table 5 below;

Table 5- maximum residue limits for Cottage cheese

S/N	Parameter	Requirements	Test method
<i>i</i>	ORGANOCHLORINE Group	0.01 ppm	KS ISO 3890-1:2009 OR AOAC 970.52
<i>ii</i>	ORGANOPHOSPHOROUS Group	0.01 ppm	AOAC 970.52

7.3 Mycotoxin residues

Mozzarella cheese shall not have more than have 0.5 µg/kg aflatoxin M1 content when tested according to KS ISO 14501:2007/ AOAC 980.21, Aflatoxin M1 in milk and cheese- thin layer chromatographic method

7.4 Antibiotics

Mozzarella cheese shall not have more than 10.0 ppb total antibiotic as (beta lactam) content when tested according to AOAC 962.16, Beta-lactam Antibiotics in milk

8 Packaging and labelling

8.1 Packaging

Mozzarella cheese shall be packed in food grade material that ensures product safety and integrity.

8.2 Labelling

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In addition to the provisions of KS EAS 38 and the General Standard for the Use of Dairy Terms (KS CODEX STAN 206-1999), the following specific provisions shall apply:

8.2.1 Name of the food

The name mozzarella may be applied in accordance with KS EAS 38, provided that the product is in conformity with this standard.

The use of the name is an option that may be chosen only if the cheese complies with this standard. Where the name is not used for a cheese that complies with this standard, the naming provisions of the KS 28-1 for cheese shall apply.

The designation of mozzarella with high moisture content shall be accompanied by a qualifying term describing the true nature of the product.

The designation of products in which the fat content is below or above the reference range but above the absolute minimum specified in section 4.3 of this Standard shall be accompanied by an appropriate qualification describing the modification made or the fat content (expressed as fat in dry matter or as percentage by mass whichever is acceptable in the country of retail sale), either as part of the name or in a prominent position in the same field of vision. Suitable qualifiers are the appropriate characterizing terms specified in the General Standard for Cheese (KS 28-1) or a nutritional claim in accordance with the Guidelines for the Use of Nutritional Claims (KS CAC/GL 023-1997)2.

The designation may also be used for cut, sliced, shredded or grated products made from cheese which cheese is in conformity with this standard.

8.2.2 Country of origin

The country of origin (which means the country of manufacture, not the country in which the name originated) shall be declared. When the product undergoes substantial transformation in a second country, the country in which the transformation is performed shall be considered to be the country of origin for the purpose of labelling.

8.2.3 Declaration of milk fat content

The milk fat content shall be declared in a manner found acceptable in the country of retail sale, 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.

8.2.4 Date marking

- i) Date of manufacture;
- ii) Expiry date; and
- iii) Storage instructions and / or conditions.

8.2.5 Other information

- i) Name and address of manufacturer;
- ii) Net weight content;
- iii) Brand name of the product;
- iv) Batch or code number

8.25 Labelling of non-retail containers.

Information specified the General Standard for the Labelling of Prepackaged Foods (KS EAS 38) and, if necessary, storage instructions, shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name of the manufacturer or packer shall appear on the container, and in the absence of such a container, on the product itself. However, lot identification and the name and address may be replaced by an identification mark, provided that such mark is clearly identifiable with the accompanying documents.

9 Methods of analysis and sampling

The products covered by the provisions of this standard shall be tested using appropriate standard methods declared in this standard. Other test may be performed as per the methods given in the latest AOAC/ Codex/ ISO and other internationally recognized methods.

ANNEX – ADDITIONAL INFORMATION

The additional information below does not affect the provisions in the preceding sections which are those that are essential to the product identity, the use of the name of the food and the safety of the food.

Mozzarella with high moisture content

1. Method of manufacture

1.1 The principal starter culture micro-organisms are *Streptococcus thermophilus* and/or *Lactococcus* spp.

1.2 Products made from buffalo's milk shall be salted in cold brine.

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