

Review Article

The Role of Camel Milk and Milk Products, in Household Diet and Therapeutic Advancement: A Review

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Abstract: This was a comprehensive review of camel (*Camelus dromedaries*) milk and the contribution of its products for the household and medicinal values. The aim was to make meta-analysis about the potentials of camel milk products; for better understanding of the role of camel milk and milk products, in household diet and therapeutic advancements. The review was summarized that the milk compositions of dairy animals have been widely studied throughout the world and thousands of references are available especially about milk consumed by humans. The cow milk, which represents 85% of the milk consumed in the world and to a lesser extent, goat and sheep milk. The studies on other dairy animals, for instance, camel is rather scarce, despite their nutritional value and contribution to food security in arid regions. Camel milk is a good source of protein and referred to as whole food. It has enough nutrients to sustain life and is often given to babies suffering from malnutrition for poor pastoralists and other human-related disease treatments. The camel milk is considered as the Insulin' of the future: which the milk has a high concentration of insulin that has positive effects on the immunity, the diabetics in different countries highly depend on the camel milk. Therefore, further study would be required on the natural dynamics, substance, and antimicrobial action of camel milk and the concerned stakeholders should give attention to improve the camel milk utilization by developing a long-term strategy.

Keywords: Camel Milk, Camelus Dromedaries, Medicinal Value, Food Diet, Livelihoods

1. Introduction

Camel (*Camelus dromedaries*) milk and its products may be one of the economical ways to improve the social life of camel owners [1]. It has been contributing to the household food diet, medicinal values, income and poverty relief, and national economy through export [2]. The number of pastoralist households has been considering camels as an essential means of production, and at the same time, an important property of social exchange through connections of likely social network expansion [3]. The camel is one of the most ignored domestic animals in developing countries in which this statement is comparable to the Ethiopian context [4, 2]. As a result, camel and camel milk had been a victim of neglect by policymakers, research, and development under the livestock subsector in

most countries [2]. Camel milk is leading food, especially for those who live in arid zones and it produced in large amounts than other domestic livestock's in the areas [5]. Hence, it is a vital part of a diet for households and its contribution to a healthy nutritional status especially during the drought and lack of pasture in the dry seasons [2].

In Sub-Saharan Africa, the camels (*Camelus dromedaries*) assume a fundamental job in the way of life of numerous networks inferable from their adjustment to the hostile climatic conditions by giving milk, meat, and transportation [6].

In most camel rearing cultures, the milk is mainly consumed in its raw state without being subjected to any sort of processing or treatment [7]. However, recently, various traditional fermented camel milk products are produced in

different parts of the world by camel herders which supported with advanced technologies [8].

In global perspectives, camel milk and milk products have always been highly valued playing an important role in the diet of the population in the rural areas [7].

Nowadays, the scholars become in agreement that camel milk has traditionally been used for medicinal values and recent scientific studies are confirmed that it is a rich source of bioactive, antimicrobial, and antioxidant substances [6, 9].

1.1. Milk Production Potential of Camel (*Camelus Dromedaries*)

Camel milk is turning into a gradually interesting product with regards to the world, for its great nutritious properties as well as for tasteful products [7]. The milk production in annual has been increasing throughout the world, in particular of camel milk is estimated to be 2.9 million tons [10]. In sub-Saharan countries, camel rising sub-division has been adding to the family food, income and destitution alleviation, and national economy through price. East African countries like Somalia are a top producer of camel milk with 1.1 million tones pursued by Kenya, Mali, Sudan, Ethiopia, and some Middle East countries are also producing a sufficient amount [11]. However, the variables that may influence and decide the convergence of minerals in the milk is accounted for as the wellbeing related components in the milk are firmly dependent on creature species and nourishing, the season of the test range, ecological conditions and feed producing process [12, 13].

1.2. Composition and Property of Camel Milk

The most important component in camel milk is water content. Varieties for this value depend generally on the management and condition (season, temperature, and feed supply) [14]. The milk composed in averages totals solid, protein, fat, ash, lactose, and acidity are 13.62%, 4.35%, 4.59%, 0.84, 3.79% and 0.19, respectively [15]. Although different research findings indicated that Camel milk is closer to human milk than any other milk. It is rich in healthy vitamins and minerals, especially B vitamins, vitamin C, and iron [16, 17, 9].

1.3. Proximate Comparisons of Camel Milk with Other Species

Camel milk is unlike other ruminants milk, with low cholesterol, low sugar, high minerals, (sodium, potassium, iron, zinc, and magnesium), high vitamin C, low protein, and a large concentration of insulin [18]. Furthermore, the milk composition of the dromedary camel is great from a dietary perspective. Different authors are argued that composition of camel milk varies due to difference of geographical origin and year of publication of the published data's but other factors such as the physiological stage, feeding conditions, seasonal or physiological variations, genetic or health status of the camel have also paramount importance [19]. The most minimal substance of fat was recorded in the fifth month of

lactation, which compared with the lactation top [20]. According to [21], It is likewise found that the normal fat% and SNF% between two age bunch are 3.35 ± 0.07 and 4.37 ± 0.70 , 8.34 ± 0.24 and 9.17 ± 0.49 , individually and the distinctions were found exceptionally critical. Camel milk is made out of lactose, fat, and protein is generally a similar extent as cow milk [6].

