

# CODEX ALIMENTARIUS COMMISSION



Food and Agriculture  
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## JOINT FAO/WHO FOOD STANDARDS PROGRAMME EXECUTIVE COMMITTEE OF THE CODEX ALIMENTARIUS COMMISSION

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### NEW WORK PROPOSAL ON STANDARD FOR CAMEL MILK

*Submitted by the Coordinator for Near East on behalf of the United Arab Emirates*

#### 1. Purpose of the Conference Room Document

The United Arab Emirates would like to inform members of the Codex Executive Committee, meeting at its 86th session in Rome from 1-5 July 2024 and solicit an early discussion on its intent to introduce a proposed international standard for Camel Milk, in support of the safety, availability and trade of this commodity.

The proposal for new work is intended to be submitted for consideration of the 47th Session of the Codex Alimentarius Commission, with a submission of the proposed project document and associated material to the 87th Session of the Codex Executive Committee.

The proposal to develop an international standard for Camel milk coincides with the designation of 2024 by the United Nations as the International Year of Camelids (IYC 2024) to spotlight the overlooked potential of camelids.

Raising awareness and encouraging increased investment in the camelid sector would align with the objectives of this year, with added support to research, capacity development, and the adoption of innovative practices and technologies in the food production sector. Camelids, through the provision of milk and meat, contribute significantly to the advancement of Sustainable Development Goals (SDGs), specifically those addressing hunger, the elimination of extreme poverty, the empowerment of women, and the sustainable utilization of terrestrial ecosystems.

#### 2. Previous Codex Discussions:

During the 11th session of the Codex Committee for the Near East (CCNE11), which was held at FAO Headquarters, Rome, Italy, from 18-22 September 2023, the United Arab Emirates (UAE) introduced a proposal to develop a regional standard for pasteurized camel milk of the species *Camelus dromedarius* (one-humped camel), highlighting the increase in camel milk production and trade, at regional and international levels, and therefore the importance to develop regional but also international standards for this commodity.

After further consideration of the production and trade data related to this commodity, it appeared that Camel milk was **widely produced and traded in other regions, beyond the Near East**, with the highest production recorded in East-Africa.

Developing a standard for Camel milk aligns with the increasing interest in Camel Milk consumption and trade. This is due to the distinct characteristics of the product, encompassing interesting compositional attributes and nutritional benefits, positioning it as a valuable food source for people residing in arid and semi-arid regions of the world but also outside of the regions where it is most commonly produced i.e., in European and North American countries, where it is currently attracting higher demand.

#### 3. Scope and Objectives of the Proposed New Work / Standard on Camel Milk

The overall objective pursued from the collective effort, started as part of the acknowledgment of the Year of Camelids, is to support the development of an international standard for **Camel Milk**, that aims to enhance the

production of this commodity safely, hence contributing to a better protection of consumers of this commodity and facilitating its trade in various international markets.

The focus is to help **identify and define the distinct characteristics** of this product helping the standardization of production and processing conditions among major producers and consumers worldwide, spanning from African countries such as Kenya, Mali, Somalia, and Ethiopia, through the Eastern Mediterranean and countries of the Gulf Cooperation Council such as the United Arab Emirates, Oman and Saudi Arabia, reaching Asia, North America and the South-West Pacific, where this product is likely to be produced and /or traded.

The scope of the standard would apply to **Camel Milk (possibly Pasteurized Camel Milk)** for human consumption, i.e., ready for its intended use as human food, presented in packaged form directly to the consumer. The standard would include the essential quality, safety conditions, testing methods and labelling requirements for the purpose of protecting the health of the consumers and ensuring fair trade practices.

#### **4. Rationale for the Development of the Proposed Standard: Conditions of Production and International Trade Extend Borders and Would Benefit from Codex Guidance to Harmonize Practices:**

Recognizing the potential for increased global trade in camel milk products, the importance of harmonizing standards appears to be needed to facilitate international commerce.

As reported by FAOSTAT (2022), Kenya leads the world producers of Raw Camel Milk, followed by Somalia, Pakistan, Mali, Ethiopia, Saudi Arabia, Niger, and United Arab Emirates. In 2022, the global Camel Milk production reached 4,116,669 tons. From 2014 until 2022, global Camel Milk production experienced a regular increase of 0.83% going from 3,430,675 tons to 4,116,669 tons. **Table 1** shows the production of Raw Camel Milk for the top producing countries during the year 2022.

