

The Importance of Camel Milk and Its Health Benefits

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Abstract

Camel milk's distinctive nutritional qualities and possible health advantages are making it famous around the globe. All around the semi-arid and dry world, people have been considering it as a potential medicinal and nutritional food source. Cow and camel milk are chemically similar; both contain a lot of fat, mostly medium-chain fatty acids, very little lactose, and plenty of iron and vitamin C. It is widely believed that camel milk and its derivatives have antidiabetic, anti-cancer, and antihypertensive effects, among numerous other beneficial health effects. Some of the potential scientific explanations for camel milk's health benefits have been uncovered by various in vitro and in vivo investigations. These include the presence of bioactive proteins (such as lactoferrin, immunoglobulins, and lactoperoxidases) and the production of bioactive peptides during digestion. Scientists and health nuts alike have taken an interest in camel milk for its unusual nutritional qualities and possible medicinal uses. Scientific investigations into camel milk's many medicinal, nutritional, and economic uses have yielded promising results. The purpose of this research is to analyse camel milk and investigate its significance while also discussing its many components, benefits, and advantages in terms of health.

1. Introduction

Commonly known as "white gold" in the desert regions, camel milk was an essential component of the diet of nomadic tribes that had been a staple food in various arid and semi-arid areas for centuries; in 1990, providing critical nutrients and water where water is available and food is scarce. Camels, unlike other animals, can survive harsh temperatures and long durations without water. Thus, they may produce milk even during droughts [1].

Pastoral communities in Asia, Africa, and the Middle East depend on camel milk [2]. Camels provide transportation, clothing, and food in the desert. Camels live in harsh conditions and are constantly milked, making them important for these areas.

1.1 Historical and Nutritional Significance of Camel Milk

Camel milk has been important for desert communities for thousands of years; Ranchers, especially in the Middle East, Africa and Asia, understand its historical and nutritional importance and incorporate it into their livelihood strategies [3].

Table 1: Chemical Composition of Camel Milk

Parameter	Camel milk value	Cow milk value	Unit
Water	90	87	%
Total solid	10	13	%
Fat	2	4	%
Insulin	40.5	16.3	Per unit/ml
Iron	0.05	0.27	Mg/100g
Calcium	132	120	Mg/100g
Potassium	152	140	Mg/100g
Zinc	0.5	0.4	Mg/100g
Vitamin C	35	10	Mg/100g
Niacin	4.6	0.6	Mg/l
Panthenic acid	0.9	3.8	Mg/l

1.2 Ancient Roots and Survival

Camels were domesticated about 3,000–4,000 years ago. For settlers, camels, sometimes called "desert canoes," were a way to survive the harsh conditions of the desert. The Bedouin of the Arabian Peninsula and the Tuareg of the Sahara Desert are two examples of societies using camels for transportation, clothing and food. Camel milk was the main source of food and clean water for colonists [4]. Camels can withstand high temperatures, have strong mouths and can survive long periods without water. They can give milk even when there is no water.

1.3 Cultural Practices and Traditions

Camel milk plays a significant role in the community culture of these villages [5]. Fresh or uncooked, it is used in a wide variety of traditional cuisines. Camel milk is utilised in the traditional healing practices of a number of different civilizations.

"Geedo," also known as camel milk, is a regular beverage for the Somali people. Camel milk is given to guests as a sign of respect and to show that they are welcome. Even on the Arabian Peninsula, camel milk is highly valued for the health benefits it provides.

2.1 Mythology and Folklore

Many different cultures have stories and rituals that include camel milk. There is appreciation for camel milk in Islam. God's ingenuity and knowledge are represented by camels in the Quran [6]. The Hadiths of the Prophet Muhammad (peace be upon him) state that camel milk is valued since it is said to be effective in treating a wide variety of illnesses.

2.2 Economic Importance

For centuries, pastoral economies have been supported by camels and milk. The dignity and wealth of camels are highly regarded and appreciated. Ghee (clear ghee) and camel milk were the primary sources of income for these settlements.

Within the contemporary era, there was an increase in the production and sale of camel milk. Camel dairy plants are being investigated in the United Arab Emirates, Saudi Arabia, and Kenya, all located in Kenya [7]. The health benefits of camel milk have increased the demand for the product, creating economic opportunities for pastoralists and helping them maintain their lifestyle.

2.3 Global Spread

Camel milk production has expanded in modern times. Camel milk is now exported worldwide due to improvements in transportation and storage. Foods include fresh milk, cheese, chocolate and ice cream. Camel milk is on the rise because of the current health and fitness trends. Increasing numbers of people, including urban populations, seek camel milk for its unique nutritional value and potential health benefits, and globalization drives cross-cultural contact, the accumulation of economic benefits, and appreciation of traditional practices.

