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THE EFFECTS OF THE NUMBER OF LACTATIONS ON THE CHEMICAL COMPOSITION OF CAMEL MILK

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ABSTRACT

The effect of the number of lactations on the chemical composition of camel milk was studied in 20 she-camels. They were divided into 4 groups A, B, C, and D, each group consisted of 5 she-camels of similar age. Group A was in first, B in second, C in third and D was in the fourth lactation period. The parameter investigated include the pH, specific gravity (S.G.), total solids (T.S.), water content, protein, fat, lactose and minerals (Ca and P). Results revealed that the number of lactations had no effect on pH, S.G., T.S. water content protein, fat, lactose and minerals (Ca and P) of camel and the differences were non significant among the 4 groups for all these parameters.

Key words: Camels, chemical composition, lactation, milk

Although camels thrive under extremely harsh environmental conditions, they produce milk of high nutritional value (Farah, 1993). The lactation periods in camels vary from 9 to 18 months (Karimi and Kimenye, 1988). The annual milk yield range from 800 to 3600 litres (Shalash, 1984), and the mean daily milk production ranged from 2 to 6 litres under desert conditions (Yagil and Etzion, 1980; Yagil *et al,* 1984 and Farah, 1993), and up to 12 to 20 litres under intensive breeding system (Karimi and Kimenye, 1988).

The main constituents of camel milk show a wide range of variation which could be attributed to the differences in the genetic make up of breeds, seasonal and climatic variation, nutrition, age and the stage of lactation (Yagil *et al,* 1986 and Knoess *et al,* 1986).

The aim of this study is to investigate the effect of number of lactations on the chemical composition of milk.

Materials and Methods

Twenty she-camels were chosen for this study. All of them were in their first stage of lactation. These were divided into 4 groups, named A,B,C and D. Each group consisted of 5 she-camel of same age and number of lactations. Group A, B, C and D animals were in the first, second, third and fourth lactation periods, respectively. Milk samples were taken from the whole yield of each animal in a 100 ml vial and kept on ice, then transported immediately to the laboratory. The pH and the specific gravity (S.G.) were immediately tested, whereas the rest of the samples were deeply frozen until they were analysed for water content, total solids (T.S.), lactose, protein, fat, calcium(Ca) and phosphorus (P). All samples were tested in duplicate. The water content was determined according to the method described by Davis (1959). Protein was determined using Kjeldahal method as described by (A.O.A.C., 1984). Fat was determined according to the method described by Frings and Dunn (1970). Lactose was determined using anthrone reagent (Richars, 1959). Calcium was determined by atomic absorption spectroscopy method described by Hanson (1950).

Statistical analysis

The data were statistically analysed by using completely randomised design (Steel and Torrie, 1980).

Results and Discussion

The effect of the number of lactations on the pH values for the 4 groups of lactation camels is presented in table 1. Although, the second lactation showed the lowest pH value but the difference was statistically non-significant. This might be due to the fact that the pH of the milk has a limited range, heme the extreme changes cause least alterations in the physiochemical properties of the milk. The effect of number of lactations on the S.G. of milk in 4 groups of lactating camels was statistically non-significant.

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Table 1. The effect of the number of lactations of camel milk composition.

Group	pH	Specific gravity	Water	Total solids	Protein	Fat	Lactose	Ca	Ph
1st lactation	6.64±0.11	1.02±0.002	86.5±0.52	13.24± 0.56	3.65 ± 1.24	3.93 ± 0.58	4.08 ± 0.43	1.84 ± 0.5	1.34 ± 0.05
2nd lactation	6.4 ± 0.04	1.024±0.003	85.64± 0.45	13.14±0.39	3.75± 0.77	3.97± 0.13	4.03± 0.45	1.76± 0.11	1.32± 0.08
3rd lactation	6.44± 0.09	1.022± 0.004	86.54± 0.9	13.24±0.89	3.75± 0.52	4.29± 0.41	3.85± 0.58	1.76± 0.11	1.3± 0.12
4th lactation	6.41±0.33	0.025± 0.003	86.9± 0.84	13.04± 0.92	3.8± 0.61	4.43± 0.43	3.70± 0.45	1.74± 0.18	1.24± 0.11

Values are described as mean ± SD (N=5)

This might be due to the fact that the S.G. depends mainly on the percentage of the milk constituents which had been altered in a limited range for all groups in this study. However, the effect of number of lactations on the water content of the milk in 4 groups of lactation camels although showed the highest value in 4th lactations but the difference was statistically non-significant. This might be due to the availability of drinking water, since the water content of milk depends mainly on the water available for the animal as stated by Yagil and Etzion (1980). The effect of number of lactations on the total solids for the 4 groups of lactating camels showed the least value of the total solids among in 4th lactations but the difference was statistically non-significant. These finding are in agreement with those reported by Bayoumi and Danasoury (1963) who reported that number of lactations had no effect on the total solids of cow's milk. Also, Darshanlal and Narayanan (1991) reported that the percentage of the total solids in cow's milk at different lactation did not show apparently any tendency for change with increasing lactation number.

In addition the effect of number of lactation on protein for the 4 groups of lactating camels showed an increase in the 2nd, 3rd and 4th lactation, but the difference was statistically non-significant. These findings are similar to those reported by Hussein (1985) who stated that parity had no effect on protein content of cow milk. In contrast, Schutz *et al* (1990) reported that the protein percentage of cow milk decreased with the number of lactation.

Also, the effect for the four groups of lactating camels showed increase with the number of lactations, but the difference was statistically non-significant. This slight increase may be due to the development of mammary glands and may appear clearly in more than 4 lactations. These findings are in agreement with Mishra and Nayak (1962) who reported that the fat content of cow milk showed a slight gradual increase from the first till the 4th lactation.

Similarly, Hussein (1985) reported that the number of lactations had no effect on cow milk fat. Whereas, Khalifa (1964) stated that the fat percentage of cow milk was lowest in the 1st lactation while it was at maximum in the 2nd lactation.

Moreover, the effect of the number of lactation lactose tend to decrease with the progress of the lacatation numbers, but the differences were statistically non-significant. These findings are in agreement with those reported by Hussein (1985) and Godara *et al* (1990) who reported that the lactation number had no effect on lactose content of cow milk from the first till the 8th lactation.

Although Ca percentage tend to decrease with the advancement of the lactation number, but the difference was non-significant. These findings are in agreement with those reported by Hussein (1985) who reported that the age of the cow had no effect on the ash content of milk. This could be explained by the fact that Ca is absorped directly from the blood so the number of lactations had no effect on Ca content of milk.

Although, phosphorus percentage tend to decrease with the advancement of the lactation number, but the difference was non-significant. These findings are in agreement with those reported by Hussein (1985) who reported that the age of a cow had no effect on the ash content of milk.

This might be due to the fact that P is absorbed directly from blood, so the number of lactations had no effect on its absorption. The results of this study indicated that the number of lactations had no effect on the chemical composition of camel milk from the 1st till the 4th lactation.

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