1.4. Health Benefits and Curative Properties of Camel Milk

Camel milk likewise has vital curative properties as it contains a high degree of antibacterial substances and a higher immune defense mechanism in correlation with cow milk [14]. It contains approximately 52 units of insulin in each liter of camel milk, making it a great treatment option for Type 1 or Type 2 diabetics as well as Gestational Diabetes [16]. The number of scholars has been argued that one of the unique characteristics of camel milk such as its therapeutic potential and absence β -LG has made it a focus area of research in the fields of health science and nutrition as an antimicrobial, anti-diabetic and antihypertensive supplement [6].

Camel milk is enriched with various protective proteins like lysozyme, lactoferrin, lactoperoxidase, NAGase, PGRP, IgG, and IgA which exert antibacterial, antiviral, antifungal and anti-parasitic activity, immunological properties, growth promotion activity and anti-tumor activity [22, 23, 18]. Of course, scholars are argued that much research still needs to be done on the healing effects of the milk. Therefore, the health benefits of camel milk, 'Insulin' of the future: camel milk has a high concentration of insulin that has a positive effect on immunity.

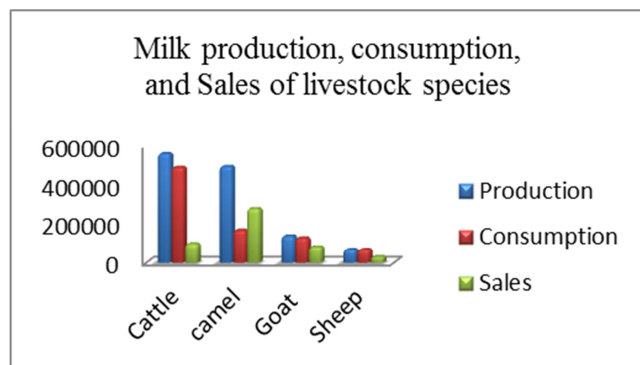
1.5. Probiotic Property and Nutritive Value

Camel milk is a significant segment of the human diet routine in numerous parts of the world [14]. Whereas the commitments rendered by dromedary camels are milk production and transportation [24]. However, the contribution of camel milk to family unit nourishment admission is critical during the dry season [16]. The camel milk is a profoundly nutritious item giving a perfect situation to the development of various and complex microbial populations. These bacterial populaces are principally gathered into two significant classifications: (i) advantageous and innovatively pertinent microscopic organisms and (ii) pathogenic and waste microorganisms. Nowadays, a couple of studies depend on the way of life subordinate methodologies have been led on the recognizable proof of the bacterial populaces of camel milk [15, 25].

1.6. The Role Camel Milk for Domestic Food Diet

Camel milk is an imperative part of food consumption routine for families in a domain that might be correct named as unfavorable as far as temperature, and its contribution to a solid healthful status, particularly during the dry spell where others domestic dairy animals ceased production and absence of field, is without a reservation [2]. The extent of families

who used different home commodities has fluctuated. For instance, while sugar, oil, and cow milk are devoured by nearly the whole pastoralist communities, the degree of utilization is 30.2%, 32.2% and 30.7% for the cow, goat and camel meat, individually [15, 26]. The camel milk is directly consumed about 60.9% while remained is used for selling and calve feeding.



Source: [27].

Figure 1. Milk Production, Consumption, and Sale of domestic livestock species.

2. Conclusion

Camel milk is a good source of protein that is a whole food. The milk has a significant contribution to the household in the market costs brought as well as, nutritional diet and medicinal values. It has enough nutrients to sustain life and is often given to babies suffering from malnutrition for poor pastoralists, but the production could affect by topographical areas, encouraging conditions, breeds, and phase of lactation which every influenced variety in the composition of camel milk. The fresh and fermented camel milk was accounted for specific potential therapeutic properties than any other domestic dairy animals. The camel milk is considered as the Insulin' of the future: for the milk has a high concentration of insulin that has a positive effect on the immunity, the diabetics in different countries highly depend on the camel milk to control their Diabetes.

3. Recommendations

Therefore, the gradually comprehensive research could be done to affirm the instrument of potential curative properties of camel milk particularly in the country like Ethiopia where the Orthodox Christianity has negative perception that camel for Muslim community. Further study would be additionally required on the naturally dynamic constituents and their antimicrobial action to improve the camel milk utilization by developing a long-term strategy.

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