Table I. Physical properties of camel milk [8].

Attribute	Minimum	Maximum	Mean	SE
Specific gravity	1.014	1.017	1.015	0.0006
pH values	6.57	6.97	6.77	0.07
Acidity%	0.12	0.20	0.18	0.01

3.1 Nutritional Profile

Unlike cow’s milk, camel’s milk has a wide variety of important properties [9]. In addition to:

3.2 Nutritional Profile of Camel Milk

The nutritious value of camel milk in comparison to that of cow's milk is what sets it apart. Because of its content, it is a drink that is both healthful and nutritious [10]. Specifics regarding a diet consisting of camel milk:

3.3 Macronutrients

The essential amino acids that you require can be found in camel milk of high quality. The milk that camels produce contains proteins [11].

Antimicrobial, antiviral, and antibacterial properties are well-known for this substance. Lactoferrin, which increases the immune system.

Within the immune system, immunoglobulins assisted in the fight against sickness and infection.

To a greater extent than casein, camel milk contains whey protein, which is beneficial to digestion.

Camels milk has a lower fat content when compared to cow's milk. Fatty acids known as omega-3 and omega-6 are included. They are beneficial to the health of the heart. Conjugated linoleic acid (CLA): Due to the antioxidant properties at its disposal, CLA has the potential to improve metabolic health and reduce body fat [12].

More lactose is found in camel milk than in cow's milk. For individuals who are lactose intolerant, camel milk's low lactose concentration makes it more digestible.

Table II. Chemical quality of camel milk [8].

Components	Minimum	Maximum	Mean
Total solids	7.76	12.13	9.74
Solids not fat	5.56	8.29	7.12
Fat	1.80	5.00	2.63
Protein	1.80	3.20	2.54
Casein	1.78	2.76	2.21
Lactose	2.91	4.12	3.65
l	0.85	1.00	0.94
Chlorides	0.20	0.28	0.26

3.4 Micronutrients

Vitamins [13]:

Camel milk is higher in vitamin C than cow's milk, which is beneficial for skin health and immunity B vitamins including thiamine, riboflavin, and cobalamin are essential for red blood cells, energy and cognitive function Fat-soluble vitamins A and E are essential for skin, vision and immunity the diseases have improved. Moreover, they act as antioxidants, protecting cells.

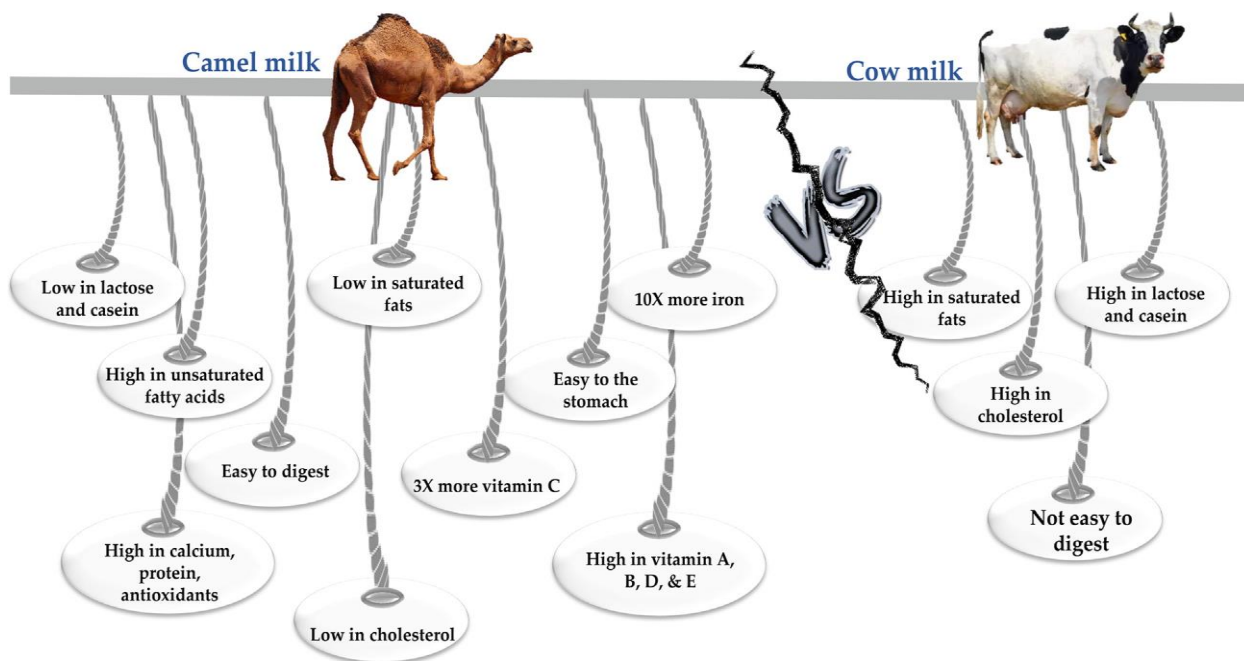
3.5 Minerals:

Camel milk consumption provides adequate amounts of calcium, which is essential for the growth and maintenance of ongoing bone health in children and the elderly Camel milk is rich in iron compared to cow milk, which prevents anemia and oxygenates the red blood cells Potassium intake is essential for fluid balance and proper cardiovascular function. Magnesium is essential for proper immune function, nerve conduction and muscle strength.

3.6 Other Beneficial Components [14]:

Camel milk contains antioxidants, which protect against oxidative stress and reduce the risk of chronic diseases. Antibodies such as lysozyme in camel milk strengthen the immune system. Camel milk contains natural probiotics that provide beneficial gut flora, aid digestion and improve overall digestive health.

Likened to cow's milk



Camel and cow milk are nutritious, and camel milk also has many benefits [15]:- **Low Lactose:** Camel milk is low in lactose and is suitable for lactose intolerance. **Rich in vitamin C and iron:** Camel milk is rich in these nutrients, which boost the immune system and prevent defects. **Digestibility:** The high protein content of fermented protein camel milk makes it easier to digest than cow’s milk, which has more casein **Healthy fats:** The fats in camel milk are not particularly saturated, contributing to good heart health and providing essential fatty acids that are beneficial for overall health

4.1 Health Benefits of Camel Milk

Nomadic cultures have consumed camel milk in harsh desert climates for centuries, prized its nutritional value and health benefits. Modern research is beginning to validate many of the traditional health claims associated with camel milk. Here is a detailed overview of the health benefits of camel milk:

1) Supports the immune system Immunoglobulin and Lactoferrin:

Camel milk contains several proteins, such as immunoglobulin and lactoferrin, which play an important role in the immune system. Immunoglobulin recognizes and binds to bacteria to help fight disease, while lactoferrin has antibacterial and antibacterial properties. lysozyme lysozyme; An enzyme found in camel milk that helps break down bacterial cell walls, providing additional antibacterial benefits. Probiotics for medicinal purposes; Camel milk contains beneficial bacteria that naturally support gut health and are closely linked to the overall immune system.

2) Anti-inflammatory properties Lactoferrin:

In addition to the antibacterial properties of lactoferrin, the ability to reduce inflammation in the body. It is especially useful for those with autoimmune diseases or chronic inflammation. Camel milk contains omega-3 and omega-6 fatty acids, both of which have antioxidant properties. With these properties, camel milk can help reduce chronic inflammation and related problems.

3) Diabetes management Insulin-like proteins:

Camel milk contains insulin-like proteins, which can help maintain healthy blood sugar levels. People with diabetes benefit from camel milk because it contains proteins that mimic the response of insulin. Consumption of camel milk has been shown to increase insulin sensitivity and reduce exogenous insulin needed in people with type 1 diabetes is associated with regular consumption of camel milk and blood glucose levels maintenance is connected.

4) Gut Health Probiotics:

Additionally, the beneficial bacteria present in camel milk supports the development of a healthy microbiota in the gut [16], which is important for overall nutrition and overall health If you maintain a healthy microbiota in the gut a, it can avoid gastrointestinal problems such as constipation, constipation and irritable bowel syndrome (IBS). It has a different amount of protein than milk , making it easier for many people to digest [17]. They are edible because the soil contains a lot of protein and casein. Camel milk is easy to digest.

5) Allergy Prevention Less allergenic properties:

Compared to cow's milk, camel's milk offers less acne. Because of the protein, camel milk can be handled well by those who are allergic to cow's milk. People who suffer from pain and sensitivity in their breasts may find it a useful option [18].

6) It is rich in antioxidants Vitamins and enzymes:

The antioxidants and enzymes in camel milk, including vitamins C and E, are responsible for protecting cells from the damaging effects of oxidative stress. These compounds help neutralize free radicals, as well reduce the risk of chronic diseases such as cancer and heart disease.

