THERAPEUTIC VALUE OF CAMEL MILK – A REVIEW

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ABSTRACT

Ayurveda has referred medicinal value of camel milk under the classification of "Dugdha Varga" (Milk Classification). The camel is among the animals mentioned in the Quran as a miracle of god. It is common practice to let camels to eat certain plants in order to use the milk for medicinal purpose. The role of indigenous knowledge has paramount importance on the day-to-day life. Pastoralists have indigenous knowledge in treating their animals and themselves. Ayurveda refers that acquiring the knowledge from Pastoralists are much important for finding the way and means of using natural components as a medicine. Due to the fact that they are living at periphery and very remote area where social services are in scarce or even absence, pastoralists depend on traditional remedies. Camel milk has enough nutrients to sustain a person through the day. Camel milk has a high vitamin and mineral content and immunoglobin content. Camel milk is low in lactose compared with cow's milk. However, levels of potassium, magnesium, iron, copper, manganese, sodium and zinc are higher than in cow's milk. Cholesterol in camel milk is lower than cow or goat milk. Camel milk is three times higher in vitamin C than cow's milk and 10 times higher in iron. It is also high in unsaturated fatty acids and B vitamins but lower in vitamin A and B2 (than cow milk). Camel milk has more fat and protein than cow's milk. In India camel milk is used therapeutically against dropsy, Jaundice, problems of the spleen, tuberculosis, asthma, anemia, and piles. The "chal" and other lung ailments have proven beneficial in the treatment of tuberculosis. The milk also apparently has slimming properties. Research by Indian scientist supports the therapeutic value of camel milk in the treatment of several diseases including tuberculosis. In this paper, Author has made effort to review the therapeutic value of Camel's milk on the basis of scientific documents, literary review, research papers and online information.

Keywords: Ayurveda; Dugdha Varga; Immunoglobin; Mycobacterium Tuberculosis; Nanoenzymatic antioxidant molecules; Anti Ulcerogenic.

INTRODUCTION

The camel is among the animals mentioned in the Quran as a miracle of God. Camel's milk has supported Bedouin, nomad and pastoral cultures since the domestication of camel's millennia ago. Herders may for periods survive solely on the milk when taking the camels on long distances to graze in desert and arid environments.

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The Food and Agriculture Organization (FAO) estimates the total population of camels in the world today to be 22 million, of which 89% are one-humped dromedary (*Camelus dromedarius*) camels and the remaining 11% are the two-humped Bactrian (*Camelus bactrianus*) generally found in the cold deserts of Asia. Although historical records show that the domestication of camels first took place in the Arabian peninsula about 3000 years ago from where they spread to other parts of the world, over 80% of the world's camel population is today found in Africa with the highest concentration in North East Africa which accounts for 63% of the world camel population. Kenya is estimated to have the fifth largest camel herd in the world after Somalia, Sudan, Ethiopia and Mauritania, in that order. [1] There is a growing interest for the camel and it products in the world. This is due to various factors that include:

• *Economic viability*: Camel milk fetches higher than cow milk i.e. camel milk is sold at about 60-80Kshs per liter at retail level compared to about 30Kshs of cow milk; higher profit margins

• *Food insecurity*: Due to climatic conditions and recurring droughts the camel has proven that it can survive the drought and continue to produce milk during the distress periods

• *Medicinal value*: able to treat Juvenile diabetes; stomach cleansing, etc.

Traditional medicinal value of camel

A study was conducted between July, 2005 and January, 2006 in Babilie and Kebribeyah woredas, Jijiga Zone of the Somali Regional State with the objective of identifying the traditional medicinal value of camel milk, meat and urine. Findings reveal that Pastoralists have indigenous knowledge in treating their animals and themselves. Due to the fact that they are living at periphery and very remote area where social services are in scarce or even absence, pastoralists depend on traditional remedies. Camel milk, meat and urine are among the materials used as traditional medicines.