**Table 1:** Raw Camel Milk production during 2022 (in tonnes).

<b>Country</b>	<b>Production (tons)</b>
<b>Kenya</b>	1,096,698
<b>Somalia</b>	987,842.9
<b>Pakistan</b>	944,000
<b>Mali</b>	294,248.6
<b>Ethiopia</b>	220,446
<b>Saudi Arabia</b>	135,540
<b>Niger</b>	106,597.4
<b>United Arab Emirates</b>	79,434.44

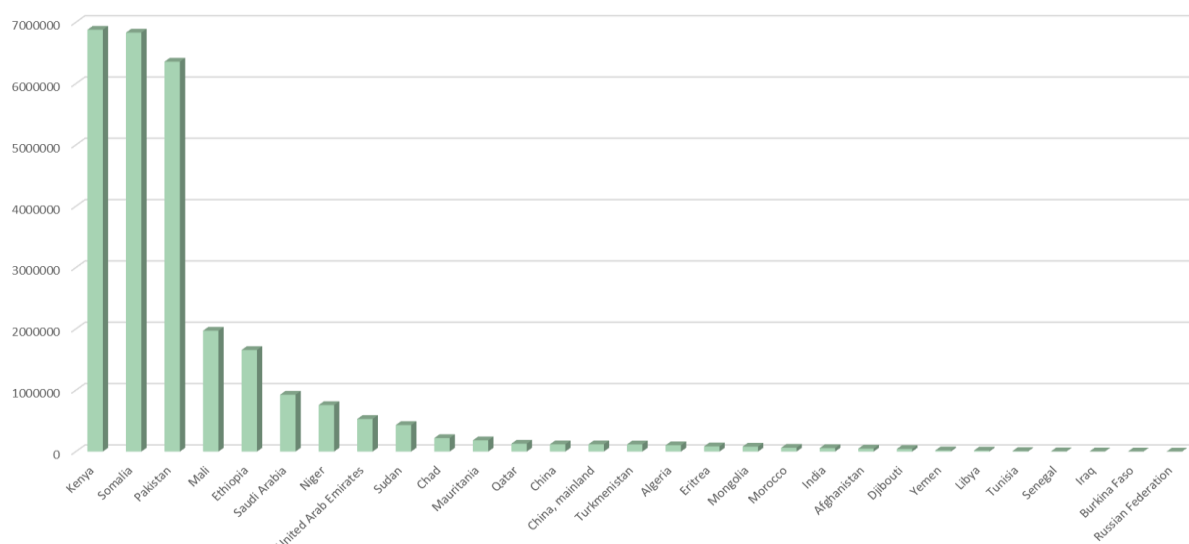
The total Raw Camel Milk production shows unchanging trends between 2016 and 2022, placing Kenya in the lead position, followed by Somalia and Pakistan, then by lesser producing countries such as Mali, Ethiopia, Saudi Arabia, Niger, and United Arab Emirates (**Figure 1**).

It was reported by Musinga et al. (2008), that in Kenya as well as in other producing countries such as Saudi Arabia, the Camel Milk sector is dominated by informal trade in both volume and number of stakeholders included. On the other hand, consumer preferences for unprocessed milk (mostly for cultural reasons), and low-level awareness of camel milk amongst non-traditional consumers, are limiting factors to the wider expansion of this trade. This situation calls for standardization efforts which will undoubtedly help better food safety and quality controls for this commodity production and facilitating its trade.

Pasteurized Camel Milk production profile differs from the Raw Camel milk. In this regard, pasteurized camel milk produced in the United Arab Emirates (UAE) is regularly sold across the country in many forms (fresh milk, flavored milk, milk powder, ghee, drinking yoghurt, etc.) and is also exported worldwide (Leila et al., 2022).

While Kenya holds 26% of the global production of Camel milk, Akweya et al. (2012), reported that only 12% of the total milk produced is traded: 10% sold to rural consumers, and only 2% to urban markets. The remaining 88% is consumed in local households, with a significant proportion going to waste due to post-production losses.

Standardization of Conditions of production and defining parameters of safety and quality will undoubtedly contribute to further development of domestic and international markets for other countries producing Camel milk.



**Figure 1:** Cumulative Raw Camel Milk Production from 2016 to 2022 (source FAOSTAT 2022).

## 5. Vulnerability to Food Fraud: Another Rationale for International Standardization

The proposed new work on an international standard for Camel milk would identify that (Pasteurized) Camel Milk be originating from the species *Camelus dromedarius* (one-humped) and/or *Camelus bactrianus* (Two-humped) camels.

Since ancient times, Camel Milk has been used as a food, and /or as a food for special use, including in traditional medicine as a cure for several diseases such as oedema, jaundice, tuberculosis, diabetes, asthma and leishmaniasis, etc. These nutraceutical properties are mainly due to its naturally occurring bioactive components (Muthukumaran et al., 2023).

