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Physico -chemical quality of Bactrian camel milk

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Abstract: Present study was carried out to investigate the quality of camel milk. A wide variation was observed in the quality of raw camel milk. Specific gravity ranged between 1.014 and 1.017 (1.015±0.001), pH 6.53 and 6.77. Total solids, fat, protein, casein, lactose, ash and minerals contents ranged between 14.23 and 12.13, 5.56 and 8.29, 1.8 and 5.0, 1.8 and 3.2, 0.78 and 2.76, 2.9 and 4.12, 0.85 to 1.00 0.20 and 0.28 g per 100 g, respectively.

Keywords; camel milk, Bactrian, chemical quality

Introduction

The Mongols have been closely linked with the camel herd and they provided their food, clothes, housing, labor utensils, transport and fuel needs with what camel yielded. 9.6% of the entire camel herds in the world are Bactrian camels. Over 30% of this kind well the Gobi aria which holds 42% of the entine Mongolia.

The lactation period of camel is 17 months. Depending on the natural, environmental and feeding conditions a camel can produce 0.5 liter of milk a day on the average and it's possible to use 500-550 liter of milk a year. If milk about 80% of the entire she-camel herd of Mongolia and obtain 0.5 liter from a camel it is possible to use a million liters of milk a year.

The Mongols have a specific technology of processing camel milk, that had come down generation to generation. As we know by now they make over 50 types of dairy products through the traditional method. The camel milk and dairy products not only meet the Gobi dwellers' needs in food and drinks. They also widely used for folk medicine. [2]

According to the FAO (Food and Agriculture Organization) certain antibodies in camel's milk can help fight diseases like cancer, HIV/Aids, Alzheimer's and hepatitis C. [4]

Composition of camel milk depends on its feed and species: Bactrian milk has a higher fat content than Dromedary milk. Well-documented properties of camel's milk include: ten times more iron than cow's milk, three to five times more vitamin C than cow's milk, rich in B vitamins, high in imunoglobins, high in protein, minerals, low in fat - 1.8-2% fat compared to 3.5-4% in cow's milk, low in cholesterol, anti-bacterial, anti-viral, anti-inflammatory, six types of fatty acid including lanolin acid.

Experimental

Milk samples from camels at various stages of lactation were collected at random from camel-rearing areas around Umnugovi and Dundgovi aimag. Milk samples (500 ml each) were collected in clean and sterilized sample bottles and brought to the laboratory

of Dairy Technology, School of Food Engineering & Biotechnology, MUST for analysis. Specific gravity, total solids, fat protein, casein and ash contents were determined according to the method of Standards (MNS402-84, 399-83, 2153-83). pH values were determined using pH meter (Model HI, Hanna Instruments, Italy).

Results and Discussion

We have defined the composition and quality of the Bactrian camel milk with that of the dromedary and showed in Table. When compared the milk of Mongolian camel to that of dromedary camel, the contents of fat, protein and total dry substance were high. It is related to the natural and the animal pedigree.

The amount of albumin and globulin in the camel milk is 1.5-2 times more than the cow milk. The camel milk preserves its freshness longer than of other livestock. In other words, the sourness of camel milk progresses comparatively slowly.

Specific gravity of camel milk in between 1.014 and 1.017 with an average of 1.015±0.001. pH values of fresh camel milk (Table I) was observed in bactrain 6.53 and dromedary 6.77.

Table 1. Physical-chemical characterizations of camel milk

Component, %	Bactrian	Dromedary
Specific gravity	1.014	1.017
pH values	6.43	6.77
Total solids	14.23	12.74
Fat	5.39	4.47
Protein	3.5	3.2
Casein	2.7	2.5
Lactose	5.1	4.95
Ash	0.8	0.7

These results were relatively similar to that of reported values (6.5-6.7) by FAO (1982), while higher than those of reported by Ahmed (1990) and Sawaya *et al*. (1984) (*i.e*. 6.53 & 6.49, respectively). It was observed that this variation was greater in between herds as compared to within a herd.

Results presented in Table I showed a wide variation in the total solids content of camel milk. The values varied between 12.74 to 14.23 g per 100 g. These results were lower than buffalo milk (14.73 g per 100 g), but in line with the values reported by different workers (Farag & Kebary, 1992; Al-Kanhal, 1993). Ahmed (1990) and FAO (1982) also reported similar fluctuations (84 to 93 g per 100 g) in the moisture content of camel milk which is inversely proportional to TS content. One of the reasons they reported was hot summer, during which the cow camel secretes highly diluted milk with low fat. This could be the natural phenomena by which the camel young ones are supplied with sufficient nutritional value and water for a superb adaptation in a desert environment. Secondly, water content of fodder would also affect water content of milk.

Fat content of camel milk ranged between 5.39 to 4.47 g per 100 g. Variation in fat content was observed to be directly related to the total solids content of camel milk, *i.e.* as the total solids increased, the fat content also increased and vice versa. These results were very similar to those of reported by (FAO, 1982) according to which, the hydration status of the animal as well as the type of forage eaten would also affect the fat content of the milk.

The total Protein content of camel milk within the range of 3.5 and 3.20 g per 100 g. It could be stressed that protein content of the feed as well as water intake had directly affected the protein quality of milk (FAO, 1982).

The concentration of casein analyzed in the present study revealed the range in between 2.7 and 2.5 g per 100 g. Lactose content of camel milk varied bactrain 5.91 to dromedary 4.12 g per 100 g. The highest lactose content observed in present study was quite similar to that of reported by Ahmed (1990) and Knoess (1982). This wide variation could be due to the fact that camel usually grazed on halophillic plants for example *Atriplex, Acacia* etc. (FAO, 1982). Ash content of camel milk was observed to vary in between 0.85 to 1.0 g per 100 g. These results were higher than those reported by different workers *i.e.* in between 0.75 to 0.83 g per 100 g (Knoess, 1982; Ahmed, 1990; Elamin & Wilcox, 1992). The reason for higher ash content observed could be due

to free grazing of camel on bushes or plants grown at saline soil.

In general the present study showed a wide variation in the gross composition of camel milk. The results obtained were in agreement with studies of Ahmed (1990) and Lapsson (1990). This variation was concluded to be partly due to the inherited capabilities of the animals and/or attributed due to various seasonal and environmental factors as well as stage of lactation, age and number of calving. In addition, the feed and water quality and quantity available to the animals also play an important role (FAO, 1982).

We relate this feature of camel milk to its mineral contents. Accordind to some research materials this quality of camel milk was explained in a link with the contents of its bactericide content.

Conclusions

The result of the research and experiment has shown that the selection of the technology of using the biologically active substance of the camel milk for the health treatment and children's nutrition would give an impetus for solving some social and economic problems of the Gobi inhabitants.

In view of the observed results of the physicochemical properties of the camel milk, it could be concluded that camel cow produces nutritious milk for human consumption.

The result could contribute to the overall knowledge of camel as food source, but much still needs to be learned if efficient improvement programmes are to be initiated. For example, if camels are reared under same environment as buffalo, there is no doubt it will produce milk of high quality.

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