7) Complex nutrients for growth and development:

Camel milk is full of essential nutrients such as those that are essential for the growth and development of babies. Camel milk is a great source of this nutrient. These include calcium for bone health, iron for blood health, and a variety of vitamins and minerals needed for healthy growth. High Protein: The high protein content of camel milk promotes muscle growth and repair, improving quality for children, athletes and those in recovery from illness.

8) Potential benefits for autism:

Behavioral improvement: Some studies and anecdotal reports suggest that camel milk can improve behavior in children with autism. The unique proteins and metabolites in camel milk are believed to positively influence muscle function and behavior [19].

4.2 Modern Applications of Camel Milk

Diabetes Management:

Insulin-like proteins: Studies have shown that camel milk contains insulin-like proteins that help regulate blood glucose levels [20]. Studies have shown that these proteins can mimic the action of insulin, improving blood sugar control in diabetics. Clinical trials: Clinical trials have shown that regular consumption of camel milk can reduce the need for exogenous insulin in type 2 diabetic patients and relieve insulin sensitivity effective in type 2 diabetic patients [21]. as, for example, a study published in

the "Journal of Endocrinology and Cell Metabolism". Camel milk has been shown to significantly lower blood glucose levels and improve cholesterol levels

4.3 Gut Health:

Probiotics and prebiotics: Beneficial bacteria and prebiotic-containing components that support uterine health in camel milk. Studies have shown that these products can boost the gut microbiome, improve digestion and reduce gastrointestinal problems. Digestive Health: According to research in the "Journal of Dairy Research", camel milk can reduce the symptoms of gastrointestinal disorders such as irritable bowel syndrome (IBS) due to its good digestive properties and laxative properties because of the den [22].

Anti-Inflammatory and Antioxidant Effects:

Bioactive compounds: Camel milk contains bioactive compounds that exhibit anti-inflammatory and anti-inflammatory properties [23]. These substances are being studied for their ability to reduce the risk of chronic diseases such as cancer, heart disease and stroke. Antioxidant properties; some studies have shown that the abundant vitamins C and E in camel milk contribute to its antioxidant properties, protecting cells from oxidative stress and inflammation

4.4 Nutritional Products [9]:

camel milk powder; Camel milk is often processed into powder which is available all over the world. This extends its shelf life and makes it easier to transport, especially in areas where fresh camel milk is not readily available. dairy; Innovations in food technology led to the production of camel milk products such as cheese, yogurt and ice cream. These products cater to consumers looking for milk alternatives and those who are lactose intolerant or allergic to cow's milk.

4.5 Medical and Therapeutic Uses:

Medications for diabetes; Camel milk is used in nutraceuticals and supplements to manage diabetes. These findings provide a novel approach to the treatment of conventional diabetes using natural insulin-like compounds found in milk. decreased immunity; Camel milk is sought after as an immune booster

because of its immune boosting properties. These therapeutic applications are being investigated for potential benefits in patients undergoing immunomodulatory therapies such as chemotherapy.

Cosmetics and Skincare:

Camel Milk Skin Care: The moisturizing and moisturizing properties of camel milk make it useful in cosmetics. Camel milk is now a popular ingredient in soaps, lotions, lotions and other skin care products aimed at soothing and hydrating the skin.

Anti-aging properties: Due to its high anti-inflammatory properties, camel milk is also involved in anti-aging skin care, where it helps reduce wrinkles and tighten the skin

Functional Foods:

Enhanced dairy alternatives: With the increasing number of health-conscious consumers, camel milk is being marketed as a functional food that offers higher nutritional benefits than conventional milk. This is especially popular with those looking for natural and nutritious food options.

Health drinks: Camel milk is used in health drinks and smoothies and is often added to other superfoods to create a nutrient-rich drink that supports overall well-being

Global Trade and Commerce:

International markets [24]: Countries such as Saudi Arabia and Kenya have developed camel milk factories catering to international markets. Exports of camel milk and its products are on the rise, driven by rising global demand.

Regulatory approval [25]: Efforts are being made to meet international food safety and quality standards, enabling camel milk to be marketed in markets such as the European Union and the US. Regulatory approval has facilitated global distribution and acceptance of camel milk.

4.5 Conclusion

Camel milk is not just a traditional beverage but a nutritional supplement with various health benefits. Its unique composition makes it an excellent alternative to cow's milk, especially for those with lactose

intolerance or milk allergies. As scientific research continues to uncover its potential, camel milk is poised to become a valuable addition to the global diet, contributing to improved health and well-being.

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