Camel milk therapy

Respondents (97.5 and 85% for Babilie and Kebribeyah, respectively) recognize the medicinal value of camel milk. This finding is in agreement with those of Yagil (1982), Knoes *et al*. (1986), Tezera (1998) and Alemayehu (2001) who stated that in all camel rearing countries, the breeders are convinced that camel milk has special medicinal properties, especially for dropsy, jaundice and conditions affecting the lungs and spleen. Respondents from Babilie indicated the medicinal value of camel milk for gastritis (17.5%), asthmatics (7.5%), stomach discomfort (2.5%), HIV (7.5%), *hamot (kar)* (12.5%), tuberculosis (12.5%), fever (2.5%), urinary problems (5%) and hepatitis (2.5%). Respondents in Kebribeyah indicated the medicinal value of camel milk for jaundice (18.33%), common cold (1.67%), *dearbeh* ("diarrhea") (1.67%), *daarta* ("vomiting") (1.67%) and diabetics (1.67%). Respondents in both woredas in common indicated the

medicinal value of camel milk for constipation (7.5, 41.67%), *yewefbeshita* (15, 6.67%), for Babilie and Kebribeyah, respectively. This finding is in conformity with those of Yagil (1994) and Guakhar and Bernand (2004) who reported the medicinal value of camel milk for cirrhosis of the liver, rickets, constipation, asthma and anaemia.[2]

Camel's Milk

Camel milk has enough nutrients to sustain a person through the day. In many countries, camel milk is given to babies suffering from malnutrition. Camel milk has a high vitamin and mineral content and immunoglobin content[3] . Camel milk is believed to modulate the immune system. A study showed its ability to ameliorate allergies in children.[4] . However, the sample size of this study is evidently small. Camel milk is also used as a medicinal product in India. The Bedouins of the Middle East believe it to have curative powers.[5] The composition of camel milk depends on its feed and species: Bactrian milk has a higher fat content than dromedary milk.

- Camel milk is low in lactose compared with cow's milk[6] However, levels of potassium, magnesium, iron, copper, manganese, sodium and zinc are higher than in cow's milk.
- Cholesterol in camel milk is lower than cow or goat milk.
- Camel milk is three times higher in vitamin C than cow's milk and 10 times higher in iron.
- It is also high in unsaturated fatty acids and B vitamins but lower in vitamin A and B2 (than cow milk).
- Camel milk has more fat and protein than cow's milk.[7]

Camel milk has medicinal properties[8] suggesting that it contains protective proteins, which may have a possible role for enhancing the immune defense mechanism. Antibacterial and antiviral activities of these camel milk proteins have been studied[9], and camel milk destroys Mycobacterium tuberculosis[10]. The inhibition of pathogenic bacteria by camel milk was also observed[11]. Camel milk is used for treating dropsy, jaundice, spleen ailments, tuberculosis, asthma, anemia and piles[12]. In USSR, camel milk was used in sanitoria for treating tuberculosis [13]. Patients suffering from chronic hepatitis acquired improved liver functions after drinking camel milk[14]. The present work was conducted to review the available literature, scientific documents information regarding the effect of camel milk and its therapeutic value. Camel milk is also used in Kazakhstan as an adjunct to chemotherapy for some cancers, especially those of the digestive tract. With the consumption of 0.5 lt of camel milk per day, the insulin demand decreased in diabetic patients and glycaemia was better balanced[15].

Therapeutic Value of Camel's Milk

1. **Autism Spectrum Disorder (ASD)**: Extensive studies have demonstrated that oxidative stress plays a vital role in the pathology of several neurological diseases,

including autism spectrum disorder (ASD); those studies proposed that GSH and antioxidant enzymes have a pathophysiological role in autism. Furthermore, camel milk has emerged to have potential therapeutic effects in autism. A study was carried out to evaluate the effect of camel milk consumption on oxidative stress biomarkers in autistic children, by measuring the plasma levels of glutathione, superoxide dismutase, and myeloperoxidase before and 2 weeks after camel milk consumption, using the ELISA technique. All measured parameters exhibited significant increase after camel milk consumption ($P < 0.5$). These findings suggest that camel milk could play an important role in decreasing oxidative stress by alteration of antioxidant enzymes and nonenzymatic antioxidant molecules levels, as well as the improvement of autistic behavior as demonstrated by the improved Childhood Autism Rating Scale (CARS).[16]

2. **Therapeutic value of camel milk as antiulcerogenic effect**:

This study was performed to investigate the regular treatment of oral administration of raw camel milk 5 mg/kg b.wt. on ethanol- and naproxen-induced peptic ulcer in rats. The collected samples of raw milk were kept at room temperature 25°C and examined for physiochemical parameters as well as sensory evaluation. The result obtained showed that pH of the fresh camel milk was 7.34 ± 0.2, while the acidity was 0.187 ± 0.2. In sensory evaluation, camel milk was fairly acceptable. Oral administration of camel milk in rats with ethanol-induced peptic ulcers, significantly ($p < 0.0.5$) lowered the amount of long ulcers, average length ulcers, index and the volume of peptic juice. The total percentage of protein significantly increased ($p < 0.05$), while the pH of the gastric juice value differed significantly, the healing rate was 70.65% in camel milk ranitidine treated group compared to 4.5% in ranitidine-treated rats. Finally, the same positive effect of the oral administration of camel milk was observed in rats with naproxen-induced peptic ulcers: the value of healing rate was 60.03% compared to 34.03% in ranitidine-treated rats. These results suggested a possible benefit of milk supplementation in treating peptic ulcer.[17]

3. **Therapeutic Value of Camel Milk as Hypoglycemic Effect:**

The efficacy of camel milk consumption as an adjunct to routine diabetic management in maintaining long-term glycaemia control in type I diabetes was assessed during a 52 week randomized study. Throughout the duration of the study, 12 randomly assigned patients underwent routine diabetic management (diet, exercise and parental insulin supplementation) and 12 randomly assigned patients additionally undertook daily consumption of raw camel milk (500ml/day). In both groups, the dose of parenteral insulin administration was adjusted to maintain an euglycaemic state. Glycosylated haemoglobin (HbA1c) and body mass index (BMI) were measured at the initiation of the study and monitored at 3

monthly intervals. Additionally, plasma insulin, C-peptide and anti-insulin antibodies were measured at the beginning and end of the study. In the group receiving camel milk, there was a significant increase in MBI (17 ± 4.4 to 19.7 ± 2.97; $p < 0.001$) and a significant reduction in HbA1c (7.8 ± 1.38 to 6 ± 0.96; $p < 0.001$), mean blood glucose (119 ±19 to 95.42 ± 15.70; $p < 0.001$) and necessary insulin dose (32 ± 12 to 17.88 ± 12.40; $p < 0.005$) compared to the values at the initiation of the study. There was no significant change in c-peptide (0.18 ± 0.04 to 0.24 ± 0.07) or antiinsulin antibodies (22.92 ± 5.45 to 21.84 ± 7.34).

It has been demonstrated that the consumption of camel milk in type I diabetes results in a significant reduction in the dose of insulin required to maintain long-term glycaemic control. Based on our results, camel milk consumption, may therefore, be considered as a useful adjunct to parenteral insulin administration in the management of type 1 diabetes.[18]

Threats :

a. Saudi scientists have found gene fragments of the deadly Middle East Respiratory Syndrome (MERS) virus in air from a barn housing an infected camel and say this suggests the disease may be transmitted through the air.

Scientists are not sure of the origin of the virus, but several studies have linked it to camels and some experts think it is being passed to humans through close physical contact or through the consumption of camel meat or camel milk. The World Health Organisation and the Saudi Health Ministry have advised camel farm and slaughterhouse workers to take precautions against MERS by ensuring good hygiene, including frequent hand washing after touching animals, facial protection where feasible, and wearing of protective clothing.[19]

b. The goal of Camel Milk USA is to make camel milk available to citizens of the United States and to further medical research and studies of camel milk in this country. There are so many people who could benefit from the healing properties of this milk. The high levels of insulin in camel's milk and the antibodies, which are much simpler in structure than human milk antibodies, enable it to penetrate deeper into the human tissue and cells, which means that the milk has the potential to serve as a major weapon against many human illnesses.[20]

Future Hopes

- With its tongue-in-cheek slogan, "make every day a hump day," and its packaging emphasizing the health benefits of camel's product, the California based company - Desert Farms is trying to turn camel's milk into the next big thing in dairy.
- A young Saudi has established a company selling camel's milk in the United States, despite the animals reportedly being the source of the Middle East Respiratory Syndrome (MERS) coronavirus.

CONCLUSION

As the findings reveals that the camel milk is being used for the treatment of various ailments, since the time immemorial, and the scientific evidences also support that the camel milk possesses anti-ulcerogenic effect, anti hyperglycemic effect, anti cancerous effect, Anti bacterial, anti viral effect. Along with it, the traditional and indigenous system of medicine refers that the camel milk is useful for the treatment of dropsy, jaundice, spleen ailments, tuberculosis, asthma, anemia and piles. It can be concluded that the camel milk is highly potential for the treatment of various challenging diseases but needs to explore more scientific documents.

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