

A Comparative Study on the Physicochemical Parameters of Camel and Buffalo Milk

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Abstract: This research work was carried out to compare the various physicochemical parameters of two species, camel and buffalo. Camel milk samples were collected at National Research Centre on Camel, Bikaner and buffaloes milk samples were collected from the surroundings villages of Bikaner. After collection milk samples were brought to the laboratory of NRCC Bikaner and they were analyzed for fat, SNF (Solid Not Fat), protein, lactose, total ash and pH using milk analyzer (Lactoscan). Camel milk had 2.71±0.11 fat, 6.91±0.03 SNF, 2.23±0.02 protein, 3.86±0.02 lactose, 0.79±0.004 total ash and 6.95±0.01 pH while buffalo milk had 8.71±0.82 fat, 8.44±0.19 SNF, 4.11±0.02 protein, 4.46±0.15 lactose, 0.98±0.05 total ash and 7.59±0.02 pH. Fat, SNF, protein and pH of buffalo milk was significantly ($P<0.001$) higher than camel milk. Lactose and total ash in buffalo milk was also higher than camel milk but at $P<0.05$ level. So it can be concluded that all the studied parameters were high in buffalo milk than camel milk.

Keywords: Fat, SNF, Protein, Lactose and Milk Analyzer.

INTRODUCTION

Milk is an excellent source of most of essential minerals for human. Milk and dairy products are part of healthy diet. The composition of the milk of various animal species differs, but in every case it has a high priority in human nutrition. The substances in milk provide both energy and building materials necessary for development. Milk also contains antibodies which protect the young mammals against infection [1]. The growing demand of buffalo milk made buffaloes to invade the home tract of cattle and camel. The acceptability and growing demand of buffalo milk attributed to its flavor and taste compelled the dairy farmers to rear buffaloes and produce buffalo milk for economic gains so buffalo milk is preferred to cow milk [2]. Buffalo milk is a valuable nutrient with high content of milk proteins, lipids, vitamins and other biologically active substances [3].

It is widely admitted that dromedary camels produce more milk of high nutritional quality and a for a longer period of time than other species in a harsh environment in terms of extreme temperature, draught and lack of pasture. Camel has ability to produce milk of good composition and quantity for human consumption even when water is severely restricted [4]. Camel feeding behavior, tolerance to high salt contents and ability to conserve water, make it the best of ruminants for arid and many semi arid areas [5]. With the help of modern science, poor farmers can rise camels for milk and can replace true cows of the

desert, which inspite of their adaptability to the area seem to have low potential for milk production compared to the dromedaries [6]. In India particularly in desert districts of Rajasthan where the economy of the people does not allow them to maintain the buffaloes for milk production vis-a-vis feed and fodder cost. So this study was conducted to compare physicochemical properties of camel milk with buffalo so that a clear picture may emerge, which in turn might provide a spur to the development of camel as a milch animal.

MATERIALS AND METHODS

Fresh camel and buffalo milk samples were collected as per standard collection method at National Research Centre on Camel, Bikaner and from the surrounding villages of Bikaner. After collection milk samples were brought to the laboratory of NRCC Bikaner and were subjected to analyze for fat, SNF (Solid Not Fat), protein, lactose, total ash and pH using milk analyzer (Lactoscan).

Statistical Analysis

The mean, standard error (SE) and test of significance of data was done as per the standard statistical method described by [7]. The ANOVA was obtained by analyzing the data using SPSS10.0 software.

RESULTS AND DISCUSSION

The results of various physicochemical parameters have been presented in Table 1. All the studied parameters were high in buffalo milk than camel milk. Mean values of fat SNF, protein and pH of buffalo milk was significantly ($P<0.001$) higher than camel milk.

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Lactose and total ash in buffalo milk was also high higher than camel milk but at $P < 0.05$ level.

Table 1: Different Milk Physicochemical Parameters (Mean \pm SE) of Buffalo and Camel

Parameters	Camel	Buffalo
Fat*	2.71 \pm 0.11	8.71 \pm 0.82
SNF*	6.91 \pm 0.03	8.44 \pm 0.19
Protein*	2.23 \pm 0.02	4.11 \pm 0.02
Lactose**	3.86 \pm 0.02	4.46 \pm 0.15
Total ash**	0.79 \pm 0.004	0.98 \pm 0.05
pH*	6.95 \pm 0.01	7.49 \pm 0.02

*($P < 0.001$) and **($P < 0.05$).

The results of fat content of camel milk were in agreement of [8, 9] and fat content found in buffalo milk was in accordance with that reported by [10, 11] while [12] reported lower fat content in buffalo milk than present investigation. Because of its high fat content, buffalo milk had considerably higher energy value than camel's milk.

pH values of the buffalo milk were ($P < 0.001$) higher than camel milk. pH values of buffalo milk in this study were higher than that observed by [13, 14] pH value of camel milk was within the normal range while SNF value of this was lower than reported by [15]. SNF value of buffalo milk was significantly ($P < 0.001$) higher than camel milk.

The concentration of protein in camel milk was similar to the findings of [9, 16] but contrary to [17] which observed high protein level in camel milk. Results of buffalo milk protein content were in line with the findings of [18]. Higher protein content in buffalo milk was reported by [13]. Present study showed that buffalo milk had significant ($P < 0.001$) higher value of protein than camel milk. This observation was supported by results [19].

It was observed that lactose content found in camel and buffalo milk was in accordance with the observations of [8, 11] respectively. Moderately high amount of lactose in camel milk was reported by [17, 20] than present study. [19, 21] observed high lactose percentage in buffalo milk.

Total ash values of camel milk samples were similar to the observation of [8, 22]. [17] revealed low total ash content while [20, 23, 24] found higher total ash value in camel milk than this study. Ash content in milk

samples of buffalo was in range reported by [11, 19, 25] observed low ash content in buffalo milk.

Although this study revealed that all the studied milk physicochemical parameters were high in buffalo milk than camel milk but in arid zones and drylands, camel has been termed as the goal animal for milk requirement in this century.

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