The **general composition** of Camel Milk varies depending upon the regions, breed, season, and lactation stage. In fact, the variations in the composition of milk from different camel types, as in other species, are attributed to genetic (breed) and non-genetic factors such as physiological stage, feeding management practices, health status and sampling conditions (Konuspayeva, 2020; Liu, et al., 2023). Seasonal variations may also play a role in Camel Milk composition, even for camels from the same species and regions (Al haj & Al Kanhal, 2010).

The primary compositional characteristics of Camel Milk pertain to its protein, fat, lactose, minerals, and vitamin content profiles.

Camel Milk may be characterized by **specific features** that may help its identification and distinction from other milk sources;

- Camel Milk contains **a high percentage of  $\beta$ -casein** (65% of total caseins) (Ho et al., 2022) – versus approximately 39% in bovine milk (Seifu, 2023). The abundance of  $\beta$ -casein is similar to what is found in human milk and is known to contribute to easier digestibility, as these proteins are less resistant to peptide hydrolysis than  $\alpha$ S-casein (Ho et al., 2022)
- Whey proteins in Camel Milk, (20-25% of the total proteins) (Seibu, 2023), are characterized by a high content of  $\alpha$ -lactalbumin and lactoferrin, and **the absence of  $\beta$ -lactoglobulin** (a major allergen in bovine milk) (Konuspayeva, 2020; Ho et al., 2022).
- Camel Milk fat contains only small amounts of short-chain fatty acids (C4–C12), but a higher concentration of long-chain fatty acids (C14-C18) (Al haj & Al Kanhal, 2010; Konuspayeva, 2020; Ho et al., 2022), with palmitic acid C16:1 content accounting for 10.13% of total fatty acids (TFA), which is much higher than that of cow's and goat's milk (Liu et al., 2023).
- Camel Milk was found to be relatively richer in conjugated linoleic acid compared to human and bovine milk (1.23, 0.42 and 0.65g/100g fat, respectively) (Konuspayeva, 2020).
- Camel Milk is known for its higher vitamin C (Ho et al., 2022), and vitamin D (Konuspayeva, 2020) content than bovine milk – while bovine milk contains more vitamin A (Ho et al., 2022). Camel and bovine milks contain similar levels of vitamins B1 and B6 (Ho et al., 2022). Reports for other vitamins are limited and varied.

These unique compositional features render Camel Milk sought after by consumers and therefore particularly susceptible to adulteration, primarily with bovine milk. This underlines the significance of establishing an international standard for this commodity.

## 6. International Regulatory Framework

At a regional level, the GCC Standardization Organization (GSO) adopted a standard for Pasteurized Camel Milk (GSO 1970:2021); raw Camel Milk being included in the GSO raw milk standard (GSO 174:2021).

At national levels, Tunisia standardized raw Camel Milk destined for further processing (NT 14.261:2009). Kenya adopted standards for raw whole Camel Milk (DKS 2061:2016), pasteurized Camel Milk (DKS 2062:2016) and fermented Camel Milk (DKS 2707:2016). Morocco also adopted a national standard for pasteurized Camel Milk (NM 08.4.300:2016).

**Table 2** summarizes the international standardization attempts for Camel Milk and some of the key features included in these standards.

**Table 2:** Summary of regional and national standards for Pasteurized Camel Milk.

Criteria		UAE	GSO	Kenya	Morocco
Type of camel milk targeted in the standards		<ul style="list-style-type: none"> <li>Pasteurized camel milk</li> <li>Raw camel Milk included in raw milk standard</li> </ul>	<ul style="list-style-type: none"> <li>Pasteurized camel milk</li> <li>Raw camel Milk included in raw milk standard</li> </ul>	<ul style="list-style-type: none"> <li>Raw whole camel milk</li> <li>Pasteurized camel milk</li> <li>Fermented Camel milk</li> </ul>	Pasteurized camel milk
Pasteurized camel milk standards		<ul style="list-style-type: none"> <li>UAE.S/GSO 1970 :2010(PCM)</li> <li>UAE.S GSO 174:2021 (RM)</li> </ul>	<ul style="list-style-type: none"> <li>GSO 1970: 2021 (PCM)</li> <li>GSO 174:2021 (RM)</li> </ul>	<ul style="list-style-type: none"> <li>DKS 2062: 2016</li> </ul>	<ul style="list-style-type: none"> <li>NM 08.4.300:2016</li> </ul>
Scope for pasteurized camel milk standards		Pasteurized camel milk from <i>Camelus dromedarius</i> (Arabian Camels – One hump camel)	Pasteurized camel milk from <i>Camelus dromedarius</i> (Arabian Camels One hump camel)	Pasteurized liquid camel milk from any Kind of Camels (One or Two humps)	Pasteurized liquid camel milk from any kind of Camels (One or Two humps)
<b>Summary of compositional requirements for pasteurized Camel Milk</b>					
<b>Milk fat</b> (% min)	Whole milk	2.5	3	2	3
	Low Fat Milk	2-1	3 - 0.5	1	-
	Skimmed Milk	0.5	0.5	0.5	-
<b>Solids not fat</b> (% min)		8	8	6	10
<b>Total acidity</b> (expressed as % of lactic acid), max		0.18 %	0.18 %	0.17 % to 0.21 % (Raw)	0.18 %
<b>Microbiological Limits for pasteurized camel milk</b>					
Total Bacterial Count Max. limit		100000 (CFU/ml)	100000 (CFU/ml)	30000 (CFU/ml)	No values

Total Coliform Count Max. limit	10 (CFU/ml)	10 (CFU/ml)	10 (CFU/ml)	No values
<b>European Union (EU)</b>	There is no specific regulation concerning the specifications of camel milk. Instead, there are regulations on products of animal origins, under which raw camel milk may be placed.  (for example, Plate count at 30 °C (per mL) ≤ 1,500,000).			

While exploring the international regulatory framework, major producing countries such as Mali were found to have no national standards for Camel Milk, neither raw nor processed. Among existing standards, there was no specific standard for raw camel milk except in Kenya, while some requirements for raw camel milk have been included in the general raw milk standards in some countries such as the GCC and the European Union. The species of camel that produces milk has not been specified except in the GSO and Emirati standards.

The main noticeable difference in the standards was in the minimum percentage of fat required in pasteurized Camel Milk, especially in the whole milk category, where it ranged from the highest level in the GSO standard (min 3%) to the lowest in the Kenyan standard (min 2%).

The other specifications and requirements in these standards are similar including requirements for drug residues, pesticide residues, and microbial limits, where Codex standards are often stated as the reference.

The current situation of the international regulatory framework indicates that while differences exist in standards attempting to define and quality this commodity, this production **remains amenable to standardization**, with a strong emphasis on alignment with and referencing of Codex standards developed by the CCMMP, where applicable.

Currently, the Codex Alimentarius Commission, through the Codex Committee on Milk and Milk Products (CCMMP), developed and adopted standards for milk powder, fermented milk, evaporated milk, and sweetened condensed milk. In addition, it developed the Code of Hygienic Practice for Milk and Milk Products (CXC 57-2004).

It will be important for the proposed standard on Camel milk to leverage and reference all relevant Codex standards that would support its safe production and representation to consumers.

## **7. Current International and Multi-Stakeholder Engagement Prior to Submission to the Consideration of the CCEXEC87 and CAC47**

As a result of the guidance received from the CCNE11 and after further investigation, a collaborative initiative was developed between the United Arab Emirates and the [International Union of Food Science and Technology \(IUFoST\)](#), Codex Observer, through its disciplinary group for food regulatory science, the [Global Food Regulatory Science Society \(GFoRSS\)](#), aiming to support the development of a discussion paper and a draft project document, enabling the consideration of the proposed new work and aiming to develop the rationale needed to achieve Codex critical review criteria.

Extensive consultations are under way with various partners and stakeholders, including countries of the Near East and the Arab region, other regions and countries producing Camel Milk (e.g., communication with CCAFRICA Chair, CCASIA and Australia as a producing country), as well as key observer organizations in Codex, relevant to this proposal such as the International Dairy Federation (IDF).

An initial engagement was also solicited from New-Zealand, as the host country and Chair of CCMMP. Continued efforts will be underway to gather the needed data, to further document the rationale for this proposal in accordance with the Codex Work Priority Criteria.

## **8. Conclusions and Next Steps**

The UAE is seeking an early discussion and additional guidance from the CCEXEC86, on its proposal for new work, on the proposed international standard for Camel Milk, in anticipation of the introduction of a fulsome project document at CCEXEC87.

It is the opinion of the UAE that the establishment of a Codex standard for this commodity holds significant benefits, ensuring global harmonization, enhancing consumer protection, supporting enhanced production and technology development, reducing waste, and facilitating trade.

Moving forward, it is proposed to develop this standard through facilitated discussions during in-person meetings, with a proposal from the UAE to co-host a session of CCMMP that would be held in a hybrid mode, enabling larger participation from developing countries, to ensure inclusivity and broad representation.

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